Strengthened Senior High School

DepED
DEPARTMENT OF EDUCATION

Lesson Exemplars for General Science

CORE SUBJECT

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FEATURES OF THE SENIOR HIGH SCHOOL LESSON EXEMPLAR

The **Senior High School Lesson Exemplar (LE)** is designed to support teachers in delivering meaningful, engaging, and standards-based instruction that responds to the diverse needs of Senior High School learners. Anchored on the **Senior High School Instructional Design Framework (SHSIDF**), the LE ensures constructive alignment among curriculum standards, teaching and learning experiences, and assessment practices. Through this alignment, learners are provided with opportunities to develop the knowledge, skills, and competencies necessary for higher education, skills development, employment, and entrepreneurship.

At the heart of the LE is the **AID** Instructional Flow, a structured approach to teaching and learning composed of three interconnected phases: Activating Prior Knowledge, Instituting New Knowledge, and Demonstrating Knowledge and Skills. This instructional flow guides teachers in creating coherent learning experiences that build from what learners already know, deepen understanding through meaningful engagement, and provide opportunities for authentic application and assessment.

The **Activating Prior Knowledge** phase serves as the entry point of the lesson. It helps learners connect prior experiences and existing knowledge to new concepts, making learning more relevant and meaningful. This phase also establishes the purpose of the lesson by clarifying learning goals, highlighting real-life applications, and motivating learners to actively engage in the learning process.

The **Instituting New Knowledge** phase focuses on the development of understanding and mastery of concepts. Learners are introduced to new ideas through carefully selected examples, guided exploration, and explicit instruction. Through discussions, collaborative activities, and structured practice, learners progressively deepen their understanding and develop the skills necessary to achieve the intended learning outcomes.

The **Demonstrating Knowledge and Skil**ls phase provides opportunities for learners to apply, synthesize, and showcase their learning. Through practical applications, reflective activities, evaluations, and differentiated follow-up tasks, learners demonstrate their understanding while teachers gather evidence of learning. This phase also ensures that learners receive appropriate support through remediation, reinforcement, or enrichment activities based on their individual learning needs.

To further enhance learning experiences, the LE incorporates several key program integrations. **Integrative Performance Tasks (IPTs**) are embedded and scaffolded throughout the lessons to ensure that learners gradually develop the competencies required to successfully complete authentic and interdisciplinary performance assessments. Rather than being treated as isolated end-of-quarter projects, IPTs are woven into classroom instruction, allowing learners to build the necessary knowledge and skills over time.

Recognizing the demands of a rapidly evolving digital world, the LE also promotes **EdTech Integration**. Educational technologies are strategically incorporated to enrich instruction, foster collaboration, encourage creativity, and provide learners with engaging and interactive learning experiences.

In addition, the LE strengthens **Literacy and Numeracy** by embedding literacy and numeracy skills across learning activities and assessments. This integration ensures that learners continuously develop the competencies needed to interpret information, communicate effectively, solve problems, make informed decisions, and navigate real-life situations confidently.

Through these features, the Senior High School Lesson Exemplar serves as a practical and comprehensive guide for teachers, supporting the delivery of high-quality instruction that is learner-centered, inclusive, relevant, and responsive to the aspirations of Senior High School learners and the demands of the 21st century.

GUIDE FOR FACILITATING INTEGRATIVE PERFORMANCE TASKS (IPT)

The **Integrative Performance Task (IPT)** is designed to serve as authentic demonstrations of learning that synthesize competencies across learning areas. To ensure that an IPT becomes the natural culmination of classroom instruction rather than a stand-alone project assigned at the end of a grading period, teachers are encouraged to observe the following principles in the development and implementation of IPT.

First, the Performance Standard should be translated into a concrete, authentic, and real-world product, performance, or solution. Clearly defining the expected output enables teachers and learners to understand the purpose of instruction and maintain focus on the desired end goal throughout the learning cycle.

Second, the accomplishment of the IPT should be developmental and cumulative. Learning Competencies (LCs), technical skills, and disciplinary knowledge required for the final output should be strategically distributed across learning areas and taught within the appropriate lessons. Each lesson should contribute a meaningful component toward the completion of the IPT.

Third, when establishing the purpose of the lesson, teachers should draw from the same real-world context or scenario presented in the IPT. Introducing the scenario early in the learning cycle helps learners recognize the relevance of each lesson and encourages them to continually connect newly acquired knowledge and skills to the final task. The IPT should be presented at the beginning of the quarter and revisited regularly as a reference point throughout instruction.

Fourth, in Finding Practical Applications part of the lesson, teachers should design learning activities that mirror the thinking processes, skills, or performance requirements of the IPT. These formative tasks serve as opportunities for practice and feedback. Whenever possible, teachers should use criteria aligned with the IPT rubric to help learners understand expectations and improve their performance progressively.

Fifth, any digital platforms, educational technologies, mathematical procedures, research methods, laboratory techniques, or other tools required for the successful completion of the IPT should be explicitly taught during the discussion, guided practice, and mastering the concept. Learners should have sufficient opportunities to practice using these tools before they are expected to apply them independently in the IPT.

Sixth, summative assessments should contribute directly to the development of the IPT. Rather than functioning as isolated evaluation activities, these assessments should require learners to produce or refine components of the final output of IPT. This approach strengthens the coherence between instruction, assessment, and performance expectations.

Lastly, the final Lesson Exemplar in the learning cycle should provide opportunities for learners to consolidate, refine, and complete their IPT outputs. This stage may include peer review, consultation, revision, rehearsal, and final polishing of outputs before formal presentation or submission. Teachers should facilitate reflection and feedback to ensure that learners demonstrate both mastery of competencies and meaningful application of learning.

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Content - Topic	**Physics in Daily Life - Physics Applications in Everyday Life**	Lesson Exemplar	1

I. OBJECTIVES	
A. Content Standard	The learners learn that physics principles apply to numerous aspects of everyday living.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills The learners identify various ways physics enhances our quality of life across different areas, including household activities, health and safety, work productivity, and leisure.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Department of Education (DepEd). 2020. Most Essential Learning Competencies (MELCs) for Science (Grades 1–12). Manila: DepEd Central Office. https://commons.deped.gov.ph. Department of Education (DepEd). 2020. “Clarification on the Use of the Most Essential Learning Competencies (MELCs).” DepEd Memorandum DM-CI-2020-000. Manila: DepEd. Department of Education (DepEd). 2022. K to 12 Curriculum Guide: Science (Revised through MELCs Implementation). Manila: DepEd. Department of Education (DepEd), Bureau of Curriculum Development. 2023. Science Curriculum Guide and Instructional Supports for Junior and Senior High School. Manila: DepEd. Department of Education (DepEd). 2023. MATATAG Curriculum Framework: Science Learning Area Overview. Manila: DepEd. Hewitt, Paul G. 2016. Conceptual Physics. 12th ed. New York: Pearson Education.

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III. CONTENT (Sequencing Content)	Physics in Daily Life - Physics Applications in Everyday Life
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	1. Describe how basic physics principles are applied in common household tasks and appliances. 2. Identify how physics enhances efficiency in tools and machines at work and increases enjoyment and function in leisure activities. 3. Explain how physics concepts contribute to safety and injury prevention in everyday situations.

<table>
<tr><th colspan="2">IV. PROCEDURES</th><th>ANNOTATIONS</th></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: Where do you see physics in your daily life? Think about situations related to the following areas</td></tr>
<tr><td>Think-Pair-Share: “Physics Around Us”

Procedure
1. The teacher writes the question on the board:
“Where do you see physics in your daily life? Think about situations related to the following areas:”
● Household – appliances, cleaning, lighting, water systems
● Health and Safety – wearing seatbelts, using helmets, medicines, body movement
● Work Productivity – machines, tools, transportation, communication devices
● Leisure and Entertainment – television, music, mobile phones, video games
● Sports and Exercise – running, jumping, cycling, basketball, swimming
● Cooking and Food Preparation – boiling, frying, refrigeration, microwave ovens
● Technology and Communication – computers, internet, Wi-Fi, cellphones.
2. Ask learners to think silently for 1–2 minutes about situations where physics is present in different categories.
3. During the thinking phase, provide the following guide questions:
● What objects, activity, or device in each category uses physics?
● What concept of physics is involved (motion, force, heat, electricity, energy, sound, or light)?
● How does that concept help people perform tasks, stay safe, or enjoy daily activities?</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about physics applications in daily life. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Note to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.</td></tr>
</table>

	4. After thinking time, instruct learners to pair with their seatmate. 5. Give learners 2–3 minutes to share and discuss their answers with their partner. 6. Remind learners that each partner must share at least two examples. 7. After the discussion, call selected pairs to share their answers with the class. 8. As learners answer, write important terms or ideas on the board such as: ● Motion ● Force ● Heat ● Electricity ● Energy ● Sound ● Light 9. **Process the activity by asking:** ● "What common idea do you notice in your examples?" ● "Which category shows the greatest use of physics in everyday life?" ● "How do the concepts of motion, force, heat, electricity, energy, sound, and light help explain the activities you identified?" ● "Why do you think physics is important in daily life?" 10. Conclude that physics helps explain how things move, work, and interact in everyday situations, making life safer, easier, and more productive.	
	Option 2: Quick Concept Match: Everyday Physics	
	Quick Concept Match: Everyday Physics Match pictures of household/workplace items to physics terms.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about physics applications in daily

	Procedure 1. Prepare printed pictures, flashcards, or PowerPoint slides showing common household, workplace, and leisure-related objects such as: ● Blender ● Bicycle ● Helmet ● Rice cooker ● Flashlight ● Pulley ● Swing 2. The teacher may source the images from: ● Science textbooks ● DepEd learning materials ● Educational websites ● Teacher-made visuals ● Community-based pictures or appropriate Facebook posts familiar to learners 3. Divide the class into small groups with 4–5 members each. 4. Give each group a set of pictures and a list of physics concepts. 5. Instruct learners to match each picture with the correct physics concept. **Examples:** ● Blender → Electricity and Rotational Motion ● Helmet → Force Distribution ● Bicycle → Motion and Mechanical Energy ● Rice Cooker → Heat Transfer ● Swing → Gravity and Motion 6. Allow groups to discuss their answers before writing their final responses. 7. After the activity, ask selected groups to present their answers to the class.	life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	8. Require learners to explain why they matched the object to the concept. To support learners who need additional guidance, write the following sentence frames on the board: ● "We matched the _____ with _____ because it uses energy to _____." ● "The _____ demonstrates _____ because _____." ● "This object shows the concept of _____ because it helps _____." **Examples:** ● "We matched the rice cooker with heat transfer because it uses thermal energy to cook food." ● "We matched the bicycle with motion and mechanical energy because pedaling makes the bicycle move." ● "We matched the flashlight with electricity because electrical energy produces light." 9. Clarify misconceptions and reinforce the relationship between everyday objects and physics principles. Expected output: Completed picture-concept matching sheet with one short reason for each answer.	
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Have you ever wondered why objects move the way they do?	
	Video Analysis **Procedure** 1. Before showing the video, ask learners: ● "Have you ever wondered why objects move the way they do?" ● "Why do appliances and machines work?" 2. Inform learners that they will watch a short video about the role of physics in everyday life.	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	3. Show the video: "The Fascinating Physics of Everyday Life" by Helen Czerski **Link:** *https://www.youtube.com/watch?v=_ryJK294Psw* Low-Tech Alternative (for classes without internet or video access): Instead of the video, the teacher may use any of the following: ● Printed screenshots from the video showing key physics situations (e.g., cycling, electricity, falling objects, machines in motion) ● Picture cards arranged in sequence illustrating the same everyday physics examples ● A short teacher-made reading passage summarizing the video content using the same real-life examples 4. While watching, instruct learners to observe carefully and take note of examples where physics is applied in daily life. 5. After viewing, give learners 3–5 minutes to answer the following guide questions: ● Why is physics important in daily life? ● Which example from the video did you find most interesting? ● How does physics help people perform work more efficiently, and how does it keep them safe from accidents? ● How does physics contribute to modern inventions and technology? 6. Divide learners into small groups and allow them to share and compare their answers. 7. Call selected learners or groups to share their insights with the whole class. 8. Process the activity by emphasizing that physics explains many natural phenomena and helps improve human life through technology and innovation.	The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

Option 2: Picture/Scenario Analysis (Gallery Walk)

Picture/Scenario Analysis (Gallery Walk)
Procedure

1. Prepare printed pictures or scenario cards showing common situations such as: (Images must be teacher-selected, appropriate, non-identifying, and properly credited):

Picture/Scenario	Simple Hint
Riding a bicycle	Motion and energy
Cellphone charging	Electrical energy
Rice cooker in use	Heat transfer
Car braking suddenly	Force slows motion
Basketball shooting	Motion and gravity
Spoon appearing bent in water	Light bends
Swinging on a playground swing	Back-and-forth motion
Ice melting	Solid becomes liquid
A ball rolling down a slope	Gravity makes it move
Light passing through glass	Light changes direction
Plant growing toward sunlight	Responds to light
Fan blowing air	Force moves air
Magnet attracting paper clips	Magnetic force
Shadow changing during the day	Sun and light movement

2. Inform learners that the teacher may also use pictures from community situations or publicly available Facebook posts that are familiar and relevant to learners' daily experiences.
3. Divide the class into small groups with 4–5 members each.
4. Assign one picture or scenario to each group.

The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	5. **Instruct learners to observe and discuss their assigned scenario using the following guide questions:** ● What is happening in the picture or scenario? ● What physics concept is involved? ● How is this related to daily life? ● What might happen if the principle did not work properly? 6. Give groups time to organize their answers and write them on a manila paper or activity sheet posted beside their assigned picture. 7. Conduct a Gallery Walk instead of formal presentations. ● Ask groups to rotate around the room every 1–2 minutes. ● Instruct learners to read the analyses of other groups. ● Allow them to write short comments, questions, or additional ideas on sticky notes or directly on the manila paper. 8. After the Gallery Walk, process the activity by asking: ● What common ideas do you observe in all situations? ● Which physics concepts appeared most often? ● Why is physics important in understanding everyday activities? 9. Conclude that physics is present in many daily experiences and helps explain how things function and interact. **Expected Output:** A completed scenario analysis sheet posted during the Gallery Walk, including the identified physics concept and a brief explanation of its application in daily life.	
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1: 4 Pics, 1 Concept	
	4 Pics, 1 Concept **Procedure** 1. Prepare sets of four pictures that represent one common physics concept.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive

	Example: ● Falling apple ● Rolling ball ● Moving car ● Swinging pendulum **Answer: Motion** *2.* Show one set of four pictures to the class. *3.* Ask learners to observe the pictures carefully. *4.* Give learners 1–2 minutes to think or discuss with a seatmate. *5.* **Ask: "What common idea or concept connects the four pictures?"** *6.* Call selected learners to answer. *7.* Require learners to explain why they chose that concept. *8.* Reveal the correct answer and briefly explain the physics principle represented by the pictures. *9.* **Repeat the activity using other sets of pictures representing different concepts such as:** ● Force ● Energy ● Heat ● Friction ● Electricity	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.
	Option 2: Physics Charades	
	Physics Charades **Procedure** *1.* **Prepare strips of paper containing different physics concepts with simple everyday-life hints such as:** ● **Gravity (Hint: Dropping a ball or an object falling.)** ● **Friction (Hint: Walking on a slippery floor or rubbing hands together.)**	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	• **Motion (Hint: Running, cycling, or pushing a cart.)** • **Energy Transfer (Hint: Turning on a flashlight or charging a cellphone.)** • **Force (Hint: Pushing a door or pulling a rope.)** • **Heat (Hint: Touching a hot pan or boiling water.)** • **Sound (Hint: Ringing a bell or speaking to someone.)** 2. Divide the class into 4-5 groups. 3. Explain that one learner from each group will act out the assigned physics concept without speaking or writing words. 4. The assigned learner picks one strip of paper. 5. Give the learner a few seconds to prepare. 6. Allow the learner to act out the concept while the group members guess the answer. 7. Set a time limit for guessing. 8. After the correct answer is guessed, require the group to go beyond identification by asking: • "What does this concept mean in physics?" • "How does it work?" • "Give one real-life example where this concept is observed in an appliance, tool, or safety device (like a helmet or seatbelt)." 9. Allow brief sharing or clarification from other groups to deepen understanding of the concept. Repeat the process until several concepts have been discussed. 10. Process the activity by emphasizing that physics concepts are not only identified but also explained and applied in real-life situations such as transportation, household appliances, sports, and natural phenomena.	The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	B. 2. Discussing New Concept	
	Option 1: Role-Play – Safety Physics	
	Role-Play – Safety Physics **Procedure** *1.* Divide the class into 4-5 groups. *2.* **Assign one scenario to each group:** ● A biker wearing a helmet during an accident ● A person using knee pads during a fall ● Airbags protecting passengers in a car crash ● A gymnast landing on a cushioned mat ● A trampoline mat and safety net helping prevent injury *3.* **Instruct each group to prepare a 2–3-minute role-play showing:** ● The accident or situation ● The safety device used ● How the device helped reduce injury *4.* **Tell learners to include a short explanation of the physics principle involved, such as:** ● Force reduction ● Increased impact time ● Energy absorption ● Momentum ● Newton's Laws *5.* Allow groups time to plan and practice their presentation. *6.* Encourage learners to use simple props or narration if available. *7.* Call groups one by one to perform their role-play. *8.* After all groups have finished, process the performances by asking the entire class: ● "What common idea did you observe in all five situations?"	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

- "Across all five skits, what did every safety device do to the time of impact?"
- "How did increasing the impact time help reduce injury?"
- "What physics principles were demonstrated in the role-plays?"

Expected Answer: The safety devices increased the time of impact, reducing the force experienced by the body and helping prevent injuries.

9. **Simple Scoring / Checking Criteria:**
Evaluate each group based on the following:

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy (Physics Concepts)	Correctly explains and applies physics concepts (force, impulse, inertia, energy absorption, etc.) with no errors.	Mostly correct with minor inaccuracies.	Some correct ideas but with noticeable misconceptions.	Incorrect or missing physics concepts.	/5
Cause-and-Effect Explanation	Clearly explains how the safety device reduces injury using physics principles (e.g., increased impact time, reduced force).	Explanation is mostly clear with minor gaps.	Partially explains cause and effect but lacks clarity.	Does not explain or gives incorrect reasoning.	/5
Clarity of Presentation	Role-play is clear, organized, audible, and easy to understand throughout.	Generally clear with minor issues in delivery.	Some parts are unclear or hard to follow.	Presentation is unclear or difficult to understand.	/5
Teamwork and Participation	All members actively participate and group is well-coordinated.	Most members participate with minor imbalance.	Some members participate; coordination is weak.	Few members participate; group is disorganized.	/5
Total					/20

	10. Process the activity by emphasizing how physics concepts are applied in safety devices used in daily life and how understanding these helps reduce accidents and injuries.	
	Option 2: Group Cause-Effect Diagram	
	Group Cause-Effect Diagram **Procedure** 1. Divide learners into 4-5 groups. 2. Assign one safety-related scenario to each group. 3. **Provide each group with:** ● Manila paper ● Marker ● Colored pens 4. **Instruct learners to create a cause-and-effect diagram showing the sequence:** Accident → Force Applied → Increased Impact Time → Reduced Force → Less Injury 5. **Require learners to:** ● Label each stage clearly ● Identify the safety device used ● Explain the physics concept involved 6. Encourage groups to use arrows, symbols, drawings, or color coding to make the diagram clear and organized. 7. Give groups time to complete their output. 8. Ask groups to present and explain their diagrams to the class. 9. After presentations, process the activity by discussing how increasing impact time helps reduce force and injury. 10. The following rubric may be used as a guide to assess the activity.	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available. **Notes to Teachers:** Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All information and relationships among force, impact time, and injury are scientifically accurate.	Most information is accurate with minor errors.	Some concepts are inaccurate or incomplete.	Major misconceptions are evident.	/4
Correct Application of Physics Concepts	Clearly and correctly explains how increasing impact time reduces force and injury; safety devices are properly identified and connected to the concept.	Explanation is mostly correct with minor omissions.	Shows partial understanding of the concept.	Shows little or no understanding of the physics principle.	/4
Clarity and Organization of Diagram	Diagrams are well-organized, easy to follow, and use labels, arrows, symbols, and colors effectively.	Diagrams are organized and understandable with minor issues.	Diagrams are somewhat confusing or lacks clear labels and connections.	Diagrams are poorly organized and difficult to understand.	/4
Relevance to Daily Life	Safety devices and scenarios are clearly connected to real-life situations, and their importance is well explained.	Real-life connection is evident, but explanation is limited.	Connection to daily life is weak or incomplete.	A little or no connection to real-life situations is shown.	/4
Completeness and Presentation of Output	All required components are present (accident, force applied, increased impact time, reduced force, less injury); presentation is	Most required components are present; presentation is understandable.	Several components are missing, or presentation lacks clarity.	Output is incomplete, and presentation is unclear or absent.	/4

	clear and confident.				
Total					/20

B. 3. Developing Mastery

Option 1: Concept Mapping (Traditional or Digital)

Concept Mapping (Traditional or Digital)
Procedure

1. Divide the class into five groups.
2. **Assign one domain to each group:**
   - Group 1 – Household
   - Group 2 – Health and Safety
   - Group 3 – Work Productivity
   - Group 4 – Leisure and Entertainment
   - Group 5 – Sports
3. **Provide each group with:**
   - Manila paper/cartolina and art materials or digital tools (Canva, Mind Meister, Lucid chart) if available
4. Instruct learners to create a concept map showing how physics concepts are applied in their assigned domain.
5. **Tell learners to include:**
   - At least 5 examples related to the domain
   - The physics concept involved
   - A short explanation of how the concept works in real life

   Examples:
   - Household → Rice cooker → Heat transfer
   - Sports → Basketball shooting → Force and motion
   - Health and Safety → Helmet → Impact reduction
6. Encourage learners to use arrows, symbols, drawings, and color coding to organize their ideas clearly.
7. Give groups enough time to complete their concept maps.
8. After the activity, ask each group to present their output to the class.
9. During the presentation, require learners to explain:
   - The examples they included

The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

- The physics concepts involved
- How physics improves daily life in their assigned domain

10. Process the activity by emphasizing that physics is present in many aspects of everyday living.
11. The following rubric may be used as a guide to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All examples and explanations accurately reflect the physics concepts involved. No misconceptions are evident.	Most examples and explanations are accurate with minor errors.	Some examples or explanations contain inaccuracies or misconceptions.	Most examples and explanations are inaccurate or show little understanding of the concepts.	/4
Correct Application of Physics Concepts	Clearly and correctly relate physics concepts to at least five real-life examples in the assigned domain.	Correctly relates most examples to the appropriate physics concepts.	Shows partial understanding; some examples are not properly linked to the concepts.	Demonstrates little understanding of the relationship between the examples and the concepts.	/4
Clarity and Organization	Concept maps are well-organized and easy to follow, with effective use of arrows, labels, symbols, drawings, or color coding.	Concept maps are organized and understandable with minor issues.	Organization is somewhat unclear; connections among ideas are incomplete.	Concept map lacks organization and is difficult to understand.	/4
Relevance to Daily Life	Examples clearly demonstrate how physics improves everyday life in the assigned domain, with meaningful explanations.	Most examples are relevant and adequately explained.	Some examples are relevant, but explanations are limited or unclear.	Examples show little connection to daily life or lack of explanation.	/4
Completeness and	Includes at least five examples, corresponding	Includes the most required components	Several required components	Output is incomplete, and	/4

Presentation of Output	physics concepts, and explanations; presentation is clear, confident, and informative.	and presents ideas clearly.	are missing, or presentation lacks clarity.	presentation is unclear or absent.	
Total					/20

Option 2: Case Study Application Task (Real-Life Problem Solving)

Case Study Application Task (Real-Life Problem Solving)
Procedure

1. Divide the class into 4-5 groups.
2. Give each group a real-life scenario such as:
   - A student slips in a wet hallway
   - A motorcycle suddenly brakes in traffic
   - A phone overheats while charging
   - A basketball player misses a shot due to incorrect force
   - A crowded room becomes noisy and uncomfortable due to sound
3. **Instruct learners to analyze the scenario by answering:**
   - What physics concept is involved?
   - What caused the situation?
   - How does physics explain what happened?
   - What should be done to improve safety or performance?
4. Provide groups with adequate time to discuss and prepare a brief explanation or output.
5. Ask each group to present their analysis.
6. **Facilitate discussion by asking:**
   - What physics concept was most important in your case?
   - How can understanding physics help prevent similar situations in real life?
7. Process the activity by emphasizing that physics is not only for identifying concepts but also for understanding, improving, and solving real-world problems.

The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

8. The following rubric may be used as a guide to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All explanations and analyses are scientifically accurate and free from misconceptions.	Most explanations are accurate with minor errors.	Some explanations contain inaccuracies or incomplete ideas.	Explanations are largely inaccurate or demonstrate little understanding of the concepts.	/4
Correct Application of Physics Concepts	Correctly identifies and thoroughly explains the physics concept involved and clearly applies it to the given situation.	Correctly identify the concept and provide an adequate explanation.	Identifies the concept but provides limited or partially correct explanations.	Fails to identify or incorrectly applies to the physics concept.	/4
Problem Analysis and Solution	Clearly identify the cause of the problem and propose practical, well-justified solutions to improve safety or performance.	Identifies the cause and suggests appropriate solutions with some justification.	Provides limited analysis or solutions that lack sufficient explanation.	Shows little analysis and provides inappropriate or no solutions.	/4
Relevance to Daily Life	Demonstrates a strong connection between the case and real-life situations and explains how physics can help prevent or solve similar problems.	Shows a clear connection to daily life with adequate explanation.	Shows some connection to daily life, but explanations are limited.	Shows little or no connection to real-life applications.	/4
Completeness and Clarity of Presentation	Addresses all guide questions completely and presents ideas clearly, confidently, and logically.	Addresses most questions and presents ideas clearly.	Addresses some questions but explanations are incomplete or unclear.	Output is incomplete, and presentation lacks clarity or organization.	/4
Total					/20

<table>
<tr><td rowspan="3">C. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: Case Study Analysis and Role-Play Simulation (Integrated Application Task)</td></tr>
<tr><td>Case Study Analysis and Role-Play Simulation (Integrated Application Task)
Procedure
1. Divide the class into small groups of 4–5 learners.
2. Provide each group with either:
● A real-life physics scenario (case study), OR
● A situation for role-play simulation
Examples:
● A student slips on a wet floor in school
● A motorcycle suddenly stops in traffic
● A car uses airbags during a crash
● A gymnast lands on a cushioned mat
● A phone overheats while charging
3. Instruct learners to choose ONE way to present their understanding:
● Case Study Analysis (explain the situation), or
● Role-Play Simulation (act out the situation)
4. Guide learners to address the following:
● What physics concept is involved?
● What caused the situation?
● How does physics explain what happened?
● What solution or improvement can be applied?
5. Give groups time to prepare their analysis or performance.
6. Ask each group to present their output.
7. Facilitate discussion after presentations by asking:
● How does physics help explain or improve real-life situations?
● What safety or performance improvements were demonstrated?</td><td>The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.</td></tr>
</table>

8. Process the activity by emphasizing that physics is both analytical and practical, helping learners understand and respond to real-world situations.
9. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All explanations and demonstrations are scientifically accurate and free from nappropriate.	Most explanations and demonstrations are accurate with minor errors.	Some explanations contain inaccuracies or incomplete ideas.	Explanations and demonstrations show little understanding of the concepts.	/4
Correct Application of Physics Concepts	Correctly identifies and thoroughly explains the physics concept involved and effectively applies it to the case study or role-play scenario.	Correctly identifies the concept and adequately applies it to the situation.	Shows partial understanding with limited or partially correct applications.	Fails to identify or incorrectly applies to the physics concept.	/4
Problem Analysis and Proposed Solution	Clearly identify the cause of the situation and provide practical, well-justified solutions or improvements related to safety or performance.	Identifies the cause and suggests appropriate solutions with some justification.	Provides limited analysis and solutions with insufficient explanation.	Shows little analysis and provides nappropriate or no solutions.	/4
Relevance to Daily Life	Demonstrates a strong connection between the scenario and real-life situations and clearly	Demonstrates a clear connection to daily life with adequate explanation.	Shows some connection to daily life, but explanations are limited.	Shows little or no connection to real-life applications.	/4

	explains the importance of physics in everyday life.				
Completeness and Effectiveness of Presentation/ Performance	Addresses all guide questions completely and presents or performs clearly, confidently, and creatively, making ideas easy to understand.	Addresses most questions and presents or performs effectively.	Addresses some questions, but explanations or performance lack clarity and organization.	Output is incomplete, and presentation or performance is unclear or ineffective.	/4
Total					/20

Option 2: Mini-Project Application (Creative Output)

Mini-Project Application (Creative Output)

Procedure

1. Divide the class into 4-5 groups.
2. **Assign learners to create a simple output demonstrating physics in daily life, such as:**
   - A safety poster on force and motion
   - A model showing energy transfer or motion
   - A diagram of household appliances and heat/electricity use
   - A mini-infographic on physics in sports or transportation
3. **Require learners to include:**
   - At least one physics concept
   - A real-life application
   - A short explanation of how it works
4. Allow time for planning and creation using available materials.
5. Have each group present their output.

The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

6. Ask guiding questions:
    - What physics concept did your project show?
    - How does it apply to real-life situations?
7. Process the activity by emphasizing that physics learning is strengthened when learners can create, explain, and apply concepts in meaningful outputs.
8. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All scientific information and physics concepts are correct and clearly explained with no misconceptions.	Most scientific information is accurate with minor errors.	Some concepts are inaccurate or partially explained.	Shows major misconceptions or incorrect understanding of concepts.	/4
Correct Application of Physics Concepts	Clearly and correctly apply at least one physics concept to a real-life situation in a meaningful way.	Correctly applies physics concept with minor gaps in explanation.	Partially applies to physics concepts but lacks clarity or completeness.	Fails to correctly apply physics concepts to the output.	/4
Creativity and Presentation	Output is highly creative, well-designed, and visually engaging (poster, model, infographic, or diagram).	Output is creative and organized with minor presentation issues.	Output shows limited creativity or lacks visual organization.	Output is poorly presented and lacks creativity or effort.	/4
Relevance to Daily Life	Strongly demonstrates how physics is used in real-life situations with clear and meaningful connections.	Shows clear connection to real-life applications with adequate explanation.	Shows some connection to real life but explanations are limited.	Shows little or no connection to real-life applications.	/4
Completeness and Explanation	Includes all required elements: physics concept, real-life	Includes most required elements with minor omissions or	Missing one required element or explanation is unclear.	Output is incomplete and lacks the required components.	/4

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	application, and clear explanation of how it works.	unclear explanation.			
Total					/20

C. 2. Making Generalization

Option 1: Mini Skits

Mini Skits

Procedure

1. Divide the class into 4-5 groups.
2. Assign or allow each group to choose one real-life situation involving physics.
   Examples:
   - Ironing clothes
   - Riding a bicycle
   - Cooking using a rice cooker
   - Playing basketball
   - Using a cellphone charger
3. Instruct learners to prepare a short skit showing the situation in action.
4. **Tell learners that the skit must include:**
   - The real-life situation
   - The physics concept involved
   - A brief explanation of how physics works in the situation
5. Allow groups time to plan and rehearse.
6. Encourage creativity, proper teamwork, and participation of all members.
7. Call groups one by one to perform their skits.
8. After each performance, ask:
   - "What physics concept was shown?"
   - "How was physics applied in the situation?"
9. Process the activity by reinforcing that physics helps explain many activities people do every day.

The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All physics concepts and explanations presented in the skit are scientifically correct and free from misconceptions.	Most concepts are correct with minor errors in explanation.	Some concepts are partially correct but contain noticeable misconceptions.	Physics concepts are mostly incorrect or not demonstrated.	/4
Correct Application of Physics Concepts	Clearly and accurately demonstrates the physics concept in the skit with strong real-life application.	Demonstrates the physics concept correctly but with limited depth.	Partially demonstrates the concept but lacks clarity or completeness.	Fails to demonstrate or incorrectly apply physics concepts.	/4
Clarity of Explanation and Communication	Explanation of physics concepts is clear, well-integrated into the skit, and easy to understand.	Explanation is generally clear with minor gaps.	Explanation is somewhat unclear or incomplete.	Explanation is unclear, missing, or not included.	/4
Creativity and Presentation	Skit is highly creative, engaging, well-organized, and shows strong teamwork and effort.	Skit is creative and organized with minor issues in presentation.	Skit shows limited creativity or uneven participation among members.	Skit lacks creativity, organization, and teamwork.	/4
Relevance to Daily Life	Strongly connects the skit to real-life situations and clearly shows how physics operates in everyday activities.	Shows clear connection to real-life situations with adequate explanation.	Shows some connection, but explanation is limited or unclear.	Shows little or no connection to real-life applications.	/4
Total					/20

Option 2: Physics Scavenger Hunt

Physics Scavenger Hunt

Procedure

1. **Prepare a checklist of physics concepts such as:**
   - Motion
   - Force
   - Heat transfer
   - Friction
   - Electricity
   - Sound
   - Light
2. Divide learners into 4-5 groups.
3. Explain that learners will search for examples of physics concepts around the school or at home.
4. **Instruct learners to:**
   - Take photos, draw illustrations, or write descriptions of the examples they find
   - Identify the physics concept involved
   - Explain briefly how the concept works in the example
5. Give learners enough time to complete the scavenger hunt.
6. After the activity, ask groups to present some of the examples they gathered.
7. Encourage learners to explain how physics concepts are present in ordinary objects and situations.
8. Process the activity by emphasizing that physics is observable in the learners' surroundings.
9. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All identified physics concepts are correct and clearly explained	Most concepts are correct with minor errors in explanation.	Some concepts are correct, but several explanations	Most or all concepts are incorrect or not clearly explained.	/4

The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	with no misconceptions.		are inaccurate or incomplete.		
Identification of Physics Concepts	Accurately identifying multiple physics concepts (motion, force, heat, etc.) in real-life examples.	Identifies most required concepts with minor omissions.	Identifies some concepts but misses several required examples.	Fails to correctly identify relevant physics concepts.	/4
Explanation of Real-Life Application	Provides clear, detailed, and meaningful explanations of how each physics concept works in the example.	Provides clear explanations with minor gaps in detail.	Explanations are limited, unclear, or partially correct.	Explanations are missing or incorrect.	/4
Completeness of Output	Submits a complete set of scavenged items (photos/drawings/descriptions) covering most or all required concepts.	Submits the required items with minor missing elements.	Submits partial output with several missing components.	Output is incomplete or insufficient.	/4
Creativity and Presentation	Output is well-organized, visually engaging, and creatively presented (photos, drawings, or descriptions).	Presentation is organized and clear with minor issues.	Presentation is somewhat disorganized or lacks visual appeal.	Presentation is unclear, disorganized, or poorly done.	/4
Total					/20

C. 3. Evaluating Learning

Option 1: Performance Task – "Physics in My Life Poster

Performance Task – "Physics in My Life Poster"
Procedure

1. **Instruct learners to create an individual poster entitled: "Physics in My Life"**
2. Tell learners to include at least five real-life situations where physics is applied.
3. **For each situation, learners must:**
   - Draw or paste a picture
   - Identify the physics concept involved
   - Write a short explanation of how the concept works

Examples:

- Electric fan → Electricity and motion
- Bicycle → Force and motion
- Rice cooker → Heat transfer

4. Encourage learners to make their posters neat, colorful, and creative.
5. Provide enough time for learners to complete their work.
6. After completion, ask selected learners to present their posters to the class.
7. **Evaluate the outputs using the rubric below:**

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All physics concepts are scientifically correct and accurately related to real-life situations.	Most concepts are correct with minor errors.	Some concepts are inaccurate or incomplete.	Many concepts are incorrect or missing.	/4
Correct Application of Physics Concepts	Correctly identify and explain the physics concepts involved in all examples.	Correctly identify and explain most examples with minor errors.	Shows partial understanding; some concepts are incorrectly applied.	Demonstrates little understanding of the physics concepts.	/4

The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

Clarity of Explanation	Explanations are clear, complete, and easy to understand.	Explanations are generally clear with minor gaps.	Explanations are somewhat unclear or incomplete.	Explanations are unclear or missing.	/4
Creativity and Presentation	Poster is highly creative, neat, attractive, and visually organized; presentation is confident and clear.	Poster is neat and creative with minor issues in organization or delivery.	Poster shows limited creativity or presentation lacks clarity.	Poster lacks creativity and is poorly presented or explained.	/4
Completeness of Output	Includes at least five situations, pictures, physics concepts, and explanations; all requirements are complete.	Includes the most required elements with minor omissions.	Several required elements are missing.	Output is incomplete and lacks many required components.	/4
Total					/20

8. Process the activity by emphasizing that physics concepts are present in everyday life and can be understood through observation, explanation, and creativity.

Option 2: Performance-Based Written Task

Performance-Based Written Task

Procedure

1. Ask learners to do an individual written activity titled: "Physics in Everyday Life"
2. Instruct learners to write five (5) situations where physics is seen in daily life.
3. **For each situation, learners should:**
   - **Write the situation (example: riding a bicycle)**
   - **Write the physics concept (example: motion, force, energy, heat, electricity)**
   - Write a short explanation (1–2 sentences only)

The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate

Example:

- **Situation:** Electric fan
- **Concept:** Electricity and motion
- **Explanation:** Electrical energy is changed into motion that makes the fan blades move.

4. Remind learners to write neatly and clearly.
5. Allow ample time for learners to finish the task.
6. Collect the outputs after completion.
7. Ask a few learners to share one of their answers.
8. Briefly discuss and correct misconceptions if needed.
9. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All five situations and explanations are scientifically correct with no misconceptions.	Most situations are correct with minor errors in explanation.	Some situations are correct, but several explanations contain inaccuracies.	Most answers are incorrect or show major misconceptions.	/4
Identification of Physics Concepts	Correctly identify appropriate physics concepts for all five situations.	Correctly identify most physics concepts with minor errors or omissions.	Identifies some correct concepts, but several are inappropriate or missing.	Fails to correctly identify relevant physics concepts.	/4
Explanation of Concepts	Provides clear, accurate, and concise (1–2 sentences) explanations for all situations.	Explanations are generally clear with minor gaps in detail or clarity.	Explanations are somewhat unclear, incomplete, or too brief/too long.	Explanations are unclear, incorrect, or missing.	/4
Completeness of Output	All five required situations are complete with concept and explanation for each.	Four situations are complete, or one part is missing.	Only 2–3 complete situations are provided.	Fewer than 2 complete situations are provided.	/4
Clarity, Neatness, and Organization	Work is very neat, well-organized, and easy to read.	Work is generally neat with minor	Work is somewhat disorganized or	Work is poorly written, unclear, or	/4

science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

		issues in organization.	difficult to read in parts.	difficult to understand.	
Total					/20

C. 4. Additional Activities

Option 1: Home Observation Journal

Home Observation Journal

Procedure

1. Instruct learners to prepare a notebook or journal for recording observations.
2. Explain that learners will observe applications of physics at home for three consecutive days.
3. Require learners to record at least five examples of physics applications each day.
4. **For every example, learners must write:**
   - The activity or object observed
   - The physics concept involved
   - A short explanation of how the concept works

Example:

- Electric fan → Electricity and motion → Electrical energy is converted into mechanical energy to rotate the blades.

5. Remind learners to observe carefully and use examples from real-life household situations.
6. After three days, ask learners to submit or share selected entries with the class.
7. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All observations and explanations are scientifically correct with no	Most observations are correct with minor errors in explanation.	Some observations are correct but several explanations are inaccurate or incomplete.	Most or all entries are incorrect or show major misconceptions.	/4

The activity targets Learning Objective 1 by engaging learners in a task related to physics applications in daily life. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Note to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	misconceptions.				
Identification of Physics Concepts	Correctly identifies appropriate physics concepts for all entries across 3 days.	Correctly identifies most concepts with minor errors or omissions.	Identifies some correct concepts but several are missing or incorrect.	Fails to correctly identify relevant physics concepts.	/4
Explanation of Observations	Provides clear, accurate, and meaningful explanations of how physics works in each example.	Explanations are generally clear with minor gaps in detail.	Explanations are limited, unclear, or partially correct.	Explanations are missing or incorrect.	/4
Completeness of Entries	Submits complete journal with at least 15 entries (5 per day for 3 days).	Submits most required entries with minor omissions.	Submits partial entries (8–12 total) or missing some days.	Submits very few entries (less than 8) or incomplete journal.	/4
Clarity, Neatness, and Organization	Journal is very neat, well-organized, and easy to read with clear labeling per day.	Journal is generally neat with minor issues in organization.	Journal is somewhat disorganized or difficult to follow in parts.	Journal is poorly organized, unclear, or difficult to read.	/4
Total					

Option 2: Physics in My Community" Photo Essay

"Physics in My Community" Photo Essay

Procedure

1. Instruct learners to take photos or draw illustrations showing physics concepts in the community.
2. Learners may focus on:
   - Transportation
   - Safety devices
   - Household appliances
   - Sports activities
   - Community tools or machines

The activity targets Learning Objective 1 by engaging learners in a task related to physics applications in daily life. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided discussion and scenario analysis, supported by peer sharing and teacher questioning. Literacy is

3. Require learners to compile at least five pictures or drawings.
4. **For each picture or drawing, learners must include:**
    - A title or caption
    - The physics concept involved
    - A short explanation of how the concept is applied
5. Remind learners to use clear and appropriate pictures.
6. Allow learners to organize their outputs in a short photo essay, scrapbook, or digital presentation.
7. After completion, ask selected learners to present their outputs to the class.
8. Process the activity by emphasizing that physics is present not only in school but also in the community and everyday experiences.
9. Refer to the rubric below to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All physics concepts and explanations are scientifically correct and free from misconceptions.	Most concepts are correct with minor errors in explanation.	Some concepts are correct, but several explanations are inaccurate or incomplete.	Most or all concepts and explanations are incorrect.	/4
Identification of Physics Concepts	Accurately identifies appropriate physics concepts for all five images/drawings.	Identifies most concepts correctly with minor omissions.	Identifies some concepts but several are incorrect or missing.	Fails to correctly identify relevant physics concepts.	/4
Explanation of Application	Provides clear, meaningful, and accurate explanations of how physics is applied in	Explanations are clear with minor gaps in detail.	Explanations are limited, unclear, or partially correct.	Explanations are missing or incorrect.	/4

integrated through reading and explaining everyday physics situations using appropriate science terms. Numeracy is integrated through comparing simple quantities, patterns, or evidence in familiar situations. EdTech is integrated through using slides, images, videos, or digital boards when available.

Notes to Teachers: Let learners give concrete examples from home, school, work, or leisure before correcting misconceptions. Use follow-up questions to connect each example to the appropriate physics principle.

	each community for example.				
Completeness of Output	Includes at least 5 well-captioned images/drawings with title, concept, and explanation for each.	Includes 4–5 entries with minor missing elements.	Includes only 2–3 complete entries or several missing components.	Includes fewer than 2 complete entries or incomplete output.	/4
Creativity and Presentation	Photo essays are highly creative, well-organized, visually appealing, and effectively presented (scrapbook/digital/printed).	Presentation is organized and clear with minor issues.	Presentation is somewhat disorganized or lacks visual appeal.	Presentation is unclear, disorganized, or poorly done.	/4
Total					/20

V. ASSESSMENT

(Assessing Learnings)

Instructions: Answer the following questions. Be clear and complete in your responses. Use examples whenever possible.

I. Make short answers to the following questions:

1. How does a rice cooker use heat transfer to cook food?
2. Why is metal preferred in cookware over plastic?
3. Explain how an electric fan helps make people feel cooler.
4. Explain how a pulley makes lifting loads easier using physics.
5. Why is a roller coaster a good example of potential and kinetic energy?
6. Why do electric wires heat up when current passes through them?
7. How does friction affect motion in everyday life?
8. How does a flashlight or simple electric device convert energy into light?
9. Why is force important in moving or stopping objects?
10. How is energy transferred in common household activities (e.g., cooking, moving objects, using appliances)?

	II. Describe the role of physics in each situation. Include the physics principle and how it improves safety, comfort, or function. *1.* A car crash where airbags deploy *2.* A biker wearing a helmet during a fall *3.* A child jumping on a trampoline with safety netting *4.* A person using a handcart to move heavy objects *5.* A person slipping slightly but regaining balance while walking **Expected Key Answers:** **I. Short Answer Questions** *1.* Converts electrical energy into heat through resistance heating. *2.* Metal conducts heat well; plastic is a poor conductor. *3.* Fan increases air movement, promoting heat loss and evaporation. *4.* A pulley changes the direction of the applied force; in a pulley system, it can reduce the effort needed by increasing the distance over which the force is applied. *5.* Shows transformation between potential and kinetic energy. *6.* Electrical resistance converts electrical energy into heat. *7.* Friction slows motion or allows control of movement. *8.* Electrical energy is converted into light energy. *9.* Force is needed to change motion (start, stop, or move objects). *10.* Energy is transferred through heat, motion, or electricity in daily activities. **II. Role of Physics in Real-Life Situations** *1.* Airbags increase impact time → reduce force (Newton's Laws). *2.* Helmet absorbs impact and increases stopping time → reduces injury. *3.* Safety net increases stopping distance/time → reduces force. *4.* Handcart reduces the required force (mechanical advantage). *5.* Friction slows motion and helps regain balance.
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. *1.* How many learners successfully demonstrated the learning objectives based on the assessment results? *2.* Which activity helped learners understand the lesson the most? Which activity helped the least? *3.* Which part of the lesson was easiest for learners? Which part was the most difficult?

	4. How many learners need enrichment or additional challenges? How many learners need remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? 6. What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Applications of Translational and Rotational Motion - Linear and Angular Quantities**	Lesson Exemplar	2

I. OBJECTIVES	
A. Content Standard	The learners learn that understanding linear and angular quantities to describe motion helps in the design of efficient machines.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	The learners compare translational and rotational motion in terms of their respective linear and angular quantities.
II. REFERENCES and MATERIALS **(Selecting Resources and Material)**	**References:** Amphenol CIT. 2023. "Linear Position and Displacement Measurement with Capacitive and Eddy-Current Sensors." Lion Precision. Last modified July 11, 2023. BYJU'S. 2020. "Angular Acceleration Formula." Last modified September 25, 2020. BYJU'S. 2022a. "Angular Velocity." Last modified August 30, 2022. BYJU'S. 2022b. "Angular Displacement." Last modified December 13, 2022. Fiveable. n.d. "Linear Acceleration - Principles of Physics I) - Vocab, Definition, Explanations." Accessed June 3, 2026. The Physics Classroom. n.d. "Speed Versus Velocity." Accessed June 3, 2026.

<table>
<tr><td>III. CONTENT

(Sequencing Content)</td><td colspan="2">Applications of Translational and Rotational Motion - Linear and Angular Quantities</td></tr>
<tr><td>IV. OBJECTIVES

(Setting Clear Objectives and Analyzing the Tasks)</td><td colspan="2">1. Identify the linear and angular quantities related to translational and rotational motion.

2. Compare and contrast translational and rotational motion in terms of their respective linear and angular quantities.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: Motion Word Cloud</td></tr>
<tr><td>Direction:

1. The class is divided into groups of at most five members. Each group uses a smartphone, tablet, or laptop to go to menti.com and enters the unique access code displayed on the teacher's screen.

2. The teacher explains that groups will submit their words digitally. Words submitted multiple times by different groups will grow larger on the screen in real-time, creating a collective, living word map.

3. The learners may only begin submitting after the teacher activates the live slide and reveals the central word. The central word is “MOTION.” Groups have exactly 3 minutes to</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through</td></tr>
</table>

	brainstorm and flood the Menti meter slide with related physics terms, descriptors, or real-world examples. 4. After 3 minutes, the teacher freezes the submissions. The massive, colorful word cloud generated by the entire class is projected on the board. The teacher then highlights the most prominent (largest) words and the unique outlier words, calling on the groups to take turns explaining the scientific connection of those specific words to "MOTION." **5. The teacher will ask:** *a.* Looking at our word cloud, which words describe an object moving from Point A to Point B (Translational)? *b.* Which words describe an object turning around a fixed pivot or axis? *c.* Do you see any terms that might apply to both types? (e.g., Velocity, Acceleration, Kinetic Energy)"	simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	Option 2: Paired K-W-L Chart	
	Working in pairs, learners collaborate to complete a KWL table on the topic of motion. They bounce ideas off each other to recall past concepts for the K (Know) column, while jointly brainstorming entries for the W (Want to know) and L(Learned) columns	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher

	<table><tr><th>What do we know about motion?</th><th>What do we want to know about motion?</th><th>What did we learn?</th></tr><tr><td></td><td></td><td></td></tr></table>	questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: The Amusement Park Design Challenge	
	1. The teacher asks a learner volunteer to walk in a perfectly straight line across the room, and another volunteer to stand in one spot and spin around in a circle. 2. The teacher will ask the class: Both learners are moving, but if they are wearing smartwatches, why does the watch track the walker's distance but show "0 meters" for the spinning student?	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and

		acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	Option 2: The "Odometer vs Tachometer" Dashboard Analysis	
	1. The teacher projects an image of a standard car dashboard, pointing specifically to the Speedometer/Odometer (measuring km/h and total kilometers) and the Tachometer (measuring RPM—Revolutions Per Minute). 2. The teacher asks the class: Both gauges move when you drive down the highway. What is the speedometer telling you about the car's movement, and what is the RPM gauge telling you?	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.

		Note to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1	
	Activity 1: Motion Zone Demonstration (Translational) 1. The teacher marks a walking path on the floor with "Start" and "Finish" tape. A student volunteer is called up to perform three different walks. 2. The volunteer walks in a straight line from Start to Finish. 3. The volunteer walks back slowly in a curved path, then walks forward quickly in a straight line. 4. The volunteer walks forward, speeding up halfway through, and then tries to walk backward halfway through. 5. The teacher gives the class a moment to finalize their observations and then facilitates a brief discussion to confirm the definitions. **Guide Question:** 1. When Student A moved along the tape, we measured their change in position as Linear Displacement (Delta x) in meters. When Student B turned the wheel, it didn't change its location on the floor. How do we describe its change in position?	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion,

	2. Student A covers meters per second. Student B covers angles per second. What is the name and formula for this rotational twin? 3. When both students sped up their movements during Action 2, what physics quantities were triggered in their respective zones? **Activity 2: Group Motion Match Maker (Rotational)** 1. The class is divided into small groups. Using a phone, tablet, or laptop, each group logs into the game using Kahoot's "Team Mode" and creates a creative physics-themed team name. 2. The teacher launches a customized Kahoot quiz. For each question, a high-quality looping GIF or video clip of a rotating object appears on the main screen (e.g., Question 1: A Ferris wheel accelerating from rest; Question 2: A ceiling fan spinning at a constant speed; Question 3: A merry-go-round slowing down to a stop; and others). 3. Groups are given 30 seconds to talk quietly amongst themselves, analyze the motion in the video, and match it to its correct mathematical descriptor. They must choose from four color-coded multiple-choice buttons on their devices (e.g., Red: Angular Displacement, Blue: Angular Velocity, Yellow: Angular Acceleration). 4. Once the timer hits zero, Kahoot instantly displays a bar graph showing how many groups picked each answer. The teacher pauses the game before showing the leaderboard, calling on	rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

	different teams to justify why they chose a specific option, and correcting any common misconceptions right on the spot.	
	Option 2	
	Activity 1: Gallery Walk (Translational) 1. Four photos are placed on the walls of the classroom. In pairs, the learners identify whether the motion described is translational or not. Moreover, they identify the quantity described by the descriptions placed with the photos. Station 1 (Sprinter): A sprinter running from the starting block to the finish line, focusing on the shortest straight-line distance between the two points. Station 2 (Dog): A dog running along a winding path, consistently covering exactly 2 meters of the road every single second. Station 3 (Plane): A plane moving down the runway, with its speedometer rapidly climbing from 0 km/h to 250km/h during takeoff. Station 4 (Fish): A fish swims directly from one coral rock to another without changing its heading or direction.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

	2. The learners go back to their seats. The teacher gives time for pairs to collaborate and finalize a joint, one-sentence explanation of their answers, then processes their answers by calling on selected learners to justify their responses to the class. **Key Questions for Processing:** 1. Did all the motions follow a straight line? What does this imply about translational motion? 2. Since the motions involved straight lines and curved lines, the path is not uniform for all the examples. What is common among all examples? Why are they all in translational? 3. What are the three physical quantities that describe translational motion? **Activity 2: Motion Commotion (Rotational)** 1. The teacher marks a "Reference" line on the floor. A student volunteer is called up to perform three different spins while the class observes. 2. The volunteer faces the reference line and completes one exact full rotation back to the start. 3. The volunteer spins around slowly for one rotation, then quickly reverses direction for a second rotation. 4. The volunteer starts a spin slowly and abruptly speeds up halfway through, then does a final spin where they suddenly reverse direction mid-rotation.	

5. The teacher will ask the students questions about the demonstrated activity, requiring the volunteer or selected students to synthesize their answers into a single sentence explanation.

Key Questions for Processing:

1. What is the difference between the previously learnt concepts of linear displacement, linear velocity, and linear acceleration and the new concepts of angular displacement, angular velocity, and angular acceleration?
2. What is common among all the example motions portrayed?

B. 2. Discussing New Concept

Option 1: The Digital Motion Matrix (Translational vs Rotational)

1. The teacher projects a digital whiteboard divided into two distinct columns: Translational Motion and Rotational Motion. The teacher pre-populates the board with color-coded digital sticky notes containing the motion characteristics and terms.

2. The teacher shares the whiteboard link or QR code with the class. Learners use their smartphones, tablets, or laptops to click, drag, and drop the digital sticky notes into the correct column simultaneously, or the teacher calls on specific students to come up and move them on an interactive TV/Smartboard.

Translational Motion	Rotational Motion
Points have equal linear displacement	Points have varying linear displacements

The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and

	Points travel in the same direction	Points travel in varying directions
	Points travel with the same velocity	Points travel with different linear velocities
	Points travel with the same acceleration	Points travel with varying accelerations
	Linear displacement	Angular displacement
	Linear velocity	Angular velocity
	Linear acceleration	Angular acceleration

3. The teacher asks a learner to explain each type of motion based on the data in the columns.

4. If the learners' explanations are insufficient, the teacher explains and summarizes them.

5. The teacher asks random learners to raise their confusions and have other learners clarify, unless the teacher's expertise is needed. This process is repeated until all confusions so far have been clarified.

acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.

Note to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

Option 2: Paper Mars Helicopter (Translational and Rotational)

1. The teacher makes introductory statements on NASA's Perseverance Mars rover. The teacher can refer to the link for help (https://tinyurl.com/NASAMarsChopper).

2. The teacher asks the learners to form pairs.

The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because

	3. The teacher provides the materials and instructions. **List of Materials:** *a.* Printed Paper Helicopter Templates (from NASA's Ingenuity/Perseverance guide) *b.* Scissors *c.* Paperclips (1–2 per pair to act as weights) *d.* Timer or Stopwatch (optional, for tracking drop rates) The teacher allows the learners to perform the activity for 10-15 minutes. 4. After the activity, the teacher facilitates the class in processing the activity. The teacher may use the actual questions in the materials for processing. The following questions should be added to relate the activity to the competency: *a.* Linear Perspective: "As the helicopter falls from your hand to the floor, does the center of mass move along a straight coordinate line? Which linear variable describes this vertical displacement? *b.* Angular Perspective: "While the body falls vertically, what are the blades doing relative to the central toothpick axis? Which angular variable tracks the speed of this spinning?" *c.* Intersecting Synthesis: "When we look at the very tip of the spinning blade, it moves forward down through the room while spinning in a circle at the same time. This means it possesses both linear velocity and angular velocity simultaneously. What are three other real-world objects that experience this exact simultaneous combination?	learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

	5. The teacher emphasizes that translational and rotational motion are not mutually exclusive, meaning a body may have both types of motion at the same time. Let the learners think of examples. Examples: a ball spinning while flying, a stone rolling downhill, and the wheels of a running vehicle.	
	B. 3. Developing Mastery	
	Option 1: AHA Slides	
	1. The teacher groups the learners into a maximum of five members. 2. The teacher prepares the Aha Slides platform, including the QR code or link. *3.* Use the following phrases for the options: *a.* Linear displacement (Translational) *b.* Linear velocity (Translational) *c.* Linear acceleration (Translational) *d.* The entire body changes location (Translational) *e.* An accelerating dog (Translational) *f.* Angular displacement (Rotational) *g.* Angular velocity (Rotational) *h.* Angular acceleration (Rotational) *i.* Spinning washing machine (Rotational) *j.* The Earth spinning about its axis (Rotational) *k.* All points have the same displacement. (Translational) *l.* All points travel in the same direction. (Translational) *m.* All points travel with the same velocity. (Translational) *n.* All points travel with the same acceleration. (Translational) *o.* The points have varying linear displacement. (Rotational)	The activity targets Learning Objective 2 by allowing learners to practice, classify, compute, or organize ideas related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.

	4. The teacher conducts an interactive game. 5. Scores are automatically revealed at the end of the game. 6. The teacher appreciates the groups with perfect scores and asks the groups with errors which part confused them. Those with perfect scores will clarify confusion unless the teacher's expertise is needed.	**Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	Option 2: Venn Diagram	
	The teacher instructs the learners to get a piece of paper or their notebook. 1. Ask the learners to draw a large Venn diagram showing the similarities and differences between translational motion and rotational motion. The teacher should say "Draw a large Venn diagram in your notebooks. Your diagram must explicitly account for and contrast the following parameters across both domains: spatial location changes, the standard SI units used, point-vector uniformity, and at least one shared scalar quantity." 2. The learners submit their outputs.	The activity targets Learning Objective 2 by allowing learners to practice, classify, compute, or organize ideas related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference

<table>
<tr><td></td><td></td><td>between linear and angular quantities before moving to computations.</td></tr>
<tr><td rowspan="3">7. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: Human Motion Video Analysis and Demonstration</td></tr>
<tr><td>1. The teacher gives a link to a video that the learners need to watch as an assignment before the next meeting: bit.ly/TransRotMove.

2. Learners will create a table using the format below:
<table><tr><th>Linear (Translational) Quantity</th><th>Human Motions/ Actions</th><th>Angular (Rotational) Quantity</th><th>Human Motions/ Actions</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>
3. Finally, answer the question: “Think about a baseball pitcher throwing a fastball. Their shoulder rotates at a specific angle of velocity. Why does a pitcher with longer arms (larger radius, throw a baseball with a much faster linear speed than a pitcher with shorter arms spinning at the exact same rotational rate? Write down the formula that proves this.

4. On the next meeting, the answers will be checked. The teacher may opt to use a physical or online word map or word cloud for the learners to write or encode their answers (action with description).</td><td>The activity targets Learning Objective 2 by asking learners to apply the lesson concepts to practical situations or performance tasks related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.

Notes to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.</td></tr>
</table>

	5. The teacher asks a learner to read the answers for "Translational Motion" while the whole class demonstrates the action. 6. The teacher asks a learner to discuss the answers for "Rotational Motion" while the whole class demonstrates the action. 7. The teacher asks two or three learners to discuss how important it is to understand translational and rotational motion in human movement. 8. The teacher summarizes the discussion, focusing on the application of translational and rotational motion in human movement.	
	Option 2: Reading and Reflection	
	1. The teacher gives a link to a scientific article related to brain injuries caused by translational and rotational motion: bit.ly/TransRotInjury. The article is to be read before the next meeting. Task: Read the article. Take note of the importance and application of understanding translational and rotational motion. Answer the following questions. *a.* What is the article about? *b.* What examples of translational and rotational motion are used in the article? *c.* What new thing did you learn from the article?	The activity targets Learning Objective 2 by asking learners to apply the lesson concepts to practical situations or performance tasks related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining

	d. What is the importance of understanding translational and rotational motion in human movement based on the article? *e.* After reading the article, what new questions do you have? 2. The answers are checked. The teacher calls learners to discuss their answers to the questions. 3. The teacher summarizes the discussion, focusing on the application of translational and rotational motion in human movement and the importance of understanding it in the context of safety.	and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Note to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	C. 2. Making Generalization	
	Option 1: Comedic Skits	
	1. The class is divided into groups of six members. 2. The learners develop role play skits portraying common scenarios, but the key concepts they learned throughout the unit are mentioned instead of normal conversational words. 3. The comedic part here is that they will use scientific terms in common scenarios instead of normal conversational words. For example, bumping into a person while running, the learner says, "Ouch! Didn't you see me making translational motion through linear displacement from one place to another?" To make it more naturally comedic, the learners can speak in mixed languages. 4. After sufficient preparation time, the learners present their skits.	The activity targets Learning Objectives 1 and 2 by asking learners to synthesize important ideas and communicate generalizations about linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete

		statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	Option 2: Concept Map	
	1. Important words and phrases used in the lesson are randomly placed in a chart. 2. The teacher asks learners to trace lines to related words or phrases. They justify their lines by explaining the relationships among the concepts. 3. The teacher gives a summary of the entire unit by stating the following: a. The definition and characteristics of translational motion. b. The definition and characteristics of rotational motion. c. The quantities under translational motion. d. The quantities are under rotational motion. e. The comparison and contrast between translational and rotational motion. f. Some examples of how linear and angular quantities are applied to human movement.	The activity targets Learning Objectives 1 and 2 by asking learners to synthesize important ideas and communicate generalizations about linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through

<table>
<tr><td></td><td>g. Some examples of how linear and angular quantities are applied to ergonomic design.</td><td>simulations, images, or presentation slides to visualize motion when available.

Note to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.</td></tr>
<tr><td></td><td colspan="2">C. 3. Evaluating Learning</td></tr>
<tr><td></td><td colspan="2">Option 1: Short Response</td></tr>
<tr><td></td><td>1. The learners are asked to answer the following questions in a paper or notebook.

a. How do translational and rotational motion differ?
b. What three quantities discussed belong to translational motion?
c. What three quantities discussed belong to rotational motion?

3. Give at least one way of how linear and angular quantities apply to human movement in daily life and explain how.

Scoring Guide:

<table><tr><th>Criteria</th><th>2 points</th><th>1 point</th><th>0 point</th></tr><tr><td>Conceptual Claim</td><td>Accurately explains that translational motion involves a body shifting position along a path, while rotational motion</td><td>Defines only one type of motion correctly or blends the definitions inaccurately.</td><td>The distinction between the two types of motion is incorrect or missing.</td></tr></table></td><td>The activity targets Learning Objectives 1 and 2 by checking learners' ability to demonstrate the required knowledge and skills related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.</td></tr>
</table>

	involves changing orientation around a fixed axis.		
Translational Quantities	Correctly lists exactly three linear quantities (e.g., position/displacement, linear velocity, and linear acceleration)	Lists only one or two correct linear quantities.	Fails to list correct translational quantities.
Rotational Quantities	Correctly lists exactly three angular quantities (e.g., angular displacement, angular velocity, and angular acceleration)	Lists only one or two correct angular quantities.	Fails to list correct rotational quantities.
Daily Life Applications	Identifies a valid daily human movement and explicitly explains how both linear and angular elements work together in that movement.	Identifies a valid movement but only explains either the linear or the angular side, not both.	The movement example is missing, or the explanation is physically incorrect.

Notes to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

Option 2: The Pivot Word

1. The teacher challenges each student to choose exactly one vocabulary word that best summarizes the connection between

The activity targets Learning Objectives 1 and 2 by checking learners' ability to demonstrate the required knowledge and skills related to linear and angular quantities in translational and rotational

	translational and rotational motion in human movement or ergonomic design. 2. The learners must defend their choice using two sentences. Sentence 1 must state how the word relates to translational mechanics. Sentence 2 must state how the word relates to rotational mechanics.	motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	C. 4. Additional Activities	
	Option 1: The "Odd One Out"	
	1. Write four terms on the board. Three of them should belong to the same category of motion, and one should be the "odd one out." Example Set: Linear Velocity, Angular Acceleration, Force, Linear Displacement.	The activity targets Learning Objective 1 by engaging learners in a task related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior

	2. Students must write down which word doesn't fit and give a one-sentence scientific reason why.	knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning, supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available. **Notes to Teachers:** Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.
	Option 2: The "True or Myth" Headline	
	1. The teacher writes a "clickbait" style headline on the board regarding sports or everyday safety. Example: "SHOCKING: Scientists claim helmets are useless because they only stop straight hits, not head twists!" 2. Students must write a quick two-sentence comment responding to this headline. Sentence one must state if the headline is a True Fact or a Scientific Myth. Sentence two	The activity targets Learning Objective 1 by engaging learners in a task related to linear and angular quantities in translational and rotational motion. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is comparative analysis using tables and guided questioning,

must back up their claim by correctly using the terms of translational motion and rotational motion.

Scoring Guide:

Criteria	2 points	1 point	0 point
Correct Claim	Sentence 1 explicitly and correctly identifies the clickbait headline as a Scientific Myth with a brief, clear introductory rationale.	Sentence 1 correctly identifies the headline as a Scientific Myth, but the statement is vague or lacks a clear concluding thought.	The student misidentifies the headline as a "True Fact," or the claim is missing entirely.
Motion Mechanics	Sentence 2 accurately integrates and distinguishes both translational motion (linear, straight-line force) and rotational motion (angular, twisting force).	Sentence 2 includes both terms, but misuses one of them, confuses their definitions, or only explains one type of motion accurately.	The student omits both terms, swaps their technical definitions entirely, or writes an incorrect mechanical explanation.
Safety Applications	Sentence 2 provides a highly specific safety connection explaining how managing these forces protects the brain from distinct injuries (e.g., standard foam prevents skull fractures while slip-liners	Sentence 2 provides a general safety connection (e.g., "it protects your head from injury") but lacks specific physical or biological context.	The safety explanation is completely missing, irrelevant, or scientifically inaccurate.

supported by peer sharing and teacher questioning. Literacy is integrated through defining and comparing motion-related terms in complete statements. Numeracy is integrated through interpreting and comparing linear and angular quantities such as displacement, velocity, and acceleration. EdTech is integrated through simulations, images, or presentation slides to visualize motion when available.

Notes to Teachers: Ask learners to state whether each example shows translational motion, rotational motion, or both. Clarify the difference between linear and angular quantities before moving to computations.

		prevent concussions).		

V. ASSESSMENT

(Assessing Learnings)

Kinematic Comparison Matrix

Instructions: Complete the comparison table below. First, pair each translational (linear) quantity with its matching rotational (angular) counterpart. Then, in the final column, write a brief two-sentence explanation contrasting how these two companion quantities differ in a real-world scenario (such as human movement or ergonomic design).

Suggested quantity pairs for checking: displacement - angular displacement; velocity - angular velocity; acceleration - angular acceleration.

Translational (Linear) Quantity	**Rotational (Angular) Quantity**	Two-Sentence Explanation (Difference of 2 Quantities in a Real-World Scenario)
		Sentence 1: Sentence 2:

	Scoring: Use this 3-level rubric to grade the Conceptual Distinction & Real-World Application column for each of the three rows (maximum 3 points per row). **3 Points (Proficient):** • The explanation explicitly highlights the core scientific difference (straight-line movement vs. rotation around a fixed axis/pivot point). • The student successfully incorporates a concrete, accurate, real-world example (human movement or ergonomic design) illustrating both concepts. **2 Points (Developing):** • The student correctly defines how the two quantities differ in theory, but the real-world example is either missing, vague, or only illustrates one of the two motions. **1 Point (Beginning):** • The distinction is inaccurate, confused, or relies entirely on casual language without using disciplinary terminology (e.g., just stating "one goes straight and one spins" without contextual depth).
VI. REFLECTION **(Feedback and Continuous Improvement)**	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?

VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Applications of Translational and Rotational Motion - Relationship Between Linear and Angular Quantities**	Lesson Exemplar	3

I. OBJECTIVES	
A. Content Standard	The learners learn that understanding linear and angular quantities to describe motion helps in the design of efficient machines.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills (Before this lesson, the learners are expected to have prior knowledge of displacement, velocity, and acceleration, vector and scalar.) The learners compare translational and rotational motion in terms of their respective linear and angular quantities. The learners demonstrate through simple activities the relationship between linear and angular quantities in human movement and ergonomic designs.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Amphenol CIT. 2023. "Linear Position and Displacement Measurement with Capacitive and Eddy-Current Sensors." Lion Precision. Last modified July 11, 2023. https://www.lionprecision.com/linear-position-and-displacement-measurement-with-capacitive-and-eddy-current-sensors/. BYJU'S. 2020. "Angular Acceleration Formula." Last modified September 25, 2020. https://byjus.com/angular-acceleration-formula/. BYJU'S. 2022a. "Angular Velocity." Last modified August 30, 2022. https://byjus.com/physics/angular-velocity/. BYJU'S. 2022b. "Angular Displacement." Last modified December 13, 2022. https://byjus.com/physics/angular-displacement/.

	Fiveable. n.d. "Linear Acceleration - Principles of Physics - Vocab, Definition, Explanations." Accessed June 3, 2026. https://library.fiveable.me/key-terms/principles-physics-i/linear-acceleration. The Physics Classroom. n.d. "Speed Versus Velocity." Accessed June 3, 2026. https://www.physicsclassroom.com/class/1dkin/lesson-1/speed-and-velocity. Department of Education. n.d. "MATATAG Curriculum." Accessed June 3, 2026. https://www.deped.gov.ph/matatag-curriculum/. Department of Education. 2024. "DepEd Memorandum No. 001, s. 2024." https://www.deped.gov.ph/wp-content/uploads/DM_s2024_001.pdf. Department of Education. 2023. "DepEd Order No. 013, s. 2023." https://www.deped.gov.ph/wp-content/uploads/DO_s2023_013.pdf.
III. CONTENT (Sequencing Content)	Applications of Translational and Rotational Motion - Relationship Between Linear and Angular Quantities
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	**At the end of the lesson, the learners should be able to:** 1. identify the linear and angular quantities related to translational and rotational motion; compare and contrast translational and rotational motion; 2. demonstrate how translational and rotational motion are applied in human movement; and 3. design and critique a simple machine or ergonomic object using the concepts of translational and rotational motion.

IV. PROCEDURES		ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**	
	Option 1: COLLABORATIVE WORD MAP	
	● The class is divided into groups of at most five members. The teacher gives each group a manila paper and marker. The teacher then instructs the learners that they will be making a word map of all the words they can think of which are related to the central word which will be written at the middle of the manila paper. They do this within five	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive

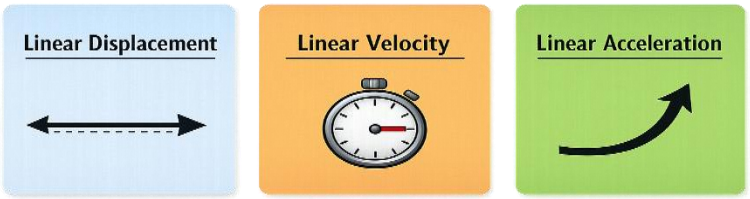
	minutes. The learners may only begin after the teacher says the central word. The central word is "motion." ● After five minutes, the learners tack their outputs on the board. Each group presents their word map where the members take turns in explaining the connection of each word to the central word. ● Teacher may implement Role Accountability (The 5-Member Team) to ensure active participation and equal sharing as mandated in the teacher notes, assign structured roles before the timer starts: ● Linear Tracker: Focuses on finding straight-line path words. ● Angular Tracker: Focuses on finding spinning/turning words. ● Metric Master: Ensures words have measurable units or tools associated with them. ● Liaison/Scribe: Manages the physical paper or digital interface layout. ● Presenter: Coordinates the final oral explanation to the class.	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: LAVA FLOOR	
	The teacher then presents statements related to motion from the previous grade levels. For each statement, learners are given 30 seconds to think. Before revealing the correct answer, the teacher can briefly connect the concept to human movement (e.g., "Displacement matters in gymnastics routines") or ergonomic design (e.g., "Force balance is crucial in chair stability") and asks learner to defend their stand through sketch a quick diagram (e.g., arrow showing displacement vs. distance.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	Statements: 1. Distance is how much ground an object has covered, regardless of direction. (True) 2. Displacement measures how far and in what direction an object is from its starting point. (True) 3. Speed is a vector because it tells you how fast and in which direction something moves. (False) 4. The SI unit for both distance and displacement is the meter (m). (True) 5. Average acceleration in one-dimensional motion equals total displacement divided by elapsed time. (False) 6. If the net force on an object is zero, it will either stay at rest or move at constant velocity. (True) 7. Displacement is the rate at which an object's velocity changes over time. (False) 8. Newton's second law can be written as F = ma, which relates to net force, mass, and acceleration. (True) 9. In uniform circular motion, although speed is constant, the velocity is changing because direction keeps changing. (True) 10. Centripetal acceleration in circular motion points away from the center of the circle. (False) Output requirement: Learners could sketch a quick diagram (e.g., arrow showing displacement vs. distance.	The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: GALLERY WALK (TRANSLATIONAL)	
	● Four photos are placed on the walls of the classroom. In pairs, the learners identify whether the motion described is translational or not. Moreover, they identify the quantity described by the descriptions placed with the photos. a. A sprinter running from the starting line to the finish line (translational, linear displacement)	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive

	b. A dog running along a curved road at a slow pace (translational, linear velocity) c. A plane flying a curved path, speeding up upon takeoff and slowing down for landing (translational, linear acceleration) d. A fish swimming in a straight line from a rock to another rock (translational, linear displacement) ● The learners return to their seats. The teacher gives time for the learners to finalize their answers, then processes their answers by calling on learners to justify their responses. **Key Questions for Processing:** 1. Did all the motions follow a straight line? Explain your answer. 2. What does this imply about translational motion? 3. Since the motions involved straight lines and curved lines, the path is not uniform for all the examples. What is common among all examples? 4. Why are they all translational? 5. What are the three physical quantities that describe translational motion?	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: GALLERY WALK (ROTATIONAL)	
	● Four photos are placed on the walls of the classroom. In pairs, the learners identify whether the motion described is translational or rotational. Moreover, they identify the quantity being described by the descriptions placed with the photos. a. A Ferris wheel making half a full spin (rotational, angular displacement) b. An electric fan spinning very fast (rotational, angular velocity)	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	c. A merry-go-round going from rest, to a slow spin, to a faster spin (rotational, angular acceleration) d. A rock rolling downhill slowly at first then faster due to gravity (rotational, angular acceleration) Note to letter D: For the rock rolling downhill, the teacher must explicitly highlight the rock scenario during processing to show that translational and rotational motion are not mutually exclusive but can occur simultaneously and at the same time emphasize both rotational (angular acceleration) and translational (linear acceleration) to reinforce the relationship between the two. • The learners go back to their seats. The teacher gives time for the learners to finalize their answers, then processes their answers by calling on learners to justify their responses. **Key Questions for Processing:** 1. What is common among all examples? Why are they all rotational? 2. What are the three physical quantities that describe rotational motion? 3. Why do you think rotational motion quantities are called "angular quantities"?	The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.

<table>
<tr><td rowspan="3">B. Instituting New Knowledge</td><td colspan="2">B. 1. Presenting Examples</td></tr>
<tr><td colspan="2">Option 1: MATCH MADE IN MOTION (TRANSLATIONAL)</td></tr>
<tr><td>
1. Three random learners are called in front. Each learner will hold a meta card containing each of the three linear quantities used to describe translational motion.



METACAR METACAR METACARD

2. The teacher calls three other learners to draw a random paper from a box. These papers contain a photo and description which are the same as the first three in Activity 2 Option 1 (sprinter, dog, and plane). These three learners stay at a side and open their papers simultaneously. They are then given 30 seconds to choose from among the three other standing learners their correct partner (holding meta cards containing linear quantities) based on the photos and descriptions that they drew. The learners who drew papers are not yet allowed to show their drawn papers until they have found a match.
3. After all, three learners have found their match; they reveal their papers.
4. The teacher processes the activity by asking the class whether they agree or disagree with the match and calling on learners to justify their responses. If a learner approached the wrong match, ask the class for help in determining the correct one.
</td><td>
The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available.

Notes to Teachers: Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
</td></tr>
</table>

	Key Questions for Processing: 1. Did all the motions follow a straight line? What does this imply about translational motion? 2. Since the motions involved straight lines and curved lines, the path is not uniform for all the examples. What is common among all examples? Why are they all translational? 3. What are the three physical quantities that describe translational motion? The teacher summarizes the key points: In translational motion, all points of the body travel the same displacement, in the same direction, with the same duration (time), and with the same velocity and acceleration at any given instant. The three physical quantities that describe translational motion are called linear quantities, and these include linear displacement, linear velocity, and linear acceleration. The teacher presents another set of terms, this time the angular quantities (angular displacement, angular velocity, and angular acceleration) and their definitions. The learners read the terms and definitions. For each term, they are given time to understand and to ask about words in the definitions that they find difficult to understand. The teacher asks other students to provide definitions of difficult words. The teacher asks the learners if the terms are familiar. **Guide Questions:** 1. What do you notice about the terms as compared to the ones previously presented?	

	2. What does this imply about the type of motion these terms describe? (Do you think these still describe translational motion?)	
	Option 2: MATCH MADE IN MOTION (ROTATIONAL)	
	1. Three random learners are called in front. Each learner will hold a meta card containing each of the three linear quantities used to describe rotational motion. 2. The teacher calls three other learners to draw a random paper from a box. These papers contain a photo and description which are the same as the first three in Activity 5 Option 1 (Ferris wheel, electric fan, and merry-go-round). These three learners stay at a side and open their papers simultaneously. They are then given 30 seconds to choose from among the three other standing learners as their correct partner (holding meta cards containing angular quantities) based on the photos and descriptions that they drew. The learners who drew papers are not yet allowed to show their drawn papers until they have found a match. 3. After the three learners have found their match, they reveal their papers. 4. The teacher processes the activity by asking the class whether they agree or disagree with the match and calling on learners to justify their responses. If a learner approached the wrong match, ask the class for help in determining the correct one. **Key Questions for Processing:** 1. What is common among all examples? Why are they all rotational? 2. What are the three physical quantities that describe translational motion?	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.

3. Why do you think quantities related to rotational motion are called angular quantities?

B. 2. Discussing New Concept

Option 1: Motion-Match Up-
(Translational Vs. Rotational Classification Chart)

1. The teacher tacks a chart on the board. The chart contains two columns: Translational Motion and Rotational Motion.
2. The teacher pulls out meta cards with terms related to translational motion and rotational motion. Learners are called to paste the meta cards in the appropriate column.

Translational Motion	Rotational Motion
Points have equal linear displacement	Points have varying linear displacements
Points travel in the same direction	Points travel in varying directions
Points travel with the same velocity	Points travel with different linear velocities
Points travel with the same acceleration	Points travel with varying accelerations
Linear displacement	Angular displacement
Linear velocity	Angular velocity
Linear acceleration	Angular acceleration

3. The teacher asks a learner to explain each type of motion based on the data in the chart.
4. If the learners' explanations are insufficient, the teacher explains and summarizes.

The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available.

Notes to Teachers: Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.

	Option 2: PAPER MARS HELICOPTER (TRANSLATIONAL AND ROTATIONAL)	
	1. The teacher makes introductory statements on NASA's Perseverance Mars rover. The teacher can refer to the link for help. 2. The teacher asks the learners to form pairs. 3. The teacher provides the materials and instructions. The teacher allows the learners to independently perform the activity. 4. After the activity, the teacher facilitates the class in processing the activity. The teacher may use the actual questions in the materials for processing. The following questions should be added to relate the activity to the competency: a. How does the paper Mars helicopter exhibit translational motion? Describe the linear quantities exhibited by helicopters. b. How does the paper Mars helicopter exhibit rotational motion? Describe the angular quantities exhibited by helicopters. c. How important is understanding translational and rotational motion in designing NASA's Perseverance Mars rover (both the paper and the actual)? The teacher emphasizes that translational and rotational motion are not mutually exclusive, meaning a body may have both types of motion at the same time. Let the learners think of examples. Examples: a ball spinning while flying a stone rolling downhill, and the wheels of a running vehicle.	The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.

	B. 3. Developing Mastery	
	Option 1: AHA SLIDES	
	1. The teacher groups the learners into a maximum of five members. 2. The teacher prepares the Aha Slides platform, including the QR code or link. 3. The teacher conducts an interactive game. 4. Scores are automatically revealed at the end of the game. 5. The teacher appreciates the groups with perfect scores and asks the groups with errors which part confused them. Those with perfect scores will clarify confusion unless the teacher's expertise is needed.	The activity targets Learning Objective 3 by allowing learners to practice, classify, compute, or organize ideas related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: VENN DIAGRAM	
	1. The teacher instructs the learners to get a piece of paper or their notebook.	The activity targets Learning Objective 3 by allowing learners to practice, classify, compute, or organize ideas related to relationships between

	2. The teacher asks the learners to create a Venn diagram showing the similarities and differences between translational motion and rotational motion. The 18 statements given may be used for the differences, but the similarities must be identified by the learners. Translational Motion 1. All points move the same distance. 2. Motion occurs along a straight or curved path. 3. Described by linear quantities — displacement, velocity, acceleration. 4. Each point moves parallel to others. 5. Center of mass changes position. 6. Measured in meters, m/s, m/s^2. 7. Examples include a car moving forward or a sprinter running. 8. Direction of motion is the same for all parts. 9. No rotation about an axis. **Rotational Motion** 10. All points move in circular paths. 11. Motion occurs around a fixed axis. 12. Described by angular quantities — displacement, velocity, acceleration. 13. Different points cover different distances. 14. The center of mass may remain fixed.	linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.

	15. Measured in radians, rad/s, rad/s^2. 16. Examples include a spinning top or rotating fan. 17. Direction of motion varies for different points. 18. Rotation involves torque and angular momentum Learner-Identified Similarities Learners can discover and write in the center of the Venn diagram: • Both involve movement of objects. • Both can be described using displacement, velocity, and acceleration (linear vs angular). • Both follow laws of motion and depend on force. • Both can be uniform or non-uniform.	
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: HUMAN MOTION VIDEO ANALYSIS AND DEMONSTRATION	
	1. The teacher gives a link to a video that the learners need to watch before the next meeting: bit.ly/TransRotMove. **Task:** Create two columns in your paper/notebook. Label the first column "Translational Motion" and the other column "Rotational Motion." Fill in the table with the human motions or actions found in the video that exhibit translational or rotational motion. Moreover, describe the actions in terms of the physical quantities. All the six discussed physical quantities should be mentioned in the table. Finally, answer the question: How	The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to relationships between linear and angular quantities in movement and ergonomic designs. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	important is understanding translational and rotational motion in human movement? 2. At the next meeting, the answers are checked. The teacher may opt to use a physical or online word map or word cloud for the learners to write or encode their answers (action with description). 3. The teacher asks a learner to read the answers for "Translational Motion" while the whole class demonstrates the action. 4. The teacher asks a learner to discuss the answers for "Rotational Motion" while the whole class demonstrates the action. 5. The teacher asks two or three learners to discuss how important it is to understand translational and rotational motion in human movement. 6. The teacher summarizes the discussion, focusing on the application of translational and rotational motion in human movement. **Reflection Prompt:** "How can understanding translational and rotational motion improve performance in sports or safety in daily activities?"	The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: READING AND REFLECTION	
	1. The teacher gives a link to a scientific article related to brain injuries caused by translational and rotational motion: bit.ly/TransRotInjury. The article is to be read before the next meeting. Task: Read the article. Take note of the importance and application of understanding translational and rotational motion. Answer the following questions. a. What is the article about?	The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss

	b. What concepts of translational and rotational motion are used in the article, and how are they used? c. What new thing did you learn from the article? d. What is the importance of understanding translational and rotational motion in human movement based on the article? e. After reading the article, what new questions do you have? 2. The answers are checked. The teacher calls learners to discuss their answers to the questions. 3. The teacher summarizes the discussion, focusing on the application of translational and rotational motion in human movement and the importance of understanding it in the context of safety. For students who could not access the link at home, provide a printed hard copy of the core text abstract for small-group review during the first 5 minutes of class, before starting the full-class discussion.	ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	C. 2. Making Generalization	
	Option 1: CONCEPT MAP	
	1. Important words and phrases used in the lesson are randomly placed in a chart. 2. The teacher asks learners to trace lines to related words or phrases. They justify their lines by explaining the relationships among the concepts. The teacher gives a summary of the entire unit by stating the following: 1. The definition and characteristics of translational motion. 2. The definition and characteristics of rotational motion. 3. The quantities under translational motion.	The activity targets Learning Objectives 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	4. The quantities are under rotational motion. 5. The comparison and contrast between translational and rotational motion. 6. Some examples of how linear and angular quantities are applied to human movement. 7. Some examples of how linear and angular quantities are applied to ergonomic design.	The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: COMEDIC SKITS	
	1. The class is divided into groups of six members. 2. The learners develop role play skits portraying common scenarios, but the key concepts they learned throughout the unit are mentioned instead of normal conversational words. 3. After sufficient preparation time, the learners present their skits. The following are the situations to act out by the learners: • Group 1-A gymnast explains angular velocity while performing a spin on the floor. • Group 2- Two friends walk to class and casually discuss displacement instead of saying "distance." • Group 3- A family in a car talk about velocity when describing how fast they're going to the mall.	The activity targets Learning Objectives 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying

	• Group 4- A runner describes acceleration while increasing speed during a race. • Group 5- A group portrays a ceiling fan, explaining rotational motion and angular acceleration. • Group 6- Passengers on a plane describe translational motion as the aircraft accelerates down the runway. **Reflection Prompt: After presentations, ask the learners:** "Which scientific terms were easiest to use in conversation? Which were hardest?"	classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	C. 3. Evaluating Learning	
	Option 1: SHORT RESPONSE	
	1. The learners are asked to answer the following questions in a paper or notebook. a. What are the characteristics of translational motion? b. What are the characteristics of rotational motion? c. How do translational and rotational motion differ? d. What three quantities discussed belong to translational motion? e. What three quantities discussed belong to rotational motion? f. Give at least one way linear and angular quantities that are applied to human movement as observed in daily life and explain how. g. Give at least one way linear and angular quantities that are applied to ergonomic designs as observed in daily life and explain how.	The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time,

<table>
<tr><td></td><td></td><td>speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available.

Notes to Teachers: Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.</td></tr>
<tr><td></td><td colspan="2">Option 2: Motion Hunt: Translational or Rotational?”</td></tr>
<tr><td></td><td>Instructions for Learners:
1. Look around your classroom. For example, if you look at a wall clock, the whole clock's body stays still, but the clock's hands spin around a fixed center point. That means the clock's hands show rotational motion, and we track how fast they turn using angular velocity (w).
2. Now It’s Your Turn! Can you name 10 objects or actions that show motion?
3. Classify each one as either: Translational motion or Rotational motion
4. For each example, briefly explain:
● What kind of motion it shows
● One linear quantity (displacement, velocity, or acceleration) OR one angular quantity (angular displacement, angular velocity, or angular acceleration)
5. Write your answers in your notebook using a simple table format:
<table><tr><th>Object/Action</th><th>Type of Motion</th><th>Explanation</th><th>Quantity Observed</th></tr><tr><td></td><td></td><td></td><td></td></tr></table></td><td>The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available.</td></tr>
</table>

	Reflection Prompt: "Which type of motion did you find more common in the classroom, translational or rotational? Why?"	**Notes to Teachers:** Let learners observe the movement first before introducing the terms. Guide them to connect body movement or design examples to the correct linear or angular quantity.
	C. 4. Additional Activities	
	Option 1: MAKING A PAPER MARS HELICOPTER	
	1. The teacher makes introductory statements on NASA's Perseverance Mars rover. The teacher can refer to the link for help. 2. The teacher asks the learners to form pairs. 3. The teacher provides the materials and instructions. The teacher allows the learners to independently perform the activity. 4. After the activity, the teacher facilitates the class in processing the activity. The teacher may use the actual questions in the materials for processing. The following questions should be added to relate the activity to the main competency: a. How does the paper Mars helicopter exhibit translational motion? Describe the linear quantities exhibited by helicopters. b. How does the paper Mars helicopter exhibit rotational motion? Describe the angular quantities exhibited by helicopters. How important is understanding translational and rotational motion in designing NASA's Perseverance Mars rover? **This is the link for this activity:** https://www.jpl.nasa.gov/edu/resources/project/make-a-paper-mars-helicopter-2/ **https://www.jpl.nasa.gov/edu/resources/project/make-a-paper-mars-helicopter-2/**	The activity targets Learning Objective 1 by engaging learners in a task related to relationships between linear and angular quantities in movement and ergonomic designs. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided exploration and motion-based modeling, supported by peer sharing and teacher questioning. Literacy is integrated through describing observed motion and justifying classifications using science vocabulary. Numeracy is integrated through measuring or comparing distance, angle, time, speed, and related motion quantities. EdTech is integrated through using videos, timers, images, or simulations to support observation when available. **Notes to Teachers:** Let learners observe the movement first before introducing the terms.

		Guide them to connect body movement or design examples to the correct linear or angular quantity.
	Option 2: COLLABORATIVE PERFORMANCE-BASED ASSESSMENT (DESIGN PITCHING AND CRITIQUING CHALLENGE)	
V. ASSESSMENT **(Assessing Learnings)**	This activity can be announced in advance to give learners ample time to prepare. The learners work in groups. The teacher instructs the groups to design a simple machine or ergonomic object using the concepts of translational and rotational motion. The following must be observed. 1. The design should be sketched in one or more bond papers (the class should determine the size). Learners are free to sketch manually or use design software. 2. The design should be made incorporating the concepts of translational and rotational motion. 3. The design should be made with the purpose in mind, which is to provide ease and comfort to living organisms, including humans. The learners fill in Annex A (Design Thinking Process) to create a successful design. When the designs are done at the set schedule, the learners exchange their designs with other groups designated by drawing lots or using a computer-based randomizer. The learners then critique and note each other's designs and suggest improvements for 15 minutes using the concepts of translational and rotational motion. After the critiquing activity, the groups present their designs for five minutes. After each presentation, the group that critiqued the design gives feedback and suggestions for improvement. This activity is open to conversations, such as the presenter defending the design. The feedback and defense last for three minutes only. The teacher assigns a learner to serve as a timekeeper who will raise a flag when there is only 30 seconds remaining for both presentation and feedback/defense. The teacher may use and modify the rubric after presenting it to the class.	

Part 1: Design Presentation (20 points)

Criteria	**Excellent (5 pts)**	**Proficient (4 pts)**	**Developing (3 pts)**	**Beginning (1-2 pts)**
Application of Translational and Rotational Motion Concepts	Accurately and clearly applies relevant concepts to explain the function and design of the object	Applies concepts with minor errors or partial clarity	Shows limited understanding or only vaguely relates concepts	Concepts are missing, inaccurate, or poorly explained
Ergonomic Relevance and Purpose	The design is highly purposeful and clearly enhances comfort/ease for living organisms	The design has a clear purpose and moderate ergonomic consideration	Purpose is somewhat evident, but ergonomic benefit is minimal	Purpose is unclear or unrelated to ergonomic benefit
Clarity and Quality of Visual Design	Sketch is neat, detailed, visually clear, and effectively supports explanation	Sketch is mostly neat and understandable, with minor issues	Sketch is basic or unclear in parts	Sketch is messy or lacks important details
Presentation and Communication Skills	Presents with confidence and clarity and ideas are well-organized and engaging	Presents clearly but may lack some organization or confidence	Presentation is hesitant or disorganized	Presentation is unclear, very short, or difficult to follow

Total Score for Part I: 20 points

Part 2: Critique of Peer's Design (20 points)

Criteria	**Excellent (5 pts)**	**Proficient (4 pts)**	**Developing (3 pts)**	**Beginning (1-2 pts)**
Use of Scientific Concepts	Critique insightfully uses concepts of translational and rotational motion to analyze design	Uses relevant concepts, though with slight inaccuracies	Concepts used are general or not well connected to critique	Scientific basis is weak or absent
Constructiveness of Feedback	Feedback is specific, respectful, and suggests practical improvements	Feedback is mostly helpful and respectful with some useful suggestions	Feedback is vague or only partially constructive	Feedback is minimal, irrelevant, or overly critical
Clarity and Structure of Critique	Ideas are clearly and logically expressed with strong justification	Mostly clear and logical, with minor gaps in explanation	Somewhat disorganized or unclear	Lacks structure and ideas are poorly communicated
Engagement in Dialogue	Actively engages in open discussion and responds thoughtfully to defense or questions	Participates in discussion and responds adequately	Limited engagement or passive interaction	Avoids or minimally engages in discussion

Total score for Part II: 20 points

VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and take full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Simple and Compound Machines - Designing Efficient Machine Prototypes**	Lesson Exemplar	4

I. OBJECTIVES	
A. Content Standard	The learners learn that the efficiency of simple and compound machines can be improved by applying basic physics principles.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills Basic understanding of motion and changes in position, various forces such as push, pull, gravity, and friction, and the practical functions of simple machines commonly used at home, in school, and throughout the community. The learners apply concepts of translational and rotational motion to design and build prototypes of efficient simple and compound machines.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Halliday, David, Robert Resnick, and Jearl Walker. Fundamentals of Physics. 11th ed. Hoboken, NJ: Wiley, 2018. Serway, Raymond A., and John W. Jewett Jr. Physics for Scientists and Engineers. 10th ed. Boston: Cengage Learning, 2019. Paredes, Rodrigo, and Jorge Angeles. 2020. "The Design of a Novel Pure-Rolling Transmission to Convert Rotational into Translational Motion." Mechanism and Machine Theory 148: 103782. Norman, J., and A. L. Liddle. 2019. "Rotational and Translational Motion Interact Independently with Form." Vision Research 162: 81–91. Krynkin, Anton, Roger J. Sandberg, Paul D. Tait, and David M. J. S. Bowman. 2016. "Measuring Rotational and Translational Movements in Rotating Machines Using a Computer Vision Approach." Journal of Mechanical Engineering Science 230 (4): 610–623.

<table>
<tr><td></td><td>The Physics Classroom. "Types of Motion." Accessed May 13, 2025.

PhET Interactive Simulations. "Rotational Motion: Interactive Learning." University of Colorado Boulder. Accessed May 13, 2025.

TED-Ed. "How Wind Turbines Work." Accessed May 13, 2025.</td></tr>
<tr><td>III. CONTENT (Sequencing Content)</td><td>Simple and Compound Machines - Prototypes Using Translational and Rotational Motion</td></tr>
<tr><td>IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)</td><td>1. Define and differentiate translational and rotational motion, as well as simple and compound machines, while recognizing their significance in daily life.
2. Identify examples of translational and rotational motion and explain their role in the functioning of simple and compound machines.
3. Integrate principles of motion into the development of a prototype simple or compound machine.
4. Construct and present a working prototype, showcasing its practical use and effectiveness.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: K-W-L Chart (Know, Want to Know, Learned)</td></tr>
<tr><td>• Ask students to make a K-W-L chart in their notebooks with three columns. Ask them to list their knowledge of motion and machinery in the "K" column. Students put questions about translational and rotational motion in the "W" column. As the session goes on, let learners share in pairs or small groups and complete the "L" column.

<table><tr><th>Type of Motion</th><th>What I Know</th><th>Example of Machine or Tool</th><th>What I Want to Know</th><th>What I Learned</th></tr><tr><td>Translational</td><td></td><td></td><td></td><td></td></tr><tr><td>Rotational</td><td></td><td></td><td></td><td></td></tr></table></td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements,</td></tr>
</table>

		counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	Option 2: Brainstorming Group Activity	
	• The teacher will divide the students into small groups (choose a specific number based on class size) and provide each group with chart paper and markers for recording ideas. • Each group will list different machines they frequently encounter at home, school, or in their community. The students will analyze how each machine moves and determines whether it uses rotational or translational motion (or both). Encourage discussion within groups and ensure everyone contributes. **Guide Questions:** 1. What movements do these machines perform? 2. How does this motion help the machine function? • Each group presents their findings to the class, explaining their reasoning for categorizing each machine. • The teacher will allow students to compare results and refine their understanding of motion concepts. **Criteria:** correct machine example; correct motion classification as translational, rotational, or both; clear explanation of how the motion helps the machine function; and participation of group members in sharing.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.

		Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Real-World Applications	
	• The teacher will show the class how translational and rotational motion are used by real-world machinery such as wind turbines, bicycles, and cranes, and allow them to thoroughly examine how these two motion types affect the equipment's function. • The teacher will facilitate discussion using guide questions. Note: Select only one or two examples depending on the available time. Prioritize one machine that shows rotational motion and one machine that shows both translational and rotational motion. **Guide Questions:** **How Wind Turbines Work – TED-Ed Animation** 1. What type of motion does the blades of a wind turbine exhibit? 2. How does rotational motion in the blades convert into electrical energy? 3. What role does wind speed play in the efficiency of the turbine's motion? 4. Could a wind turbine function with only translational motion? Why or why not? **Bike Wheel Experiment: Angular Momentum** 1. What type of motion does the bike wheel demonstrate? 2. How does rotational motion influence balance and stability in bicycles? 3. How do gears and pedals contribute to both translational and rotational motion in a bicycle?	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	How Cranes Work – Animation 1. What components of a crane use rotational motion? 2. How does translational motion help crane lift and move heavy loads? 3. Why is the combination of translational and rotational motion important in crane operation? 4. How have advancements in motion mechanics improved the efficiency and safety of cranes over time?	
	Option 2: Inspire Innovation: Comparison from Old to Present Designs	
	The teacher will have groups to create comparison charts showing old vs. present designs. The teacher will provide students with the comparison readings for: 1. Bicycle Design 2. Wind Turbines 3. Cranes and Lifting Machines 4. Cars and Engines The teacher will divide the students into small groups and assign each group to a specific machine type. **Guide Questions:** 1. How did old designs utilize motion? 2. What improvements in present designs optimize efficiency? 3. What lessons can engineers learn from past innovations?	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether

		learners can clearly explain the motion involved and how it helps the machine perform work.
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1: Demonstration of a Simple Machine: The Lever	

	• The teacher will prepare all the needed materials for the activity.
	  ○ A sturdy plank or ruler (lever)
	  ○ A block or small object (fulcrum)
	  ○ A weight (such as a book or small bag of sand)
	  ○ A handle or force application point (where students apply pressure)
	• Introduce the concept
	  ○ Explain the basic parts of a lever: fulcrum, effort, and load.
	  ○ A lever works mainly through rotational motion around a fulcrum. When effort is applied on one side, the lever rotates and causes the load to move. This helps reduce the effort needed to lift or move the load.
	  ○ Ask students to predict how shifting the fulcrum might affect force efficiency.
	• Set Up the Demonstration
	  ○ Place the fulcrum (block or object) near the center or one end of the plank.
	  ○ Position the weight (load) on one side of the lever.
	  ○ Ask a student to apply force on the opposite end (handle) to lift the weight.
	• Observation & Discussion
	  ○ Have students observe how the force transforms through motion.
	  ○ Ask: Does moving the fulcrum closer to the weight make lifting easier?
		The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.
		
		Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	○ Discuss real-world examples like seesaws, crowbars, and scissors. ● Hands-On Application ○ Allow students to adjust the fulcrum's position and test different force applications. ○ Encourage them to compare the effort required at different points. ● Wrap-Up & Reflection ○ Discuss: Why are levers important in engineering and everyday tools?	
	Option 2: Interactive Physics Simulations	
	● The teacher will ensure access to PhET or other online simulations that model motion principles. ● Provide students with devices (or pair them in groups if limited resources are available). ● Introduction & Learning Goals ○ Explain the purpose of using simulations—to observe motion changes dynamically by adjusting variables. ○ Define translational vs. rotational motion and highlight their real-world applications. ● Guided Exploration ○ The teacher will demonstrate how to navigate the simulation interface. ○ Show students how to adjust variables (force, mass, friction, etc.) and predict outcomes. ● Student Experimentation & Observation ○ Allow students to test different settings and observe motion behaviors. ○ Encourage them to identify patterns in translational and rotational effects. ○ Have students record findings and compare cause-effect relationships.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.

	• Discussion & Analysis o Use guiding questions to deepen understanding: 1. How does increasing mass affect translational motion? 2. What happens when rotational speed increases? 3. How do friction and external forces impact movement? **Low-tech alternative:** If devices or internet access are not available, use printed diagrams or teacher-led board demonstrations showing how force, mass, friction, torque, and rotation affect motion. Learners may record observations using a worksheet.	**Note to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	B. 2. Discussing New Concept	
	Option 1: Peer Teaching	
	• Introduction & Group Formation o The teacher will begin by explaining the peer teaching method—students will work in pairs to research and teach the class about a machine. o Clarify the difference between simple machines (one mechanism) and compound machines (multiple working parts). o Assign or allow students to choose their machine to research. • Research & Preparation o The teacher will provide students with reliable sources (textbooks, websites, simulation tools like PhET). o Instruct pairs to investigate how their machine utilizes translational and rotational motion. o **Have each group prepare a short presentation (3-5 minutes) with:** Presentation Guide: Each pair must explain the machine's purpose, identify its simple-machine	The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or

	parts, describe where translational motion occurs, describe where rotational motion occurs, and suggest one design improvement for efficiency. ▪ A basic explanation of how the machine works ▪ Examples of real-world applications ▪ A visual aid (drawing, model, or digital slide) ● Presentation & Demonstration o Each pair presents their findings to the class, explaining the motion principles involved. o Encourage students to ask questions after each presentation. o If possible, allow groups to demonstrate the machine physically or using simulations. ● Wrap-Up & Reflection o Summarize key insights, emphasizing the role of motion in mechanical efficiency. o Discuss how innovations in machine design improve real-world applications.	presentation tools to support prototype planning when available. **Note to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	Option 2: Group Discussion on Forces	
	● Introduction & Concept Explanation o The students will define translational motion (linear movement) and rotational motion (circular movement). o The teacher will introduce key forces acting on machines: ▪ Friction: Resistance that slows motion. ▪ Weight: Force due to gravity affecting movement. ▪ Tension: Force applied through cables, ropes, or strings. ▪ Torque: Rotational force affects spinning objects.	The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is

	○ Set the discussion goal: Students will analyze how these forces shape machine efficiency and motion. ● Guided Discussion Using Real-World Examples ○ Divide the class into small groups and assign each force to a group to explore. ○ **Present everyday machines that experience these forces, such as:** ▪ Friction: Bicycle gears, car brakes, or conveyor belts. ▪ Weight: Elevator systems, cranes lifting materials. ▪ Tension: Pulley systems, suspension bridges. ▪ Torque: Wind turbine blades, rotating bicycle wheels. ● Use Guiding Questions to Facilitate Dialogue: ○ Friction: How does friction help or hinder machine performance? ○ Weight: Why must engineers consider weight when designing mechanical systems? ○ Tension: How do tension forces contribute to motion stability in machines? ○ Torque: What factors influence torque in rotational systems? ● Encourage Peer Interaction & Critical Thinking ○ Have each group discuss and analyze how their assigned force affects motion. ○ Ask groups to present key insights to the class, demonstrating examples of force interaction. ○ Encourage debate: How could reducing or increasing each force improve efficiency?	integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	B. 3. Developing Mastery	
	Option 1: Prototype Design Challenge	

	• The teacher will begin by explaining the importance of translational and rotational motion in machine functionality.
	• Present the challenge: Design and construct a simple prototype that incorporates both types of motion using everyday materials.
	• Highlight examples of machines that use both motions (e.g., wind turbines, bicycles, conveyor belts).
	• For Design & Planning Phase
	  ○ Each group brainstorms ideas for their prototype.
	  ○ **Guide students with design questions:**
	  1. How will your machine use translational motion (moving in a straight path)?
	  2. Which parts of your machine will incorporate rotational motion?
	  3. What materials will work best for each motion type?
	  ○ Have groups sketch their design and plan their construction process before assembling.
	• For Building & Testing Prototypes
	  ○ Students construct their prototypes, refining the design as needed.
	  ○ Encourage them to test their models and adjust based on observations.
	  ○ Guide them to identify challenges (e.g., weak structures, inefficient movement) and propose solutions.
	• For Presentation & Reflection
	  ○ **Each group presents their prototype to the class, explaining:**
	  1. Their machine's purpose and motion mechanics
	  2. Challenges faced and how they solved them
		The activity targets Learning Objective 3 by allowing learners to practice, classify, compute, or organize ideas related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.
		
		Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	3. How their design could be improved for real-world applications • Facilitate a discussion: How do engineers use motion principles to create effective machines?	
	Option 2: Motion Analysis Assignment	

	• The students will observe and analyze a simple machine (such as a bicycle or wind-up toy) in their daily environment, collecting data on translational and rotational motion and the forces affecting movement.
	• Introduction & Assignment Explanation
	  ○ The teacher will begin by reviewing motion principles, defining translational (linear) and rotational (circular) motion.
	  ○ Explain the assignment: Students will observe, analyze, and diagram the motion of a simple machine found at home or in daily life.
	• Selecting a Machine & Observing Motion
	  ○ Ask students to choose a simple machine they frequently encounter, such as:
	  ▪ Bicycle – Observe the wheels (rotational motion) and forward movement (translational motion).
	  ▪ Wind-Up Toy – Analyze how gears rotate and drive motion in a straight line.
	  ▪ Scissors or Lever – Examine force application and movement efficiency.
	• Data Collection & Motion Analysis
	  ○ **Guide students to record:**
	  1. Which parts of the machine move in translational motion?
	  2. Which parts rotate, and how does rotational motion contribute to function?
	  3. What forces (friction, weight, tension, torque) affect movement efficiency?
		The activity targets Learning Objective 3 by allowing learners to practice, classify, compute, or organize ideas related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.
		
		Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	• Diagram & Presentation Preparation
	  ○ Have students create labeled motion diagrams of their chosen machine.
	  ○ **Encourage them to explain:**
	  1. How motion types contribute to functionality?
	  2. What improvements could be made to enhance efficiency?
	• Class Discussion & Reflection
	  ○ Students present their observations and findings to the class.
	  ○ Facilitate a discussion: How do these motion principles apply to larger machines in engineering?	

C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: Machine Dissection	

	• Introduction & Concept Explanation
	  ○ The teacher will explain the purpose of machine dissection—to explore how components interact through motion.
	  ○ **Review key motion concepts:**
	  ▪ Translational Motion: Parts moving in a straight path (e.g., sliding gears, pistons).
	  ▪ Rotational Motion: Circular movement (e.g., gears, wheels, rotating motors).
	  ▪ Set expectations for observing, labeling, and recording findings.
	• Group Formation & Machine Disassembly
	  ○ Divide students into small groups (3–5 members per team).
	  ○ Each group carefully disassembles their machine, documenting the process.
	  ○ Guide them to label parts and categorize motion types.
		The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or

	• Analysis & Reflection
	  ○ Ask guiding questions:
	  1. Which components exhibit translational motion?
	  2. How do rotational parts affect movement efficiency?
	  3. What forces (friction, torque) influence the machine's functionality?
	  ○ Encourage groups to compare similarities and differences between machines.
	• Creative Presentation
	  ○ **Each group chooses a format for their findings:**
	  ▪ Video demonstration – Show step-by-step disassembly and motion analysis.
	  ▪ Infographic or poster – Visually display labeled parts and motion explanations.
	  ▪ Live presentation – Explain findings to classmates through a guided walkthrough.
		presentation tools to support prototype planning when available.
		
		Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	Option 2: Case Study Analysis: Motion-Based Innovations	

	• The teacher will provide students with relevant resources (articles, engineering reports, or video documentaries).
	• Divide students into small groups (3–5 members per team).
	• **Instruct students to investigate their case study, focusing on:**
	  ○ How motion principles influenced efficiency improvements?
	  ○ What forces (friction, torque, tension) contributed to functionality
	  ○ How the invention evolved over time
	• Encourage students to gather diagrams, key findings, and historical comparisons.
		The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy

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Guide each group to structure their 5–7-minute presentation, including:

Overview of the invention and its purpose
How translational and rotational motion were applied
What design changes led to efficiency improvements
Visual representation (graphs, diagrams, or digital slides)

Each team presents their case study findings.
Encourage peer engagement by allowing classmates to ask questions.
Facilitate a discussion: How do motion principles drive engineering advancements?

</td>
<td>is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.

Note to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.</td>
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<tr>
<td></td>
<td colspan="2">C. 2. Making Generalization</td>
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<td colspan="2">Option 1: KWL Continuation</td>
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<td></td>
<td>The students will continue filling out the last part of their KWL Chart- What I Learned column. In this part, they will summarize key takeaways from the lesson using the table:
<table>
<tr><th>Types of Motion</th><th>What I Know?</th><th>What I Want to Know?</th><th>What have I learned?</th></tr>
<tr><td>Translational</td><td>Objects move in a straight line or along a path without rotating</td><td>How does translational motion apply to machines in everyday life?</td><td>Translational motion helps in transportation …</td></tr>
<tr><td>Rotational</td><td>Objects spin around an axis, like</td><td>How does rotational motion contribute to</td><td>Rotational motion is essential in machines like</td></tr>
</table>
</td>
<td>The activity targets Learning Objectives 1, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated</td>
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	wheels or gears	machine efficiency and power generation?	wind turbines, bicycles, etc.	through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	Option 2: Concept Mapping			

	• The teacher will ask the students to define translational and rotational motion and give real-world examples.
	• Discuss their differences, focusing on how motion influences machine functionality.
	• **Provide guiding questions:**
	  o How does translational motion differ from rotational motion?
	  o What machines rely on each type of motion?
	  o How do forces interact with both motion types?
	• Presentation & Class Discussion
	  o Each group presents their concept map to the class, explaining their connections.
	  o **Facilitate peer questions and discussions:**
	  ▪ Which machines combine both motions?
	  ▪ How do engineers optimize motion for efficiency?
	• Assign a reflection task, asking students to consider: How could understanding motion principles improve machine design?
				The activity targets Learning Objectives 1, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
				
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				Notes to Teachers: Emphasize that the prototype does not need to be complex. Check whether

		learners can clearly explain the motion involved and how it helps the machine perform work.
	C. 3. Evaluating Learning	
	Option 1: Self-Assessment	
	• **Provide students with a structured questionnaire that includes:** 1. **Concept Understanding:** o Can I clearly define translational and rotational motion? o Can I identify real-world examples of each motion type? o Do I understand how forces (torque, friction, gravity) affect motion? 0. **Application of Concepts:** o Can I explain how motion principles improve machine efficiency? o Can I analyze how motion contributes to engineering advancements? o Am I able to describe how machines integrate both motions? 0. **Confidence Level & Areas for Growth:** o Which motion concept do I feel most confident in? o What specific topic do I need to review or understand better? o What strategies can help me strengthen my understanding? After completing the self-assessment, learners shall answer one application item: Identify one machine, state whether it uses translational motion, rotational motion, or both, and explain how this motion helps the machine perform its task.	The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to translational and rotational motion in simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Note to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	Option 2: Exit Ticket	

	● At the end of the lesson, students submit an exit ticket responding to the question: "How do translational and rotational motions work together in machines?"
	● Review Before Submission
	  o Before answering, guide a short class discussion on examples:
	  ▪ Bicycles: Rotational motion in the wheels creates translational movement forward.
	  ▪ Wind Turbines: Rotational blades convert energy into usable electrical motion.
	  ▪ Cars: Rotational motion in the wheels enables linear movement.
	● Writing the Exit Ticket Response
	  o Provide students with index cards, paper slips, or digital forms to submit answers.
	  o **Instruct them to write a concise response (2–3 sentences) explaining:**
	  1. How both motions interact in a machine of their choice
	  2. Why combining motion types improves functionality
		The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to translational and rotational motion in simple and compound machines. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.
		
		The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available.
		
		Notes to Teachers: Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.

	C. 4. Additional Activities	
	Option 1: Motion Sorting Challenge (Remediation)	
	● The teacher will prepare picture cards, word cards, or printed examples of objects and machines that demonstrate different types of motion (e.g., bicycle wheel, elevator, fan, escalator, Ferris wheel, conveyor belt, wind turbine).	The activity targets Learning Objective 1 by engaging learners in a task related to translational and rotational motion in simple and compound machines. It applies to the

	● Introduction & Review of Concepts o Review the characteristics of translational motion and rotational motion using simple examples. o Explain that students will classify examples based on the type of motion involved. ● Sorting Activity o Divide students into pairs or small groups. o Provide each group with motion cards. o Ask students to classify each example under: 1. Translational Motion 2. Rotational Motion 3. Both Translational and Rotational Motion ● Guided Discussion & Checking of Answers o Allow groups to explain the basis for their classifications. o **Facilitate discussion using guide questions:** 1. Why did you classify the object under this type of motion? 2. Can some machines use more than one type of motion? 3. How does identifying motion help us understand machine functions? ● Reflection o Select a machine from your environment. Describe the primary and secondary motions it exhibits, and evaluate how these motions allow it to perform its intended task effectively. Sample Answer Key: Bicycle wheel - rotational; elevator - translational; fan - rotational; escalator - both; Ferris wheel - rotational; conveyor belt - translational; wind turbine - rotational; sewing machine - both.	Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Note to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
	Option 2: Design Improvement Challenge (Enrichment)	
	Introduction & Challenge Presentation o Explain that engineers continuously improve machines to increase efficiency and performance.	The activity targets Learning Objective 1 by engaging learners in a task related to translational and rotational motion in simple and compound machines. It applies to the

	○ Present the challenge: Students will analyze an existing machine and propose improvements using motion principles. Brainstorming & Planning ○ Divide students into pairs or small groups. ○ **Assign or allow students to select a machine such as:** ● Bicycle ● Wheelbarrow ● Crane ● Pulley system ● Toy car ● Wind turbine Design Analysis ● Ask students to identify: 1. What type of motion is involved? 2. How does the machine currently function? 3. What limitations or problems can be improved? 4. How can translational or rotational motion be modified to improve efficiency? Presentation & Sharing of Ideas ● Students present their proposed improvements through: ○ Drawings ○ Labeled diagrams ○ Short presentations ○ Prototype sketches Reflection ● **Facilitate discussion using the question:** "How can understanding motion principles help engineers create more effective and efficient machines?"	Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is design-based learning and prototype analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining how machine parts move and how the prototype functions. Numeracy is integrated through using measurements, counts, or comparisons to evaluate motion and machine performance. EdTech is integrated through using videos, digital sketches, or presentation tools to support prototype planning when available. **Notes to Teachers:** Emphasize that the prototype does not need to be complex. Check whether learners can clearly explain the motion involved and how it helps the machine perform work.
V. ASSESSMENT **(Assessing Learnings)**	**Engineering Motion: Building Efficient Machines** The learners will work in small groups to design, build, and test a working prototype of a simple or compound machine that demonstrates both translational and rotational motion. They will then explain the physics behind the motion of their machine and reflect its efficiency.	

	Materials (Suggested) • Cardboard, wood, strings, pulleys, rubber bands • Screws, nails, glue, hot glue gun • Plastic wheels, gears, syringes (for hydraulics) • Rulers, protractors, stopwatch, weights • (Students are encouraged to reuse/recycle materials as much as possible.) Before the Activity 1. **Review the Concepts:** • Quick recap of rotational motion • Quick recap of translational motion • Introduce types of simple machines (lever, pulley, inclined plane, wheel and axle, wedge, screw) • Explain compound machines and examples 0. **Form Student Groups:** • Assign or let students form groups of 3–5 • Each group should have mixed strengths (builders, thinkers, writers) • Provide guidelines During the Activity • **Over 2–3 class sessions (or assigned as a project over 1–2 weeks):** • Allow time for designing, building, and testing • Encourage iteration (test, observe, improve) • Walk around to ask probing questions and ensure concepts are applied After the Activity • **Each group submits:** • Prototype (demonstrated in class or through video) • Written Report • Presentation Requirements 1. **Must include:** • At least one rotating component (wheel, gear, pulley, etc.) • At least one translational component (sliding, pushing, lifting, etc.)

- At least one simple machine (lever, pulley, etc.)

2. **Must accomplish a useful task, such as:**
   - Lifting a weight
   - Moving an object
   - Launching something
2. Use recycled or low-cost materials

Calculation Guide: If applicable, include at least one simple measurement or calculation, such as distance moved, time, number of rotations, load lifted, effort used, or estimated efficiency. Learners may explain why calculation is not applicable to their prototype.

Safety Note: Learners must use cutting tools, screws, nails, and hot glue guns only with teacher supervision. Sharp, hot, or heavy materials should be handled carefully. Groups may use safer alternatives such as tape, string, cardboard, bottle caps, and recycled materials.

Deliverables

1. Prototype (presented in class or video demonstration)
2. **Written Report (2–3 pages) with:**
   - Description and labeled diagram of your machine
   - Explanation of how it works using physics terms
   - Calculations of force, torque, efficiency (if applicable)
   - Reflection on design process and teamwork
2. **Short Group Presentation (3–5 minutes):**
   - Show the working prototype
   - Explain how translational and rotational motion are involved

Sample Scoring Rubric:

Criteria	**Excellent (Full)**	**Satisfactory**	**Needs Improvement**
Prototype Functionality (30 pts)	Works smoothly, efficient, creative use of motion	Basic working model, minor flaws	Limited function or incorrect application
Application of Motion Concepts (20 pts)	Accurate use of translational & rotational motion	Partial understanding shown	Concepts misapplied or not shown

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<tr><td></td><td><table>
<tr><td>Design and Engineering (20 pts)</td><td>Smart, creative, structurally sound</td><td>Average design, stable</td><td>Fragile or poorly thought out</td></tr>
<tr><td>Written Report (30 pts)</td><td>Clear, complete, accurate physics and math</td><td>Generally clear, with some errors</td><td>Lacks depth or accuracy</td></tr>
<tr><td>Presentation (20 pts)</td><td>Clear, engaging, physics explained well</td><td>Understandable, with some gaps</td><td>Confusing or lacks explanation</td></tr>
</table></td></tr>
<tr><td>VI. REFLECTION (Feedback and Continuous Improvement)</td><td>Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery.
1. How many learners successfully demonstrated the learning objectives based on the assessment results?
2. Which activity helped learners understand the lesson the most? Which activity helped the least?
3. Which part of the lesson was easiest for learners? Which part was most difficult?
4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support?
5. What did the assessment results show about learners' understanding of the lesson?
What improvement would you make if you taught this lesson again?</td></tr>
<tr><td>VII. USE OF GENERATIVE AI</td><td>In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.</td></tr>
</table>

Content - Topic	**Simple and Compound Machines - Characteristics of Efficient Machines**	Lesson Exemplar	5

I. OBJECTIVES	
A. Content Standard	The learners learn that the efficiency of simple and compound machines can be improved by applying basic physics principles.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	Before engaging in this lesson, learners should already possess foundational knowledge and basic skills in science and mathematics that will support their understanding of simple and compound machines. They should be familiar with fundamental concepts of force, motion, and energy, including how forces can move or change the motion of objects. An understanding of basic measurements such as mass, distance, and time, as well as the ability to perform simple calculations, is also important. Additionally, learners should have prior exposure to the different types of simple machines—such as levers, pulleys, inclined planes, wedges, screws, and wheels and axles—and their everyday applications.
	The learners explain the characteristics of efficient simple and compound machines.

II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Halliday, David, Robert Resnick, and Jearl Walker. Fundamentals of Physics. 11th ed. Hoboken, NJ: Wiley, 2018. Hibbeler, R. C. Engineering Mechanics: Statics & Dynamics. 14th ed. Upper Saddle River, NJ: Pearson, 2016. VanCleave, Janice. Physics for Every Kid: 101 Easy Experiments in Motion, Heat, Sound, and Electricity. New York: Wiley, 1991. Goyal, S., and R. Ruina. "Mechanical Advantage in Simple Machines: A Theoretical and Experimental Approach." Journal of Applied Mechanics 85, no. 4 (2018): 041001. Khan Academy. "Simple Machines and Mechanical Advantage." Accessed May 13, 2025. TeachEngineering. "Introduction to Simple Machines." Accessed May 13, 2025. NASA. "How Machines Help Us Work in Space." Accessed May 13, 2025. OpenStax. (n.d.). 9.3 Simple machines. In Physics. OpenStax. https://openstax.org/books/physics/pages/9-3-simple-machines.	
III. CONTENT (Sequencing Content)	Simple and Compound Machines - Characteristics of Efficient Machines	
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	**By the end of this lesson, the learners should be able to:** *1.* Define efficiency in the context of simple machines. *2.* Explain the characteristics of efficient simple machines, such as low friction, proper alignment, and optimal mechanical advantage. Compare simple and compound machines in terms of structure, function, and efficiency and recommend improvements.	
IV. PROCEDURES		ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**	
	Option 1 Think-Pair-Share: Simple Machines in Daily Life	
	The teacher will begin by briefly reviewing simple machines (lever, pulley, wheel and axle, wedge, screw, inclined plane).	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about efficiency and characteristics of

	Guide Questions: 1. What simple machines do you regularly use? 2. How does each machine help make work easier? 3. Where have you seen these machines applied in real-world engineering or construction? Ask students to individually list three examples of simple machines they encounter in daily life (e.g., scissors, car jacks, door hinges). **Pair Discussion Phase** After listing their examples, students pair up and compare their answers. Encourage critical dialogue, guiding them with these prompts: 1. Do you and your partner have similar machines listed? 2. Can you explain how these machines function? 3. What forces influence their operation?	simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	Option 2 Basic Machines Prior Knowledge Quiz	
	The teacher will prepare a quiz with questions covering simple and compound machines, including: • Definitions & Functions (e.g., What is a lever used for?) • Examples (e.g., Which of the following is a pulley system?) • Real-World Applications (e.g., How does a bicycle use both translational and rotational motion?) Design questions in multiple-choice, true/false, or short-answer formats, selecting the format that best supports the learning objective and encourages active participation.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer

	• Discuss the top correct and incorrect answers to address misconceptions. • Ask guiding questions: ✓ Why did certain questions challenge you? ✓ What concepts do you feel most confident about? ✓ What areas need for further explanation? • Provide quick insights on motion principles and their applications. **Sample questions:** **Multiple Choice** *1.* What is the main purpose of a simple machine? A. To make work harder B. To make work easier C. To stop all motion D. To create electricity only *2.* Which of the following is an example of a lever? A. Ramp B. Crowbar C. Screw D. Pulley *3.* **A pulley is commonly used to: A. Cut paper B. Lift objects C. Measure temperature D. Produce light** *4.* Which simple machine is used in a ramp? A. Lever B. Pulley C. Inclined plane D. Wheel and axle *5.* Which of the following is a compound machine? A. Knife B. Ramp C. Bicycle D. Screw *6.* A pair of scissors is considered a compound machine because it is made up of: A. Only one simple machine B. Two or more simple machines C. No moving parts D. Electrical parts only *7.* Which part of a bicycle shows rotational motion? A. Seat B. Wheels C. Handle grip only D. Frame *8.* Which example shows translational motion? A. A rolling wheel spinning in place B. A bicycle moving forward C. A fan blade rotating D. A doorknob turning	sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

	True or False Write TRUE if the statement is correct and FALSE if it is incorrect. *9.* A lever can help lift or move objects using a fulcrum. *10.* A screw is an example of an inclined plane wrapped around a cylinder. *11.* A machine always removes the need for force. *12.* A compound machine is made up of two or more simple machines. Short Answers *13.* Give one example of a simple machine found at home. *14.* How does a bicycle help a person move more easily? *15.* Why are machines important in daily life?	
	A. 2. Establishing the Purpose of the Lesson	
	Option 1 Real-Life Problem Scenario: Choosing an Efficient Tool	
	The teacher will give a real-world situation: You need to lift a heavy box onto a raised platform. Which tool would be the most appropriate? **Provide students with three tool options to choose from:** • Ramp (inclined plane) – Uses translational motion to move objects upward with reduced force. *https://ph.pinterest.com/pin/603341681298775409/* **https://ph.pinterest.com/pin/603341681298775409/** • Pulley System – Uses rotational motion to lift objects with less effort. *https://www.education.com/science-fair/article/moveable/* **https://www.education.com/science-fair/article/moveable/** • Lever (crowbar) – Transfers force efficiently by applying rotational motion at one end.	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital

https://www.teachengineering.org/lessons/view/cub_simp_machines_lesson03
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The students will be divided into small groups and have them discuss:

1. Which tool would be the best choice for lifting the box efficiently?
2. What forces (friction, gravity, torque) influence their decision?

Encourage students to justify their choices using real-world reasoning (e.g., energy efficiency, ease of use). Guided by the given criteria

Criteria	Guide Questions for Students	What to Present
1. Chosen Tool	Which tool did your group choose: ramp, pulley system, or lever?	State the selected tool clearly.
2. Force Required	Which tool requires the least force to lift or move the heavy box?	Explain how the tool reduces the effort needed.
3. Distance Moved	Does the tool require the box or rope to move a longer distance?	Describe how distance affects the ease of lifting or moving the box.
4. Friction	Will friction make the task easier or harder?	Explain how friction affects the efficiency of the tool.
5. Safety	Is the tool safe to use when lifting or moving the box?	Identify possible safety risks and how to avoid them.
6. Available Materials	Are the materials needed easy to find or prepare?	Mention if the tool can be set up using available materials.
7. Task Suitability	Is the tool appropriate for lifting the box onto a raised platform?	Explain why the tool fits the task.
8. Motion Involved	Does the tool use translational motion, rotational motion, or both?	Describe how the motion helps make the task more efficient.

images, videos, or simulations of machines when available.

Note to Teachers: Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

9. Real-World Challenge	What problem might happen when using the tool in real life?	Give one possible challenge, such as lack of space, too much friction, or unstable load.	
10. Alternative Tool	Would another tool be better for a different situation?	Explain when a different tool may be more efficient.	

Option 2 "Fix My Machine!"

The teacher presents this situation:
"A student is using a wheelbarrow to carry soil, but the wheel is rusty and hard to move."
Think Time
Learners individually answer:

- What makes the wheelbarrow inefficient?
- How can it be improved?

Pair Discussion

- Learners discuss their answers with a partner and agree on the most effective improvement

Class Sharing

- Selected pairs share their suggested improvement with the class.

Learner Output
Learners complete this sentence:
The wheelbarrow is inefficient because _____. It can be improved by _____.

The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available.

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<table>
<tr><td rowspan="5">B. Instituting New Knowledge</td><td colspan="2">B. 1. Presenting Examples</td></tr>
<tr><td colspan="2">Option 1 Video Clips</td></tr>
<tr><td>The teacher may utilize videoclips resources available.
Short Video Viewing
Worksheet: Simple Machines and Efficiency
Name: _____
Grade/Section: _____
Date: _____
Before Watching
1. What do you already know about simple machines?
2. How do simple machines help make work easier?
During the Video
3. How does the machine use force or motion to complete a task?
4. How does the design of the machine improve efficiency?
After Watching
5. Which simple machine seemed most efficient? Why?
6. How can you apply what you learned to improve or design a machine?

Learner’s Output
One simple machine I observed is: _____
It is efficient because: _____
One improvement I suggest is: _____</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available.

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<tr><td colspan="2">Option 2 Model Demonstrations</td></tr>
<tr><td>The students will observe hands-on demonstrations of simple machines—lever, pulley, and ramp—to understand how they work and when they are most efficient in real-world applications.
Introduction & Context Explanation</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to efficiency and characteristics of simple and compound</td></tr>
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Start with a class discussion:

1. How do simple machines make work easier?
2. Where have you seen levers, pulleys, or ramps in daily life?

Explain that each machine reduces effort by manipulating force and motion.

Demonstration of Each Simple Machine

Lever:

1. Place a board over a fulcrum.
2. Apply force at different points to observe how position affects effort needed.
3. Discuss real-world applications (e.g., crowbars, seesaws, and car jacks).

Pulley:

1. Set up a pulley system with a rope and weight.
2. Have students compare pulling directly vs. using a pulley to lift an object.
3. Explain applications in construction, cranes, and well systems.

Ramp (Inclined Plane):

1. Slide objects up a ramp and compare force needed vs. lifting vertically.
2. Discuss applications in wheelchairs, loading docks, and accessibility ramps.

Utilize the observation table below:

Simple Machine Used	Task Performed	Effort Needed	Distance Moved	Friction Points Observed	Conclusion About Efficiency

machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available.

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Lever	Board placed over a fulcrum; force applied at different points to lift or move a load.	Difficult to move/lift Somewhat easy to move/lift Easy to move/lift Explain: _____ _____	Short distance Moderate distance Long distance Explain: _____ _____ _____	Between board and fulcrum Between load and board Other: _____ _Observation: _____ _____ _____	Very efficient Less efficient Reason: _____ _____
Pulley	Rope and pulley used to lift weight; compare lifting directly and lifting using the pulley.	Difficult to move/lift Somewhat easy to move/lift Easy to move/lift Explain: _____ _____	Short distance Moderate distance Long distance Explain: _____ _____ _____ _____ _____ _____	Between rope and pulley wheel Between rope and hand Other: _____ _Observation: _____ _____ _____	Very efficient Less efficient Reason: _____ _____ _____ _____ _____ _____
Ramp / Inclined Plane	Object pushed or pulled up a ramp and compared with lifting the object vertically.	Difficult to move/lift Somewhat easy to move/lift Easy to move/lift Explain: _____ _____	Short distance Moderate distance Long distance Explain: _____ _____ _____	Between object and ramp surface Between wheels and ramp, if used Other: _____ _ Observation: _____	Very efficient Less efficient Reason: _____ _____

	Student Engagement & Reflection **Facilitate a discussion on:** ***1.*** Which machine required the least effort to move objects? ***2.*** How do engineers use these concepts to improve real-world designs? Differentiated Tasks and Alternative Outputs Students may choose or be assigned one of the following output options depending on their readiness level, learning style, language ability, or support needs. Guided Observation Worksheet Best for learners who need more structure or support Students complete the observation table with sentence starters. **Sentence Starters:** • The machine that required the least effort was _____ because _____. • The machine that required the longest distance was _____. • Friction was observed between _____ and _____. • The machine was efficient because _____. • The machine was less efficient because _____. **Expected Output:** Completed observation table with short explanations. Visual Poster or Infographic Best for visual learners and creative learners Students create a poster showing: *1.* The three simple machines *2.* How each machine works *3.* One real-life example for each *4.* Which one was most efficient in the activity *5.* One explanation about friction or energy loss	

	Expected Output: Poster, digital infographic, or illustrated bond paper output. **Oral Explanation or Demonstration** Best for learners who express ideas better through speaking Students explain or demonstrate one simple machine in front of the class. **Guide Prompts:** • This simple machine is called _____. • It makes work easier by _____. • In our demonstration, we observed that _____. • It is useful in real life because _____. • Its efficiency may decrease when _____. **Expected Output:** Two- to three-minute oral presentation or demonstration. Short Written Reflection Best for learners who are comfortable with writing Students write a short paragraph answering: Which simple machine was most efficient in the demonstration? Explain your answer using the ideas of effort, distance, friction, and useful output. **Expected Output:** One paragraph with at least 5–7 sentences.	
	B. 2. Discussing New Concept	
	Option 1 Direct Instruction on Efficiency & Mechanical Advantage	
	The teacher will introduce the key concepts. • Efficiency: The ratio of useful output work to input work in a machine, minimizing wasted energy.	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to efficiency and characteristics of simple and

	• Mechanical Advantage (MA): The ratio of a machine's output force to the input force applied, indicating how much the machine changes the magnitude of the applied force. • Show a diagram of an efficient vs. inefficient machine (e.g., a high-friction pulley vs. a well-oiled pulley). • Highlight energy loss in inefficient systems due to heat, friction, or poor design. **Demonstrate Mechanical Advantage:** • Use a real-world example, such as comparing using a crowbar vs. lifting an object directly. • The teacher will show physical models and demonstrations **Lever Demo:** • Set up a simple lever with a fulcrum and weights. • Have students test different fulcrum positions to observe changes in force requirements. **Pulley Demo:** • Compare lifting weight with and without a pulley system. • Explain how multiple pulleys increase mechanical advantage by reducing effort force. **Inclined Plane Demo:** • Slide an object up a ramp vs. lifting it vertically. • Discuss how inclined planes reduce the force needed by increasing distance traveled. Teacher will give emphasis on: A. Formula for Efficiency Efficiency tells how much of the input work is converted into useful output work. A machine is more efficient when less energy is wasted due to friction, heat, or poor design. $$Efficiency = \frac{Output\ Work}{Input\ Work} \times 100$$	compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

Where:

Output Work = useful work done by the machine

Input Work = work put into the machine

Efficiency is expressed as a percentage (%)

B. Formula for Mechanical Advantage

The mechanical advantage shows how much a machine multiplies the input force. It helps explain how simple machines reduce the effort needed to move or lift a load.

$$Mechanical\ Advantage = \frac{Output\ Force}{Input\ Force}$$

or

$$MA = \frac{Load}{Effort}$$

Where:

Output Force / Load = force exerted by the machine on the object

Input Force / Effort = force applied by the user

MA has no unit because it is a ratio

Worked Examples:

Problem

A student uses a pulley to lift a 200 N load. The student applies an effort force of 50 N. The input work done is 500 J, while the useful output work is 400 J.

Find the:

1. Mechanical Advantage
2. Efficiency of the pulley

Given

$$Output\ Force\ or\ Load = 200N Input\ Force\ or\ Effort = 50N Output\ Work = 400J Input\ Work = 500J$$

Step 1: Solve for Mechanical Advantage

$$MA = \frac{Output\ Force}{Input\ Force} MA = \frac{200N}{50N} MA = 4$$

Answer for Mechanical Advantage:

$$MA = 4$$

This means the pulley multiplies the student's effort by 4 times.

Step 2: Solve for Efficiency

$$Efficiency = \frac{Output\ Work}{Input\ Work} \times 100 Efficiency = \frac{400J}{500J} \times 100 Efficiency$$
$$= 0.8 \times 100 Efficiency = 80\%$$

Answer for Efficiency:

$$Efficiency = 80\%$$

This means that 80% of the input work became useful output work, while 20% was lost, possibly due to friction in the pulley system.

Processing Questions After the Worked Example

1. What does a mechanical advantage of 4 mean?
2. Why is the efficiency not 100%?
3. What could have caused energy loss in the pulley system?
4. How can the pulley be improved to increase its efficiency?
5. Why is it important for engineers to design machines with high efficiency?

Practice Problems for Learners

Solve the following problems. Show your solution.

1. Mechanical Advantage

A lever is used to lift a 300 N load. The student applies an effort force of 100 N.

$$MA = \frac{Load}{Effort}$$

Solution:

Answer:

2. Efficiency

A ramp has an input work of 600 J and an output work of 450 J.

$$Efficiency = \frac{Output\ Work}{Input\ Work} \times 100$$

Solution:

Answer:

3. Combined Mechanical Advantage and Efficiency

A machine lifts a 500 N object using an effort force of 125 N. The input work is 1,000 J and the output work is 750 J.

Find the:

a. Mechanical Advantage b. Efficiency

Solution:

Answers:

a. Mechanical Advantage: _____

b. Efficiency: _____

	Option 2 Analogy Discussion: Understanding Efficiency in Machines	
	Introduce an analogy, such as: • Athlete Comparison: The best athletes maximize power while conserving energy—just like an efficient machine that minimizes waste and maximizes work. Ask students: What other real-world examples function efficiently? • **Pairs or Small Groups:** Have students work together to think of an analogy for machine efficiency. Encourage a diverse range of comparisons: *a.* A well-trained musician – A pianist who plays fluidly without wasted motion. *b.* A traffic system – Roads designed to minimize congestion, much like machines minimize inefficiency. *c.* A chef in a busy kitchen – Precision and organization reduce wasted movement, just like optimized machine designs. **Group Presentations & Class Discussion** Each group presents their analogy, explaining: *1.* How does their analogy relate to efficiency in machines? *2.* What factors make something efficient or inefficient? **Encourage questions and peer insights:** • Would this analogy work for all machines or specific ones?	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

	B. 3. Developing Mastery	
	Option 1 Efficiency Calculation Exercise	
	Introduction & Concept Explanation • Define efficiency: The ratio of useful output work to input work in a machine. • Present the efficiency formula and explain why efficiency matters in engineering and technology. Guided Calculation as a Class **Example 1: Pulley System** **Given:** Input work = 200 J Output work = 150 J **Formula:** Efficiency = (Output Work ÷ Input Work) × 100 **Substitution:** Efficiency = (150 J ÷ 200 J) × 100 **Computation:** Efficiency = 0.75 × 100 Efficiency = 75% Answer: The efficiency of the pulley system is 75%. Interpretation: This means that 75% of the input work was converted into useful output work, while 25% was lost, possibly due to friction between the rope and pulley wheel.	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

	Example 2: Inclined Plane **Given:** Input work = 500 J Output work = 400 J **Formula:** Efficiency = (Output Work ÷ Input Work) × 100 **Substitution:** Efficiency = (400 J ÷ 500 J) × 100 **Computation:** Efficiency = 0.80 × 100 Efficiency = 80% Answer: The efficiency of the inclined plane is 80%. Interpretation: This means that 80% of the input work was converted into useful output work, while 20% was lost, possibly due to friction between the object and the ramp surface. **Independent Practice** **Directions:** Solve the following problems. Show the formula, substitution, computation, unit, and interpretation. **Problem 1: Lever in a Construction Site** A worker uses a lever to move a heavy object. The input work applied is 300 J, while the useful output work is 240 J. Find the efficiency of the lever. **Problem 2: Wheel and Axle in a Bicycle System** A bicycle wheel and axle system receives 600 J of input work. It produces 480 J of useful output work. Find the efficiency of the wheel and axle system.	

	Problem 3: Hydraulic Lift in a Factory A hydraulic lift uses 1,000 J of input work to raise a load. The useful output work is 850 J. Find the efficiency of the hydraulic lift. Solution Guide for Independent Practice **Problem 1: Lever in a Construction Site** **Given:** Input work = 300 J Output work = 240 J **Formula:** Efficiency = (Output Work ÷ Input Work) × 100 **Substitution:** Efficiency = (240 J ÷ 300 J) × 100 **Computation:** Efficiency = 0.80 × 100 Efficiency = 80% Answer: The efficiency of the lever is 80%. Interpretation: This means that 80% of the input work was converted into useful output work, while 20% was lost, possibly due to friction, heat, or movement of parts. **Problem 2: Wheel and Axle in a Bicycle System** **Given:** Input work = 600 J Output work = 480 J **Formula:** Efficiency = (Output Work ÷ Input Work) × 100	

	Substitution: Efficiency = (480 J ÷ 600 J) × 100 **Computation:** Efficiency = 0.80 × 100 Efficiency = 80% Answer: The efficiency of the wheel and axle system is 80%. Interpretation: This means that 80% of the input work was converted into useful output work, while 20% was lost, possibly due to friction between moving parts or resistance from the road surface. **Problem 3: Hydraulic Lift in a Factory** **Given:** Input work = 1000 J Output work = 850 J **Formula:** Efficiency = (Output Work ÷ Input Work) × 100 **Substitution:** Efficiency = (850 J ÷ 1000 J) × 100 **Computation:** Efficiency = 0.85 × 100 Efficiency = 85% Answer: The efficiency of the hydraulic lift is 85%. Interpretation: This means that 85% of the input work was converted into useful output work, while 15% was lost, possibly due to friction, heat, or resistance in the hydraulic system.	

	Option 2 Peer Review: Analyzing Machine Efficiency	
	Preparation & Topic Selection • Assign or let students choose a common machine to analyze (e.g., bicycle, car jack, elevator). • **Explain that the poster must include:** Machine Function – What does it do? Mechanical Advantage & Efficiency – How does it reduce effort? Ways to Improve Efficiency – Consider friction reduction, material choice, or design changes. Visual Representation – Diagrams, labels, and real-world applications. **Creating Posters** • Provide students with poster boards, markers, or digital tools for creating visuals. • Allocate 20–30 minutes for students to develop their posters, ensuring clarity and structure. • Encourage creativity and clear explanations using labeled diagrams. **Peer Review Process** • Pair or group of students to review each other's posters. • **Provide guiding questions for feedback:** • Is the explanation of efficiency clear and accurate? • Does the poster include strong visuals that support understanding? • Are there any areas that could be improved for clarity or detail? • Students write feedback using sticky notes or digital comments. **Class Discussion & Reflection** • Have volunteers share insights from the peer review process.	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

	Discuss: 1. What are the common features of efficient machines? 2. What did students learn about making visual information effective?	
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1 Prototyping Challenge: Designing Efficient Machines	
	Introduction and Context Setting **Begin with a class discussion on efficient machine design using the following guide questions:** ● What makes a machine efficient? ● How do engineers optimize motion and force in machine systems? ● Where can we observe efficient machines in real life, such as bicycles, cranes, pulleys, ramps, and gears? The teacher will emphasize that efficient machines reduce wasted energy by minimizing friction, improving motion, and reducing the input force needed to complete a task. Required Materials Each group may use the following materials. The teacher may adjust the list depending on availability. ● Cardboard or illustration board ● String, yarn, or thin rope ● Popsicle sticks or small wooden sticks ● Plastic bottle caps, toy wheels, or improvised pulleys ● Paper clips, rubber bands, or fasteners ● Tape, glue, or glue gun to be handled with teacher supervision ● Scissors, ruler, pencil, and marker ● Small load or test object such as an eraser, small box, or toy block	The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

- **Optional: gears, small pulleys, wooden dowels, recycled materials, spring scale, stopwatch, or measuring tape**

Safety Reminders

- Handle scissors, cutters, pointed sticks, and other sharp objects carefully. Use them only for their intended purpose.
- If a glue gun is used, it must be operated with teacher supervision to avoid burns.
- Do not throw materials, swing ropes, or use the prototype in a way that may hit or injure classmates.
- Keep the work area clean and free from scattered materials to prevent slipping or tripping.
- Test only small and safe loads. Do not use heavy objects that may fall or cause injury.
- Report broken materials, loose parts, or unsafe designs to the teacher before testing.
- Wash hands after the activity, especially after handling glue, recycled materials, or dusty objects.

Time Allotment

Activity Phase	**Suggested Time**	**Task Description**
Introduction and grouping	10 minutes	Discuss efficient machine design and form groups of 3–5 members.
Planning and sketching	15 minutes	Choose a machine, identify materials, and draw the planned prototype.

Building and prototyping	30 minutes	Construct the prototype using available materials.
Testing and improvement	20 minutes	Test the prototype, observe problems, and revise the design to improve efficiency.
Group presentation	15 minutes	Present the prototype and explain how it works.
Reflection and cleanup	10 minutes	Answer reflection questions and clean the work area.

Total suggested time: 100 minutes. The activity may be completed in one long session or divided into two class meetings.

Group Formation and Design Phase
Form groups of 3–5 members.

- Choose one simple or compound machine to design, such as a lever, pulley, ramp, wheel and axle, gear system, or a combination of these.
- Decide the purpose of the machine. Example: lifting a small object, moving an object with less effort, or changing the direction of force.
- Create a simple sketch showing the parts of the prototype and labeling the expected input force, output force, motion, and load.

Research and Concept Development

Before building, each group should discuss the following design considerations:

- Type of motion involved: translational motion, rotational motion, or both.
- Mechanical advantage: how the machine reduces effort or changes the direction of force.
- Materials used: how the materials make the machine durable, stable, and efficient.
- Energy optimization: how friction, slipping, bending and energy loss can be minimized.

Prototyping and Building Process

- Build the prototype according to the group sketch.
- Test whether the prototype can perform its intended function.
- Observe friction points, loose connections, unstable parts, or areas where effort is wasted.
- Revise the design by improving support, reducing friction, changing angles, adjusting rope position, or strengthening weak parts.
- Record at least one improvement made after testing.

Testing Checklist

Testing Question	**Learner Response**
Did the prototype perform its intended function?	
What part of the prototype required the most effort?	
Where did friction or energy loss occur?	

What change did the group make to improve efficiency?	
After improvement, did the machine work better? Explain briefly.	

Presentation and Justification of Design

- **Each group will present its prototype to the class. The presentation should answer the following questions:**
- What machine did your group design, and why did you choose it?
- How does your prototype use translational or rotational motion?
- How does your prototype reduce effort or improve efficiency?
- What friction points or energy losses did you observe?
- What improvement did your group make after testing?
- What real-world machine or engineering application is related to your prototype?

Rubric for Prototyping Challenge

Criteria	4 - Excellent	3 - Satisfactory	2 - Developing	1 - Beginning
Function	Prototype works consistently and clearly performs the intended task.	Prototype works and performs the task with minor issues.	Prototype partly works but needs frequent adjustment	Prototype does not work or does not show the intended function.

Efficiency Improvement	Design shows clear improvement after testing; friction or effort was reduced effectively.	Design shows some improvement after testing; friction or effort was reduced in at least one part.	Improvement was attempted but had a limited effect on efficiency.	No clear improvement was made after testing.
Explanation	Group clearly explains machine type, motion, mechanical advantage, friction points, and efficiency improvement.	Group explains most concepts correctly with minor gaps.	Group gives a basic explanation but lacks details or has some misconceptions.	Group explanation is unclear or does not connect to machine efficiency.
Teamwork	All members demonstrate active participation, equitable sharing of tasks, and respectful collaboration throughout the activity.	Most members participate and cooperate during the activity.	Some members participate, but teamwork is uneven.	Limited cooperation is observed, with tasks often dependent on a single member.

Learner Reflection

1. What was the most successful part of your prototype?
2. What problems did your group encounter during testing?
3. How did your group improve the efficiency of the prototype?

4. What would you change if you had more time or better materials?
5. How can this prototype be related to a real-world machine or engineering design?

Option 2 Field Observation

Directions for Learners

- Explore your environment, such as your home, school, garden, classroom, workshop area, playground, or nearby structures.
- Identify at least three simple machines or objects that use simple machines.
- Take a photo or make a clear sketch of each machine. If taking photos outside the home or school, ask permission when needed.
- Complete the observation checklist for each machine.
- Identify the simple machine or combination of simple machines involved.
- Observe possible sources of friction or energy loss, such as rough surfaces, loose parts, rust, slippage, or misalignment.
- Suggest one practical improvement that could make the machine more efficient, safer, or easier to use.
- Prepare a short report or presentation based on your observations.

Examples of Simple Machines to Observe

Simple Machine	**Possible Examples**	**What to Observe**
Lever	Seesaw, crowbar, hammer claw, scissors handle	Fulcrum position, effort arm, load

The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available.

Notes to Teachers: Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.

		arm, looseness or wear
Pulley	Clothesline, well pulley, flagpole pulley	Rope movement, pulley wheel, rope friction, alignment
Inclined Plane	Ramp, slide, loading board	Slope angle, surface roughness, effort needed to move upward
Wheel and Axle	Bicycle, rolling cart, doorknob, toy car	Wheel rotation, axle alignment, bearing friction
Wedge	Knife, chisel, axe, gardening tool	Sharpness, surface resistance, force needed to cut or split
Screw	Jar lid, screw, drill bit, bottle cap	Thread condition, turning effort, tightness or rust

Observation Checklist

Complete the table below for each machine you observe. Use short but clear descriptions.

No.	Machine Name / Object Observed	Simple Machine/s Involved	Function or Purpose	Source of Friction or Energy Loss	Suggested Improvement
1					

2						
3						
4						
5						

C. 2. Making Generalization

Option 1 Socratic Seminar: Efficiency & Mechanical Advantage

Preparation & Guiding Questions

- Before the seminar, students review prior lessons on efficiency and mechanical advantages.
- **Provide them with discussion prompts to think about in advance:**
  - ✓ Why is efficiency important in machine design and technology?
  - ✓ How do simple and compound machines maximize mechanical advantages?
  - ✓ What are some real-world examples where improving efficiency has led to technological advancements?
  - ✓ What challenges do engineers face in making machines more efficient?

Setting Up the Seminar Structure

- Arrange students in a circle or small discussion groups, encouraging open dialogue.

The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital

	Assign roles, such as: • Primary Contributors – Lead discussions and introduce key insights. • Clarifiers – Ask follow-up questions to deepen the conversation. • Synthesizers – Summarize discussions at intervals to refine understanding. **Facilitating the Discussion** • Begin by posing a thought-provoking question related to efficiency and mechanical advantage. • Students respond by citing examples, theories, or observations. • **Ensure engagement by encouraging:** ✓ Building on others' responses rather than just stating facts. ✓ Using real-world examples to support arguments. ✓ Ask follow-up questions that challenge assumptions and encourage deeper thinking.	images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	Option 2 Concept Mapping: Simple Machines, Efficiency & Compound Machines	
	Introduction & Context Setting • **Begin with a discussion:** ✓ What are simple machines, and how do they improve efficiency? ✓ How do simple machines combine to form compound machines? ✓ What role does mechanical advantage play in reducing effort and energy loss? • Explain the goal: Students will construct a concept map showing relationships between machines and efficiency principles.	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer

	Group Formation & Materials Preparation • Divide students into small groups (3–5 members). • **Provide each group with:** • Large poster paper or digital concept mapping tools (such as Google Jamboard or MindMeister). • Markers, sticky notes, or diagram templates for organizing ideas. Concept Mapping Process • **Guide students through the organization of their concept maps, ensuring key categories include:** • Simple Machines: Lever, Pulley, Wheel & Axle, Inclined Plane, Wedge, Screw. • Efficiency Factors: Mechanical advantage, reducing friction, minimizing energy loss. • Compound Machines: Examples such as bicycles, elevators, can openers, and cars. • **Encourage connections between categories, asking:** ✓ How do different simple machines interact within a compound machine? ✓ Which machines maximize efficiency, and why? **Group Presentations & Peer Review** • **Each group presents their concept map, explaining:** ✓ Why did they structure the relationships in this way? ✓ What insights they gained about efficiency in machines. ✓ Any surprising connections they discovered. Encourage peer feedback, focusing on clarity and organization of ideas.	sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	C. 3. Evaluating Learning	
	Option 1 Post-Quiz: Efficiency & Simple Machines	
	P**reparation** • **Prepare a quiz with multiple-choice questions covering:**	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the

	✓ Definitions of simple machines and efficiency. ✓ Concepts of mechanical advantage. ✓ Basic calculations related to efficiency and force. • Ensure the quiz includes a mix of conceptual and application-based questions. **Delivery of the Quiz** • **Distribute the quiz either:** • Physically (printed copies). • **Digitally (using tools like Google Forms, Kahoot, or Quizizz. Provide clear instructions:** ✓ Answer all questions to the best of your ability. ✓ Show calculations where required. **Post-Quiz Discussion** • After the quiz, review answers with the class: • Discuss correct answers and explain reasoning. • Address common misconceptions or errors. Encourage students to ask questions about concepts they found challenging.	required knowledge and skills related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	Option 2 Exit Ticket: Understanding Efficiency in Machines	
	Introduction & Purpose Explanation • Explain that the exit ticket serves as a quick reflection to assess understanding. • Emphasize concise yet insightful responses that connect efficiency principles to real-world applications. **Distribute the Exit Ticket Prompt** • Provide students with index cards, slips of paper, or digital forms.	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior

	• Clearly state the prompt: In two sentences, define efficiency in machines. Give one example of a machine you consider highly efficient. **Collection & Review Process** • Gather student responses at the end of class. • Analyze answers to identify common themes, misconceptions, and strengths. • Use insights from responses to adjust teaching strategies for future lessons. **Class Discussion & Reinforcement (Optional)** • If time allows, discuss a few standout responses with the class. • **Encourage peer reflection:** ***1.*** Which machine example do you agree with the most? Why? ***2.*** How can efficiency in machines be improved further?	knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	C. 4. Additional Activities	
	Option 1 Simple-to-Compound Build Task	
	Activity for developing learners The students will combine two simple machines (e.g., ramp + wheel) and explain how each part affects overall efficiency.	The activity targets Learning Objective 1 by engaging learners in a task related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine

		characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital images, videos, or simulations of machines when available. **Notes to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
	Option 2 Efficiency Design Challenge	
	Advanced Extension Activity: Mechanical Tool Redesign Students will engineer an optimized design for a common mechanical tool (e.g., a car jack). **Design Criteria:** • **Improved Mechanical Advantage:** Modifications must clearly reduce the input force required to operate the tool. • **Reduced Friction:** The design must incorporate physical or material solutions to minimize mechanical resistance and energy loss. **Deliverable:** Students will present a brief technical explanation detailing their modifications and the scientific principles supporting their redesigned tool.	The activity targets Learning Objective 1 by engaging learners in a task related to efficiency and characteristics of simple and compound machines. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry and machine comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing machine characteristics such as friction, alignment, and mechanical advantage. Numeracy is integrated through comparing input, output, distance, force, and efficiency-related values when data are available. EdTech is integrated through digital

		images, videos, or simulations of machines when available. **Note to Teachers:** Focus learners on why a machine is efficient, not only whether it makes work easier. Clarify that real machines lose some energy because of friction and other factors.
V. ASSESSMENT **(Assessing Learnings)**	**Option 1 Culminating Project: Understanding Simple & Compound Machines** Students will consolidate their understanding of simple and compound machines by analyzing efficiency and proposing enhancements through a digital or physical presentation. 1. Introduction & Project Overview • Explain the goal: Students will create a comprehensive presentation showcasing their understanding of motion principles in machine design. • **Discuss key components:** ◦ Definitions & Real-World Examples – Simple vs. compound machines. ◦ Efficiency Analysis – How mechanical advantage optimizes performance. ◦ Proposed Enhancements – Suggestions for improving machine efficiency. 2. Group Formation & Topic Selection • Divide students into small teams (3–5 members). • **Each team selects a specific machine or machine type, such as:** ◦ Household machines – Scissors, openers, bicycles. ◦ Industrial machines – Gears, conveyor belts, robotic arms. ◦ Transportation systems – Elevators, pulleys in construction. 3. Research & Content Development • **Guide students in gathering information on their chosen machine:** ◦ Breakdown of simple machines involved (e.g., pulleys, levers, wedges). ◦ Efficiency factors – Mechanical advantage, motion types, energy loss. ◦ Areas for improvement – Reducing friction, enhancing design, optimizing materials. 4. Presentation Format Options • **Allow students to choose between digital or physical presentations, such as:** ◦ Slide decks (Google Slides, PowerPoint). ◦ Posters or physical models (diagrams with labeled components). ◦ Video demonstrations (recording to their analysis and experiments).	

5. Presentation & Peer Feedback Session

- **Each team presents their findings, focusing on:**
  - How does their machine work?
  - Which principles of motion improve efficiency?
  - What innovative suggestions can enhance its design?
- Encourage peer engagement through Q&A and constructive feedback.

Sample Scoring Rubric:

Criteria	4 - Excellent	3 - Proficient	2 - Developing	1 - Beginning
Content Accuracy	Information is accurate, complete, and shows a strong understanding of simple and compound machines.	Information is mostly accurate with minor missing details.	Information has some errors or lacks important concepts.	Information is inaccurate, incomplete, or unclear.
Efficiency Analysis	Clearly explains mechanical advantage, motion, friction, energy loss, and effort reduction.	Explains efficiency with some details but may lack depth in one area.	Gives a limited or unclear efficiency explanation.	Does not provide meaningful efficiency analysis.
Proposed Improvement	Improvement is practical, science-based, and clearly linked to better efficiency or reduced energy loss.	Improvement is reasonable but needs stronger explanation or support.	Improvement is generally or weakly connected to efficiency.	No clear improvement is proposed.

		Evidence	Uses strong evidence such as labeled diagrams, photos, measurements, calculations, observations, or sources.	Use some evidence to support the analysis.	Uses of limited evidence or evidence are not clearly connected to claims.	No supporting evidence is provided.	
		Presentation	Presentation is clear, organized, engaging, and uses visuals/model effectively.	Presentation is organized and understandable with minor issues.	Presentation lacks clarity, organization, or effective visuals.	Presentation is disorganized, unclear, or incomplete.	
		Collaboration	All members contribute actively and demonstrate shared responsibility.	Most members contribute and work cooperatively.	Some members contribute, but task sharing is uneven.	Little teamwork is shown, or only one member does most tasks.	
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? 6. What improvement would you make if you taught this lesson again?						

VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and take full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**The Physics of Fluids - Hydraulic Systems and Pascal's Principle**	Lesson Exemplar	6

I. OBJECTIVES	
A. Content Standard	The learners learn that hydraulic systems exploit the relationship between pressure, force, and area to multiply forces and perform tasks.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills The learners explain how simple hydraulic systems use fluid principles to enhance simple and compound machines.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Department of Education (DepEd). 2020. Most Essential Learning Competencies (MELCs) for Science (Grades 1-12). Manila: DepEd Central Office. https://commons.deped.gov.ph. Department of Education (DepEd). 2020. "Clarification on the Use of the Most Essential Learning Competencies (MELCs)." DepEd Memorandum DM-CI-2020-000. Manila: DepEd. Department of Education (DepEd). 2022. K to 12 Curriculum Guide: Science (Revised through MELCs Implementation). Manila: DepEd. Department of Education (DepEd), Bureau of Curriculum Development. 2023. Science Curriculum Guide and Instructional Supports for Junior and Senior High School. Manila: DepEd. Department of Education (DepEd). 2023. MATATAG Curriculum Framework: Science Learning Area Overview. Manila: DepEd. Pascal, Blaise. 1663. Experiences nouvelles touchant l'equilibre des liquides et l'usage de la pression des eaux dans les machines. Paris.

	Young, Hugh D., and Roger A. Freedman. 2012. University Physics with Modern Physics. 13th ed. Boston: Pearson Education. Khan Academy. n.d. "Hydraulic Systems and Pascal's Principle." Accessed June 9, 2026. https://www.khanacademy.org/science/physics/fluids. FuseSchool - Global Education. 2015. "Hydraulics | Pascal's Principle Explained." YouTube video, 4:11. https://www.youtube.com/watch?v=9T1vfsHYiKY. Learn Engineering. 2017. "How Hydraulic Brakes Work?" YouTube video, 4:58. https://www.youtube.com/watch?v=Q2Hk7f8u4cM. Learn Engineering. 2015. "Hydraulic Lift System - Working Animation." YouTube video, 3:52. https://www.youtube.com/watch?v=8b1zF1s4h5k. Physics Videos by Eugene Khutoryansky. 2016. "Pascal's Law and Fluid Pressure Explained." YouTube video, 5:20. https://www.youtube.com/watch?v=8z5r2h6pQ3k. Smart Learning for All. 2018. "Fluid Pressure Demonstration - Physics Concepts." YouTube video, 3:40. https://www.youtube.com/watch?v=6u0dYhG4mJQ. Free Science Lessons. 2019. "Hydraulic Systems Explained with Diagrams." YouTube video, 6:02. https://www.youtube.com/watch?v=Kx5bQyPp2fA. **Learning Resources:** Khan Academy. n.d. “Hydraulic Systems and Pascal’s Principle.” Accessed June 9, 2026. https://www.khanacademy.org/science/physics/fluids. FuseSchool – Global Education. 2015. “Hydraulics | Pascal’s Principle Explained.” YouTube video, 4:11. https://www.youtube.com/watch?v=9T1vfsHYiKY. Learn Engineering. 2017. “How Hydraulic Brakes Work?” YouTube video, 4:58. https://www.youtube.com/watch?v=Q2Hk7f8u4cM. Learn Engineering. 2015. “Hydraulic Lift System – Working Animation.” YouTube video, 3:52. https://www.youtube.com/watch?v=8b1zF1s4h5k. Physics Videos by Eugene Khutoryansky. 2016. “Pascal’s Law and Fluid Pressure Explained.” YouTube video, 5:20. https://www.youtube.com/watch?v=8z5r2h6pQ3k. Smart Learning for All. 2018. “Fluid Pressure Demonstration – Physics Concepts.” YouTube video, 3:40. https://www.youtube.com/watch?v=6u0dYhG4mJQ.

	Free Science Lessons. 2019. “Hydraulic Systems Explained with Diagrams.” YouTube video, 6:02. https://www.youtube.com/watch?v=Kx5bQyPp2fA. **Materials:** A. Materials Used for Learner Activities. (Hands-on, group work, experiments, and outputs). Modeling clay. Coin and nails. Wooden block. Sponge. Weights or heavy objects. Worksheets (pressure problems, guided tasks). KWL chart template. Manila paper / cartolina. Marker pens. Sticky notes. Printed images or cards (for matching activities, concept mapping, and case studies. Design templates or scaffolding worksheets (for scenario problem solving. B. Materials Used by the Teacher for Instruction and Facilitation. (Instructional delivery, demonstration, and presentation tools). Pictures or printed images from books, magazines, Facebook posts, or online sources. Laptop / television / projector. Short video clips (hydraulic systems, Pascal’s Principle demonstrations). PowerPoint presentations (with diagrams, animations, or embedded videos). Simulation tools (e.g., PhET Interactive Simulations). Teacher-made illustrations or diagrams. Board / chalkboard / whiteboard. Prepared concept maps or chart templates. Digital platforms (e.g., YouTube, Khan Academy, Mentimeter, Padlet, Google Forms). Matching cards (machine-function-principle sets). Sample outputs / exemplars for modeling.
III. CONTENT (Sequencing Content)	The Physics of Fluids - Hydraulic Systems and Pascal's Principle

<table>
<tr><td>IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)</td><td colspan="2">1. Recall the key concepts of pressure, fluid flow, and the behavior of liquids in enclosed systems.
2. Explain Pascal's Principle and how it applies to the transmission of pressure in fluids.
Illustrate and compute the relationship between pressure, force, and area using the formula: through data-based activities involving comparison of pressure values in real-life situations.

3. Explain how hydraulic systems apply fluid pressure to enhance the function of simple and compound machines.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: Why does a sharp nail easily penetrate wood?</td></tr>
<tr><td>Think-Pair-Share (TPS)
Procedure
1. Prepare guide questions related to pressure and force.
Examples:
● "Why does a sharp nail easily penetrate wood?"
● "Why do high heels sink deeper into soft ground than flat shoes?"
2. Ask learners to think quietly about the questions for 1–2 minutes.
3. Instruct learners to write their answers or ideas in their notebooks.
4. Pair the learners with a seatmate or group of three.
5. Allow learners to discuss and compare their answers within their group.
6. Call several volunteers to share their answers with the class.
7. Write important ideas on the board such as:
● force
● pressure
● surface area
● fluid movement
8. Introduce the lesson by asking: "How is pressure affected by force and area?"
9. Present the formula: P = F/A</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available.

Notes to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed</td></tr>
</table>

	10. **Begin only the K and W portions of the KWL chart by asking learners:** ● "What do I already KNOW about pressure and fluids?" ● "What do I WANT to know about hydraulic systems?" 11. Inform learners that the L (What I Learned) portion will be completed later during the generalization or reflection of part of the lesson after the activities and discussions.	fluid and that force changes depending on the piston area.
	Option 2: Visual Prompt Discussion	
	Visual Prompt Discussion **Procedure** 1. **Prepare pictures or short video clips showing:** ● a person stepping on sand ● a bed of nails ● a hydraulic car lift ● hydraulic brakes ● construction equipment 2. **Images may be gathered from:** ● science books ● magazines ● teacher-made illustrations ● Facebook posts ● educational websites 3. Show the images or videos to class one at a time. 4. Ask learners to observe carefully. 5. Ask the following questions: ● "What do you notice in the picture?" ● "Why does one object sink deeper than another when placed on a surface (e.g., sand or soft ground)?" ● "How can a machine lift heavy objects?" 6. Allow learners to share their observations. 7. List key ideas on the board. 8. Introduce the concept of pressure and its relationship to force and area.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available. **Notes to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

	9. **Present the formula: P = F/A** 10. Ask learners to complete the "K" and "W" columns of the KWL chart.	
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Clay Press Activity	
	Clay Press Activity **Procedure** 1. Divide the class into small groups. 2. Give each group: ● modeling clay ● one coin ● one nail 3. Instruct learners to place the clay on a flat surface. 4. Ask learners to press the coin into the clay using moderate force. 5. Next, ask them to press the nail into the clay using approximately the same force as used with the coin. To help ensure this, instruct learners to press both objects using the same hand, from the same height/starting position, and with a single steady downward push (no extra force or repeated pressing). 6. Let learners compare the depth and shape of the marks made. 7. Ask the following questions: ● "Which object produced a deeper mark?" ● "Which object has a smaller surface area?" ● "What can you conclude about pressure?" 8. Relate the activity to the lesson on pressure and hydraulic systems.	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

<table>
<tr><td rowspan="2"></td><td colspan="2">Option 2: Multimedia Integration</td></tr>
<tr><td>Multimedia Integration
Procedure
1. Prepare short video clips about hydraulic systems such as:
● car lifts
● airplane brakes
● excavators
● dentist chairs
(Videos may be sourced from educational platforms such as YouTube, Khan Academy, or teacher-curated Google Drive folders.
2. Play the video clips for the class using a laptop connected to a projector or smart TV. You may also use a YouTube playlist or Google Slides with embedded videos for smoother presentation.
3. Ask learners to observe how the machines move or lift objects.
4. After viewing, ask:
● “How can small machines lift heavy objects?”
● “What do you think helps transmit the force?”
5. Allow learners to share ideas and predictions using:
● Think-Pair-Share
● or a digital response tool such as Mentimeter, Padlet, or Google Forms (quick response poll)
6. Introduce Pascal’s Principle as the main concept of the lesson.</td><td>The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.</td></tr>
<tr><td rowspan="3">B. Instituting New Knowledge</td><td colspan="2">B. 1. Presenting Examples</td></tr>
<tr><td colspan="2">Option 1: Concept Mapping</td></tr>
<tr><td>Concept Mapping
Procedure
1. Write the words “Force,” “Area,” and “Pressure” on the board.
2. Ask learners to recall related concepts, formulas, or examples.</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive</td></tr>
</table>

3. Let learners write their ideas on sticky notes or directly on the board.
4. Ask learners to connect related ideas using arrows or lines.
5. Discuss the relationships between the concepts presented.
6. Use the concept map as a transition to Pascal's Principle.
7. The following rubric may be used as a guide to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Scientific Accuracy	All concepts and relationships are scientifically correct with no errors.	Minor inaccuracies but overall correct understanding.	Some incorrect concepts or weak connections.	Many misconceptions or scientifically incorrect ideas.	4
Application of Physics Concepts	Correct and clear application of Force, Area, and Pressure with accurate use of principles/formulas.	Mostly correct application with minor gaps.	Limited or partially correct application of concepts.	No clear application of physics concepts.	4
Clarity of Explanation / Organization	Concept map is well-organized, logical, and very easy to follow.	Generally clear with slight issues in organization.	Some parts are confusing or poorly structured.	Disorganized and difficult to understand.	4
Relevance to Daily Life	Clear and well-explained real-life application	At least one relevant real-life example is included.	Weak or unclear real-life connections.	No real-life application is provided.	4

approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

	s are included.				
Completeness of Output	All required concepts, links, and details are fully present.	Most required elements are present.	Several required elements are missing.	Output is incomplete and lacks key components.	4
Total					20

Option 2: KWL Chart Activity

KWL Chart Activity

Procedure

1. Distribute KWL chart templates to learners.
2. Review the "K" and "W" columns completed during the activating prior knowledge activity.
3. **Present examples of hydraulic systems and pressure applications such as:**

• Hydraulic jack
• Syringe
• Car brake system
• Hydraulic lift

4. Ask learners to observe how pressure is transmitted in each example.
5. Instruct learners to add new information and evidence to the "L" column based on the lesson discussion and examples presented.
6. **Require learners to write at least three things they learned about:**

• Pressure and force relationship
• Pascal's Principle
• Real-life applications of hydraulic systems

The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship between pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed

7. Allow selected learners to share their answers with the class.

Process the activity by emphasizing that pressure applied to an enclosed fluid is transmitted equally in all directions through the fluid, which is the key idea of Pascal's Principle, making hydraulic systems effective in lifting or moving heavy loads.

8. The following rubric may be used as a guide to assess the activity.

Criteria	**4 – Excellent**	**3 – Proficient**	**2 – Developing**	**1 – Beginning**	**Pts.**
Scientific Accuracy	All entries (K, W, L) are scientifically correct and show a clear understanding of pressure and Pascal's Principle.	Minor inaccuracies but overall correct understanding.	Some incorrect or unclear scientific ideas.	Many misconceptions or incorrect concepts.	4
Application of Physics Concepts	Clearly explains pressure transmission, Pascal's Principle, and hydraulic systems with correct relationships.	Shows mostly correct application with slight gaps.	Limited or partially correct application of concepts.	No clear application of physics concepts.	4
Clarity of Explanation / Organization	Ideas are well-organized, easy to follow, and clearly written in all KWL columns.	Generally clear with minor organization issues.	Some parts are confusing or poorly expressed.	Disorganized and difficult to understand.	4
Relevance to Daily Life	Provides clear and meaningful	Includes at least one relevant	Weak or unclear connection to	No real-life application is provided.	4

fluid and that force changes depending on the piston area.

	real-life applications (e.g., hydraulic jacks, brakes, syringe).	real-life example.	real-life situations.		
Completeness of Output	All KWL columns are complete with at least three well-developed learnings in the "L" column.	Most required parts are complete.	Some required entries are missing or incomplete.	Output is largely incomplete.	4
Total					20

B. 2. Discussing New Concept

Option 1: Hydraulic Lift and Brake System

Hydraulic Lift and Brake System

Procedure

1. Show pictures, diagrams, or videos of:
   - hydraulic lifts
   - hydraulic brake systems
2. Explain that these machines use Pascal's Principle, where pressure applied to an enclosed fluid is transmitted equally throughout the fluid.
3. **Present a simple hydraulic lift diagram with two pistons:**
   - Small piston area = 2 cm²
   - Large piston area = 10 cm²
   - Applied force on small piston = 20 N
4. **Guide learners in solving the example using the relationship between pressure, force, and area:**

$$P = \frac{F}{A}$$

The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through the relationship among pressure, force, and area in tables, comparisons, and simple computations.

	Explain that equal pressure exists in both pistons: $$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$ 5. **Guide learners in computing the output force:** $$\frac{20\,N}{2\,cm^2} = \frac{F_2}{10\,cm^2}$$ 6. Ask learners to solve for the output force and explain why the larger piston produces greater force. 7. **Discuss how:** ● pressure applied to a small piston is transmitted through fluid ● the pressure reaches a larger piston ● the larger piston produces greater force because of its larger area 8. **Present real-life examples such as:** ● car repair shop lifts ● vehicle braking systems 9. Ask learners: ● "Why is fluid important in hydraulic systems?" ● "How does pressure help multiply force?" ● "What happens when the output piston area becomes larger?" 10. Emphasize that hydraulic systems use confined fluids to transfer pressure equally and multiply force through larger piston areas.	EdTech is integrated through simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.
	Option 2: Everyday Hydraulic Systems	
	Everyday Hydraulic Systems **Procedure** 1. Show images or videos of: ● garbage trucks ● excavators ● bulldozers	The activity targets Learning Objectives 2 and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build

	● hydraulic jacks 2. Ask learners to identify the heavy tasks performed by the machines. 3. Explain how hydraulic cylinders and fluid pressure help move heavy loads. 4. **Draw or present a simple comparison diagram showing:** ● a small input piston ● a larger output piston 5. Explain that the pressure inside the fluid remains equal, but the larger piston produces greater force because it has a larger area. 6. **Provide a guided computation example:** ● Input force = 15 N ● Input piston area = 3 cm^2 ● Output piston area = 12 cm^2 **Guide learners in solving for pressure and output force using: and** 8. Ask learners to compare the input force and output force and explain why the machine can lift heavier objects. 9. Relate the examples to Pascal's Principle and force multiplication. 10. Ask learners to identify other hydraulic machines found in the community and explain how pressure is used in their operation.	understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on piston area.
	B. 3. Developing Mastery	
	Option 1: Hydraulic Lift Animation	
	Hydraulic Lift Animation **Procedure** 1. **Present an animation or video of a hydraulic lift using a simulation platform or digital resource such as:** ● PhET Interactive Simulations	The activity targets Learning Objectives 3 and 4 by allowing learners to practice, classify, compute, or organize ideas related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive

	● YouTube educational videos ● Khan Academy physics videos ● or a teacher-prepared PowerPoint with embedded animations (GIFs or video clips) 2. Ask learners to observe: ● the movement of the small piston ● the movement of the large piston ● the flow of pressure through the fluid 3. Pause the animation at important parts for discussion using the pause or playback controls of the video player or simulation tool. 4. Ask the following questions: ● "What happens when force is applied to the small piston?" ● "How does the large piston respond?" 5. Explain that pressure applied to an enclosed fluid is transmitted equally throughout the system, using the animation as visual evidence. 6. Relate the animation to Pascal's Principle as the scientific explanation of the observed motion and force multiplication. Low-Tech Alternative (No Video/Animation) 1. Provide learners with printed sequential diagrams or teacher-drawn illustrations showing a hydraulic system in 3–4 steps: ● **Step 1: Small force applied on small piston** ● **Step 2: Fluid pressure spreads through enclosed liquid** ● **Step 3: Large piston begins to rise** ● **Step 4: Heavy load is lifted** 2. Alternatively, use a picture strip or storyboard displayed on a manila paper, chalkboard, or slide presentation (PowerPoint/Google Slides) showing the same sequence. 3. Guide learners to observe each step and describe what is happening in each diagram.	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

	4. Ask the following questions: ● "What changes do you notice from Step 1 to Step 4?" ● "How is the force transmitted through the liquid?" ● "Why does the large piston move upward even if only a small force is applied?" 5. Emphasize that pressure in a confined fluid is transmitted equally in all directions, allowing a small force to produce a larger output force in hydraulic systems, as explained by Pascal's Principle.	
	Option 2: Diagram Analysis	
	Diagram Analysis **Procedure** 1. Present a labeled diagram of a hydraulic lift. 2. **Identify the following parts:** ● small piston ● large piston ● enclosed fluid 3. Ask learners to observe the arrows showing pressure transmission. 4. Discuss how force applied to one piston affects the other piston. 5. Ask learners: ● "Why can the larger piston lift heavier objects?" ● "What role does area play in pressure?" 6. Summarize how hydraulic systems multiply force.	The activity targets Learning Objectives 3 and 4 by allowing learners to practice, classify, compute, or organize ideas related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Notes to Teachers:** Check whether learners distinguish pressure from force. Remind them

		that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: Weight and Area Experiment	
	Weight and Area Experiment **Procedure** *1.* **Prepare:** ● sponge ● wooden block ● weights *2.* Place the wooden block flat on the sponge. *3.* Put weights on top of the block. *4.* Ask learners to observe how deep the block sinks. *5.* Remove the block and place it on its narrower side. *6.* Put the same weights on the block again. *7.* Ask learners to compare the depth of the dents. *8.* Discuss why smaller surface areas produce greater pressure. *9.* **Distribute worksheets containing word problems involving:** ● pressure (P) ● force (F) ● area (A) ● Pascal's Principle applications in fluids ● hydraulic lift and simple hydraulic system problems using force multiplication *10.* Guide learners in solving the problems step-by-step. *11.* Allow learners to solve the remaining problems in pairs. *12.* Review answers and discuss common mistakes. *13.* Conduct the "Pressure Match-Up" game using prepared cards with force, area, and pressure values.	The activity targets Learning Objective 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

Trial	Orientation of Block	Force / Weight Used	Contact Area	Observed Dent Depth	Explanation (Pressure Relationship)
1	Flat side	Same weight	Large area	_____	_____ _____
2	Narrow side	Same weight	Small area	_____	_____ _____

Option 2: Pressure Comparison Activity

Pressure Comparison Activity
Procedure
1. Divide learners into small groups.
2. Provide each group with sample data involving force and area.

Situation	Force (N)	Area (m²)
High-heeled shoe	500	0. 002
Rubber shoe	500	0. 020
Knife edge	120	0. 001
Flat wooden block	120	0. 020

3. **Instruct learners to compute pressure using:**

$$P = \frac{F}{A}$$

4. Ask learners to compare their answers and identify which situations produce greater or lesser pressure.
5. **Require learners to explain the meaning of the computed pressure in context using guide questions such as:**
   - Why does a high-heeled shoe produce greater pressure than rubber shoes?
   - Why does a sharp knife cut more effectively than a dull one?

The activity targets Learning Objective 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed

	• How does changing areas affect pressure when force remains constant? *6.* Process the activity by emphasizing that pressure increases when force increases or when the contact area decreases. *7.* Ask learners to complete the "L" column of the KWL chart. Support Strategies (For Learners Who Need Assistance) Provide a guided formula sheet showing a sample computation of. • Offer a step-by-step computation guide (identify F → identify A → divide → write unit). • Allow use of a calculator or guided teacher support station. • Pair learners in heterogeneous groups (peer tutoring strategy). • Provide partially completed examples for scaffolding. Extension Tasks (For Fast Finishers / Advanced Learners) • Ask learners to create their own real-life scenario involving force and area and compute pressure. • Challenge them to rank all situations from highest to lowest pressure and justify their reasoning in complete sentences. • Ask them to predict what would happen if force or area is doubled or halved. • Optional: Let them graph force vs. pressure or area vs. pressure trends using a simple table or spreadsheet.	fluid and that force changes depending on the piston area.
	C. 2. Making Generalization	
	Option 1: What is Pascal's Principle?	
	Pair-and-Share Prompt **Procedure** *1.* Pair the learners with a partner.	The activity targets Learning Objectives 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about hydraulic

	2. Ask learners to discuss the following questions: ● "What is Pascal's Principle?" ● "What does the formula P = F/A mean?" ● "How do hydraulic systems make work easier?" 3. Allow selected pairs to share their answers. 4. Summarize the lesson by emphasizing: ● pressure depends on force and area ● hydraulic systems use fluids to transmit pressure ● hydraulic systems multiply force	systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.
	Option 2: What do these machines have in common?	
	Visual Recall **Procedure** 1. Show images of: ● car jacks ● dump trucks ● backhoes ● hydraulic presses 2. Ask learners: ● "What do these machines have in common?" ● "How does pressure help these machines work?"	The activity targets Learning Objectives 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	3. Allow learners to explain their ideas. 4. Conclude that hydraulic systems enhance machine performance by transmitting pressure through fluids.	The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.
	C. 3. Evaluating Learning	
	Option 1: Matching Cards with Justification	
	Matching Cards with Justification **Procedure** 1. **Prepare three sets of cards:** ● machine names ● machine functions ● descriptions of hydraulic pressure application 2. Divide learners into groups. 3. Distribute one set of mixed cards to each group. 4. Instruct learners to match the related cards correctly. 5. After matching, ask learners to answer the following: ● "How does Pascal's Principle apply to the machine?" ● "How does pressure improve the machine's performance?" 6. Let groups present their answers. 7. Evaluate responses using accuracy and explanation.	The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area,

	Simple Evaluation Checklist: Correct Matching (1 point) • All or most cards are correctly paired (machine, function, and principle) Correct Explanation of Pascal's Principle (1 point) • Learner clearly explains how pressure is transmitted equally in a confined fluid Correct Real-Life Function Explanation (1 point) • Learner correctly describes how the machine helps in real-life tasks (e.g., lifting, braking, or moving heavy loads) Scoring Guide (Optional for Teacher Use) • 3 points – Excellent understanding • 2 points – Good understanding with minor errors • 1 point – Limited understanding • 0 points – Incorrect or incomplete responses	piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available. **Note to Teachers:** Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.
	Option 2: Interactive Chart	
	Interactive Chart **Procedure** 1. **Prepare a blank chart with the following headings:** • Machine Name • Simple or Compound Machine • Use of Fluid • Mechanical Advantage • Real-Life Application • Explanation 2. Divide learners into small groups. 3. Assign one hydraulic machine to each group (e.g., hydraulic lift, hydraulic jack, brake system, syringe, excavator). 4. Ask learners to complete the chart using the assigned machine based on discussion, videos, and prior activities. 5. **Instruct groups to explain:**	The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area,

- how pressure is transmitted
- how force is multiplied
- how the machine becomes efficient

6. Allow groups to present their outputs to the class for comparison and discussion.

Preparation for Final Performance Task

7. After presentations, introduce the final design task by explaining that learners will apply their understanding of force, pressure, and hydraulic systems to create a simple model, diagram, infographic, or prototype of a hydraulic device.
8. **Guide learners by asking:**
   - "How can you apply Pascal's Principle in your own design?"
   - "What real-life problem can your hydraulic system solve?"
9. Emphasize that the interactive chart serves as a planning and idea-building stage for their final output, where they will combine concepts, explanations, and applications into a creative performance task.

Use the following rubric to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All written and oral explanations are scientifically correct with no misconceptions about hydraulic systems.	Mostly correct with minor errors in either chart or explanation.	Some correct ideas but with noticeable misconceptions in chart or presentation.	Scientific ideas are mostly incorrect or missing.	/5

piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on piston area.

	Correct Application of Physics Concepts (Force, Pressure, Pascal's Principle, Mechanical Advantage)	Clearly and correctly apply all physics concepts in both chart and oral explanation; shows a deep understanding of how hydraulic systems work.	Mostly correct application with minor gaps or inconsistencies.	Partial understanding; concepts are applied but not fully correct or complete.	Concepts are not correctly applied or are absent.	/5	
	Clarity of Explanation (Written and Oral Communication)	Charts are well-organized, and explanations are clear; oral presentation is confident, logical, and easy to follow.	Generally clear in both written and oral output with minor issues.	Some parts of the chart or presentation are unclear or poorly organized.	Both written and oral explanations are unclear or difficult to understand.	/5	
	Relevance to Daily Life / Real-Life Application	Provides strong, meaningful, and well-explained real-life applications for hydraulic systems.	Real-life applications are clear but somewhat general.	Limited or partially relevant real-life applications.	No clear connection to real-life situations.	/5	

Completeness of Output (Chart + Presentation Content)	All chart sections are complete and detailed; presentation fully explains required guide questions (pressure transmission, force multiplication, efficiency).	Most required parts are complete with minor missing details.	Several required sections or explanations are incomplete.	Major parts of the chart and/or presentation are missing.	/5	
Teamwork and Participation	All members actively participate in both chart completion and presentation; strong coordination is evident.	Most members participate in minor imbalances.	Only some members participate; coordination is uneven.	Very limited participation; group is disorganized.	/5	
Total					30	

C. 4. Additional Activities

Option 1: Case Study Presentation

Case Study Presentation **Procedure** *1.* Present a short video or story about hydraulic systems in: o fire trucks o airplane landing gear o heavy equipment *2.* Ask learners to identify: o the simple or compound machines involved	The activity targets Learning Objective 1 by engaging learners in a task related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

- the role of fluid pressure

3. Let learners explain how Pascal's Principle is applied.
4. Discuss the importance of hydraulic systems in daily life.
5. The following rubric may be used as a guide to assess the activity.

Criteria	4 – Excellent	3 – Proficient	2 – Developing	1 – Beginning	Pts.
Science Accuracy	All explanations of hydraulic systems and machines are scientifically correct with no misconceptions.	Mostly correct with minor errors in identifying systems or processes.	Some correct ideas but with noticeable misconceptions.	Explanations are mostly incorrect or missing.	/5
Correct Application of Physics Concepts (Pascal's Principle, Pressure, Force Transmission)	Clearly and correctly explains how Pascal's Principle applies in all examples with strong understanding of fluid pressure and force transmission.	Mostly correct application with minor gaps in explanation.	Partial understanding; explanation is incomplete or unclear.	Does not correctly apply physics concepts.	/5

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed fluid and that force changes depending on the piston area.

Identification of Machines and Components	Correctly identifies all simple/compound machines involved in each case study (fire truck, landing gear, heavy equipment).	Mostly correct identification with minor errors.	Some correct identification but incomplete or confused.	Unable to correctly identify machines involved.	/5	
Clarity of Explanation and Communication	Ideas are clearly expressed, well-organized, and easy to follow during presentation.	Generally clear with minor issues in organization or delivery.	Some explanations are unclear or difficult to follow.	Presentation is disorganized or unclear.	/5	
Relevance to Daily Life / Real-World Understanding	Strong and meaningful explanation of how hydraulic systems are essential in real-life applications.	Clear connection to real-life applications but somewhat general.	Limited explanation of real-life relevance.	No clear connection to real-life situations.	/5	
Completeness of Response (Case Analysis Requirements)	Fully answers all required tasks: identifies machines,	Most requirements are met with minor missing details.	Several required parts are incomplete or unclear.	Major parts of the task are missing or not addressed.	/5	

	explains fluid role, and applies Pascal's Principle comprehensively.				
Total					30

Option 2: Scenario Problem Solving

Scenario Problem Solving
Procedure

1. Present the situation: "You are asked to design a machine that can lift heavy boxes using minimal human effort."
2. Ask learners to work in pairs.
3. **Instruct learners to create a design output that must include:**
   - a labeled sketch or written design brief
   - the machine chosen (e.g., hydraulic lift, jack, crane, press)
   - the role of pistons and fluid in the system
   - explanation of pressure transmission using Pascal's Principle
   - how force is multiplied in the system
   - one clear practical use in real life (e.g., warehouse lifting, car repair shop)
4. Allow pairs to share their ideas with the class.
5. Provide feedback and emphasize real-life applications of hydraulic systems in engineering and industry.

Support Strategies (For Learners Who Need Assistance)

- Provide a design template or scaffolded worksheet with sentence starters (e.g., "The machine I chose is…", "It works by…").
- Show a sample labeled diagram of a basic hydraulic lift for reference.

The activity targets Learning Objective 1 by engaging learners in a task related to hydraulic systems, pressure, force, and area. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided computation and model analysis, supported by peer sharing and teacher questioning. Literacy is integrated through explaining hydraulic-system ideas using terms such as pressure, force, area, piston, and fluid. Numeracy is integrated through using the relationship among pressure, force, and area in tables, comparisons, and simple computations. EdTech is integrated through using simulations, diagrams, videos, or calculators when available.

Note to Teachers: Check whether learners distinguish pressure from force. Remind them that pressure is transmitted through the enclosed

- Allow learners to use a word bank (piston, pressure, fluid, force, lift, area).
- Assign peer support pairing (stronger learner with a developing learner).
- Provide guided questioning from the teacher during task completion.

Extension Tasks (For Fast Finishers / Advanced Learners)

- Ask learners to improve their design by adding safety features or efficiency enhancements.
- Require a comparison of two hydraulic machines (e.g., jack vs. crane) in terms of force and function.
- Challenge learners to calculate or estimate pressure and force values in their design.
- Ask them to justify their design choice using engineering reasoning (why this machine is best for the task).
- Optional: Let them create a digital version of their design using Canva, PowerPoint, or Sketchpad tools.

The following rubric may be used as a guide to assess the activity.

Criteria	**4 – Excellent**	**3 – Proficient**	**2 – Developing**	**1 – Beginning**	**Pts.**
Correct Machine Design and Representation	Design is appropriate, well-labeled, and clearly represents a functional hydraulic machine (e.g., lift, jack, crane, press).	Design is appropriate but may have minor labeling or clarity issues.	Design is partially appropriate but incomplete or unclear.	Design is incorrect, missing, or not related to the task.	/4
Hydraulic System Explanation (Pistons, Fluid,	Clearly and correctly explains how pistons and fluid	Mostly correct explanation	Partial understanding; explanation lacks clarity	Explanation is incorrect or missing	/4

fluid and that force changes depending on the piston area.

	Pressure Transmission)	transmit pressure using correct physics concepts.	with minor gaps.	or completeness.	key concepts.	
	Application of Pascal's Principle and Force Multiplication	Clearly explains Pascal's Principle and accurately describes how force is multiplied in the system.	Mostly correct explanation with minor conceptual gaps.	Limited understanding; explanation is partially correct.	Incorrect or no explanation of force multiplication or Pascal's Principle.	/4
	Clarity and Completeness of Design Output (Sketch/Brief + Labels + Explanation)	Output is complete, well-organized, and easy to understand with clear labels and explanations.	Mostly complete with minor missing details or unclear parts.	Some required components are missing or unclear.	Output is incomplete or difficult to understand.	/4
	Practical Application / Real-Life Relevance	Provides a clear, realistic, and well-explained application (e.g., warehouse, repair shop, construction).	Real-life application is clear but somewhat general.	Limited or weak connection to real-life use.	No clear real-life application is provided.	/4
	Total					20
V. ASSESSMENT **(Assessing Learnings)**	Part I. Choose the letter of the best answer. 1. When force is applied to a piston in a confined fluid, how is the resulting pressure transmitted? a) It decreases as it moves through the fluid b) It increases only in the direction of the applied force c) It is transmitted equally in all directions d) It becomes weaker in distant parts of the fluid					

2. Pascal's Principle states that pressure applied to a confined fluid is transmitted equally in all directions. Which of the following is an example of Pascal's Principle in action? a) Water rising in a straw when you suck on it. b) A car jack lifting a car with the application of a small force. c) Water flowing down a river. d) A balloon expands when air is pumped inside.
3. Which formula correctly represents the relationship between pressure, force, and area? a) $P = F + A$ b) $P = F / A$ c) $P = A / F$ d) $P = A * F$
4. Which of the following best describes how hydraulic systems work? a) They use air pressure to transmit force. b) They use fluid pressure to transmit force and multiply it. c) They use electrical pressure to transmit energy. d) They use gravitational force to lift objects.
5. What is the primary advantage of using a hydraulic system in machines like car jacks or excavators? a) It eliminates the need for input force. b) It decreases the amount of fluid needed. c) It multiplies force to lift or move heavy objects with less effort. d) It increases the speed at which objects can be moved.

Part II: Provide short answer

1. Explain how Pascal's Principle applies to hydraulic systems. (3 pts)
2. A force of 100 N is applied to a small piston with an area of 0.2 m^2 in a hydraulic system. What is the pressure applied to the fluid? (Use the formula $P = F / A$) (3pts)
3. Describe how pressure, force, and area are related in the context of a hydraulic lift. Why does a small force on a small piston result in a large force on a large piston? (3pts)
4. A force of 2000 N is applied to the small piston of a hydraulic lift. If the small piston has an area of 0.05 m^2 and the large piston has an area of 2 m^2, calculate the force produced on the large piston using Pascal's Principle. (Hint: Use formula P = F / A for both pistons and set the pressure equal on both pistons.) (5pts)
5. Give a real-world example of a machine that uses hydraulics. Explain how the hydraulic system makes the machine easier to operate or more effective in lifting, stopping, or moving heavy loads. (3pts)

Answer Key (Assessment):

Part I

1. c) It is transmitted equally in all directions
2. b) A car jack lifting a car with the application of a small force.
3. b) $P = F / A$
4. b) They use fluid pressure to transmit force and multiply it.
5. c) It multiplies force to lift or move heavy objects with less effort.

Part II

1. Explain how Pascal's Principle applies to hydraulic systems. (3 pts)

	Expected Answer: Pascal's Principle states that pressure applied to a confined fluid is transmitted equally in all directions through the fluid. In hydraulic systems, this allows a small force applied on a small piston to be transmitted and produce a larger force on a bigger piston. **Scoring Guide:** • 1 pt – Mentions pressure transmission in confined fluid • 1 pt – States "equally in all directions" • 1 pt – Connects to hydraulic systems/force multiplication 2. A force of 100 N is applied to a small piston with an area of 0.2 m². What is the pressure? (3 pts) **Formula:** $P = \frac{F}{A}$ **Solution:** $P = \frac{100\,N}{0.2\,m^2} = 500\,Pa$ **Final Answer: 500 Pa** **Scoring Guide:** • 1 pt – Correct formula used • 1 pt – Correct substitution • 1 pt – Correct final answer with unit 3. Describe the relationship between pressure, force, and area in a hydraulic lift. (3 pts) Expected Answer: Pressure is equal to force divided by area. When a small force is applied over a small area, it creates pressure that is transmitted through the fluid. If the output piston has a larger area, the same pressure results in a larger force, allowing heavy loads to be lifted. **Scoring Guide:** • 1 pt – States P = F/A relationship • 1 pt – Explains pressure transmission • 1 pt – Explains force multiplication due to larger area 4. Hydraulic lift problem (5 pts) **Given:** • Force on small piston = 2000 N • Area of small piston = 0.05 m² • Area of large piston = 2 m² **Step 1: Find pressure** $P = \frac{2000}{0.05} = 40000\,Pa$ **Step 2: Find force on large piston** $F = P \times A = 40000 \times 2 = 80000\,N$

	Final Answer: 80,000 N **Scoring Guide:** • 1 pt – Correct formula used (P = F/A and/or F = P × A) • 1 pt – Correct pressure calculation • 1 pt – Correct substitution for large piston • 1 pt – Correct final answer • 1 pt – Correct unit and interpretation 5. Real-world hydraulic machine example (3 pts) Expected Answer: Examples include hydraulic car lifts, excavators, or hydraulic brakes. These machines use fluid pressure to multiply force, allowing heavy objects to be lifted or controlled with small input force, making the machine easier to operate and more effective for heavy tasks. **Scoring Guide:** • 1 pt – Correct example of hydraulic machine • 1 pt – Correct explanation of pressure/force use • 1 pt – Explains force multiplication or practical benefit
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. *1.* How many learners successfully demonstrated the learning objectives based on the assessment results? *2.* Which activity helped learners understand the lesson the most? Which activity helped the least? *3.* Which part of the lesson was easiest for learners? Which part was most difficult? *4.* How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? *5.* What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**The Physics of Fluids - Archimedes' Principle and Pascal's Principle**	Lesson Exemplar	7

I. OBJECTIVES	
A. Content Standard	The learners learn that hydraulic systems exploit the relationship between pressure, force, and area to multiply forces and perform tasks.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	Before engaging in this lesson, learners should already apply concepts of translational and rotational motion to design and build prototypes of efficient simple and compound machines; explain the characteristics of efficient simple and compound machines; explain how simple hydraulic systems use fluid principles to enhance simple and compound machines.
	The learners identify applications of Archimedes' principle and Pascal's principle in various contexts, such as home, community, businesses, and transportation; and design simple practical activities or models to determine how variations in physical properties, such as shape, mass, and volume, affect an object's ability to float in a fluid.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** PhET Interactive Simulations. 2025. "PhET Interactive Simulations." Accessed May 8, 2025. https://phet.colorado.edu/en/activities/4136. Serway, Raymond A., and John W. Jewett Jr. 2018. Physics for Scientists and Engineers. 10th ed. Boston: Cengage Learning. HyperPhysics. n.d. "Pascal's Principle and Hydraulics." Georgia State University. Accessed May 8, 2025. NASA Glenn Research Center. n.d. "Pascal's Principle and Aeronautics." Accessed May 8, 2025.

III. CONTENT (Sequencing Content)	The Physics of Fluids - Archimedes' and Pascal's Principles	
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	1. Identify examples of hydraulic systems in daily life and community settings. 2. Describe the importance of Pascal's principle in various contexts such as home, community, businesses, and transportation. 3. Describe how the weight of displaced fluid relates to the buoyant force of an object. 4. Give examples of applications of Archimedes 'Principle at home, in community, businesses, and transportation. 5. Identify the relationship between an object's mass, volume, and shape and its ability to float in a fluid. 6. Design a simple experiment or model showing how shape, mass, and volume affect an object's ability to float in a fluid.	
IV. PROCEDURES		ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**	
	Option 1: Fluid Mechanics Speed Round	
	Short Review ACTIVITY A "Fluid Mechanics Speed Round" **Instructions:** 1. Form small groups (3–5 students each). 2. Give each group a set of flashcards or a worksheet with 5–10 quick questions. 3. Groups have 5 minutes to answer as many questions as possible. 4. Review the answers as a class and give a small prize or recognition to the group with the most correct answers. **Sample Questions:** 1. What is the formula for pressure? 2. State Pascal's Principle in your own words. 3. What is the unit of pressure in the SI system? 4. True or False: Liquids are compressible like gases. 5. What happens to the pressure when the area of contact decreases but the force stays the same?	The activity targets Learning Objectives 1 and 3 by asking learners to recall prior knowledge and surface initial ideas about Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on

<table>
<tr><td></td><td>6. Give one real-life application of Pascal’s Principle.
7. What is buoyant force?
8. Why do objects feel lighter in water?

Alternative: If digital, you can use Kahoot, Quizizz, or Mentimeter to run a live review quiz.</td><td>whether the fluid can provide enough buoyant force to balance the object’s weight.</td></tr>
<tr><td></td><td colspan="2">Option 2: STEAM Vocabulary (Individual Activity)</td></tr>
<tr><td></td><td>STEAM Vocabulary (Individual Activity)
Instructions: Write at least five terms related to fluid mechanics. For each term, write a short meaning and give one real-life situation where the term is applied.
<table><tr><th>Words/Terms</th><th>Meaning or Description</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td><td>The activity targets Learning Objectives 1 and 3 by asking learners to recall prior knowledge and surface initial ideas about Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available.

Note to Teachers: Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object’s weight.</td></tr>
</table>

	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Why Do I Feel Lighter?	
	Activity Title: "Why Do I Feel Lighter?" **Materials:** • A bucket of water • A heavy object (like a dumbbell or a large stone) • A spring scale (if available) • **Optional: quick video clip of someone "floating" easily in water** **Steps:** **1. Ask:** "Have you ever noticed how much easier it is to lift someone or something underwater than on land? Why do you think that happens?" **2. Demonstrate:** Dip a heavy object into water and let students observe how it feels lighter or appears easier to lift. If using a spring scale, compare the weight in air vs. underwater. **3. Challenge Students to Predict:** "What force could be pushing up on this object in water? Why doesn't it feel as heavy?"	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Notes to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.
	Option 2: P-O-E: The Mystery Tower	
	P-O-E: "The Mystery Tower" **Set the Scene:** 1. Prepare the Density Tower in advance (using honey, dish soap, water, oil, etc.) in a clear container. 2. Place several small objects (like a grape, a marble, a plastic bead, a piece of cork) next to the tower.	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge,

	Challenge the Class: Start the lesson by showing the colorful layered tower and holding up the objects. 1. "What do you think will happen if I drop these objects into this tower?" 2. "Will they sink, float, or stop somewhere in between? Why?" Let students predict and share their reasoning—don't reveal the answer yet! **The Big Reveal:** • Drop each object one at a time and watch as they settle at different levels in the tower. • • Allow the wow factor to sink in as students notice that some objects float in the middle!	discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Applications of Pascal's Principle **Pressure Spot Test** **Activity:** Place a plastic bag filled with water on the table. Push down with a single finger versus using your whole palm. **Concept Questions:** • Was the pressure applied only under your finger/palm, or did it spread throughout the bag? • Why do you think the water moved or bulged out in certain areas? • What does this tell you about how fluids inside a confined space behave?	The activity targets Learning Objectives 1, 2, 3, and 4 by presenting concrete examples that help learners identify key ideas related to Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing

	Critical Thinking: • If the plastic bag were bigger or smaller, do you think the effect would change? Why or why not? • What might happen if there were an air bubble inside the bag? Would the pressure behave the same way? Hydraulic System Model (Syringe Experiment) **Materials:** Two syringes (different sizes), plastic tubing, water **Activity:** ● Connect two syringes with tubing and fill the system with water (no air bubbles). Push one plunger and observe the other move. ● Objective Link: Demonstrates how pressure is transmitted equally in all directions through a confined fluid — the core of Pascal's Principle. **Expected Output:** Learners will complete a short observation sheet describing what happens when one syringe plunger is pushed, how pressure is transmitted through the liquid, and how the model relates to a real hydraulic system such as car brakes or hydraulic lifts.	mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Notes to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.
	Option 2: Applications of Archimedes' Principle	
	Archimedes' Principle Activity **Materials:** • Spring balance, overflow can, container, water, metal block	The activity targets Learning Objectives 1, 2, 3, and 4 by presenting concrete examples that help learners identify key ideas related to Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge,

	Activity: • Weigh the object in air using a spring balance. • Submerge it in water using the overflow can. • Collect displaced water and weigh it. • Compare weight loss of object with weight of displaced water. An activity learning sheet will be provided) Phet Simulation on density **Link:** **https://phet.colorado.edu/en/simulations/density** Students can use the simulation and investigate how the weight of displaced fluid is related to the weight loss of the object submerged in water. Escape the Sinking Ship Challenge **Scenario:** • Your ship has hit an obstacle and is starting to take on water! To stay afloat and reach safety, your crew must use your knowledge of Archimedes' Principle to solve these challenges. Complete each task to unlock clues that will keep your ship balanced and above water. Sample Tasks **Task 1: Calculate the Buoyant Force** **Problem:** You have a cargo box with a mass of 3 kg and a volume of 4,000 cm^3. The ship is in freshwater (density = 1 g/cm^3). **Question:** Calculate the buoyant force acting on the box. Will the box float or sink? **(Hint: 1 g/cm^3 = 1,000 kg/m^3; use Archimedes' Principle: Buoyant force = weight of displaced fluid.)**	discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.

Answer Key:

Given:

- Mass of box = 3 kg
- Volume of box = 4,000 cm^3
- Density of freshwater = 1,000 kg/m^3
- Acceleration due to gravity = 9.8 m/s^2

Step 1: Convert the volume to cubic meters

$$4{,}000\ cm^3 = 0.004\ m^3$$

Step 2: Use Archimedes' Principle

$$F_B = \rho V g$$

$$F_B = (1{,}000\ kg/m^3)(0.004\ m^3)(9.8\ m/s^2)$$

$$\boldsymbol{F_B = 39.2\ N}$$

Step 3: Find the weight of the box

$$F_W = mg$$

$$F_W = (3\ kg)(9.8\ m/s^2)$$

$$\boldsymbol{F_W = 29.4\ N}$$

Step 4: Decide if it will float or sink

Since the buoyant force (39.2 N) is greater than the weight of the box (29.4 N), the box will float.

Final Answer:

Buoyant force = 39.2 N

The box will float.

Task 2: Design a Better Hull
Problem:
Your current hull is not keeping the ship stable. You need to redesign the hull so it can displace enough water to

	produce a buoyant force that balances the weight of the boat and its load. **Instructions:** On your task sheet, sketch a new hull design that you think will float better. Label key parts and explain why your design is an improvement using terms like volume, displacement, and stability. **Task 3: Sort the Cargo by Density** **Problem:** You have 5 types of cargo. To prevent sinking, you must place the least dense items at the bottom and the densest on top. Item Mass (g) Volume (cm^3) Wooden crate 800 1,200 Metal box 1,000 200 Plastic tub 500 1,000 Glass container 900 600 Cotton bale 300 1,500 Investigating the effects of varying the physical properties (shape, mass and volume) to the objects' ability to float in fluid Floating Frenzy: Sink or Swim? **Task:** In pairs or small groups, students will plan and carry out an experiment using simple materials (e.g., modeling clay, plastic wrap, coins, bottle caps) to test how shape, mass, and volume affect floating. Level 1 – Use guided inquiry (recipe type)	

	Required Elements: Identify variables (shape, mass, volume) Record observations Summarize findings Level 2 – Give the objectives and materials. **Required Elements:** Identify variables (shape, mass, volume) Design the steps Record observations Summarize findings Level 3 – Give a testable problem. **Required Elements:** Formulate a hypothesis Identify variables (shape, mass, volume) Choose materials Design the steps Record observations Summarize findings	
	B. 2. Discussing New Concept	
	Option 1: Buoyancy Solutions	
	A. “Buoyancy Solutions” **Task: Design a Floating Device That Helps Communities** Have students use Archimedes' Principle to create a model that could support clean water delivery, flood response, or sustainable transport in line with one or more SDGs. **Suggested: Flood Warning Device – Buoyant Alert System**	The activity targets Learning Objectives 2, 3, 4, and 5 by guiding learners to explain concepts, compare examples, and clarify relationships related to Archimedes' principle, Pascal's principle, and floating. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer

	Design a flood warning device applying the Archimedes' principle. Students record: How much weight their boat held What shape worked best Why they think their design succeeded or failed based on Archimedes' Principle (displacement, buoyant force)	sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.
	Option 2: Pascal's Principle Concept Mapping	
	B. Pascal's Principle Concept Mapping: 1. Create a concept map with **Pascal's Principle** as the central idea. 2. Connect it to the following concepts: **force, area, pressure, confined fluid,** and **equal transmission of pressure**. Use arrows and linking words to show how force applied over an area produces pressure and how pressure is transmitted equally throughout a confined fluid. 3. Connect the principle to at least three real-life applications: **hydraulic brakes, hydraulic lifts,** and **hydraulic presses**. Include a brief explanation of how Pascal's Principle operates in each application.	The activity targets Learning Objectives 2, 3, 4, and 5 by guiding learners to explain the relationships among force, area, pressure, confined fluid, and the equal transmission of pressure, and to connect Pascal's principle to hydraulic brakes, lifts, and presses. It applies the Constructivist and Collaborative approaches because learners organize concepts based on prior knowledge, represent relationships using arrows and linking words, discuss their ideas with peers, and refine their concept maps through teacher-guided questioning. The pedagogical strategy used is concept mapping and application-based analysis, supported by peer discussion and teacher feedback. Literacy is integrated through the use of appropriate scientific terms and short explanations describing how pressure is produced, transmitted, and applied in hydraulic systems. Numeracy is integrated through examining the relationship among force, area, and pressure and comparing the sizes of input and output pistons in hydraulic devices. EdTech is integrated

		through digital concept-mapping tools, videos, simulations, or interactive presentations when available. **Note to Teachers:** Check whether the arrows and linking words accurately show the relationships among the concepts. Emphasize that, according to Pascal's principle, pressure applied to a confined fluid is transmitted equally in all directions. Clarify that hydraulic systems can increase the output force by applying the transmitted pressure over a larger area, although the pressure itself remains equal throughout the fluid.
	B. 3. Developing Mastery	
	Option 1: Build it, Load it!	
	B. "Build it, Load it!" Task: Challenge students to design a simple boat from aluminum foil that can hold as many marbles as possible before sinking. Discuss why the boat floats and how buoyant force relates to the volume of water displaced. Outcome: Leads to understanding boat design and safety — real-world transportation tie-in. **Objective:** • Students will design and build a small boat using basic materials and test its buoyancy to understand how Archimedes' Principle applies. **Materials:** Aluminum foil sheets Straws, plastic wrap, tape Small weights (like coins or marbles) A basin or tub of water Ruler (optional) **Instructions:** **Design:**	The activity targets Learning Objectives 5 and 6 by allowing learners to practice, classify, compute, or organize ideas related to Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Notes to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on

	In pairs or small groups, students design a boat that can hold the most weight without sinking. Criteria for boat design: a. stability of design, b. correct application of buoyancy, c. number of weights held **Build:** Construct the boat using the given materials. **Test:** Place the boat in the water and add weights one at a time until it sinks. **Record: Follow-Up Discussion:** **Questions:** 1. Which designs were the most effective, and why? 2. How did the shape and volume of the boat affect its floating ability? 3. How did Archimedes' Principle explain the results?	whether the fluid can provide enough buoyant force to balance the object's weight.
	Option 2: Buoyancy Computation Extension	
	Extension Idea: • Learners calculate the estimated weight of water displaced by their boat and compare it with the total weight of the boat and load. They will explain whether the comparison supports why the boat floated or sank.	The activity targets Learning Objectives 5 and 6 by allowing learners to practice, classify, compute, or organize ideas related to Archimedes' principle, Pascal's principle, and floating. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing

		mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.
B. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: Hydraulics in the Community	
	ACTIVITY C **Task: Mini Research** **Title: "Hydraulics in the Community"** • Assign groups in different fields (e.g., construction, health care, transport) to research how Pascal's Principle is applied. • Each group presents examples (e.g., hydraulic cranes, dentist chairs, hydraulic presses) with simple diagrams or models. Task requirements: Each group will submit a one-page output or short slide showing one hydraulic system, the parts involved, how Pascal's principle is applied, its use in the community, and one safety or efficiency consideration.	The activity targets Learning Objectives 2, 4, 5, and 6 by asking learners to apply the lesson concepts to practical situations or performance tasks related to Archimedes' principle, Pascal's principle, and floating. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is hands-on investigation and principle-based classification, supported by peer sharing and teacher questioning. Literacy is integrated through explaining observations using terms such as buoyant force, displaced fluid, pressure, and volume. Numeracy is integrated through measuring or comparing mass, volume, shape, force, and displacement in simple investigations. EdTech is integrated through videos, simulations, or digital worksheets when available. **Note to Teachers:** Ask learners to explain the evidence behind their answers. Clarify that floating depends on whether the fluid can provide enough buoyant force to balance the object's weight.

Option 2: Pascal in Action

Task: Create an Infographic
Title: "Pascal in Action"
Activity:

- Individually or in pairs, students design an infographic showing at least 3 real-world applications of Pascal's Principle — including how it works and why it's important.

Rubric for assessing an infographic on Pascal's Principle

Criteria	Excellent (4)	Good (3)	Fair (2)	Needs Improvement (1)
Accuracy of Pascal's Principle	Explanation is completely accurate and demonstrates deep understanding of Pascal's Principle.	Mostly accurate with only minor errors.	Some correct ideas but contains noticeable misunderstandings.	Explanation is incorrect or missing.
Real-World Examples	Multiple appropriate and clearly explained real-world applications (e.g., hydraulic lift, brakes).	At least one correct example with explanation.	Example is unclear or weakly explained.	No example or incorrect example provided.
Clarity of Explanation	Concepts are explained clearly, logically, and easy to understand for the intended audience.	Mostly clear with minor confusion.	Some explanations are unclear or hard to follow.	Explanations are confusing or incomplete.
Visual Organization & Design	Excellent layout; visually appealing, well-organized, and enhances understanding.	Organized and visually clear with minor design issues.	Somewhat disorganized; visuals do not always support content.	Poor organization; difficult to follow or distracting design.
Readability	Text is clear, concise, easy to read (good font, size, spacing). No errors in grammar or spelling.	Mostly readable with few minor errors.	Hard to read in some parts; several errors present.	Very difficult to read; many errors.
Use of Graphics/Illustrations	High-quality visuals (diagrams, icons) that strongly support understanding.	Visuals are appropriate and helpful.	Some visuals included but not always relevant or clear.	Few or no visuals; do not support learning.
Citation of Sources	All sources are properly cited and credible.	Most sources are cited properly.	Some citations missing or incomplete.	No citations provided.

	C. 2. Making Generalization	
	In 3-5 sentences, explain how Pascal's principle and Archimedes' principle help people solve real-life problems in transportation, business, home, or community settings. Give one example for each principle.	Scoring Guide (Optional) 22–28 points = Excellent 15–21 points = Good 8–14 points = Fair 7 and below = Needs Improvement
	Option 2: Design a Better Hull	
	Task 2: Design a Better Hull **Problem:** Your current hull is not keeping the ship stable. You need to redesign the hull so it can displace enough water to produce a buoyant force that balances the weight of the boat and its load. **Instructions:** On your task sheet, sketch a new hull design that you think will float better. Label key parts and explain why your design is an improvement using terms like volume, displacement, and stability.	
	C. 3. Evaluating Learning	
	Option 1: Multiple Choice Assessment	
	Multiple Choice: 1. What does Pascal's Principle state about the pressure applied to a confined fluid? A. Decreased at the bottom B. Lost in the fluid C. Transmitted equally in all directions D. Absorbed by air	**Answer Key:** **Multiple Choice:** 1. C 2. B 3. C 4. B 5. B

	2. When an object is submerged in water, what force acts upward against it? A. Gravity B. Buoyant force C. Friction D. Centripetal force 3. Which of the following best explains why a large, hollow object can float in water, while a small, solid object may sink? A. The larger object has more mass, so it floats better. B. The smaller object is lighter, so it sinks faster. C. The shape and volume of the larger object cause it to displace more water, increasing the buoyant force. D. The solid object traps air inside, making it heavier than the hollow one. 4. Which of the following objects is most likely to float in water? A. A small, dense metal ball B. A large, flat sheet of metal shaped like a bowl C. A wooden cube smaller than a marble D. A rock with air bubbles inside 5. Which combination of properties makes an object most likely to float in water? A. High mass, low volume, round shape B. Low mass, high volume, wide shape C. High mass, small volume, sharp shape D. Low mass, low volume, compact shape **Performance based item:** Design a simple test showing how changing the shape, mass, or volume of an object affects its ability to float. Identify the variable to be changed, the variable to be observed, the materials needed, and the expected observation.	

Option 2: Explanation Questions

Explanation:

1. Give two examples of hydraulic systems found in your home or community.
2. Give two real-life examples of Archimedes' Principle at work—one in the home and one in transportation. Explain how it applies in each case.
3. Explain how Pascal's Principle helps a car's brake system work.
4. In your own words, describe how the weight of displaced fluid affects whether an object floats or sinks.

For the Explanation, the answers may vary. Below is the suggested scoring guide/checklist for assessing students' answers:
For numbers 1 and 2.
Explanation Scoring Guide / Checklist

Student Name: _____
Date: _____
Topic: _____

Criteria	4 – Excellent	3 – Good	2 – Fair	1 – Needs Improvement	Score
Accuracy of Concept	Concept is completely correct with no errors.	Mostly correct with minor mistakes.	Some correct ideas but with noticeable errors.	Incorrect or missing explanation.	____
Relevance of Examples	Examples are highly relevant, clear, and well-explained.	Example is relevant and explained.	Example is somewhat related but unclear.	No example or unrelated example.	____
Use of Scientific Terms	Uses scientific terms accurately, appropriately, and consistently throughout.	Uses most scientific terms correctly with few errors.	Uses some scientific terms, but with frequent inaccuracies.	Little to no use of scientific terms.	____
Clarity of Explanation	Very clear, logical, and easy to understand.	Generally clear with small confusion.	Some parts are unclear or difficult to follow due to gaps or disorganized ideas.	Very unclear or confusing explanation.	____
Completeness of Answer	Fully answers the question with all key points included.	Mostly complete; minor details are missing.	Partially complete; several key points are missing.	Incomplete or does not answer the quest	____

Total Score: _____ / 20

Performance Levels

17–20 points → Excellent
13–16 points → Good
9–12 points → Fair
5–8 points → Needs Improvement

✓ **Teacher Comments: (if there is any)**

C. 4. Additional Activities

Option 1: Hydraulic Systems Data Interpretation

1. Interpret data from an experiment involving hydraulic systems.
• Supports scientific inquiry and data literacy.
• **Example: "Analyze how changing the size of a syringe affects force transmission."**

For numbers 3 and 4.

Criteria	**3 pts (Excellent)**	**2 pts (Satisfactory)**	**1 pt (Needs Improvement)**
Accuracy of Concept	Correctly explains the concept	Partial understanding; some correct concepts, but with minor errors or vague phrasing.	Misunderstanding or incorrect explanation
Clarity of Explanation	Clearly written in the student's own words; easy to understand.	Understandable but with minor grammar or clarity issues.	Unclear, poorly worded, or copied verbatim.

Option 2: Field Observation or Interview

2. Field Observation or Interview (optional/homework)
• Activity: Have students talk to a mechanic, nurse, or heavy machinery operator about tools they use that involve fluid pressure.
• They summarize how those tools relate to Pascal's Principle.

V. ASSESSMENT **(Assessing Learnings)**	1. Which of the following is an example of a hydraulic system? A. Bicycle chain B. Car brake system C. Windmill D. Ceiling fan 2. When pressure from a small piston is transmitted through a confined fluid to a larger piston, what happens at the larger piston? A. No change in pressure B. A smaller force on the other piston C. A larger force is produced on the larger piston because the same pressure acts over a larger area D. The system failing to operate 3. According to Archimedes' Principle, the buoyant force on an object is equal to what? A. The weight of the object B. The volume of the fluid C. The mass of the object D. The weight of the displaced fluid 4. When will an object float in water? A. When it is heavier than the water, it displaces. B. When it is made of metal. C. When the fluid can provide enough buoyant force to balance the object's weight. D. When it is shaped like a ball. 5. When the volume of an object increases but its mass stays the same, what is likely to happen to its ability to float? A. It will sink regardless of shape. B. It will become denser and float better. C. It will become less dense and float better. D. Its density won't change, so its buoyancy is unaffected.

	Answer Key: **Multiple Choice:** 1. B 2. C 3. D 4. C 5. C **Practical Assessment Task:** Learners will propose and sketch a simple model demonstrating how shape, mass, or volume influences floating. Their output should specify the materials and procedures, predict expected results, and explain findings using Archimedes' Principle.
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Utilization of Electricity - Electrical Hazards and Safety Practices**	Lesson Exemplar	8

I. OBJECTIVES	
A. Content Standard	The learners learn that analysis of electricity generation, consumption patterns, and energy-efficiency practices can lead to better energy supply and management.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills In this topic, the learners are assumed to have prior knowledge on electric circuit and component, conductors and insulators; and prior skills on safe handling of electrical appliances and devices, and recognizing hazardous electrical conditions.
	The learners discuss safety practices in dealing with electrical hazards, such as overloading, damaged insulation, damp electrical conditions, faulty wiring, and electrocution.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Institute of Integrated Electrical Engineers of the Philippines. 2017. Philippine Electrical Code, Part I - 2017 Edition. Taguig City: IIEE. Accessed May 7, 2025. https://iiee.org.ph:89/uploads/files/898.pdf. Jones & Bartlett Learning. 2015. Electrical Inspection Checklist: 2015. Burlington, MA: Jones & Bartlett Learning. https://samples.jbpub.com/9781284041835/Electrical_Inspection_Checklists.pdf. Joviland, Rita. 2025. "Electrical Issues Remain Most Common Cause of Fire - BFP Data." GMA Integrated News, February 28, 2025. https://www.gmanetwork.com/news/topstories/nation/937689/electrical-issues-remain-most-common-cause-of-fire-bfp-data/story/. University of Hawai'i at Manoa. n.d. OPF Safety Program Manual - Electrical Safety. Honolulu: Office of Physical Facilities and Grounds.

<table>
<tr><td></td><td colspan="2">https://manoa.hawaii.edu/opf/documents/safety/19%20OPF%20Safety%20Program%20Manual%20-%20Electrical%20Safety.pdf.</td></tr>
<tr><td>III. CONTENT
(Sequencing Content)</td><td colspan="2">Utilization of Electricity - Electrical Hazards and Safety Practices</td></tr>
<tr><td>IV. OBJECTIVES
(Setting Clear Objectives and Analyzing the Tasks)</td><td colspan="2">1. Identify common electrical hazards in various settings based on given scenarios and real-life case studies.
2. Demonstrate appropriate electrical safety practices through role-play and group presentations.
3. Reflect on key safety principles and formulate a personal action to promote electrical safety.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: K-W-L CHART</td></tr>
<tr><td>

Learners construct a KWL Chart in their notebooks to guide the session. In What I Know, they write prior knowledge about electrical hazards, safety practices, and basic components (insulators/conductors): Absolutely Certain: Facts they are confident about, supported by prior learning. Somewhat Sure: Ideas they think are true but need clarification. Uncertain: Assumptions or incomplete knowledge needing investigation.
In What I Want to Know, they list questions or scenarios about handling electrical hazards.

<table>
<tr><th colspan="3">What I Know</th><th>What I Want to know</th><th>What I Learned</th></tr>
<tr><td>Absolutely Certain</td><td>Somewhat Sure</td><td>Uncertain</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
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</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available.

Notes to Teachers: Do not allow unsafe demonstrations using live electricity. Use</td></tr>
</table>

	● After completing the chart, volunteer students share their answers. The teacher gathers responses, highlights misconceptions, and provides immediate feedback to gauge baseline knowledge.	pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: HAZARD SORTING CHALLENGE	
	● The teacher shall prepare relevant images showing different electrical hazards. The teacher may print or compile them into a slideshow presentation. ● The images will be shown to the learners, and they shall determine what specific electrical hazard is illustrated. Require also learners to state visual cue and possible safety practices for the identified hazard. Images on the following electrical hazards may include overloading, damaged insulation, damp electrical conditions, faulty wiring, and electrocution- (See Annex for sample images). ● The activity can be done as a class by asking individual students or in a group to let students collaborate and discuss their answers with each other.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.

	A. 2. Establishing the Purpose of the Lesson	
	Option 1: UNLOCKING VOCABULARY: FLIP AND DEFINE	
	● The learners will explore key vocabulary related to electrical safety that they will come across to understand electrical hazards, prevention strategies, and emergency responses. ● The learners will be given a set of terms related to electrical safety (e.g. electricity, conductor, power source, electrocution, short circuit, faulty wiring, safety switch, grounding, Personal Protective Equipment, Fire Safety), and a set of definitions/descriptions. (See Annex for sample terms with definitions) ● The students will match the terms with their corresponding definitions correctly. ● This can be done individually or collaboratively where students race to match the terms and definitions correctly.	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: NEWS REFLECTION	
	● This activity will be done in groups. The teacher will provide digital or printed copies of news related to electrical hazards to each group. ● The news can be from the local community.	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because

	● Before learners form their groups, the teacher will provide the discussion questions to guide them as they read the news. Sample news article: Rita Joviland. "Electrical Issues Remain Most Common Cause of Fire — BFP Data." GMA Integrated News, February 28, 2025. The news is about the report of the Bureau of Fire Protection in connection with the Fire Prevention Month. (See Annex for the complete article) **Discussion Questions:** a. What are the possible causes of the electrical hazard or accident described in the news? b. Was there any warning signs before the accident occurred? c. How did the electrical issue affect the people and property involved? d. What electrical safety practices could have prevented the incident? The teacher may provide follow up questions or leading questions for a more in-depth discussion.	learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1: SHOCK AWARENESS	
	● The teacher will present scenarios using a slideshow presentation or printed materials to enhance student engagement. If digital or printed resources are unavailable, the teacher may read the text aloud or assign a student to do so. To further support visualization, the teacher can incorporate GIFs, images, or illustrations that depict the described scenarios, helping students better imagine and relate to the context for deeper understanding.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is

	● Learners will reflect on the scenarios provided and answer guiding questions. These scenarios illustrate common habits or practices that may lead to electrical hazards (see Annex for sample scenarios with images).	integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: HAZARD HUNT	
	● Learners will work in groups. Each group will assign members to the following roles: Leader, Observers, Documenter, Photographer, Secretary, Reporter, and Safety Analyst. ● Each group will be assigned to a specific area in the school. They will explore the assigned environment to identify potential electrical hazards, assess risks, and propose safety measures. (The areas may include classroom, restrooms, laboratories, canteen, library, and others) ● The learners will look for signs of potential hazards using a checklist: (the checklist may be modified, additional items may be accessed through the Jones & Bartlett Learning, Electrical Inspection Checklist: 2015 (Burlington, MA: Jones & Bartlett Learning, an Ascend Learning Company, 2015). (See Annex for a prescribed checklist) **Safety rule:** Conduct a visual inspection only. Do not touch, unplug, switch on, open, move, or repair any outlet, wire, appliance, or electrical panel. Keep away from wet areas and	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides,

	report any suspected hazard to the teacher or authorized personnel immediately. **Discussion Questions:** a. What were the most common electrical hazards identified during the inspection? b. Were there any hazards that surprised you or that you hadn't considered before? c. Which hazards pose the greatest risk? Explain d. How did you determine whether an issue was low, medium, or high risk? e. What simple actions can reduce electrical hazards found during inspection? f. How can schools, homes, or businesses improve their electrical safety practice?	images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	B. 2. Discussing New Concept	
	Option 1: ELECTRICAL SAFETY SHOWCASE	
	● The learners will be grouped into groups of 4-5. Each group will choose one format they are most comfortable with to demonstrate electrical safety awareness and practice. **Option A:** Safety Drill Role Play Perform a 3–5-minute role play of an electrical safety scenario. Integrate correct safety practices into the script. Use technical terms in dialogue and demonstrate realistic responses. **Option B:** Safety Demonstration. Show a short demonstration of safe electrical practices (e.g., proper use of extension cords, safe appliance handling). Explain the rationale behind each practice. **Option C:** Infographics Making Create an infographic that highlights hazards and safety measures. Use visuals, icons, and concise text to communicate safety reminders.	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable.

	Option D: Case Study Analysis Analyze a real or simulated incident report. Identify causes, assess risks, and propose corrective measures. Present findings clearly to the class. **Option E:** Digital Safety Campaign. Produce a short digital content piece (poster, PSA video, or social media post). Advocate for safe electrical practices in a creative, tech-integrated way. ● Themes will be assigned to each group (overloading, damaged insulation, damp electrical condition, faulty wiring, electrocution) ● Preparation such as reading materials, planning, rehearsals, or design work should be given ample time or can be done outside class time. ● In class, groups will present their chosen output within the allotted time frame. ● After the presentation, each group must submit an Incident Report Form and explain their findings in class. ● The teacher will reinforce correct safety procedures, provide immediate feedback, and award "Safety Awards" (e.g., Best Safety Solution, Most Realistic Demonstration, Best Visual Communication). See Annex for a unified scoring rubric	EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: TOOLBOX TALK PRESENTER	
	Divide learners into 5 groups. Each group will explain and demonstrate a key electrical safety topic: Overloading, Damaged Insulation, Damp Electrical Conditions, Faulty Wiring, or Electrocution. ● The students will research and prepare a short explanation and demonstration related to their assigned topic.	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	● The students may use visual aids, props, or models where applicable to effectively demonstrate or talk about the safety practice on the electrical hazard assigned to them. ● After each Toolbox Talk Presenter, the teacher should engage the class with questions to test understanding of the learners and to reinforce learning. **Guide Questions:** 1. What electrical hazards were discussed, and why is it dangerous in school or home settings? 2. What signs or conditions should you look for to detect this hazard early? 3. What safety procedure or precaution is most effective in preventing this hazard? 4. If you encountered this hazard in real life, what would be your first response?	The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	B. 3. Developing Mastery	
	Option 1: CHECKPOINT ACTIVITY: ELECTRICAL SAFETY QUICK CHECK	
	● The learners' mastery of electrical hazards and safety practices will be assessed through a 5-item structured yet quick formative assessment. ● The learners will match each electrical hazard in column A with the correct safety practice in Column B. (See Annex Link for sample items)	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard

		cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2, IF-THEN (THINK PAIR SHARE)	
	● Learners will identify electrical hazards, discuss it with their peers, and propose safety solutions using the Think-Pair-Share strategy. ● Each pair will be given a list of "If" scenarios describing an electrical hazard. Afterwards, they each will write "Then" safety practice. ● Partners will exchange answers for each scenario, discuss their reasoning, and evaluate each other's solutions. They may revise their responses based on peer feedback. ● Ask volunteer students to present their If-Then output. ● The teacher facilitates discussion, clarify misconceptions and reinforce key safety practices. Here is a sample "if" scenario **1.** If an extension cord is overloaded with multiple high-power devices, Then... **2.** If water spills near an exposed electrical wire, Then... **3.** If someone tries to fix an electrical issue without turning off the main power supply, Then...	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use

		pictures, case studies, or unplugged materials to discuss hazards and safety responses.
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: CASE STUDY	
	● Learners will be given real case studies about electrical safety incidents. They will analyze the cases, evaluate causes, and propose practical solutions based on learned concepts. (See Annex for sample cases)	The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.

	Option 2: Philippine Electrical Code (PEC)- Guide for Crafting Electrical Safety Protocols in School, Home, Community.	
	● The teacher may access the Philippine Electrical Code through the Institute of Integrated Electrical Engineers of the Philippines website. ● To facilitate student understanding, the teacher will provide a concise summary of key PEC provisions, focusing on hazard prevention, electrical standards, and best practices relevant to schools, homes, and communities. ● After the discussion, students will collaboratively draft a list of Electrical Safety Protocols, applying what they have learned to propose practical solutions for reducing risks in different settings (school, home, community)	The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to electrical hazards and safety practices. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	C. 2. Making Generalization	
	Option 1: KWL CONTINUATION	
	● The students will continue filling the last part of their KWL Chart- What I Learned column. In this part, they will	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about electrical

<table>
<tr>
<td></td>
<td>summarize key takeaways from the lesson using the table:

<table>
<tr><th>Key Concepts</th><th>What I Learned</th><th>Reflection Prompt</th></tr>
<tr><td>Electrical Hazards</td><td>New risks I discovered are …</td><td>What are hazards you didn’t know before?</td></tr>
<tr><td>Safety Practices</td><td>I can improve electrical safety by …</td><td>What safety rules do you now understand better?</td></tr>
<tr><td>Prevention Strategies</td><td>The best way to prevent accidents is …</td><td>What actions will you take at home, school, or in the community?</td></tr>
<tr><td>Real-World Applications</td><td>Electrical safety matters because …</td><td>How does this knowledge apply to daily life?</td></tr>
</table></td>
<td>hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available.

Notes to Teachers: Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.</td>
</tr>
<tr>
<td></td>
<td colspan="2">Option 2: SAFETY COMMITMENT</td>
</tr>
<tr>
<td></td>
<td>● The learners will state one personal action they will take to improve electrical safety practices in their lives guided by a summary of key takeaways they learned during the session.</td>
<td>The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer</td>
</tr>
</table>

	SAFETY COMMITMENT I commit to practicing and promoting electrical safety by: 1. **Identifying hazards such as …** 2. **Following safety protocols like ….** 3. **Reporting issues by …** 4. **Educating others through …** 5. **Adopting safe habits like …** **Signature:** _____ **Date:** _____	sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	C. 3. Evaluating Learning	
	Option 1: 321 EXIT TICKET	
	● Students will reflect on their learning about electrical hazards and safety practices before leaving the lesson using a 3-2-1 Exit Ticket: 3 – Things I Learned: Key takeaways from the discussion 2 – Things I Found Interesting: Concepts, facts, or real-world applications that stood out 1 – Question I Still Have: Any unclear points or topics I would like to explore further	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard

		cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: CONCEPT CHECK	
	● Create a 5-item quiz to gauge students' mastery of the lesson. ● The items should be more scenario-based, if possible, to elicit students' mastery on safety practices. ● The teacher may use electronic tools (Google Forms, Kahoot, etc.) to make it more engaging. (See Annex for the items.)	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Notes to Teachers:** Do not allow unsafe demonstrations using live electricity. Use

		pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	C. 4. Additional Activities	
	Option 1: VOLTA (BINGO)	
	● The students will create their BINGO card but instead of - the usual BINGO, they will use the word VOLT compose of 4x4 grids. The students will assign numbers in each cell from 1-16 randomly. ● The teacher will prepare at least 10 questions numbered randomly from 1-16. The teacher will pick a number, and the corresponding question will be asked to the learners. ● The learners with correct answers can cross out the number on their card. The students will be able to win the VOLTA challenge once they are able to cross out 4 cells in either horizontal, vertical, or diagonal.	The activity targets Learning Objective 1 by engaging learners in a task related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
	Option 2: QUOTE TO PONDER	
	● The teacher will present the quote: "Electricity powers life—awareness keeps it safe." ● Students will reflect on the quote and write their responses in their notebooks using the guide:	The activity targets Learning Objective 1 by engaging learners in a task related to electrical hazards and safety practices. It applies to the Constructivist, Collaborative, and Interactive

	1. The quote talks about _____. 2. The quote reminds me of _____. 3. My insight on the quote for people is _____. 4. My insight on the quote for events is _____. 5. My insight on the quote for actions is_____. ● Selected or volunteer students will share their reflections in class.	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is scenario-based discussion and safety analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading hazard scenarios and explaining safety responses using correct electrical-safety terms. Numeracy is integrated through counting, sorting, or ranking hazard cases according to risk level when applicable. EdTech is integrated through using slides, images, videos, or online polling tools when available. **Note to Teachers:** Do not allow unsafe demonstrations using live electricity. Use pictures, case studies, or unplugged materials to discuss hazards and safety responses.
V. ASSESSMENT **(Assessing Learnings)**	**Unit Performance Task** **Option 1: Electrical Safety Protocol** The learners will create electrical safety protocols on different settings of their choice based on the identified potential electrical hazards. The components of their protocol may include clear guidelines for prevention, emergency response, and maintenance. This activity is a refinement of their activity on PEC. (See Annex for the Scoring Rubric and Format Template) **Option 2: Summative Assessment The students will be assessed through a summative assessment. The teacher may opt to use Multiple Choice items.** 1. A household uses a single extension cord to power a refrigerator, an electric fan, a washing machine, and a rice cooker simultaneously. After several hours, the extension cord feels hot to the touch and emits a burning smell. What electrical hazard is most likely occurring, and what is the immediate safety action? A. Short circuit; continue using but monitor closely	

B. Overloading; unplug some appliances immediately
C. Faulty wiring; replace the extension cord with a heavier-duty one
D. Damaged insulation; wrap the cord with electrical tape

2. During a typhoon, floodwater enters a ground-floor classroom and submerges electrical outlets. A student suggests using the submerged outlets to charge their phone since the power is still on. What is the primary electrical hazard in this situation, and why must the main power supply be turned off before entering the area?
A. Damaged insulation; water weakens wire coating
B. Damped electrical condition; water conducts electricity and creates electrocution risk
C. Faulty wiring; moisture causes wires to disconnect
D. Overloading; wet outlets draw more current

3. An electrician finds that the grounding wire in a residential electrical panel is disconnected. The homeowner says, “It’s been like that for years and nothing bad has happened, so it’s probably not important.” What is the most accurate response to the homeowner’s statement?
A. The homeowner is correct—grounding is optional for older homes.
B. Grounding is only necessary during lightning storms.
C. Without grounding, fault current has no safe path, increasing fire and shock risk even if no incident has occurred yet.
D. The disconnected wire is likely a spare and not needed.

4. During an electrical fire in a school laboratory, a student remembers to use the CO_2 fire extinguisher. However, another student grabs a bucket of water to help. What is the correct evaluation of both students' actions?
A. Both actions are correct—water and CO_2 are both effective on electrical fires
B. The first student is correct; the second student's action is dangerous because water conducts electricity and can electrocute responders
C. The first student is incorrect—CO_2 should not be used in laboratories; the second student is correct
D. Both students are incorrect—electrical fires should be allowed to burn out

5. Which of the following is the **unsafe practice** when dealing with damaged electrical cord insulation?
A. Replacing the entire cord with a manufacturer-approved equivalent
B. Wrapping the damaged area with cloth tape to save money
C. Discontinuing use until proper repair or replacement
D. Consulting a licensed electrician for assessment

6. What is the primary hazard when multiple extension cords are connected together ("daisy-chained") to power high-wattage appliances?
A. Voltage increases that damages appliance motors
B. Increased resistance at connection points causing overheating and fire risk
C. Electromagnetic interference with nearby electronic devices
D. Reduced electrical efficiency leading to higher utility bills

	7. What electrical hazard refers to defective, deteriorated, or improperly installed conductors and connections? overloading C. damp electrical conditions A. damaged insulation D. faulty wiring 8. Which safety device is **required by the Philippine Electrical Code** to protect personnel from ground fault electrocution in wet locations? A. Surge protector C. Circuit breaker B. Ground Fault Circuit Interrupter (GFCI) D. Voltage regulator 9. What does the “grounding wire” (green or bare copper) in an electrical system primarily do? A. Carries normal operating current to power appliances B. Provides a safe path for fault current to dissipate into the earth C. Reduces electricity bills by improving energy efficiency D. Prevents power outages during storms 10. Which action best demonstrates “proper electrical safety protocol” when encountering a person experiencing electrocution? A. Immediately grab the person and pull them away from the source B. Use a wooden broomstick or other non-conductive object to separate the person from the source, then call for emergency help C. Pour water on the person to "ground" the electricity D. Wait for the person to release themselves before assisting E.
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners’ performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners’ understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

ANNEX

A. 1. Activating Prior Knowledge
Option 1: K-W-L CHART

What I Know			What I Want to know	What I Learned
Absolutely Certain	Somewhat Sure	Uncertain		

Option 2: HAZARD SORTING CHALLENGE
Sample images with sample answers

Images	Visual cue	Electrical Hazard	Possible Safety Practice
	Too many plugs in one outlet or extension cord; warm or sparking sockets.	overloading	• Use only one high-power appliance per outlet. • Avoid daisy-chaining extensions. • Unplug unused devices.
	Frayed, cracked, or exposed wires; visible copper strands.	Damaged insulation	• Replace damaged cords immediately. • Do not tape over exposed wires. • Keep cords away from sharp edges or heat.
	Wet outlets, plugs near sinks, or moisture on electrical surfaces.	Damped/wet conditions	• Keep electrical devices dry. • Never touch plugs or switches with wet hands. • Install Ground Fault Circuit Interrupters (GFCIs) in damp areas.
	Loose connections, burnt marks, flickering lights, or buzzing sounds.	Faulty wiring	• Have wiring inspected by a licensed electrician. • Avoid DIY electrical repairs. • Report irregular power behavior immediately.

	Sparks or shock when touching devices; person in contact with live wire.	electrocution	• Turn off power before helping. • Use a non-conductive object (wood, rubber) to separate victims from source. • Call emergency services (911 or local equivalent).

A. 2. Establishing the Purpose of the Lesson
Option 1: UNLOCKING VOCABULARY: FLIP AND DEFINE
Suggested Terms/ Vocabularies

1. Conductor – A material (like metal) that allows electricity to pass through easily.
2. Damaged Insulation – When the protective covering around wires is worn out, cut, or broken. Exposed wires increase the risk of electric shock or short circuits.

Damp Electrical Condition – When electrical equipment or wiring is exposed to moisture or water. Dampness makes electricity more likely to leak or travel through unintended paths, increasing shock and fire risks.

3. Electricity – The flow of electric charge (usually through wires) that powers lights, appliances, and machines.
4. Electrocution – A severe injury or death caused when electricity passes through the body. It happens when a person directly contacts live wires or energized equipment.
5. Electrocution – Injury or death caused by electric shock when electricity passes through the body.
6. Faulty Wiring – Damaged or poorly installed electrical wires that increase the risk of shock or fire.
7. Fire Safety – Practices and equipment (like fire extinguishers, alarms, and evacuation plans) that prevent or respond to fires caused by electrical problems.
8. Grounding – Connecting electrical systems to the earth to safely discharge excess electricity and prevent shocks.
9. Overloading – When too many appliances or devices are connected to one outlet or circuit, causing excessive current flow. This can lead to overheating, sparks, or fire.
10. Personal Protective Equipment (PPE) – Safety gear such as gloves, goggles, or insulated boots used to protect against electrical hazards.
11. Power Source – The origin of electricity, such as a battery, generator, or electrical outlet.
12. Safety Switch – A device that automatically cuts off electricity when a fault or overload is detected.
13. Short Circuit – An unintended path for electricity that can cause sparks, overheating, or fire.

Option 2: NEWS REFLECTION
Sample News Article

Electrical issues remain most common cause of fire —BFP data
By JOVILAND RITA, GMA Integrated News
Published February 28, 2025, 11:05am

Most of the fire incidents reported since January this year were due to electrical issues, data from the Bureau of Fire Protection (BFP) showed.
From January 1 to February 27, the BFP said a total of 2,307 fire incidents have been recorded, and 625 of these cases were caused by electrical issues. Electrical issues were also the most common cause of fire in the same period last year with 1,181 cases.
Aside from electrical issues, the following are the other common causes of fire incidents this year so far:
open flame – 398; embers and sparks – 158; motor vehicular – 52; natural – 43; spontaneous combustion – 30; explosion – 21; fireworks and pyrotechnics - 16
A total of 74 fatalities were reported this year including 70 civilians and four members of law enforcement agencies, the BFP data showed.
Meanwhile, a total of 209 injured persons were reported including 190 civilians, 12 BFP firefighters, five members of law enforcement agencies, and two volunteers.
Damage worth P1,609,188,402 in total was also reported.
The number of fire incidents decreased by 38% from 3,733 on January 1 to February 27, 2024, to 2,307 in the same period this year, according to the BFP.

Fire Prevention Month

On Saturday, the BFP is set to kick off the Fire Prevention Month, which will focus on raising awareness on protecting persons with disabilities (PWD) and other vulnerable individuals.
“The 2025 Fire Prevention Month Campaign of the BFP centers on raising awareness of the absolute necessity for every member of the community to protect those individuals who cannot protect themselves from destructive fires,” the BFP said.
According to the BFP, the number of PWD casualties in fire incidents from 2013 to 2023 averaged at four people every quarter, with 2022 garnering the highest percentage of PWD casualties at 17.3%.
The BFP produced an advocacy video “Baldado,” written and directed by actor John Arcilla, which follows a senior citizen who is aware and conscious of potential causes of fire that the people around him are neglecting or unmindful of.
“When normal people could easily run away from fires, those who are vulnerable, such as the PWDs, senior citizens, and those needing special care could not and will definitely fall victim to fire,” the BFP said.

Aside from this, the BFP is also set to sign a memorandum of understanding (MOU) with PAGIBIG Fund to help BFP personnel gain access to more affordable, easy, and convenient housing programs. —AOL, GMA Integrated News

B. 1. Presenting Examples
Option 1: SHOCK AWARENESS
Here are sample scenarios with images (The teacher may opt to create and add more scenarios)

Scenario 1. A resident in Barangay Maliwanag gets electrocuted while fixing exposed wiring on a flooded area. A neighbor rushes to help by grabbing him directly.

https://imagedelivery.net/XjfldUw-7ltNkd6h3uw2jw/thai.news/2024/12/image-46.png/w=1024

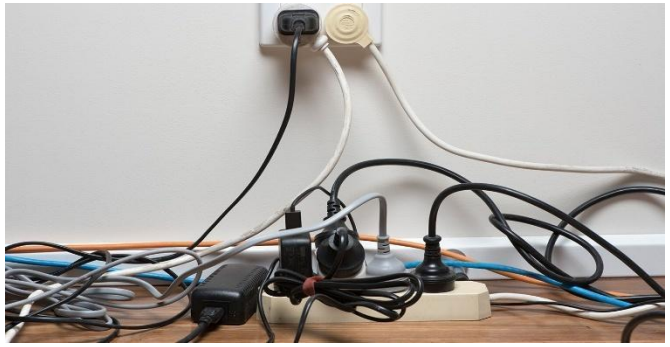
Discussion Questions:

a. What can be the cause of electrocution of the worker?
Possible Answer: The worker was electrocuted because he touched exposed live wires in floodwater.

b. What should the coworker have done differently?
Possible Answer: The neighbor should have turned off the power and used a nonconductive object instead of grabbing him.

c. How can the community leaders ensure safety in handling electricity among the residents?
Possible Answer: Community leaders should promote safety training, enforce proper wiring standards, and ensure inspections after floods.

Scenario 2. You noticed that a single electrical outlet in your classroom is powering multiple devices-computers, a projector, a fan, and a phone charger. You feel the outlet is unusually warm to touch.



https://cmregent.com/blog/overloaded-electrical-hazards-and-practices/

Discussion Questions:

a. What dangers could arise from this situation?
   Possible Answer: The outlet could overheat, spark, or cause fire due to overloading.
b. What immediate action should be taken?
   Possible Answer: Immediately unplug some devices and stop using the outlet until inspected.
c. How can overloading outlets be prevented in daily use?
   Possible Answer: Prevent overloading by distributing devices across outlets, using surge protectors, and limiting high-power appliances per socket.

Option 2: HAZARD HUNT
(the checklist may be modified, additional items may be accessed through the Jones & Bartlett Learning, Electrical Inspection Checklist: 2015 (Burlington, MA: Jones & Bartlett Learning, an Ascend Learning Company, 2015), https://samples.jbpub.com/9781284041835/Electrical_Inspection_Checklists.pdf

Inspection Items	Documentation (Attach photo)	Risk Level (Low/Medium/High)	Suggested Actions	Responsible Person
B. **Outlets and Wires** [ ] **Overloaded sockets** [ ] **Damaged/exposed wires** [ ] **Flickering lights** C. **Appliances and Devices** [ ] **Overheating appliances** [ ] **Tangled or unsafe extension cords** [ ] **Unplugged unused devices** D. **Environmental Risks** [ ] **Electrical items near water/ damp area** [ ] **Wires and devices placed unsafely** [ ] **Improper ventilation for electrical equipment** E. **Emergency Readiness** [ ] **Working fire extinguisher nearby** [ ] **Emergency contact availability** [ ] **Placed Electrical Safety Procedures** **E. Other Hazards**				

Discussion Questions:

a. What were the most common electrical hazards identified during the inspection?
b. Were there any hazards that surprised you or that you hadn't considered before?
c. Which hazards pose the greatest risk?
d. How did you determine whether an issue was low, medium, or high risk?
e. What simple actions can reduce electrical hazards found during inspection?
f. How can schools, homes, or businesses improve their electrical safety practice?

B. 2. Discussing New Concept
Option 1: SAFETY DRILL ROLE PLAY

Criteria	Excellent (4)	Proficient (3)	Developing (2)	Beginning (1)
Accuracy of Safety Content	Demonstrates thorough and correct understanding of electrical hazards and safety procedures; no misconceptions	Mostly accurate with minor errors or omissions	Some inaccuracies or misconceptions evident	Major misconceptions; safety content unclear or incorrect
Application of Safety Solutions	Proposes clear, practical, and effective safety measures directly linked to hazards	Suggests generally appropriate safety measures with minor gaps	Safety measures are vague, incomplete, or partially relevant	No clear safety measures proposed or irrelevant solutions
Creativity & Engagement	Highly creative, engaging, and original presentation (role play, visuals, analysis, or campaign)	Creative and engaging with some originality	Limited creativity; presentation feels routine	Minimal creativity; presentation lacks engagement
Clarity & Communication	Ideas are communicated clearly, logically, and confidently; technical terms used appropriately	Mostly clear and logical; minor lapses in communication	Some unclear or disorganized parts; limited use of technical terms	Difficult to follow; poor communication of ideas
Collaboration & Group Work	All members contribute actively; roles are well-distributed and coordinated	Most members contribute; roles mostly clear	Uneven participation; some roles unclear	Minimal collaboration; one or two members dominate
Incident Report Submission	Report is complete, well-structured, and aligns with findings; integrates technical terminology	Report is complete with minor lapses in structure or terminology	Report is partially complete; lacks detail or structure	Report missing, incomplete, or irrelevant

B. 3. Developing Mastery

Option 1: CHECKPOINT ACTIVITY: ELECTRICAL SAFETY QUICK CHECK
Sample items

Column A	Column B
1. **Overloading sockets**	A. Keep electrical appliances away from water sources.
2. **Damaged insulation on wires**	B. Avoid plugging too many devices into one outlet.
3. **Wet electrical Conditions**	C. Ensure that all wirings are properly installed and maintained.
4. **Faulty wiring**	D. Use insulated wires and check for damage regularly.
5. **Electrocution risk**	E. Do not touch someone experiencing electric shock-turn off the power source first.

C. 1. Finding Practical Application
Option 1: CASE STUDY

Here are some Case Studies they may work on: (The teacher may provide other additional case studies)

1. Bsafe incident case study 04: Death of electrician due to electrocution: Electrical accident (February 27, 2021). https://britanniapandi.com/2021/02/bsafe-incident-case-study-04-death-of-electrician-due-to-electrocution/

Contractor sustains electric shock after failure to isolate power supply.

2. Worker received shock whilst using a pressure water washing machine. https://www.hse.gov.uk/electricity/maintenance/washingmachine.htm
3. An Invisible Threat: The Lived Experiences EIM Students On Electrical Precautionary Measures: A Qualitative Study. https://www.scribd.com/document/668796943/An-Invisible-Threat-The-Lived-Experiences-EIM-Students-on-Electrical-Precautionary-Measures-A-Qualitative-Study

Case Study Report Question Guides:

General Question:

How do electrical hazards arise, what impact do they have, and what preventive measures can be taken to ensure safety?

Probing Questions:

1. What electrical hazard is present in the case?
2. What were the contributing factors that led to the unsafe situation?
3. In what ways did the hazard affect the safety of individuals, the condition of property, and the well-being of the community in this case?
4. What safety protocols should have been followed to prevent this hazard?
5. If this situation happened in a school or home, what precautions would you implement?

C. 2. Making Generalization
Option 1: KWL CONTINUATION

Key Concepts	What I Learned	**Reflection Prompt**
Electrical Hazards	New risks I discovered are …	What electrical hazards did you learn about today that you didn't know before?
Safety Practices	I can improve electrical safety by …	What safety rules do you now understand better?
Prevention Strategies	The best way to prevent accidents is …	What actions will you take at home, school, or in the community?
Real-World Applications	Electrical safety matters because …	How does this knowledge apply to daily life?

Option 2: SAFETY COMMITMENT

SAFETY COMMITMENT

I commit to practicing and promoting electrical safety by:

1. **Identifying hazards such as ...**
2. **Following safety protocols like ....**
3. **Reporting issues by ...**
4. **Educating others through ...**
5. **Adopting safe habits like ...**

Signature: _____

Date: _____

Option 2: CONCEPT CHECK
Sample quiz items:

1. A student plugs a rice cooker, electric kettle, and microwave into the same extension cord. After a few minutes, the cord feels hot.
    a. Continue using the appliances since they are working
    b. Unplug one or more appliances to reduce the load ☑
    c. Wrap the cord with tape to prevent overheating
    d. Move the extension cord to another room

    Rationale: Overloading causes overheating and fire risk. Reducing the load prevents damage and hazards.
2. While cleaning, you notice a wire with cracked insulation exposing copper strands.
    a. Cover the exposed wire with paper or cloth
    b. Ignore it since the appliance still works
    c. Stop using the appliance and report/replace the wire ☑
    d. Step on the wire carefully to avoid touching it

    Rationale: Damaged insulation exposes live wires. The safest action is to stop using it and replace or report immediately.
3. A classmate tries to plug in a fan while standing on a wet floor after mopping.
    a. Proceed quickly before the floor gets wetter
    b. Dry the floor first before plugging in the fan ☑
    c. Wear slippers and continue plugging in
    d. Ask someone else to plug it in instead

    Rationale: Water conducts electricity. Drying the floor prevents electrocution risk.
4. The lights in the laboratory flicker and emit a burning smell.
    a. Switch off the lights and report the issue immediately ☑
    b. Continue using the lights until they stop working
    c. Spray water to cool down the wiring
    d. Cover the switch with tape

    Rationale: Burning smell indicates overheating or faulty wiring. Turning off power and reporting prevents fire or shock.
5. A student accidentally touches a live wire and collapses.
    a. Pull the student away with bare hands
    b. Turn off the main power source before helping ☑
    c. Pour water on the student to revive them
    d. Wait until the wire stops sparking before helping

    Rationale: Never touch a victim while the current is flowing. Cutting off the power source ensures safe rescue.

C. 4. Additional Activities
Option 1: VOLTA (BINGO)
Here is a sample VOLT Card.

V	O	L	T
1	12	11	8
16	2	14	5
6	~~13~~	~~7~~	10
15	3	9	4

Here are sample questions:

7. It refers to any condition that increases the risk of electric shock, fire, or injury due to unsafe wiring, damaged equipment, or improper handling of electrical devices.
13. It is a non-conductive material (such as rubber or plastic) that covers electrical wires to prevent accidental contact with live current.

Assessment
Option 1: Electrical Safety Protocol
Scoring Rubrics

Criteria	Excellent (10 points)	Proficient (7-9 points)	Developing (4-6 points)	Needs Improvement (1-3 points)
Clarity & Organization	Protocol is well-structured, easy to follow, and logically arranged.	Mostly clear with minor lapses in organization.	Some sections are unclear or lack logical flow.	Protocol is unclear, disorganized, and cannot be followed as written.
Identification of Hazards	Accurately identify electrical hazards in assigned settings and provide thorough explanations of the	Identifies most hazards, but some may need further clarification	Identifies only basic hazards without detailed explanation.	Minimal hazard identification with vague descriptions.

	potential risks involved.			
Emergency Response Plan	Detailed, practical steps for handling emergencies; clear action items.	Emergency responses outlined, but some steps lack clarity.	Response plan is present but lacks effectiveness	Emergency response is vague or missing.
Maintenance & Long-Term Safety	Comprehensive maintenance plan ensuring ongoing electrical safety.	The maintenance plan addresses key concerns but could be improved.	Maintenance suggestions are present but lack depth.	No clear plan for long-term electrical safety.
Presentation & Formatting	Well-organized, visually appealing, and professionally formatted.	Clear presentation, minor formatting issues.	Presentation lacks clarity or organization.	Disorganized with formatting errors that hinder readability.

Electrical Safety Protocol Template

Group Name / Members: _____

Chosen Setting: _____ **(e.g., Classroom, Laboratory, Canteen, Library, Restroom)**

1. Introduction

- **Briefly describe the chosen setting.**
- **State why electrical safety is important in this environment.**

2. Identification of Hazards

- **List and explain potential electrical hazards in the chosen setting.**

Hazard 1: _____

Hazard 2: _____

Hazard 3: _____

3. Prevention Guidelines

- **Provide clear steps to prevent hazards.**
- **Example:** "Avoid overloading outlets by limiting appliances per socket."

4. Emergency Response Plan

- **Outline what to do in case of an electrical incident.**

Step 1: _____

Step 2: _____

Step 3: _____

5. Maintenance & Long-Term Safety**

- **Suggest practices to maintain safety over time.**
  Example: "Conduct monthly inspection of wiring and outlets."

6. Presentation & Formatting

- **Include visuals, diagrams, or tables if applicable.**
- **Ensure that the protocol is organized and easy to follow.**

Option 2: Summative Assessment Answer Key
Answer key:

1. B. Overloading; unplug some appliances immediately. Rationalization: The scenario describes multiple high-power appliances drawing current through a single extension cord, exceeding its rated capacity. This causes excessive current flow (overloading), generating heat. The hot cord and burning smell are classic warning signs. The immediate action is reducing the load by unplugging appliances to prevent fire. Option A is dangerous monitoring does not reduce risk. Option C addresses a different hazard not indicated here. Option D is insufficient and unsafe for overheating cords.
2. B. Damped electrical condition; water conducts electricity and creates electrocution risk. Rationalization: Floodwater is conductive due to dissolved minerals and contaminants. Submerged energized outlets create a severe electrocution hazard—electricity can travel through standing water to anyone nearby. Turning off the main power eliminates the energy source before rescuing or recovery. Option A describes a secondary issue, not the immediate lethal risk. Option C misidentifies the mechanism. Option D is scientifically incorrect—wet conditions do not cause overloading.
3. C. Without grounding, fault current has no safe path, increasing fire and shock risk even if no incident has occurred yet. Rationalization: Grounding provides a low-resistance path for fault current to safely dissipate into the earth, triggering protective devices (circuit breakers/GFCI) to interrupt power. Absence of past incidents does not indicate safety—faults are probabilistic about events, and the homeowner has been operating without protection. Option A violates Philippine Electrical Code requirements. Option B understates grounding's continuous protective function. Option D is technically incorrect—grounding conductors are never "spare."
4. B. The first student is correct; the second student action is dangerous because water conducts electricity and can electrocute responders. Rationalization: CO_2 extinguishers are appropriate for Class C (electrical) fires because CO_2 is non-conductive and leaves no residue. Water is never used on energized electrical fires because it conducts electricity, creating electrocution risk for the responder, and potentially spreading the fire. Option A is lethal misinformation. Option C incorrectly disqualifies CO_2—laboratory suitability depends on equipment sensitivity, not CO_2 ineffectiveness. Option D violates all emergency response protocols.
5. B. Wrapping the damaged area with cloth tape to save money. Rationalization: Cloth tape lacks electrical insulation properties, can conduct electricity when wet, may overheat or ignite, and provides no protection against electrocution. Options A, C, and D represent proper safety practices per the Philippine Electrical Code and basic hazard prevention principles.
6. B. Increased resistance at connection points causing overheating and fire risk. Rationalization: Each connection point introduces additional resistance, generating heat under load. Daisy-chaining also typically involves undersized cords for the cumulative load, compounding overloading risks. Option A is incorrect voltage drop occurs, not increase. Option C is unrelated. Option D misidentifies immediate safety concerns.
7. D. Faulty Wiring. Rationalization: Faulty wiring encompasses installation and material defects.
8. B. Ground Fault Circuit Interrupter (GFCI). Rationalization: GFCIs detect current imbalances as small as 4-6 milliamperes and interrupt power within milliseconds, preventing sustained shock. The PEC specifically mandates GFCI protection in wet locations (bathrooms, kitchens, outdoor areas). Option A protects equipment from voltage spikes. Option C protects conductors from overcurrent but not personnel from ground faults at low currents. Option D stabilizes voltage but provides no shock protection.

9. B. Provides a safe path for fault current to dissipate into the earth. Rationalization: Grounding ensures that if live wires contact metal enclosures due to insulation failure, fault current flows through the grounding conductor rather than through a person. This low-resistance path also enables sufficient current to trip protective devices. Option A confuses grounding with neutral/phase conductors. Options C and D are scientifically unfounded.

Use a wooden broomstick or other non-conductive object to separate the person from the source, then call for emergency help. Rationalization: Direct contact risks secondary electrocution for the rescuer (Option A). Water is conductive and exacerbates the hazard (Option C). Passive waiting wastes critical intervention time (Option D). Non-conductive tool use eliminates rescuer risk while enabling prompt separation from the energy source, followed by emergency medical response for potential internal injuries not visibly apparent.

Content - Topic	**Utilization of Electricity - Energy Loss and Energy Wastage**	Lesson Exemplar	9

I. OBJECTIVES	
A. Content Standard	The learners learn that analysis of electricity generation, consumption patterns, and energy-efficiency practices can lead to better energy supply and management.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	In this topic, the learners are assumed to have prior knowledge on energy and its forms, conservation of energy, energy sources, and prior skills on power usage calculations.
	The learners propose ways to minimize energy loss and energy wastage in homes, schools, local businesses, and other parts of society.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Action on Carbon & Energy in Schools. 2024. Schools Energy Efficiency Checklist. Oxford: ACES. Department of Energy. 2024. 2023 Power Statistics in the Philippines. Manila: Department of Energy. Ejiofor, Chiwetel, dir. 2019. The Boy Who Harnessed the Wind. Netflix. Philippines. 2019. Republic Act No. 11285: An Act Institutionalizing Energy Efficiency and Conservation, Enhancing the Efficient Use of Energy, and Granting Incentives to Energy Efficiency and Conservation Projects. April 12, 2019. United Nations Department of Economic and Social Affairs. 2020. SDG Resource Document: Targets Overview. New York: United Nations.
III. CONTENT (Sequencing Content)	Utilization of Electricity - Energy Loss and Energy Wastage

<table>
<tr><td>IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)</td><td colspan="2">1. Identify energy inefficiency practices in homes, schools, and public spaces.
2. Design policies that demonstrate strategies to minimize energy wastage.
3. Demonstrate commitment to energy conservation by proposing personal and collective energy-saving actions.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: ENERGY TIC-TAC-TOE</td></tr>
<tr><td>Create a tic-tac toe grid with energy-related questions. Each grid on the board comes with an energy-related question. The learner playing should decide first on the grid that he/she wants to place “X” or “O”. The question behind the grid should be answered correctly so that he/she may be allowed to place “X” or “O” on the board. The first to get three in a row wins.
The teacher may decide on how many rounds they should play to ensure that all needed prior knowledge/skills are activated.
<table>
<tr><td>Give examples of energy sources</td><td>Explain Conservation of Energy</td><td>What is POWER</td></tr>
<tr><td>Give example of renewable source</td><td>Give examples of forms of energy</td><td>How to calculate power consumption?</td></tr>
<tr><td>The unit for POWER</td><td>How is energy transmitted in households?</td><td>Disadvantages of using Non-Renewable sources</td></tr>
</table></td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

Notes to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td></tr>
</table>

	Option 2: BRAIN DUMP- SPIDER WEB	
	• Learners will write words relevant on a given term. The terms may include but not limited to energy forms, energy sources, electrical energy, power, etc.) • This may be done using digital tools such as Mentimeter, Canva. If online tools are not available, it can be done offline by writing a general topic on the board and letting the learners generate subtopic and further generate terms/words/phrases relevant to the subtopics. • As the spider web progresses, the teacher should collaboratively discuss the concepts with learners as a means to revisit prior knowledge.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: ENERGY SDGs-WHY IT MATTERS?	
	The teacher will start with the following prompt questions 1. What if energy sources became extremely limited? The teacher will list, connect, and emphasize SDGs related to the conservation of energy. The teacher provides brief discussion	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive

	of the following SGDs to help learners to better connect the SGDs to the topic. ✓ **SDG 7: Affordable and Clean Energy** ✓ **SDG 12: Responsible Consumption and Production** ✓ **SDG 13: Climate Action** ✓ **SDG 9: Industry, Innovation, and Infrastructure** Question to Ponder: How does saving energy at home and school contribute to these global goals? **Probing Questions:** a. What daily habits do you practice at home and in school to reduce energy consumption? b. How can saving electricity help protect the environment? c. Why is switching to renewable energy important for the future? d. How can students help make schools more energy-efficient?	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Option 2: PHILIPPINE POWER CHECK 2023	
	● The teacher will show a summary of the 2023 Power Statistics in the Philippines to the students. (See Annex for the data) ● Students will analyze the data by answering the guide questions. **Discussion Questions:** a. What trends do you notice from the 2003 to 2023 energy consumption data? b. Which sector consumes most of the energy? - Residential, Commercial, or Industrial? c. Which energy source provided the largest share of the total energy consumed?	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation

<table>
<tr><td></td><td>d. What do you think will happen in the future if the trend on energy consumption continues?</td><td>actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

Notes to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td></tr>
<tr><td rowspan="3">B. Instituting New Knowledge</td><td colspan="2">B. 1. Presenting Examples</td></tr>
<tr><td colspan="2">Option 1: POWER PATROL</td></tr>
<tr><td>Learners check for energy-wasting habits in school. Divide learners into small groups and assign each group in specific areas in school (classroom, canteen, laboratory, library, etc.) (See LAS for the criteria for level classification)

<table>
<tr><th>Inspection Item</th><th>Energy Waste Level (Low/ Medium/ High)</th><th>Recommended Action</th><th>Responsible Person</th></tr>
<tr><td>Electricity Use
☐ Lights left on in empty rooms
☐ Windows covered when natural light is available
☐ Electric devices left on when not in use</td><td></td><td></td><td></td></tr>
</table>
</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets,</td></tr>
</table>

	Ventilation ☐ Electric fans running unnecessarily ☐ Doors/windows left open while AC is on Water ☐ Faucets left running unnecessarily ☐ Leaking faucets ☐ Damaged water pipes				calculators, videos, or energy-use data when available. **Note to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Discussion Questions: a. What were the most common energy-wasting habits observed during your inspection? b. Were there any surprising findings you did not expect? c. What simple habits can you do to minimize unnecessary energy consumption?				
	Option 2: THE BOY WHO WANTED TO HARNESS THE WIND				
	● The teacher may instruct the learners a day prior to watching the movie at home or during their vacant periods as it may consume the whole session of time. ● The Movie is available on Netflix. ● If Netflix subscription is not available, a recap of the movie can be accessed in YouTube ● During discussion/review, the teacher should show key scenes where the protagonist learns about energy generation and applies knowledge to build a windmill. **Discussion Questions:** a. How did the main character use prior knowledge to create new solutions?				The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation

	b. What challenges did he face in applying scientific concepts? c. How does his innovation connect to the importance of sustainable energy? d. What are some local energy conservation projects that could be implemented to reduce energy waste and promote sustainability in your community?	actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	B. 2. Discussing New Concept	
	Option 1: ENERGY GUARDIANS- DESIGN THINKING	
	Learners will use design thinking to identify energy inefficiencies, empathize with users, brainstorm creative solutions, prototype ideas, and test energy-saving strategies in homes, schools, businesses, and society. **Instructions:** 1. EMPATHIZE-Learners will conduct interviews or surveys with learners, teachers, and business owners about the challenges they face related to energy consumption, energy loss, or energy wastage. 2. DEFINE- Learners organize their findings into common patterns (e.g. excessive appliance use, poor insulation, unnecessary lighting, etc.) 3. IDEATE- Learners brainstorm with their peers to propose energy saving programs or innovations (use of solar powered-automatic night switch, Earth Hour, etc.) PROTOTYPE- Learner's design models or small-scale prototypes for a policy. TEST and REFINE- learners may gather feedback from authorities (e.g. teachers and school heads, community leaders,	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets,

	residents, learners, etc.) Learners will refine their proposed policies based on feedback gathered. Discussion Questions: After completing the design thinking activity, learners will present their findings and solutions to the class. This collaborative exchange allows learners to reinforce their own learning, gain insights from other groups, and refine their ideas based on peer feedback. A. What was the biggest challenge your group faced during the activity? B. How did empathizing with real-world energy problems help shape your solution? C. If given more time and resources, how would you improve or expand your proposed policies? D. How has the activity changed your perspective on energy conservation?	calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Option 2: LEADER IN ACTION	
	● Learners will be choosing a leadership role. o Senator/ Legislators- draft laws for efficient energy use. o DOE Secretary- Draft national energy policies such as clean energy projects, and ensure industry compliance on energy efficiency standards o NAPOCOR Representative- draft sustainable energy practice protocols such as the use of renewable energy. o Mayor- draft local energy-saving initiatives in the community. o School Principal- draft energy conservation programs like enforcing eco-friendly policies in school. Students will focus on a major energy-related issue (e.g., high electricity consumption, lack of renewable sources, inefficient infrastructure, etc.)	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons.

	The learners will draft a policy, law, advocacy campaign, project, or program to promote energy conservation and efficient use of energy. ● The learners present their plan in a mock government session, explaining why their ideas should be implemented. The teacher and learners will provide feedback from the presented plans.	EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	B. 3. Developing Mastery	
	Option 1: SPOT AND SAVE- ENERGY PICTURE ANALYSIS	
	Learners will analyze images showing different energy usage scenarios and list practical solutions to minimize energy wastage. ● Teachers may use images showing lights left on empty rooms, appliances plugged unnecessarily, and the likes. ● When the teacher presents the images, the learners examine the images and list instances of energy inefficiency. ● From the listed instances of energy inefficiency, the learners provide 2-3 ways to address the issue. And share it in class.	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

<table>
<tr>
<td></td>
<td>Picture Analysis Data Table
<table><tr><th>Image Examined</th><th>Instances of Energy Inefficiency</th><th>Possible solutions</th></tr><tr><td></td><td></td><td></td></tr></table></td>
<td>Notes to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td>
</tr>
<tr>
<td></td>
<td colspan="2">Option 2: ENERGY FEUD</td>
</tr>
<tr>
<td></td>
<td>Learners will engage in a competitive quiz game inspired by Family Feud, testing their knowledge of energy conservation while promoting team collaboration and critical thinking.

● The learners will be divided into two teams (or more depending on class size)
● Each team selects a captain to lead discussions.
● The teacher will prepare survey-style questions on energy conservation. (e.g. What is the top energy-wasting habits in households?)
● Learners take turns guessing answers, aiming to name the most common response.

Answers are ranked based on pre-determined survey results or expert recommendations.</td>
<td>The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

Note to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td>
</tr>
</table>

<table>
<tr><td rowspan="4">C. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: ENERGY BUDGETING</td></tr>
<tr><td>

Learners will estimate their household energy consumption and reflect on energy-saving strategies. The learners may use the table for their output.

<table>
<tr><th>Appliance/Device</th><th>Number of devices</th><th>Wattage</th><th>Usage per Day</th><th>Energy Consumption per Day</th><th>Energy Saving Action</th></tr>
<tr><td>Example:

Electric Fan</td><td>4</td><td>75W</td><td>8 hrs</td><td>0. 60kWH</td><td>Use natural ventilation when possible</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

After completing the table, learners develop a simple household policy focused on reducing energy consumption and wastage.

</td><td>The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

Note to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td></tr>
<tr><td colspan="2">Option 2: UNDERSTANDING RA 11285 (ENERGY EFFICIENCY AND CONSERVATION ACT)- JIGSAW</td></tr>
<tr><td colspan="2">

The teacher provides key excerpts of RA 11285, highlighting its goals to the students. (See Annex for Key Excerpts for Student Use (Simplified))
a. institutionalizing energy efficiency
b. enhancing efficient use of energy

</td><td>The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to energy loss, energy wastage, and energy</td></tr>
</table>

	c. granting incentives for energy conservation projects. ● Learners are divided into expert groups, with each group assigned to a specific section of the Act to study. a. Expert Groups – Each group deeply analyzes their assigned portion of the Act, summarizing key points and discussing their implications. b. Cross-Group Sharing – Groups reorganize into mixed teams, where each student teaches their section to their new team members. c. Application Discussion – Teams brainstorm real-world energy efficiency solutions based on RA 11285, focusing on practical applications for homes, schools, and businesses. d. Presentation & Reflection – Each team presents their findings, highlighting policy insights, proposed solutions, and community impact. **Discussion Questions:** a. What are the main objectives of RA 11285? b. How does the act encourage energy efficiency in business, households, and public institutions? c. How can you learners contribute to the implementation of RA11285?	conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Note to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	C. 2. Making Generalization	
	Option 1: ENERGY PLEDGE	
	Learners create their own energy-saving habits guided by their key takeaways in the session. **Here is a sample fillable energy pledge:** I, _____, commit to making a positive impact by using energy responsibly. I have learned that _____ contributes to energy waste and harms the environment. **I pledge to:** ● Turn off lights and appliances when _____, as I have learned, this prevents unnecessary electricity consumption.	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	• Unplug devices when _____, because I now understand that plugged-in electronics still drain power even when not in use. • Use energy-efficient alternatives such as _____, based on what I have learned about sustainable solutions. • Promote awareness by sharing energy-saving tips with _____, applying what I know about environmental responsibility. • Support sustainable energy solutions like _____, recognizing how clean energy helps fight climate change. I will apply my knowledge to create a greener future by practicing energy efficiency every day! **Signature:** _____ **Date:** _____	The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Note to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Option 2: SIMSON SAMSON- ENERGY CONSERVATION RELAY	
	Learners will take turns in naming actions, technologies, or habits that minimize energy wastage while following a pattern or rule. • The first player starts by saying: "Simson Samson saves energy by…" Then they name an energy-saving action (e.g. turning off unused lights) • The next player must repeat the previous actions and add new one. The game will continue until a student runs out of response.	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns,

		and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	C. 3. Evaluating Learning	
	Option 1: 321 EXIT TICKET	
	• Learners will reflect on their learning about ways to minimize energy consumption before leaving the lesson. They will use the 321 Exit Ticket: 3- Things you learned- Key Takeaways from the discussion 2- Things you found interesting- concepts, facts or real-world applications that stood out. 1- Question you still have any unclear points or topics you would like to explore further.	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

		Notes to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Option 2: CONCEPT CHECK	
	● Create a 10-item quiz to gauge learners' mastery of the lesson. ● The items should be more scenario-based, if possible, to elicit learners' mastery on energy conservation. ● The teacher may use electronic tools (Google Forms, Kahoot, etc.) to make it more engaging.	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Notes to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.

	C. 4. Additional Activities	
	Option 1: Community Energy Policy Forum- Enrichment	
	This activity extends policy design skills to authentic civic engagement. Learners who demonstrated mastery in the Leader in Action and RA 11285 Jigsaw activities present refined energy policy proposals to actual community stakeholders, experiencing democratic deliberation and potentially influencing local decisions.	The activity targets Learning Objective 1 by engaging learners in a task related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available. **Note to Teachers:** Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.
	Option 2: Renewable Energy Feasibility Study- Enrichment	
	This activity extends Energy Budgeting and Energy Guardians by requiring comprehensive technical and economic analysis of renewable energy implementation for a real site. Learners produce professional-quality feasibility documents integrating scientific measurement, financial modeling, and policy alignment.	The activity targets Learning Objective 1 by engaging learners in a task related to energy loss, energy wastage, and energy conservation. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build

<table>
<tr><td></td><td></td><td>understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is data-based problem solving and policy design, supported by peer sharing and teacher questioning. Literacy is integrated through explaining conservation actions and justifying recommendations in clear statements. Numeracy is integrated through interpreting power use, consumption patterns, and savings from simple data or comparisons. EdTech is integrated through digital worksheets, calculators, videos, or energy-use data when available.

Notes to Teachers: Help learners distinguish energy loss from energy wastage. Ask them to connect each recommendation to a specific behavior, device, or setting.</td></tr>
<tr><td>V. ASSESSMENT

(Assessing Learnings)</td><td colspan="2">Unit Performance Task

Advocacy Drive

Learners will design and execute an energy conservation campaign to raise awareness in their school or community to encourage responsible energy use and sustainable practices. The learners may choose to use posters, infographics, jingle, and slogans for their campaign.

Scoring Rubric

<table>
<tr><th>Criteria</th><th>Excellent (4 pts)</th><th>Proficient (3 pts)</th><th>Developing (2 pts)</th><th>Beginning (1 pt)</th></tr>
<tr><td>Content Accuracy & Relevance</td><td>Campaign materials present accurate, well-researched information on energy</td><td>Information is mostly accurate and relevant; minor gaps</td><td>Some inaccuracies or vague content; limited alignment with objectives.</td><td>Content is inaccurate, superficial, or</td></tr>
</table></td></tr>
</table>

	conservation and sustainability; directly aligned with objectives.	or generalizations present.		unrelated to energy conservation.
Creativity & Engagement	Highly creative use of medium (poster, infographic, jingle, slogan); captures attention and motivates the audience effectively.	Creative elements present; engage the audience adequately.	Limited creativity; audience engagement is weak.	Minimal creativity; fails to engage the audience.
Clarity of Message	Message is clear, concise, and persuasive; the audience can easily understand and act upon it.	Message is generally clear; minor issues with persuasiveness or focus.	Message is somewhat unclear or confusing; lacks persuasiveness.	Messages are unclear, unfocused, or difficult to understand.
Execution & Presentation	Campaign is well-executed with polished visuals/audio; demonstrates strong effort and professionalism.	Execution is solid; minor issues in polish or consistency.	Execution is uneven; noticeable errors or lack of refinement.	Execution is incomplete or careless; poor quality presentation.
Impact & Call to Action	Campaign includes a strong, specific call to action; demonstrates potential for real impact in school/community.	Call to action is present but somewhat general; moderate potential impact.	Call to action is vague or weak; limited potential impact.	No clear call to action; little or no potential impact.

Option 2: Written Summative Assessment

1. A school library keeps all fluorescent lights on from 7:00 AM to 7:00 PM daily, even though peak usage occurs only between 3:00 PM and 6:00 PM when students arrive for research. The windows on the east side provide adequate natural lighting until 10:00 AM. Which statement best describes the energy inefficiency in this scenario?
    a. The library uses LED lights instead of incandescent bulbs
    b. The library operates beyond standard school hours
    c. Lights remain on during periods of low occupancy and when natural light is available
    d. The library lacks air conditioning for student comfort

	2. A household receives an unusually high electricity bill. Upon inspection, the following conditions are observed: (1) refrigerator door seal is cracked, (2) air conditioner is set to 18°C even when the room is unoccupied, (3) television remains plugged in 24/7, and (4) all bulbs are incandescent. Which condition contributes to energy loss rather than energy wastage? a. Television remaining plugged in 24/7 b. All bulbs being incandescent c. Refrigerator door seal being cracked d. Air conditioner set to 18°C while the room is unoccupied 3. A barangay council wants to reduce municipal building energy consumption by 20% within one year. Which policy intervention best aligns with RA 11285 and demonstrates a structural/systemic approach rather than purely behavioral change? a. Posting "Please Turn Off Lights" signs in all offices b. Installing motion-sensor lighting and programmable thermostats with automatic scheduling c. Hosting a monthly energy conservation awareness seminar d. Distributing energy-saving tip flyers to employees 4. A manufacturing company operates 24/7 with heavy machinery. Under RA 11285, which policy mechanism could the company utilize to offset costs of upgrading to energy-efficient equipment? a. Applying for tax incentives and rebates available for energy efficiency and conservation projects b. Reducing worker salaries to fund equipment purchases c. Increasing product prices to cover upgrade costs d. Requesting government subsidies for raw materials 5. A school principal drafts an energy conservation policy requiring: (1) all classrooms to use natural lighting when available, (2) air conditioning only above 28°C ambient temperature, (3) monthly energy audits by student committees, and (4) penalties for classrooms exceeding baseline consumption. Which component demonstrates monitoring and evaluation as required for effective policy implementation? a. Using natural lighting when available b. Air conditioning threshold of 28°C c. Monthly energy audits by student committees d. Penalties for excessive consumption 6. Which practice contributes to standby power load in household? a. Running the washing machine during peak hours b. Leaving phone chargers plugged in when not charging devices. c. Using incandescent bulbs instead of LEDs d. Setting the air conditioner at 18 °C 7. Which action demonstrates collective rather than personal energy conservation commitment? a. A student turning off their bedroom light when leaving b. A family agreeing to set air conditioning at 24°C minimum

	c. An individual unplugging their phone charger after use d. A person switching to LED bulbs in their personal workspace 8. A student observes that their school leaves hallway lights overnight for "security purposes." Research shows that motion-activated LED security lighting reduces energy consumption by 70% while maintaining safety standards. The student proposes a pilot program to the principal. Which combination of skills best describes this student's demonstration of learning? a. Only identifying inefficiency b. Only proposing personal action c. Identifying inefficiency, researching solutions, and advocating for institutional change d. Only calculating energy savings 9. Which element is essential for effective implementation of an energy conservation policy? a. Colorful promotional posters b. Clear monitoring schedules and assigned responsibilities c. A policy title in both English and Filipino d. Signature of the highest-ranking official 10. Classroom lights usually remained on during lunch break when no students were present. Which type of energy inefficiency does this represent? a. Energy loss due to equipment malfunction b. Energy wastage due to behavioral habits c. Energy loss due to poor infrastructure design d. Energy wastage due to outdated technology
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

A. 2. Establishing the Purpose of the Lesson
Option 2: Philippine Power Check

Year	Electricity Consumption by Sector in GWh				Electricity Sales	Utilities Own Use	System Losses	Total Consumption
	Residential	Commercial	Industrial	Others				
2003	15,357	11,106	15,188	1,069	42,720	3,410	6,810	52,941
2004	15,920	11,785	15,012	1,359	44,076	4,654	7,228	55,957
2005	16,031	12,245	15,705	1,177	45,159	4,591	6,817	56,568
2006	15,830	12,679	15,888	1,275	45,672	4,227	6,885	56,784
2007	16,376	13,470	16,522	1,641	48,009	3,994	7,608	59,612
2008	16,644	14,136	17,031	1,395	49,206	3,935	7,680	60,821
2009	17,504	14,756	17,084	1,523	50,868	3,524	7,542	61,934
2010	18,833	16,261	18,576	1,596	55,266	4,677	7,800	67,743
2011	18,694	16,624	19,334	1,446	56,098	5,398	7,680	69,176
2012	19,695	17,777	20,071	1,668	59,211	5,351	8,360	72,922
2013	20,614	18,304	20,677	1,971	61,566	5,959	7,741	75,266
2014	20,969	18,761	21,429	2,186	63,345	6,461	7,455	77,261
2015	22,747	20,085	22,514	2,462	67,808	7,124	7,481	82,413
2016	25,631	21,770	24,117	2,634	74,153	8,357	8,288	90,798
2017	26,782	22,768	25,573	2,670	77,793	8,316	8,262	94,370
2018	28,261	24,016	27,587	2,753	82,617	8,141	9,007	99,765
2019	30,552	25,476	28,194	2,897	87,118	8,929	9,994	106,041

2020	34,292	20,727	25,566	2,658	83,243	8,771	9,742	101,756
2021	34,981	21,119	27,623	3,695	87,417	8,729	9,968	106,115
2022	35,324	24,294	28,844	2,871	91,333	9,490	10,693	111,516
2023	36,968	26,236	29,493	3,112	95,808	10,403	11,793	118,004

C. 1. Finding Practical Application
Option 2: Understanding RA 11285
Key Excerpt for Student Use

1. Institutionalizing Energy Efficiency. The State shall make energy efficiency and conservation a national way of life. This means creating plans and programs so that energy is used wisely, supply is stable, and the environment is protected.
   Student-friendly meaning: Energy efficiency is not optional—it should be part of everyday living, supported by government programs and policies.
2. Enhancing Efficient Use of Energy. The Act promotes the use of efficient and renewable energy technologies to make sure resources are used in the best and most sustainable way.
   Student-friendly meaning: We should use modern, efficient technologies (like LED lights, solar panels, or energy-saving appliances) to reduce waste and protect resources.
3. Granting Incentives for Energy Conservation Projects. The government shall provide incentives to businesses and organizations that implement energy efficiency and conservation projects.
   Student-friendly meaning: If schools, companies, or communities start projects that save energy, they can get rewards or benefits from the government.

Assessment
Answer Key:

1. Answer: C. This scenario exemplifies two distinct inefficiencies: unnecessary lighting during low-occupancy periods (7:00 AM–3:00 PM, 6:00 PM–7:00 PM) and failure to utilize available natural light (7:00 AM–10:00 AM).
2. Answer: C. Energy loss refers to unintended energy dissipation due to equipment malfunction or poor condition—the cracked refrigerator seal causes cooled air to escape, forcing the compressor to work harder. Energy wastage refers to unnecessary consumption from behavior or inefficient technology: standby power (A), inefficient technology choice (B), and unnecessary low-temperature air-conditioning in an unoccupied room (D, which is behavioral wastage). The distinction is critical for targeting appropriate interventions: loss requires repair, wastage requires behavior or technology change.
3. Answer: B. RA 11285 emphasizes institutionalizing energy efficiency through technology and infrastructure, not merely voluntary behavior change. Motion sensors and programmable thermostats embody the Act's focus on enhancing efficient use of energy through automated systems that eliminate reliance on individual compliance. Options A, C, and D rely on behavioral change, which is less reliable and not specifically incentivized under RA 11285's provisions for energy efficiency projects.

4. Answer: A. RA 11285 Section 15-19 explicitly provides incentives for energy efficiency and conservation projects, including tax incentives, rebates, and technical assistance. This directly supports the Act's goal of granting incentives to encourage private sector participation. Options B, C, and D are not provisions under RA 11285 and represent unsound business or labor practices.
5. Answer: C. Monitoring and evaluation (M&E) requires systematic data collection to assess policy effectiveness. Monthly energy audits by student committees provide regular feedback on consumption patterns, enabling evidence-based adjustments. Option A is a technical specification, B is an operational standard, and D is an enforcement mechanism—all important, but only C constitutes M&E. Effective policies under RA 11285 require all four elements, but M&E is frequently overlooked in learner-designed policies.
6. Answer: B. Standby power load is electricity consumed by devices when switched off but still plugged in.
7. Answer: B. Collective commitment requires shared agreement and mutual accountability among multiple stakeholders. The family agreement (B) involves negotiated consensus and shared responsibility for monitoring compliance. Options A, C, and D are individual actions with no interdependence or mutual obligation.
8. Answer: C.
9. Answer: B. Effective policies require monitoring and evaluation mechanisms. While A, C, and D may support communication or authority, B ensures accountability and measurable outcomes.
10. Answer: B. Lights remaining on in unoccupied rooms result from human behavior—forgetting to switch off or lack of awareness—rather than equipment failure or building design.

Content - Topic	**Understanding and Using Light and Sound - Properties of Light and Sound in Technology**	Lesson Exemplar	10

I. OBJECTIVES	
A. Content Standard	The learners learn that an understanding of the properties of light and sound leads to their safe and productive application.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	Learners should have prior understanding of waves as forms of energy, identify common sources and uses of light and sound, distinguish between light and sound in everyday situations, and demonstrate skills in observation, classification, interpretation of information, and relating scientific concepts to real-life experiences.
	The learners discuss properties of light and sound waves related to communications technology, navigation, medicine, and entertainment.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Science of Sound. “15 Fascinating Everyday Uses of Sound.” Accessed June 11, 2026. Universiti Putra Malaysia. “Discover the Many Ways Electromagnetic Waves Are Revolutionizing Modern Life: From Communication and Entertainment to Medicine and Energy Production.” Accessed June 11, 2026. **Materials:** aluminum Foil. mobile phones. pen. notebook.
III. CONTENT (Sequencing Content)	Understanding and Using Light and Sound - Properties of Light and Sound in Technology

<table>
<tr><td>IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)</td><td colspan="2">1. Describe the different properties of light and sound waves.
2. Analyze how the properties of light and sound waves are applied in communications technology, navigation, medicine, and entertainment.
3. Recognize the importance of the application of the properties of light and sound in daily life.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: Identify it!</td></tr>
<tr><td>Directions: Identify what is being described in each statement. Choose your answer from the box below.
_____1. The phenomenon where light bounces off a surface and changes direction.
_____2. It is the bending of light rays as they pass from one medium to another.
_____3. It is the distance between two consecutive points in phase on the wave.
_____4. The height of a wave is measured from its equilibrium position.
_____5. It refers to the number of cycles or oscillations a sound wave completes in one second.
_____6. It refers to the distance a wave travels through a medium at a given time.

amplitude frequency
reflection refraction
velocity wavelength</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

Notes to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.</td></tr>
</table>

Option 2: Electromagnetic Waves

Directions: Identify the different electromagnetic waves represented by the pictures and describe their common applications in everyday life. Choose your answers from the electromagnetic waves listed below. Using the table provided, write the corresponding electromagnetic wave and its common application.

Choices:

Radio Waves Gamma Rays

Microwaves X-rays

Infrared Ultraviolet

Visible Light

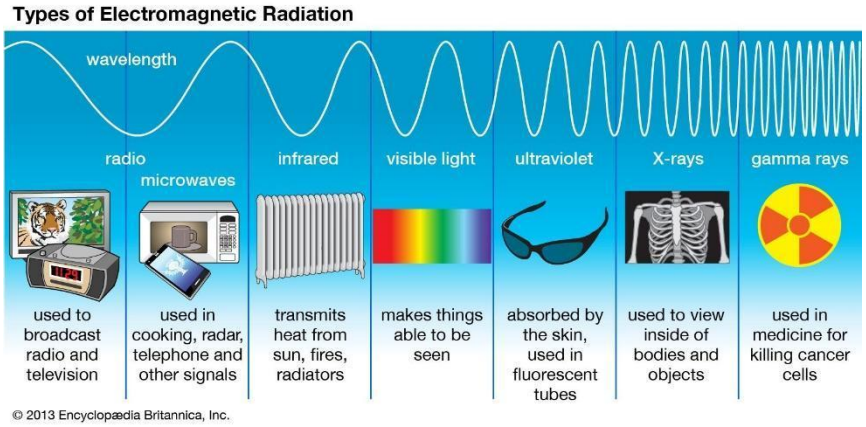


Figure 1. Types of Electromagnetic Radiation and Their Common Applications.

This part makes the lesson integrative through visual interpretation and concept identification, as different real-life applications of electromagnetic waves are organized in one diagram. It also makes the lesson relevant to learners because the concepts presented are commonly encountered in their daily experiences.

Answer Key:

Radio waves – broadcasting and communication; Microwaves – Wi-Fi, GPS, satellite communication, and microwave cooking; Infrared – remote controls and thermal imaging; Visible light – seeing, lighting, and optical devices; Ultraviolet – sterilization and some security markings; X-rays – medical imaging and security scanning; Gamma rays – cancer treatment and sterilization.

Picture	Electromagnetic Wave	Common Application
1	Visible Light	Lighting, vision, photography
2	Ultraviolet	Sterilization, disinfection, tanning
3	X-rays	Medical imaging, examining bones
4	Gamma Rays	Cancer treatment, sterilization of medical equipment
5	Radio Waves	Radio and television broadcasting, communication

Table: Activity 1

Picture	Electromagnetic Wave	Common Application
1	Visible Light	
2	Ultraviolet	
3	X-rays	
4	Gamma Rays	
5	Radio Waves	
6	Microwaves	
7	Infrared	
8	Visible Light	

6	Microwaves	Microwave ovens, satellite communication
7	Infrared	Remote controls, thermal imaging
8	Visible Light	Lighting and vision

A. 2. Establishing the Purpose of the Lesson

Option 1: 4-Pics-in-1-Concept

Directions: Observe and interpret the diagram showing four pictures. Analyze the technologies represented and answer the guide questions below using your observations.

Guide Questions:
1. What is being shown in the pictures?
2. What are the physics concepts related to the pictures?
3. In what fields are these technologies related to?

The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

<table>
<tr><td></td><td>Figure 2. Four pics 1 word. Source: AI-generated image created using ChatGPT (OpenAI), June 2026.</td><td>Notes to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.</td></tr>
<tr><td></td><td colspan="2">Option 2: Classify it!</td></tr>
<tr><td></td><td>Directions: Classify the words on the box whether they are related to the fields of communication, navigation, medicine or entertainment. Write them in the corresponding column.
<table><tr><th>Communication</th><th>Navigation</th><th>Medicine</th><th>Entertainment</th></tr><tr><td></td><td></td><td></td><td></td></tr></table></td><td>The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

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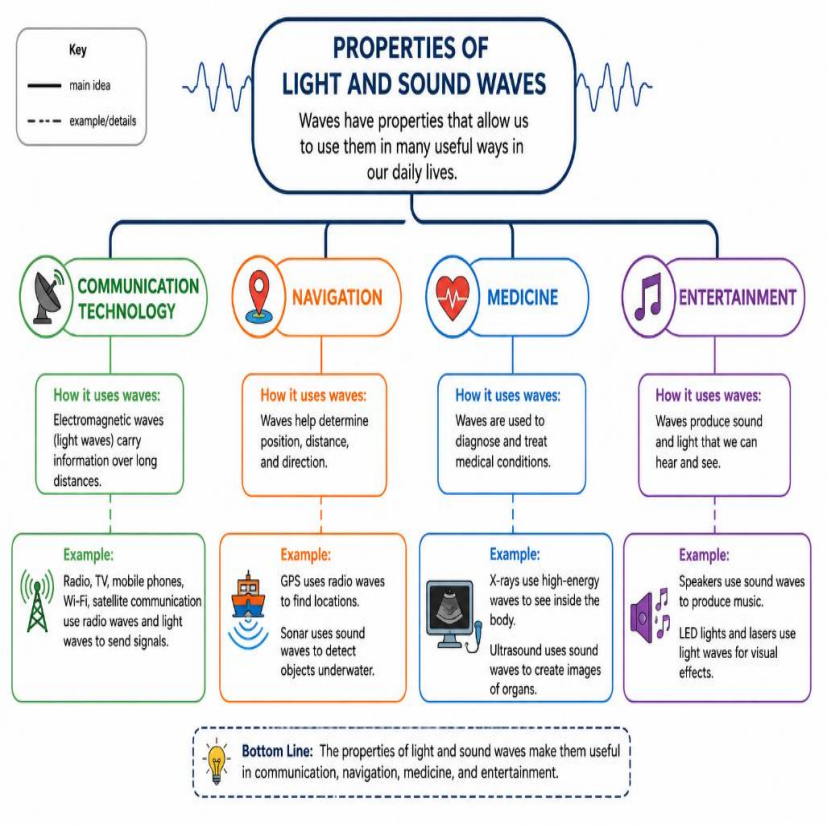
</table>

B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1:	
	Direction: Watch the following videos carefully and answer the guide questions provided. **Videos:** 1. "How GPS Works Today" **Source:** https://www.youtube.com/watch?v=FU_pY2sTwTA Description: This video explains how the Global Positioning System (GPS) uses electromagnetic waves transmitted by satellites to determine a user's location on Earth. It highlights the application of radio waves in navigation and communication technologies. 2. "Medical Imaging | Waves | Physics | Fuse School" **Source:** https://www.youtube.com/watch?v=0q9wTyGhqFs Description: This video discusses the use of different electromagnetic waves, such as X-rays and gamma rays, in medical imaging and diagnosis. It explains how these waves help healthcare professionals examine internal body structures and detect medical conditions. 3. "That's How Wi-Fi Works" **Source:** https://www.youtube.com/watch?v=hePLDVbULZc Description: This video explains how Wi-Fi technology uses radio waves to transmit and receive data wirelessly. It demonstrates the role of electromagnetic waves in modern communication and internet connectivity. Source: https://www.youtube.com/watch?v=hePLDVbULZc	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use "electromagnetic waves" when the example is not specifically visible in light.

	Notes to Teachers: If any of the videos are unavailable, teachers may use alternative videos that explain the applications of electromagnetic waves in navigation (GPS), medical imaging, and wireless communication (Wi-Fi). **Guide Questions:** A. GPS 1. In two to three sentences, explain how GPS works. 2. How important is GPS today? B. Medical Imaging 1. What are the different techniques used in medical imaging? 2. How essential is medical imaging in the field of medicine? C. Wi-Fi 1. In two to three sentences, explain how Wi-Fi works. 2. What is the impact of Wi-Fi availability in your daily life?	
	Option 2: Connecting Waves	
	Direction: Using the given concept map, identify and explain how light and sound waves are applied in the fields of communication, navigation, medicine, and entertainment. Analyze the picture carefully to answer the following guide questions. **Guide Questions:** *1.* How are light and sound waves used in communication technology? *2.* How do waves help with navigation and transportation? *3.* Why are waves important in medicine and entertainment?	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is

	How do these technologies affect people's daily life?  Figure 3. Properties of Light and Sound Waves Source: AI-generated image created using ChatGPT (OpenAI), June 2026.	integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use "electromagnetic waves" when the example is not specifically visible in light.

	B. 2. Discussing New Concept	
	Option 1: Background of the lesson	
	Light and sound waves are forms of energy that possess unique properties and functions. Light is one type of electromagnetic wave. Other electromagnetic waves, such as radio waves, microwaves, and X-rays, also play important roles in communication, navigation, medicine, and entertainment because of their speed, ability to travel through a vacuum, and interaction with matter. On the other hand, sound waves are mechanical waves that require a medium to travel and are commonly used in communication, navigation, medicine, and entertainment. Understanding the properties and applications of light and sound waves helps learners appreciate their importance in everyday life and modern technology. Topic 1: Properties of Light and Sound Waves Activity 1: Exploring the Properties of Light and Sound Waves Objective: Describe the different properties of light and sound waves. This activity serves as the foundation of the lesson by helping learners understand the basic properties of light and sound waves. Understanding these properties enables learners to explain how waves behave and how they are applied in various real-life situations. Topic 2: Light and Sound Waves in Communication Technology Activity 2: Applications of Light and Sound Waves in Communication Objective: Explain how light and sound waves are used in communication technology. This activity helps learners connect wave properties to their practical applications in communication technologies such as mobile phones, radios, television, and the internet.	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Notes to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.

	Topic 3: Light and Sound Waves in Navigation Activity 3: Waves in Navigation and Transportation Objective: Analyze how light and sound waves help in navigation and transportation. This activity enables learners to explore the importance of waves in navigation systems and transportation technologies, highlighting their role in ensuring safety and efficiency. Topic 4: Light and Sound Waves in Medicine Activity 4: Importance of Waves in Medical Technology Objective: Discuss the applications of light and sound waves in the field of medicine. This activity helps learners understand how waves contribute to medical diagnosis and treatment through technologies such as X-rays, ultrasound, and medical imaging devices. Topic 5: Light and Sound Waves in Entertainment Activity 5: Waves in Entertainment and Media Objective: Recognize the importance of light and sound waves in entertainment and daily life. This activity allows learners to appreciate the role of waves in entertainment and media, such as music, films, television, and digital platforms, making the lesson relevant to their daily experiences.	
	Option 2: Waves in Everyday Devices	
	Directions: Analyze the following devices commonly used in everyday life. Determine whether they use electromagnetic waves, sound waves, or both, and explain how these waves enable the devices to perform their functions. Use your understanding of the properties and	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive

	applications of light and sound waves to answer the guide questions. **Devices:** Cellphone Television Radio GPS X-ray Machine Microwave Oven **Guide Questions:** 1. Which devices use electromagnetic waves, and which use sound waves? 2. How do light and sound waves help these devices function properly? 3. Why are these devices important in your daily life?	approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use "electromagnetic waves" when the example is not specifically visible in light.
	B. 3. Developing Mastery	
	Option 1: Wave Applications Analysis	
	Direction: Analyze the following situations involving the applications of light and sound waves in everyday life. Fill in the blanks using the choices inside the box. **Choices:** **a. Fields: -Communication** - Navigation - Medicine - Entertainment **b. Types of Waves: -Electromagnetic Waves** - Sound Waves	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

- Light and Sound Waves

c. **Applications:**

-Allows people to communicate over long distances
-Helps people identify locations and directions accurately
-Helps doctors examine internal body organs and monitor health conditions
-Provides visual and audio entertainment
-Produces sound for listening and enjoyment

Situation	**Field**	**Type of Wave Used**	**Application**
1. A student from a far-flung barangay video-calls a relative in in Manila using a cellphone			
2. A taxi driver uses GPS/Waze to find a faster route to school.			
3. A pregnant mother in Davao Region has an ultrasound at a local clinic.			
4. Watching educational videos or news on TV/YouTube at home.			
5. SHS students listening to music through Bluetooth			

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

Note to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.

	earphones while studying				

Option 2: Everyday Waves at Work

Directions: Read the situation below and answer the guide questions that follow.

One Saturday, Mia spent the day with her family. On their way to the mall, they used a GPS application on their smartphone to find the fastest route. While traveling, Mia listened to music using her earphones. Later, her grandmother visited a hospital for an ultrasound examination. That evening, the family watched a movie on a large television screen.

Guide Questions:

1. Identify at least three technologies mentioned in the situation. What type of wave (light or sound) does each technology use?
2. What property of light or sound waves allows each technology to function effectively? Explain your answer.
3. How do these technologies make people's lives easier, safer, healthier, or more enjoyable?

The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

Note to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.

<table>
<tr><td rowspan="5">C. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: My Life, My Technology</td></tr>
<tr><td>Directions: Choose one field where the properties of light and sound waves are applied (Communication, Navigation, Medicine, or Entertainment). Describe a real-life situation in which you used technology related to your chosen field.

Guide Questions:
1. What technology or device did you use?
2. What type of wave (light or sound) was involved?
3. What property of the wave allowed the technology to function?
4. How did this technology help you accomplish a task or solve a problem?</td><td>The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

Notes to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.</td></tr>
<tr><td colspan="2">Option 2: A Day Without Light and Sound Technologies</td></tr>
<tr><td>Directions: Imagine that technologies that use the properties of light and sound waves suddenly stopped working for one day.</td><td>The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to</td></tr>
</table>

	Guide Questions: 1. Which technologies would be affected in communication, navigation, medicine, or entertainment? 2. What difficulties might people experience without these technologies? 3. Why is it important to understand how light and sound waves are applied in everyday life?	properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use "electromagnetic waves" when the example is not specifically visible light.
	C. 2. Making Generalization	
	Option 1: Complete the Statements	
	Directions: Choose the correct answer from the box to complete each statement. **Choices: communication • sound waves • light waves • daily life • medicine** 1. Technologies such as mobile phones and video calls improve _____.	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding

	2. Ultrasound is a technology used in _____. 3. GPS and other navigation tools rely on the properties of _____ to transmit signals. 4. Earphones and speakers use _____ to produce and transmit sound. 5. The applications of light and sound waves make tasks easier and more convenient in _____.	from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.
	Option 2: Finish the Thought	
	Directions: Complete the statement using what you learned from the lesson. "I learned that the properties of light and sound waves are important because _____. These properties help technologies in communication, navigation, medicine, and entertainment by _____."	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about properties and applications of light, sound, and electromagnetic waves. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is

		integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use "electromagnetic waves" when the example is not specifically visible light.
	C. 3. Evaluating Learning	
	Option 1: Option 1 Exit Ticket Assessment 1	
	The teacher may ask the following questions to the students: 1. What was the most important thing you learned today? 2. How do the concepts connect to something you learned and experienced before? 3. What is one thing you would like me to discuss more?	This part makes the lesson reflective where students assess their own learning and convey it to the teacher by answering the posted questions. The feedback will help the teacher identify points to strengthen in the lesson; thus, continuous improvement is being catered. **Answer Key:** 1. What was the most important thing you learned today? I learned that the properties of light and sound waves make many technologies possible, such as GPS, ultrasound machines, mobile phones, and televisions. 2. How does the concept connect to something you learned and experienced before?

		The lesson connects to my daily experiences because I use devices such as smartphones, earphones, and televisions, which rely on the properties of light and sound waves to function. 3. What is one thing you would like me to discuss more? I would like to learn more about how ultrasound uses sound waves to produce images inside the body and how GPS uses signals to determine locations.
	Option 2: Exit Ticket Assessment 2	
	Directions: Reflect on your learning today. Put a check mark (✓) if you can do the statement confidently. Put an X if you still need more help or practice. **Statement:** 1. I can identify the properties of light and sound waves. 2. I can distinguish between light waves and sound waves. 3. I can explain how light and sound waves are used in communication and navigation technologies. 4. I can explain how light and sound waves are applied in medicine and entertainment. 5. I can describe the importance of light- and sound-wave technologies in my daily life. **Brief Reflection:** One thing I learned today is _____. One thing I would like to learn more about is _____.	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

		Note to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.
	C. 4. Additional Activities	
	Option 1: Match and Explain	
	Directions: Match Column A with the correct answer in Column B. Then, write one sentence explaining how the wave property helps the technology function. **Column A** — **Column B** 1. Ultrasound — A. Communication 2. GPS — B. Entertainment 3. Television — C. Navigation 4. Mobile Phone — D. Medicine	The activity targets Learning Objective 1 by engaging learners in a task related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available. **Note to Teachers:** Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.

<table>
<tr><td></td><td colspan="2">Option 2: Fact or Application?</td></tr>
<tr><td></td><td>Directions: Read each statement carefully. Write P if the statement describes a property of light or sound waves and A if it describes an application of light or sound waves.

_____ 1. Ultrasound uses sound waves to produce images inside the body.
_____ 2. Sound waves require a medium to travel.
_____ 3. GPS helps people determine their location.
_____ 4. Light waves can travel through a vacuum.
_____ 5. Television uses light and sound waves to provide entertainment.
_____ 6. Sound waves are produced by vibrating objects.
_____ 7. Mobile phones use electromagnetic waves for communication.
_____ 8. Light travels faster than sound.
_____ 9. X-ray machines use electromagnetic waves to help doctors examine bones and internal structures.
_____ 10. Sound waves travel by transferring energy through vibrations.</td><td>The activity targets Learning Objective 1 by engaging learners in a task related to properties and applications of light, sound, and electromagnetic waves. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and guided comparison, supported by peer sharing and teacher questioning. Literacy is integrated through describing wave properties and their applications in communication, navigation, medicine, and entertainment. Numeracy is integrated through comparing wave-related quantities such as frequency, wavelength, speed, or signal range when applicable. EdTech is integrated through videos, simulations, diagrams, or presentation slides when available.

Note to Teachers: Clarify that GPS and mobile phones use radio or microwave electromagnetic signals, not visible light. Use “electromagnetic waves” when the example is not specifically visible in light.</td></tr>
<tr><td>V. ASSESSMENT

(Assessing Learnings)</td><td colspan="2">A. MULTIPLE CHOICE
Directions: Read each question carefully and choose the letter of the best answer.
1. During a power outage, Mia cannot use her television to watch the news, but she can still listen to updates through a battery-operated radio. Which statement best explains why the radio continues to provide information?

A. Radio waves can transmit information over long distances.
B. Sound waves travel faster than light waves.</td></tr>
</table>

C. Radios do not use any type of wave.
D. Television and radio use the same technology.

2. A doctor needs to examine a baby's condition inside the womb without performing surgery. Which technology is most appropriate and why?

A. GPS, because it uses satellite signals.
B. Ultrasound, because reflected sound waves can create images of internal structures.
C. Television, because it displays moving images.
D. Radio, because it transmits information through sound.

3. While traveling to an unfamiliar place, Carlo uses a GPS application to find the fastest route. Which property of electromagnetic waves, specifically radio/microwave signals, makes this technology possible?

A. Electromagnetic waves require a medium to travel.
B. Electromagnetic waves are produced only by vibrating objects.
C. Electromagnetic waves can transmit signals over long distances.
D. Electromagnetic waves travel slower than sound waves.

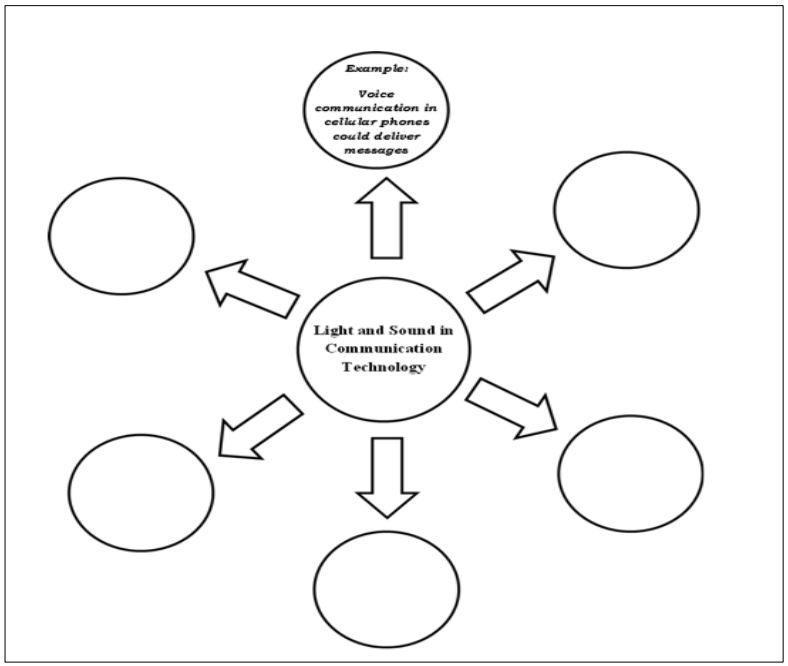
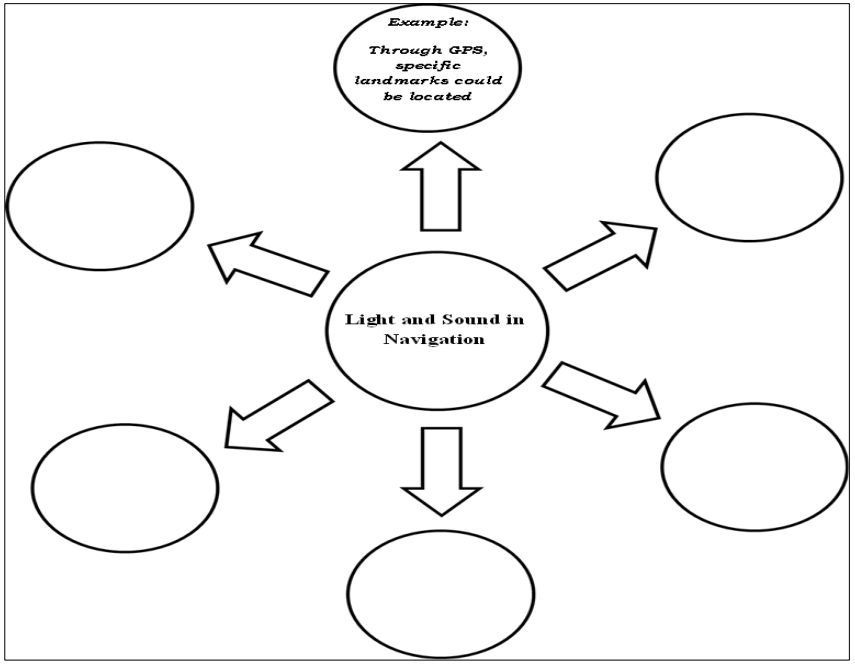
4. A concert organizer wants the audience to clearly see the performers and hear the music from any seat in the venue. Which combination of technologies best applies to the properties of light and sound waves?

A. GPS and ultrasound machine
B. Stage lighting and speaker system
C. Compass and thermometer
D. X-ray machine and calculator

5. A community loses access to technologies that rely on electromagnetic and sound waves for one day. Which situation would most likely occur?

A. People can still use GPS and make video calls without interruption.
B. Medical imaging, communication, navigation, and entertainment services would be greatly affected.
C. Only entertainment devices would stop working.
D. Transportation and healthcare services would improve.

Answer Key: 1.A, 2.B, 3.C, 4.B, 5.B

	B. BUBBLE MAP ACTIVITY **Direction:** Complete the bubble map by identifying important electromagnetic and sound wave applications in various fields that could affect one's everyday life.  
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?

VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Understanding and Using Light and Sound - Innovations Related to Sound and Light**	Lesson Exemplar	11

I. OBJECTIVES	
A. Content Standard	The learners learn that an understanding of the properties of light and sound leads to their safe and productive application.
B. Performance Standard	By the end of the quarter, learners identify general physics principles and their applications in daily life. They use scientific principles to solve problems, make informed decisions, and illustrate the applications of physics for self, society, and the environment. They design simple and compound machines and hydraulic systems to demonstrate applications of force, torque, center of mass, and hydraulic-related principles. They evaluate energy-efficient practices in electricity supply and consumption at home and local businesses and explore the advantages and drawbacks of light and sound in medical imaging, security, communication, and entertainment.
C. Learning Competencies	Prerequisite Knowledge and Skills
	Foundational understanding of wave generation and propagation, the specific properties of sound waves, how waves interact with various materials, and the characteristics of the visible spectrum.
	The learners identify innovations related to sound and light, such as soundproofing, sound amplifiers, LEDs, holograms, and lasers.
II. REFERENCES and MATERIALS **(Selecting Resources and Material)**	**References:** NBC News Learn. "Lasers in Our Everyday Lives." YouTube video, 1:44. May 1, 2020. Science Channel. "How Stethoscopes Amplify Sounds You Can't Hear." YouTube Shorts, 0:59. March 18, 2023. **Materials:** Laptop/projector or TV. Cardboard box.

	Towels. Plastic wrap. Foil. Flashlight. Activity worksheets. Internet access.	
III. CONTENT **(Sequencing Content)**	Understanding and Using Light and Sound - Innovations Related to Sound and Light	
IV. OBJECTIVES **(Setting Clear Objectives and Analyzing the Tasks)**	1. Enumerate the different innovations related to light and sound. 2. Discuss how the different innovative technologies such as but not limited to LEDs, hologram, lasers, soundproofing, and sound amplifiers apply the properties of light and sound. 3. Recognize the significance of innovations related to light and sound in daily life.	
IV. PROCEDURES		ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**	
	Option 1: Taxonomy of Light and Sound	
	Direction: "Let's build a Light & Sound A-to-Z! Look at the alphabet and pick one word related to light or sound that starts with different letters. Enter them into Menti meter now and watch our collective word cloud grow!"	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

<table>
<tr><td></td><td></td><td>The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available.

Notes to Teachers: Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.</td></tr>
<tr><td></td><td colspan="2">Option 2: Counting and Comparing Light & Sound in Our Environments</td></tr>
<tr><td></td><td>Direction: “List at least five (5) technologies related to light and sound for both Home and School. Once your columns are filled, tally the total number of items in each category. Write a concluding statement using inequality symbols (>or<) or a difference calculation to show which environment relies more on light and sound technology today (e.g., 'School has more sound technologies than Home')."

<table><tr><th colspan="2">Technologies related to light and sound at...</th></tr><tr><td>HOME</td><td>SCHOOL</td></tr><tr><td>1.</td><td>1.</td></tr><tr><td>2.</td><td>2.</td></tr></table></td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is</td></tr>
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	3. | 3. 4. | 4. 5. | 5.	available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: The Magic of Light	
	1. The teacher may download and show the students a short video or demonstration of a holographic display or a laser light show. **Holographic Display:** https://www.youtube.com/shorts/8G4GdXqlQwk **https://www.youtube.com/shorts/8G4GdXqlQwk** **Laser Light:** https://www.youtube.com/watch?v=OB4xk4iR4a8 **https://www.youtube.com/watch?v=OB4xk4iR4a8** **2. Then, the teacher may pose this question:** **For holographic display:** a. "How does bouncing light make a 3D picture float in mid-air? **For laser light show:** b. “Why does the focused light from the lasers stay in sharp, bright lines without spreading out like a regular flashlight?"	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light.

		Avoid accepting product names without an explanation of the science behind them.
	Option 2: What If...?	
	1. Divide the class into four groups. Each group will be assigned into four different fields, namely: 1. Classroom Learning 2. Commuting or Travelling 3. Socializing or Participating in Group Activities 4. Playing Sports or Games 2. Each group will list at least three (3) real-world scenarios showing what would happen if light or sound suddenly disappeared from their assigned field. 3. Groups must connect each scenario to a specific modern light or sound innovation and explain the exact physical property (e.g., reflection, refraction, or amplification) being utilized.	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1: LASERS in Our Everyday Life	
	1. The learners will watch a video entitled "Lasers in Our Everyday Life". (This video introduces learners to the fundamental science of lasers and explores how concentrated light technology is utilized in common, real-world applications—ranging from barcode scanners at checkout counters to advanced medical procedures and fiber-optic communication networks). **Video Title: Lasers in Our Everyday Life** Video Link: Watch on YouTube (https://www.youtube.com/watch?v=cdRxQjrL744)https://www.youtube.com/watch?v=cdRxQjrL744 2. Before hitting play, the teacher presents these three focus checkpoints to the class to guide their active viewing: a. What does the word LASER stand for? b. What are the things mentioned in the video that uses laser technology? c. What are the different applications of laser mentioned in the video? 3. After playing the video, the teacher asks learners about the questions presented.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

	Option 2: Sound Amplification and Stethoscopes	
	1. The learners will watch a video entitled "How Stethoscopes Amplify Sounds You Can't Hear." (This video clip breaks down the physics of acoustic amplification, showing learners how a stethoscope's chest piece captures subtle sound waves from inside the human body—like heartbeats and lung vibrations—and seals them through flexible tubing to deliver clear, concentrated sound directly to a doctor's ears). **Video Title: How Stethoscopes Amplify Sounds You Can't Hear** **Video Source:** *https://www.youtube.com/watch?v=K4NRzbxcM4Q* 2. Before hitting play, the teacher presents these three focus checkpoints to the class to guide their active viewing: a. How does a stethoscope amplify sounds produced inside the human body? b. What parts of the stethoscope help transmit and amplify sound to the listener's ears? c. How is the sound amplification of a stethoscope connected to other sound technologies like speakers, megaphones, or soundproofing materials? 3. After playing the video, the teacher asks learners about the questions presented.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

	B. 2. Discussing New Concept	
	Option 1: The Live Test	
	A. The Live Test 1. The teacher places a ringing phone inside a cardboard box. 2. Learners take turns wrapping the box in different materials (towels, plastic wrap, foil) to see which blocks the sound best (Soundproofing). 3. Then, they unwrap it and attach a rolled-up paper cone to the box opening to see how it directs and boosts the sound (Amplification). Simple Discussion: What kinds of materials trap sound vibrations, and what shapes make them louder? B. The Laser vs. Flashlight Show The teacher shines a regular flashlight on the wall (showing how the light scatters wide) and contrasts it by shining a small laser pointer (showing a single, tiny, intense dot). Simple Discussion: Why does a flashlight spread out to light up a whole room, while a laser stay focused in a perfect, straight line? Which one is better for cutting or precise surgery?	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	Option 2: Picture Talk	
	A. Picture Talk	The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to

	The teacher shows a simple side-by-side picture of a recording studio wall (with thick foam) and a megaphone. Simple Discussion: Looking at these pictures, which one is designed to swallow sound waves, and which one is designed to push them forward? How can you tell? B. The Smartphone Illusion (Creative) The teacher lets students hold a clear plastic cutout over a smartphone screen to reflect a floating image. Simple Discussion: How does a flat screen combined with angled plastic trick our eyes into seeing a 3D object? How is this different from a normal light bulb or LED?	innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	B. 3. Developing Mastery	
	Option 1: Light and Sound Saves the Day	
	Instructions: 1. Divide the class into four groups. Give each group a scenario card. **Example scenario cards:** Card 1: A hearing aid helps a person hear better.	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior

	Card 2: A pedestrian crosses the street using visual and sound cues from a traffic light. Card 3: A doctor performs laser eye surgery. Card 4: A blind person uses a cane with a sound sensor for navigation. 2. State whether light, sound, or both play a key role in the assigned scenario. **3. Then, answer the following questions:** a. What technology is used? b. Why is it important? c. What problem does it solve?	knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	Option 2: Wrap It Up!	
	Directions: 1. Divide learners into small groups and assign each group to one technology (LEDs, holograms, lasers, soundproofing, sound amplifiers). 2. Provide each group with printed handouts detailing their assigned technology principles, applications, and impact. 3. Allow groups to research further using their mobile phones or laptops. 4. Each group should prepare a brief presentation (5 minutes) on their technology, focusing on its properties, applications, and significance.	The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light

		properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application**	
	Option 1: Recent Advancements in Light and Sound Technology	
	Students will research recent, real-world advancement in either light or sound technology (developed or popularized within the last 2–3 years) and analyze its practical implications for modern society. **Step 1: Choose Your Topic** Select **one** specific recent advancement in either light or sound technology to research. • *Examples of Light Technology:* Human-Centric Lighting (HCL), Li-Fi (wireless data via light), AI-automated smart city lighting, or advanced laser/LiDAR systems. • *Examples of Sound Technology:* AI-driven context-aware noise cancellation, open-ear spatial audio (e.g., in smart glasses), or real-time AI voice translation.	The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video

	Step 2: Research and Analyze Using reliable search engines, find at least **one highly credible source** (e.g., a scientific journal, a reputable technology news outlet like *Wired* or *MIT Technology Review*, or an official industry report) that discusses your chosen technology. As you read, take notes on the following: • What is the technology, and how does it basically work? • What specific problem does it solve? • How will this impact society? (Consider the effects on daily life, healthcare, the environment, the economy, or global communication). **Step 3: Write Your Summary** Draft a cohesive summary of your findings. Your summary must include the following sections: 1. **Introduction to the Technology:** Clearly identify and describe the advancement. 2. **The Science Behind It:** Briefly explain how it manipulates or utilizes light or sound waves. 3. **Societal Implications:** Discuss how this technology is currently impacting or will impact society. *Be specific—who benefits from this and why?* **Submission Guidelines:** • **Length:** 250–400 words. • **Formatting:** Typed, standard 12-point font. • **Citation:** You must cite your credible source(s) at the bottom of your summary using APA 7th edition	clips, images, online examples, or presentation tools when available. **Note to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

format. Include a working link to the article if submitted digitally.

Criteria	4 - Exemplary	3 - Proficient	2 - Developing	1 - Beginning
Scientific Accuracy & Description (30%)	Provides a highly accurate, clear, and detailed explanation of the technology and the specific physics of how it manipulates light or sound waves.	Provides an accurate description of the technology and a general explanation of how it manipulates light or sound waves, with minor omissions.	Provides a vague or overly simplified description of the technology; the explanation of the light/sound physics contains noticeable errors.	Fails to accurately describe the technology or completely omits the explanation of the underlying light or sound physics.
Societal Implications (30%)	Offers a deep, insightful analysis of how the technology impacts society, citing specific examples of who benefits and why (e.g., health, economy, environment).	Discusses the societal impact of the technology clearly, identifying general benefits or consequences for specific groups.	Mentions societal impact, but the analysis is superficial, lacks specific examples, or is loosely connected to the technology.	Does not address the societal implications, or the explanation is entirely inaccurate.
Source Credibility & Citation (20%)	Selects a highly credible, authoritative source. The citation is perfectly formatted according to the required style, and the source is	Select a credible source. The citation is included and mostly formatted correctly, with only minor technical errors.	Uses a source of questionable credibility (e.g., a basic blog or unverified site). The citation is incomplete or	Fails to include a source, uses a highly unreliable source, or completely lack a citation.

	seamlessly integrated.		improperly formatted.	
Organization & Mechanics (20%)	The summary is exceptionally well-organized, falls within the 250–400-word limit, and is free of grammatical or spelling errors.	The summary is organized logically and meets the length requirement. Contains a few minor grammatical or spelling errors that do not impede readability.	The summary lacks clear structure, falls slightly outside the word limit, or contains several mechanical errors that distract the reader.	The summary is disorganized, significantly over/under the word count, and contains major errors that severely impact readability.

Option 2: The "Tech Detective"

Learner Instruction:

1. Explore your home or school. Find three physical examples of the innovations listed in your learning competency. Fill out the quick tracking log below for each item you find.

Tracking Log

1. Name of the Object Found: _____

2. Where did you find it? _____

3. Assigned Innovation Category:

[ ] LED

[ ] Hologram

[ ] Laser

The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is

	[ ] Soundproofing [ ] Sound Amplifier **4. Wave Type Used: [ ] Light Wave Only | [ ] Sound Wave Only | [ ] Both Light & Sound** 5. Practical Application: In your own words, explain exactly how this object helps people or solves a daily problem: _____ _____ _____	available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Notes to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	C. 2. Making Generalization	
	Option 1:	
	The teacher may ask the following questions: 1. How do you think these technologies that involve light and sound improve our daily life? 2. How can understanding these technologies help in solving real-world problems?	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through

		comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available. **Note to Teachers:** Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.
	Option 2: Think-Pair-Share	
	The teacher will pose the question below, and learners will find their pair and exchange their ideas. Afterwards, some learners may share their ideas with the whole class. **"Which light or sound innovation do you think has changed the world the most? Why?"**	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available.

<table>
<tr><td></td><td></td><td>Notes to Teachers: Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.</td></tr>
<tr><td></td><td colspan="2">C. 3. Evaluating Learning</td></tr>
<tr><td></td><td colspan="2">Option 1</td></tr>
<tr><td></td><td>The teacher may ask the following questions:

1. Which of the researched inventions do you believe has the most significant impact on improving human safety or quality of life? Justify your selection.

2. Explain the underlying physics: How does your chosen device manipulate wave behavior (e.g., reflection, refraction, absorption, or amplification) function effectively?

3. Based on the capabilities of current technology, formulate a new scientific question regarding the unexplored potential of light or sound waves.

If this assessment is administered via pen and paper, please refer to the grading rubric below:

<table>
<tr><th>Score</th><th>Criteria for Written Responses</th></tr>
<tr><td>3 Points (Thorough)</td><td>Answers all parts of the prompt clearly. Provides specific evidence or examples from the research. Correctly uses scientific terminology (e.g., reflection, amplitude, manipulation) when explaining how the device works.</td></tr>
</table>
</td><td>The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available.

Note to Teachers: Ask learners to connect each innovation to a specific property of sound or light.</td></tr>
</table>

	2 Points (Adequate) — Answers the prompt, but the explanation lacks depth or specific details. Mentions how the device works but uses basic or slightly inaccurate scientific vocabulary. **1 Point (Incomplete)** — Attempts to answer, but the response is too brief, off-topic, or shows a clear misunderstanding of how the technology manipulates light or sound waves.	Avoid accepting product names without an explanation of the science behind them.
	Option 2: One Word Summary	
	What one word best summarizes today's lesson?" Explain it in 2-3 sentences.	This part uses strategies to gather feedback from learners for continuous improvement of the delivery of the lesson.
	C. 4. Additional Activities	
	Option 1: It's time to Reflect!	
	Write a 3- to 5-paragraph essay discussing how recent innovations in light and sound technology impact your everyday life. To guide your writing, be sure to answer the following questions in your essay: • Which specific light and sound technologies do you use or experience daily? • How do these technologies make your daily tasks easier, safer, or more enjoyable? • Briefly explain the basic science behind one of these technologies (e.g., how does your device use light or sound waves?).	The activity targets Learning Objective 1 by engaging learners in a task related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is

Criteria	4 - Outstanding	3 - Satisfactory	2 - Developing	1 - Beginning
Content & Personal Reflection (40%)	Provides a deep, insightful reflection on how light/sound technologies impact daily life. Uses highly specific, real-world personal examples.	Provides a clear reflection on the impact of these technologies with adequate personal examples.	Reflection is somewhat vague or generalized. Struggles connect technologies to personal daily life.	Fails to address the personal impact of the technologies, or the response is entirely off topic.
Scientific Understanding (30%)	Accurately identifies the technologies and provides a clear, correct explanation of how they utilize light or sound waves.	Identifies technologies and attempts to explain the underlying science, with only minor inaccuracies.	Mentions technologies but provides a weak or highly inaccurate explanation of the associated light or sound physics.	Does not attempt to explain the science behind the technologies, or the explanation is completely incorrect.
Organization & Structure (15%)	Essay is exceptionally well-structured with a clear introduction, logically sequenced body paragraphs,	Essay has a visible structure (introduction, body, conclusion) and flows logically for the most part.	Essay lacks clear structure or paragraph breaks. Ideas feel disconnected or jump around.	Essays are entirely disorganized, making it difficult for the reader to follow the main idea.

available. EdTech is integrated through video clips, images, online examples, or presentation tools when available.

Notes to Teachers: Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

	and a strong conclusion.			
Grammar & Mechanics (15%)	Free of spelling, punctuation, and grammatical errors. Uses strong, appropriate academic vocabulary.	Contains a few minor errors that do not interfere with the meaning. Vocabulary is appropriate.	Contains several frequent errors in spelling or grammar that occasionally distract the reader.	Contains major, pervasive errors that make the essay extremely difficult to read and understand.

Option 2: The "Home Tech Audit"

Home-Based Performance Task: Science Detective Audit

Learners will apply their understanding of wave mechanics by identifying and documenting real-world applications of light and sound innovations within their immediate environment.

Task Instructions:

1. **The Investigation:** Act as a "Science Detective" in your own home. Explore your house, apartment, or immediate neighborhood to locate at least **three** different examples of modern light or sound innovations in action. *(Examples: an energy-efficient LED bulb, a security hologram on an ID or bank card, noise-canceling headphones, or soundproofing materials like heavy curtains).*

The activity targets Learning Objective 1 by engaging learners in a task related to innovations related to sound and light. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is technology analysis and product classification, supported by peer sharing and teacher questioning. Literacy is integrated through naming innovations and explaining how each applies sound or light properties. Numeracy is integrated through comparing features such as brightness, sound level, distance, or efficiency when data is available. EdTech is integrated through video clips, images, online examples, or presentation tools when available.

2. **The Documentation:** Record your findings by completing the **Science Audit Log** below.

Science Audit Log Requirements: For each of the three innovations you discover, your log must include:

- **Target Identified:** Name the specific object or technology.
- **Visual Evidence:** Attach a clear photograph or provide a neat, hand-drawn illustration of the item in its actual location.
- **Household Impact:** Write a concise, 2-sentence explanation detailing exactly how this technology utilizes light or sound to improve safety, efficiency, or daily life for your family.

Criteria	4 - Exemplary	3 - Proficient	2 - Developing	1 - Beginning
Identification & Completeness (30%)	Successfully identifying **three** distinct and highly accurate examples of light or sound innovations within the home or neighborhood.	Identifies **two** accurate examples of light or sound innovations or includes three items, but one is not a true light/sound technology.	Identifies only **one** accurate example or includes multiple items that do not clearly relate to light or sound innovations.	Fails to identify any relevant light or sound innovations, or the log is completely blank.
Visual Evidence (30%)	Provides clear, relevant photographs or neat, detailed	Provides photographs or drawings for most items, but	Provides visual evidence for only one item, or the provided	Does not provide any visual evidence (no

Notes to Teachers: Ask learners to connect each innovation to a specific property of sound or light. Avoid accepting product names without an explanation of the science behind them.

		hand-drawn illustrations for **all three** identified innovations.	one may be missing or slightly unclear/messy.	visuals are too messy or blurry to identify the object.	photos and no drawings).
	Explanation of Impact (40%)	Writes a clear, well-thought-out 2-sentence explanation for **all three** items, explicitly detailing how the light/sound technology improves safety, efficiency, or daily household life.	Writes explanations for all items, but they may be slightly vague, lack a direct connection to how the technology functions, or do not follow the 2-sentence length requirement.	Explanations are missing some items, or the provided explanations are very weak and fail to mention how technology impacts the household.	Fails to provide explanations, or the explanations are entirely off-topic and incorrect.

V. ASSESSMENT

(Assessing Learnings)

A. Multiple Choice

Direction: Read each question carefully before choosing your answer. Select the best option that correctly answers the question.

1. Which innovation is primarily used in recording studios and highway barriers to block or absorb unwanted noise?

A. Sound Amplification

B. Soundproofing

C. LED Lighting

D. Lasers

	2. A principal needs to make an announcement in a crowded, noisy school cafeteria. Which technology is best suited to increase the volume of their voice? A. Sound Amplification B. Soundproofing C. Hologram Projectors D. Fiber Optics 3. Why do cities widely choose Light Emitting Diodes (LEDs) over traditional lightbulbs for their streetlights? A. LEDs project three-dimensional images onto the road. B. LEDs use high-heat laser beams to improve visibility. C. LEDs are highly energy-efficient and have a long lifespan. D. LEDs absorb surrounding traffic and engine noise. 4. Which technology relies on highly precise, focused light beams to perform delicate tasks like engraving metal, manufacturing electronics, or performing eye surgeries? A. Fiber optics B. Laser cutting/application C. Holograms D. Soundproofing

5. Where would you be most likely to find fiber optic technology actively working in today's society?

A. In the noise-canceling foam of a music room

B. On the shiny 3D security stickers of credit cards

C. Inside high-speed internet network cables

D. Inside hearing aids to help people hear louder

Answer Key: 1.B, 2.A, 3.C, 4.B, 5.C

B. Short Constructed-Response

Identify one modern innovation from your lesson (such as LEDs, holograms, lasers, soundproofing, or sound amplifiers) and write a 3-to-4 sentence paragraph explaining how it manipulates light or sound waves and why it is useful in daily life.

Scoring Guide:

Criteria	3 pts	2 pts	1 pt
Identification and Usefulness	Correctly names a specific innovation and clearly describes why it is beneficial or essential in a daily life context.	Names an innovation, but its practical daily usefulness is vague or weakly explained.	Fails to name an innovation or does not explain its practical usefulness.
Scientific Mechanism	Accurately explains how the device works by explicitly naming and tracking a specific wave of property (e.g., absorption, reflection, emission).	Explains how the device works but misses the core wave property or tracking its behavior.	The explanation fails to connect to wave mechanics entirely.
Scientific Accuracy	The response is entirely free of scientific misconceptions; all physics	The response contains one minor scientific error or misuses a technical term,	The response contains major scientific errors or severe misconceptions

		terms are used correctly in context.	but the core concept remains understandable.	about how light or sound behaves.
VI. REFLECTION **(Feedback and Continuous Improvement)**	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?			
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.			

I. OBJECTIVES	
A. Content Standard	The learners learn that past research in the field of chemistry provides foundations for the development of helpful products and processes.
B. Performance Standard	By the end of the quarter, learners apply research skills to discover how scientists have impacted our lives. They recognize the significant role of different agencies in the Philippines, such as DOST and DTI, in scientific innovation and development. They show critical thinking in explaining the different substances in household and personal care products, including their benefits and potential risks of using and disposing of them. They demonstrate appropriate and safe handling and use of chemicals. They explain that chemical reactions occur in human activities and the environment, and that several chemical solutions pose a threat to the community.
C. Learning Competencies	Prerequisite Knowledge and Skills The learners use information from secondary resources to report how Louis Pasteur combined research from the fields of chemistry and biology, which has helped scientists to understand the cause of some diseases and prevent infection.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Brock, Thomas D. Robert Koch: A Life in Medicine and Bacteriology. Washington, DC: ASM Press, 1999. Bulloch, William. The History of Bacteriology. Oxford: Oxford University Press, 1938. Debré, Patrice. Louis Pasteur. Baltimore: Johns Hopkins University Press, 1998. Duclaux, Émile. Pasteur: The History of a Mind. Philadelphia: W.B. Saunders Company, 1920. Geison, Gerald L. The Private Science of Louis Pasteur. Princeton, NJ: Princeton University Press, 1995. Institut Pasteur. "Louis Pasteur." Accessed June 10, 2026. **Materials:** Journals, books, illustrations, printed materials, and laptops.
III. CONTENT (Sequencing Content)	Chemists and How They Have Made an Impact on Our Lives - Louis Pasteur's Contributions
IV. OBJECTIVES (Setting Clear Objectives and	**At the end of the lesson, the learners will be able to:** 1. Create a timeline that highlights the major contributions of Louis Pasteur in the fields of chemistry and biology.

<table>
<tr><td>Analyzing the Tasks)</td><td colspan="2">2. Enumerate the contributions of each experiment and explain how they enhanced scientists' understanding of the causes of disease and the prevention of infection.
3. Identify modern products that were developed based on Pasteur's scientific experiments.
4. Explain how these products are applied in society today.
5. Outline the impact of Pasteur's discoveries on daily life, particularly in the areas of medicine, food preservation, and commonly used materials by presenting
6. Recognize the role of chemists in improving the quality of human life.</td></tr>
<tr><td colspan="2">IV. PROCEDURES</td><td>ANNOTATIONS</td></tr>
<tr><td rowspan="3">A. Activating Prior Knowledge</td><td colspan="2">A. 1. Activating Prior Knowledge</td></tr>
<tr><td colspan="2">Option 1: VIRTUAL TOUR TO PASTEUR'S MUSEUM</td></tr>
<tr><td>VIRTUAL TOUR TO PASTEUR'S MUSEUM
Students will be instructed to visit Pasteur's Virtual Museum at
https://artsandculture.google.com/story/XAXBwj6OxM9xKA
Prompt Questions
Pre-Tour Questions
1. What do you already know about Louis Pasteur and his contributions to science?
2. How do you think Pasteur's discoveries influence modern medicine and food safety?
3. What aspects of microbiology, vaccination, or pasteurization are you most curious about?
During the Tour Questions
1. What scientific instruments or artifacts stand out to you? How do they compare to modern laboratory tools?
2. How did Pasteur's work contribute to public health regulations?
3. What challenges did Pasteur face in proving his theories, and how did he overcome them?
4. How does the museum present Pasteur's legacy in consumer education and regulatory knowledge?</td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available.

Notes to Teachers: Guide learners to avoid saying that Pasteur invented all related products.</td></tr>
</table>

<table>
<tr><td></td><td>5. What connections can you make between Pasteur's discoveries and FDA, DTI, or DENR regulations?
Post-Tour Reflection Questions
1. What was the most surprising fact you learned about Pasteur's work?
2. How can Pasteur's discoveries be applied to current scientific and regulatory challenges?
3. If you could ask Pasteur one question, what would it be and why?

If internet access is not available, provide printed reading cards or screenshots about Pasteur's life, experiments, and discoveries. Learners may complete the same guide questions using the printed materials.</td><td>Emphasize that his research helped scientists understand and control microbial processes.</td></tr>
<tr><td></td><td colspan="2">Option 2: WORD MATCH CHALLENGE</td></tr>
<tr><td></td><td>WORD MATCH CHALLENGE
Match the description given on the first column to the corresponding terms from the second column

<table><tr><th>Corresponding Terms</th><th>Description</th></tr><tr><td></td><td>1. A characteristic of molecules where they exist as mirror images of one another, much like the left and right hands that appear similar but are not exactly the same.</td></tr><tr><td>VACCINES</td><td>2. This process is responsible for the production of foods like yogurt, bread, and wine, and is also the reason milk changes and turns</td></tr></table></td><td>The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

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</table>

	GERM THEORY MOLECULAR ASYMMETRY FERMENTATION PASTEURIZATION INFECTIOUS DISEASE	sour over time. 3. It is what makes the milk you buy at the store safe to drink and helps it last longer in your fridge. 4. A scientific idea that explains that many diseases are caused by microorganisms that are too small to be seen with the naked eye and can spread from one person to another. 5. Colds or flu caught from someone else 6. Shots given to you when you were a child to protect you from diseases.	through using online sources, QR-linked materials, videos, or presentation tools when available. **Note to Teachers:** Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.
	Ask: "What do these words make you think of? Can you guess who connects all of them?"		
	A. 2. Establishing the Purpose of the Lesson		
	Option 1: Students may refer to the following sources.		
	Activity: " "Pasteur's Breakthroughs: A Timeline Challenge" - an interactive timeline activity where students will be grouped to become researchers uncovering Pasteur's groundbreaking achievements and create a timeline about his significant contributions in the field of chemistry. Students may refer to the following sources.		The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

Title	**Type**	**URL**	**Short Description**

Louis Pasteur - Inventions, Achievements & Facts	Article	bit.ly/4k8Le6E	This article explores the life and contributions of Louis Pasteur.
Louis Pasteur: Pioneer of Modern Medicine | GCSE History	Video documentation	bit.ly/42UW5vj	The video showcases the groundbreaking contributions of Louis Pasteur to the field of medicine.
Biography: Louis Pasteur: A controversial figure in a debate on scientific ethics Author links open overlay panel B. Lee Ligon, PhD	Article	bit.ly/3GVpmgv	This article provides an overview of Pasteur's life and the debate regarding his scientific discoveries and honesty that has ensued for more than 100 years.
The Remarkable Life and Legacy of Louis Pasteur	Video documentation	bit.ly/42KCLkg	The video chronicles the life and legacy of Louis Pasteur.

Students have the option to select their preferred method for presenting their timelines. They may choose from the following:

a. Interactive Poster or Wall Display

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Note to Teachers: Clarify to learners: Pasteur did not invent all related products. Emphasize that his research helped scientists understand and control microbial processes.

	● Create a large, visually appealing timeline on a poster or bulletin board with images, dates, and short descriptions. ● Use color-coding to differentiate periods or themes (e.g., scientific breakthroughs, personal milestones). b. Digital Timeline (Presentation or Infographic) ● Use tools like PowerPoint, Canva, or Timeline JS to create an interactive digital timeline. ● Add animations or clickable sections for a dynamic experience. c. Storyboard or Comic Strip ● Represent key moments in Pasteur's life through illustrations, like a comic strip or storybook format. ● Students can narrate the discoveries using speech bubbles for each event. The outputs should address the following guide questions: Content Understanding 1. Who is Louis Pasteur, and why is he important in the field of chemistry and medicine? 2. What are the key scientific contributions of Louis Pasteur? (e.g., pasteurization, germ theory, vaccines) 3. What problems or issues were scientists facing before Pasteur's discoveries? 4. How did Pasteur's experiments change scientific understanding during his time? Chronological Thinking	

	1. What are the major events in Pasteur's life and discoveries, and when did they occur? 2. How can these events be arranged in a logical and chronological timeline? 3. Which discoveries came first, and how did they influence his later work? Analysis and Reflection 1. Why are Pasteur's contributions still important today? 2. What challenges or controversies did Pasteur face in his scientific career? 3. How did Pasteur's work influence modern chemistry, medicine, or public health?	
	Option 2: Why Should We Care? – The Invisible Impact	
	Activity Title: "Why Should We Care? – The Invisible Impact" **Goal:** To help students realize the relevance of the lesson by connecting Pasteur's work and chemists to their daily life, health, and community. Step I. Hook Scenario (Real-Life Trigger) "Two families live in the same town. One family drink untreated milk and stores food without proper care. The other drinks treated milk, follows hygiene practices, and gets vaccinated. After one month, one family experiences illness, while the other remains healthy." Step 2. Students think individually, then discuss with a partner **Guide Questions**	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines

	● What could explain the difference between the two families? ● What invisible factors might affect their health? ● Who do you think discovered or studied these factors? Step 3. Students share responses before the class Step 4. Reveal the Purpose (Teacher Bridging Statement) Step 5. Select a group or an individual to present their created timeline. **From the presentations of students, give emphasis on the following:** 1. Pasteurization in Food Safety – His pasteurization process is still used today to kill harmful bacteria in milk, juice, and other beverages, ensuring they are safe for consumption. 2. Vaccines for Disease Prevention – Pasteur's work on vaccines led to the development of life-saving immunizations, including those for rabies and anthrax, paving the way for modern vaccination programs. 3. Improved Hygiene and Sanitation – His germ theory of disease revolutionized medical practices, leading to better sterilization techniques in hospitals and reducing infections. 4. Advancements in Microbiology – His discoveries laid the foundation for microbiology, helping scientists understand how microorganisms affect health and industry. 5. Protection of the Wine and Silk Industries – Pasteur's research saved the French wine industry from spoilage and helped prevent diseases in silkworms, preserving economic stability.	of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Clarify to learners: Pasteur did not invent all related products. Emphasize that his research helped scientists understand and control microbial processes.
	B. 1. Presenting Examples	

<table>
<tr><td rowspan="2">B. Instituting New Knowledge</td><td colspan="2">Option 1: From Experiment to Impact: The Pasteur Investigation</td></tr>
<tr><td>Title: “From Experiment to Impact: The Pasteur Investigation”
Purpose:
Students will construct new understanding by analyzing Pasteur’s experiments, linking them to discoveries, modern products, and real-life applications.
Procedure:
Step 1: Group Assignment (3 minutes)
Assign each group one Pasteur experiment:
1. Fermentation Studies
2. Swan-Neck Flask Experiment
3. Pasteurization
4. Fowl Cholera (Vaccination Discovery)
5. Anthrax Vaccine Trial
6. Rabies Vaccine Development
Step 2: Investigation Task
Each group completes an Investigation Organizer:
PART A: What Happened?
• What was the experiment about?
• What problem was Pasteur trying to solve?
PART B: What Was Discovered?
• What did the experiment prove or explain?
• How did it change scientists’ understanding of disease or infection?
PART C: Modern Products & Use Today
• What products or practices came from this discovery?
• How are these used in society today?
PART D: Impact on Daily Life</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

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</table>

- **How did this discovery improve:**
  - Medicine
  - Food safety/preservation
  - Public health

PART E: Role of Chemists

- How did Pasteur act as a chemist in solving real-world problems?
- What does this tell us about the importance of chemists today?

Step 3: Creative Output (10 minutes)

Each group presents their findings through one of the following:

Option A: Concept Map Poster

Must include:

- Experiment → Discovery → Product → Application → Impact

Option B: Mini News Report

Students act as reporters:

- "Breaking News: Pasteur's Discovery Saves Lives!"
- Must explain experiment, result, and impact

Option C: Timeline + Impact Chart

- Place their experiment in a timeline
- Add effects before and after discovery

Step 4: Presentation & Sharing (8–10 minutes)

Each group presents for 1–2 minutes.

Audience Task:

While listening, students fill in a simple matrix:

Experiment	Discovery	Product	Real-Life Use

Step 5: Teacher Synthesis

Sample Content Guide (Teacher Reference)

Experiment	Discovery	Product	Real-Life Use
Fermentation Studies	Microorganisms cause fermentation	Controlled fermentation in products such as yogurt, cheese, and bread	Food production and preservation
Swan-Neck Flask Experiment	Microorganisms come from the environment (not spontaneous generation)	Sterilization practices	Clean laboratories and medical procedures
Pasteurization	Heat kills harmful microorganisms	Pasteurized milk, juice	Safe drinking and longer shelf life of food
Fowl Cholera (Vaccination)	Weakened bacteria can produce immunity	Vaccines	Preventing diseases in animals and humans
Anthrax Vaccine Trial	Vaccination protects against infection	Livestock vaccines	Protects animals and supports food supply
Rabies Vaccine Development	Vaccines prevent deadly viral diseases	Rabies vaccine	Treatment after animal bites to save lives

Option 2

B. 2. Discussing New Concept

Option 1: 1 Germ Theory Challenge

Activity: "Pasteur's Scientific Solutions"

Divide the class into teams. Each team represents a group of scientists facing a mysterious disease outbreak. Their goal is to use Pasteur's discoveries to resolve the following problems.

1. Germ Theory Challenge

The activity targets Learning Objectives 1, 2, and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist,

	A hospital is struggling with patients getting infections after surgery. Some doctors believe diseases come from "bad air." What experiment from Pasteur could help prove the real cause? 2. Pasteurization Challenge Farmers in a village complain that their milk spoils too quickly, making people sick. What scientific process can they use to keep milk safe for longer? 3. Rabies Vaccine Challenge A child was bitten by a rabid dog; the Barangay health workers who are supposed to provide first aid do not know how to save him. What method, based on Pasteur's work, could help protect people from deadly rabies? 4. Spontaneous Generation Challenge Some scientists argue that bacteria appear randomly in spoiled food. What experiment could prove that microorganisms come from other living things rather than just appearing out of nowhere? Students will organize their group's work using the following parts: A. Identify the Problem • Clearly describe the issue or situation in your case. • What is happening and who is affected? B. Connect to Pasteur's Discovery • Identify which of Pasteur's discoveries is related to the problem. • Explain how this scientific idea helps in understanding the situation. C. Design a Solution • Propose a solution or experiment based on Pasteur's work. • Describe the steps or actions that should be taken. D. Predict the Results • What do you think will happen if your solution is applied?	Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Clarify to learners: Pasteur did not invent all related products. Emphasize that his research helped scientists understand and control microbial processes.

	• How will this support Pasteur's idea? E. Conclude and Apply • State your conclusion based on your reasoning. • Explain how your solution can be used in real-life situations (e.g., hospitals, farms, communities).	
	Option 2: Case-Based Solution Presentation	
	Case-Based Solution Presentation **Task: Apply Pasteur's Ideas to Solve Real Problems** **CASE 1: The Spoiled Milk Problem** **Scenario:** A local store reports that customers are getting sick after drinking milk. Investigation shows the milk spoils quickly, even when refrigerated. **Guide Questions:** 1. What is the possible cause of the problem? 2. Which Pasteur experiment explains this? 3. What solution should be applied to? 4. How will this improve people's health? **CASE 2: Hospital Infection Outbreak** **Scenario:** A hospital notices that many patients develop infections after surgery. The hospital staff do not regularly sterilize instruments. **Guide Questions:** 1. Why are infections spreading? 2. Which scientific idea explains this? 3. What should the hospital do? 4. What will be the result? **CASE 3: Farm Animal Disease** **Scenario:** A farmer reports that many of his cows are dying from a contagious disease. Nearby farms are also affected.	The activity targets Learning Objectives 1, 2, and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Note to Teachers:** Clarify to learners: Pasteur did not invent all related products. Emphasize that his research helped scientists understand and control microbial processes.

	Guide Questions: 1. What is the likely cause? 2. Which Pasteur discovery can help? 3. What solution can be applied to? 4. How will this benefit the community? **CASE 4: Dog Bite Emergency** **Scenario:** A boy is bitten by a stray dog suspected of carrying rabies. His family is unsure what to do. **Guide Questions:** 1. What is the danger in this situation? 2. Which Pasteur contribution applies? 3. What action should be taken immediately? 4. Why is this life-saving? **CASE 5: Food Production Problem** **Scenario:** A bakery notices that their dough is not rising properly, and bread quality is poor. **Guide Questions:** 1. What might be missing or incorrect? 2. Which Pasteur study explains this? 3. What should be done to fix the problem? 4. How does this affect food production? **CASE 6: Community Hygiene Issue** **Scenario:** In a community, people rarely wash their hands and often leave food uncovered. Many residents frequently get sick. **Guide Questions:** 1. What is causing the illnesses? 2. Which Pasteur idea applies? 3. What practices should be introduced? 4. How will this improve daily life?	

	B. 3. Developing Mastery	
	Option 1: Pasteur's Scientific Impact Symposium	
	Pasteur's Scientific Impact Symposium Students will participate in a roundtable discussion, acting as scientists presenting and discussing their research on the following topics. Each discussion will be anchored by a specific guiding question. Groups must use at least two reliable secondary sources, such as a science textbook, peer-reviewed article, university or museum database, or an official science or public health organization. Students must cite the source of each major claim in their written consensus and submit a full reference list (including the author or organization, title, date, publisher or website, and URL). 1. Historical Significance • How did Pasteur's experiments change scientists' understanding of disease prevention? • Which of his contributions do you think had the most lasting impact on modern medicine? Defend your answer. 2. Ethical & Societal Impact • How did Pasteur's discoveries affect public health policies? Give examples of laws or practices influenced by his work. • If Pasteur had not conducted his experiments, how might modern healthcare look different today? 3. Connection to Modern Science • What scientific advancements today build on Pasteur's work (e.g., vaccines, antibiotics, food safety)? • Compare and contrast the challenges Pasteur faced in his time with challenges scientists face today when making medical discoveries.	The activity targets Learning Objectives 2, 3, and 4 by allowing learners to practice, classify, compute, or organize ideas related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Clarify to learners: Pasteur did not invent all related products. Emphasize that his research helped scientists understand and control microbial processes.

4. Application Scenarios
- Imagine there is a new infectious disease outbreak. Based on Pasteur's principles, what would be the first steps in controlling the spread?

If Pasteur were alive today, what emerging scientific problems do you think he would work on?

Option 2: Then vs Now Comparison Chart

Then vs Now Comparison Chart
Students fill in and discuss changes.

Situation	Before Pasteur	After Pasteur
Food spoilage		
Disease spread		
Medical treatment		

Product Investigation: "Science Behind It
Task:
Assign everyday products:
- Milk
- Yogurt
- Vaccines
- Vinegar
- Disinfectants

Students explain:
1. Which Pasteur discovery is connected
2. How the product is made or works
3. Its importance in daily life

Can be presented in mini-report or infographic

The activity targets Learning Objectives 2, 3, and 4 by allowing learners to practice, classify, compute, or organize ideas related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

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<table>
<tr><td rowspan="5">C. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: Students may choose from the following options</td></tr>
<tr><td>Activity: "Pasteur’s Legacy – Then & Now"
Objective:
Students will explore how Pasteur’s discoveries have influenced modern products and conducting research and presenting real-world applications.

Students may choose from the following options
1. Product Investigation
Students will be assigned the task of tracing the origins of various modern products, such as modern vaccines, high-pressure pasteurization, probiotics, and antimicrobial coatings, back to the foundational experiments of Pasteur. This includes exploring concepts like germ theory, fermentation, and vaccine development.

2. Innovation Showcase
Create mini-presentations (posters, slides, or short videos) explaining how Pasteur’s work led to the development of their assigned product.
Include scientific connections, benefits, and real-world impact.</td><td>The activity targets Learning Objectives 3, 4, and 5 by asking learners to apply the lesson concepts to practical situations or performance tasks related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

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<tr><td colspan="2">Option 2: Step 1: Form a Team</td></tr>
<tr><td>Activity: News Report Activity:</td><td>The activity targets Learning Objectives 3, 4, and 5 by asking learners to apply the lesson concepts to practical situations or performance tasks</td></tr>
</table>

	Task: Students are news reporters assigned to report an important scientific breakthrough by Louis Pasteur. Their task is to present the information as if it is breaking news. **Step 1: Form a Team** • Work in small groups. • Assign roles (e.g., news anchor, field reporter, script writer, visual designer). **Step 2: Choose a Topic** • Select one of Pasteur's discoveries or experiments (e.g., germ theory, pasteurization, rabies vaccine, swan-neck flask experiment). **Step 3: Research the Topic** • Use the given sources to gather accurate information. • Focus on understanding the experiment, discovery, and its importance. **Step 4: Prepare News Report** **Organize your report using the following parts:** 1. Introduction (Breaking News) • Start with an attention-grabbing headline. (Example: "Breaking News: Scientist Louis Pasteur Discovers the Cause of Disease!") • Introduce the topic and why it matters. 2. Description of the Experiment • Explain what Pasteur did in his experiment. • Describe the materials, steps, or process in simple terms.	related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.

	3. Explanation of the Discovery • What did Pasteur find out? • What scientific idea or principle was proven? 4. Impact on Society • Why is this discovery important? • How does it help people today? • Give real-life applications (e.g., safe food, vaccines, clean hospitals). **Step 5: Choose Presentation Format** • Live news reporting (role play) • Recorded video report • Poster or visual news board • Digital presentation with slides **Step 6: Present News Report** • Speak clearly and confidently. • Use visuals, props, or costumes (optional). • Ensure all group members participate.	
	C. 2. Making Generalization	
	Option 1: Personal Reflection	
	Personal Reflection Students should think about these questions and give thoughtful answers. 1. Why do scientists need to combine multiple fields of study (like chemistry, biology and technology) to advance medicine? 2. How does Pasteur's legacy inspire future innovations in healthcare? 3. Imagine a world without Pasteur's discoveries. How would hospitals, food safety, and disease prevention look different today? 4. How does Pasteur's work help scientists combat new diseases, such as COVID-19?	The activity targets Learning Objectives 1, 2, 5, and 6 by asking learners to synthesize important ideas and communicate generalizations about Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources,

		summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.
	Option 2: What did Pasteur prove about microorganisms?	
	One-Sentence Summary Challenge **Purpose:** To help students synthesize all key concepts (experiments, discoveries, applications, and impact) into a clear, meaningful generalization. **Procedures:** Ask students quick recall questions • "What did Pasteur prove about microorganisms?" • "What are examples of products from his discoveries?" • "How did his work improve human life?" **Write key words on the board:** • microorganisms • germ theory • pasteurization • vaccines • disease prevention • food safety	The activity targets Learning Objectives 1, 2, 5, and 6 by asking learners to synthesize important ideas and communicate generalizations about Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked

<table>
<tr><td></td><td></td><td>materials, videos, or presentation tools when available.

Notes to Teachers: Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.</td></tr>
<tr><td></td><td colspan="2">C. 3. Evaluating Learning</td></tr>
<tr><td></td><td colspan="2">Option 1: Short Written Assessment: “From Experiment to Impact</td></tr>
<tr><td></td><td>Activity Title: Short Written Assessment: “From Experiment to Impact”
Purpose: To evaluate students’ ability to explain Pasteur’s experiments, connect them to modern products, and describe their impact on daily life.
Task Instructions. Answer the question clearly in 3–5 sentences:
Question: Explain how one of Louis Pasteur’s experiments led to a modern product and describe its impact on daily life.”

<table><tr><th>Criteria</th><th>3 – Good</th><th>2 – Fair</th><th>1 – Needs Improvement</th></tr><tr><td>Understanding</td><td>Correct and complete</td><td>Partially correct</td><td>Incorrect/ unclear</td></tr><tr><td>Connection</td><td>Clear link (experiment → product)</td><td>Weak link</td><td>No clear connection</td></tr><tr><td>Impact Explanation</td><td>Clear real-life impact</td><td>Limited explanation</td><td>No explanation</td></tr></table></td><td>The activity targets Learning Objectives 1, 2, 3, 4, 5, and 6 by checking learners' ability to demonstrate the required knowledge and skills related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur’s contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available.

Notes to Teachers: Guide learners to avoid saying that Pasteur invented all related products.</td></tr>
</table>

		Emphasize that his research helped scientists understand and control microbial processes.
	Option 2: Exit Reflection: Pasteur's Impact in One Minute	
	Activity Title: Exit Reflection: Pasteur's Impact in One Minute" Purpose: To quickly assess students' understanding, reflection, and key takeaways about Pasteur's discoveries, their applications, and the role of chemists in improving human life. Task: In 2 to 3 sentences, explain one specific discovery of Louis Pasteur, one modern product or practice connected to it, and one way it improves human life today. Alternative question options (Use 1 or 2 only) • "What is the most important thing you learned today?" • "Give one example of a product from Pasteur's work and explain its use." • "Why is Pasteur's work still important today?"	The activity targets Learning Objectives 1, 2, 3, 4, 5, and 6 by checking learners' ability to demonstrate the required knowledge and skills related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.

	C. 4. Additional Activities	
	Option 1: Short Answer (5 pts each)	
	Short Answer (5 pts each) 1. Explain how Pasteur's discovery of germ theory helped prevent infections in hospitals. 2. Describe a modern application of Pasteur's fermentation research in food or medicine. 3. What would happen to public health if Pasteur's discoveries had never been made? 4. How did Pasteur's rabies vaccine experiment change the way vaccines are developed today? What are the differences between spontaneous generation and Pasteur's germ theory?	The activity targets Learning Objective 1 by engaging learners in a task related to Louis Pasteur's contributions to chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is historical case analysis and evidence-based reporting, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available. **Notes to Teachers:** Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.
	Option 2: Pasteur's Impact on Our Lives" Infographic	
	Title: "Pasteur's Impact on Our Lives" Infographic Purpose: To help students organize, connect, and visually present key concepts about Louis Pasteur's work, including experiments, discoveries, applications, and their impact on daily life.	The activity targets Learning Objectives 1, 2, 3, 4, 5, and 6 by checking learners' ability to demonstrate the required knowledge and skills related to Louis Pasteur's contributions to

Task Instructions: Create an infographic that shows how Louis Pasteur's work changed science and daily life. Your infographic must include:

- Experiment (What did Pasteur do?
- Discovery (What did he prove?)
- Product (What modern product resulted?)
- Use (How is it used today?)
- Impact (How did it improve human life?

The teacher may use the scoring rubric below or collaboratively establish scoring criteria with the learners for evaluating their outputs

Criteria	**Description**	**Pts.**
Completeness of Content	Includes all required parts: Experiment, Discovery, Product, Use, and Impact	25
Accuracy of Information	Information is correct, clear, and relevant to Pasteur's work	25
Clarity & Organization	Ideas are well-organized, easy to follow, and clearly explained	20
Visual Design & Creativity	Infographic is neat, attractive, and uses visuals (icons, colors, images) effectively	20
Connection to Real-Life Impact	Clearly shows how Pasteur's work affects daily life today	10

chemistry, biology, disease prevention, and infection control. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading secondary sources, summarizing evidence, and reporting Pasteur's contributions clearly. Numeracy is integrated through organizing dates, sequences, or timelines of scientific developments. EdTech is integrated through using online sources, QR-linked materials, videos, or presentation tools when available.

Notes to Teachers: Guide learners to avoid saying that Pasteur invented all related products. Emphasize that his research helped scientists understand and control microbial processes.

V. ASSESSMENT

(Assessing Learnings)

I. Multiple Choice (Choose the Best Answer) (2 points each)

1. What theory did Pasteur's swan-neck flask experiment disprove?
   a. Germ theory
   b. Miasma theory
   c. Spontaneous generation
   d. Cell theory

2. Pasteur's discoveries contributed significantly to which of the following?
    a. Development of antiseptics
    b. The invention of the telescope
    c. Discovery of DNA structure
    d. Creation of the periodic table
3. Which industry benefited directly from Pasteur's pasteurization process?
    a. Textile industry
    b. Dairy and food industry
    c. Automobile industry
    d. Electronics industry
4. Which of the following best explains why Pasteur's germ theory changed medical practices?
    a. It proved that disease was caused by tiny organisms, leading to better hygiene and sterilization.
    b. It showed how plants grow faster using fertilizers.
    c. It introduced electricity as a treatment for infections.
    d. It recommended eating raw foods to improve immunity.
5. Pasteur's vaccine development laid the foundation for which modern medical advancement?
    a. Ultrasound technology
    b. Antibiotic discovery
    c. modern vaccines
    d. Blood transfusions

II: Matching Type (2 points each)

Match Pasteur's Experiments to their corresponding Contributions in the second column.

Experiment	**Contribution**
Pasteurization	Proved microorganisms come from the environment
Germ Theory	Led to sterilization techniques in hospitals
Rabies Vaccine	First vaccine developed for a viral disease
Spontaneous Generation Disproof	Prevents bacterial growth in food and beverages

	Answer Key: Multiple Choice - 1.C, 2.A, 3.B, 4.A, 5.C. **Matching Type**: Pasteurization: Reduces harmful microorganisms in food and beverages and helps extend shelf life Germ Theory: Led to sterilization techniques in hospitals Rabies Vaccine: First vaccine developed for a viral disease Spontaneous Generation Disproof: Proved microorganisms come from the environment.
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and take full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Application of Chemical Substances in Household and Personal Care Products - Product Labels and Functions of Substances**	Lesson Exemplar	13

I. OBJECTIVES	
A. Content Standard	The learners learn that household and personal care products contain chemical substances that determine their properties and guide their proper use and disposal.
B. Performance Standard	By the end of the quarter, learners apply research skills to discover how scientists have impacted our lives. They recognize the significant role of different agencies in the Philippines, such as DOST and DTI, in scientific innovation and development. They show critical thinking in explaining the different substances in household and personal care products, including their benefits and potential risks of using and disposing of them. They demonstrate appropriate and safe handling and use of chemicals. They explain that chemical reactions occur in human activities and the environment, and that several chemical solutions pose a threat to the community.
C. Learning Competencies	Prerequisite Knowledge and Skills Learners should have prior understanding of elements, compounds, and the properties of matter; recognize common household and personal care products and their ingredients; and demonstrate skills in reading product labels, identifying and classifying substances, organizing information in tables, and communicating scientific observations. The learners construct a table using product labels that describe the function of the different substances (elements or compounds) present in household products such as those in bleach, detergents, baking powder, and personal care products such as shampoo, soaps, and toothpaste.
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Fashionlady. “Understanding What Is Cosmetic Chemistry: Why Is It So Important to Know Before Applying Makeup?” March 13, 2016. https://www.fashionlady.in/understanding-what-is-cosmetic-chemistry-why-is-it-so-important-to-know-before-applying-makeup/65382. IvyRose. “Common Chemicals Found in the Home: Basic Chemistry.” Accessed November 7, 2019. http://www.ivyroses.com/Chemistry/GCSE/Common-Chemicals-in-the-Home_Molecular-Formulae.php. Prezi. “10 Household Products & Their Active Ingredients.” Accessed May 7, 2025. https://prezi.com/oxydtyhideiq/10-household-products-their-active-ingredients/.

	Solubility of Things. “Chemistry in Household Products.” Accessed May 7, 2025. https://www.solubilityofthings.com/chemistry-household-products. Starts at 60 Writers. “Six Things You Can Use Instead of Bleach When Cleaning.” Starts at 60, October 18, 2019. https://startsat60.com/discover/lifestyle/6-things-you-can-use-instead-of-bleach-when-cleaning. **Materials:** Product labels from household and personal care products (e.g., bleach, detergent, baking powder, shampoo, soap, toothpaste). Activity sheets/worksheets. Manila paper or cartolina. Pentel pen/marker. Textbooks and learning modules. Mobile phones, tablets, or computers with internet access (if available). Presentation materials (e.g., slides, charts, or infographics). Video resources related to household and personal care products (if applicable).	
III. CONTENT (Sequencing Content)	**Application of Chemical Substances in Household and Personal Care Products - Product Labels and Functions of Substances**	
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	1. Identify the different substances (elements or compounds) found in common household and personal care products based on product information labels. 2. Describe the functions of the substances present in household and personal care products such as bleach, detergents, baking powder, shampoo, soap, and toothpaste. 3. Create a table that shows the substances and their functions in selected household and personal care products.	
IV. PROCEDURES		ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**	
	Option 1: Product Detective!	
	Directions: The teacher will present images of common household and personal care products such as bleach, detergent, baking powder, shampoo, soap, and toothpaste. Learners will carefully observe each product and discuss what they already know about it.	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build

	Using the images, learners will complete the following tasks: A. Classify the product as either a household product or a personal care product. B. Identify the product's primary use. C. Predict at least one substance or ingredient that might be found in the product. D. Explain why they think that substance or ingredient is included in the product. Learners may work individually, in pairs, or in groups before sharing their responses with the class. 	understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

	Figure 1. Household and Personal Care Products and Their Ingredients Source: AI-generated image created using ChatGPT (OpenAI), 2026.	
	Option 2: ABC of Home Essentials	
	Directions: The teacher prepares cut-out letters representing all 26 letters of the alphabet and places them in a container. The teacher randomly draws a letter from the container. The chosen learner or group must identify a household product or personal care product that begins with the selected letter. After naming the product, the learner or group should: 1. Classify it as a household product or a personal care product. 2. State its primary use. 3. Identify one possible ingredient or substance that may be present in the product. 4. Explain the function of the identified ingredient or substance. Learners may use available reference materials such as textbooks, learning modules, product labels, or mobile phones with internet access to help identify the ingredients or substances present in the product and determine their functions. Encourage learners to use reliable sources when gathering information	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Note to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Match me!	
	Directions: Read the products listed in Column A and match each one with its correct use in Column B. Write the letter	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on substances and functions in household and

	of your answer on the space provided before each number. **Column A (Product)** / **Column B (Use)** _____ 1. Bleach _____ 2. Toothpaste _____ 3. Shampoo _____ 4. Detergent _____ 5. Soap A. Cleans teeth and helps prevent cavities B. Cleans hair and scalp C. Removes stains and disinfects surfaces D. Cleans clothes and removes dirt E. Cleans the skin and helps remove germs After completing the matching activity, answer the question below: **What do you think makes these products effective in performing their functions?**	personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	Option 2: Spot, Observe, and Learn	
	Direction: Examine the product labels of common household and personal care products such as bleach, detergent, baking powder, shampoo, soap, and toothpaste. Identify the ingredients listed on each label. Compare the ingredients and note those that appear in more than one product as well as those that are unique to a particular product. After examining the labels, answer the following questions: 1. What similarities do you observe among the ingredients listed on the product labels?	The activity targets Learning Objective 1 by helping learners connect familiar situations to the purpose of the lesson on substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing

	2. What differences do you observe among the ingredients listed on the product labels? 3. Why do you think different products contain different ingredients?	ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
B. Instituting New Knowledge	**B. 1. Presenting Examples**	
	Option 1: Mind Mapping: Product and Ingredient Connections	
	Directions: Create a mind map showing the relationship between household and personal care products, their ingredients, and their functions. 1. Write Household and Personal Care Products at the center of your mind map. 2. Add examples of products such as bleach, detergent, baking powder, shampoo, soap, and toothpaste. 3. For each product, identify at least one substance or ingredient found in the product. 4. Draw links among products that contain similar ingredients or have similar functions. 6. Share your completed mind map with the class. Note: Use colors, symbols, or illustrations to organize your ideas. Different colors may be used to represent products, ingredients, and functions.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Note to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

Scoring Guide:

Criteria	2 Points	1 Point	0 Point
Accuracy of Information	All products, functions, and connections are correct.	Some information is correct but contains minor errors.	Most information is incorrect or missing.
Organization and Connections	Ideas are well-organized, and connections are clearly shown.	Ideas are partially organized with limited connections.	Ideas are poorly organized, or connections are absent.
Completeness	Includes products, functions, and meaningful relationships among concepts.	Includes some required information but lacks details.	Output is incomplete or lacks required information.

	Option 2: Discuss–Reflect–Connect: Understanding Household and Personal Care Products	
	Directions: Work with your group and identify common household and personal care products found at home. Examine their labels and identify the ingredients listed in each product. Discuss the possible functions of the ingredients and compare them with those found in other products. Record your observations and answer the guide questions below. It is important and encourage for the learners to bring an actual product packaging from their homes. So that they will have an actual basis for what they are to write in their activity. **Guide Questions:** 1. Are certain ingredients found in multiple products? What does this suggest about their use? 2. What surprised you the most about the ingredients found in household and personal care products? Share your group's responses with the class. Learners should realize that household and personal care products contain substances that serve specific functions and that some ingredients may appear in multiple products because they perform similar roles. This understanding will prepare them for constructing a table of substances and their functions in the succeeding activities.	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

B. 2. Discussing New Concept

Option 1: Ingredient Detective

Directions:
Examine the product labels provided. Identify the substances or ingredients listed in each product and determine their possible functions.

Complete the table below.

Product	Substance/ Ingredient	Function
Bleach		
Detergent		
Shampoo		
Soap		
Toothpaste		

After completing the table, answer the guide questions.

Guide Questions:

1. Which ingredients appear to have similar functions in different products?
2. Why is it important to know the function of the ingredients found in household and personal care products?

Answer Key:
Sample Completed Table

Product	Substance/ Ingredient	Possible Function
Bleach	Sodium Hypochlorite (NaClO)	Removes stains and kills bacteria through oxidation

The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

Note to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

Detergent	Surfactants	Remove dirt, grease, and stains	
Detergent	Enzymes	Break down protein-based stains	
Baking Soda	Sodium Bicarbonate ($NaHCO_3$)	Neutralizes odors and acts as a leavening agent	
Shampoo	Sodium Lauryl Sulfate (SLS)	Removes oil and dirt from hair and scalp	
Soap	Sodium Hydroxide (NaOH)	Helps produce soap and remove dirt and oil	
Soap	Glycerin	Retains moisture and helps protect the skin	
Toothpaste	Sodium Fluoride	Strengthens teeth and helps prevent tooth decay	

Option 2: Visual Learning: Exploring Household & Personal Care Products

Directions:

Watch the video "The Chemistry of Everyday Life: Household Chemicals Explained." While watching, take note of the different household and personal care products discussed, their active ingredients, and the functions of these substances.

After watching the video and examining the information provided in the table "Chemistry Behind Common Household and Personal Care Products," answer the guide questions below.

Source: The Chemistry of Everyday Life: Household Chemicals Explained

The activity targets Learning Objectives 1 and 2 by guiding learners to explain concepts, compare examples, and clarify relationships related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables

About the Video: "The Chemistry of Everyday Life: Household Chemicals Explained" discusses common household and personal care products, their active ingredients, and how these substances perform specific functions such as cleaning, disinfecting, protecting teeth, and maintaining personal hygiene. The video helps learners understand the relationship between product ingredients and their uses in everyday life.

Guide Questions:

1. What role do different substances play in making household and personal care products effective?
2. What similarities and differences exist among the substances found in various household and personal care products?

Chemistry Behind common Household and Personal Care Products

Cleaning Products and their Key Components

Category	**Function/ Purpose**	**Active Ingredient(s)**	**Key Components and Roles**
Bleach	Breaks down stains and kills bacteria through oxidation.	Sodium Hypochlorite (NaClO)	Calcium Hypochlorite ($Ca(ClO_2)$ - water purification. Chlorine Gas (Cl_2) industrial bleaching. Chlorine Dioxide (ClO_2) – Strong oxidizing agent.

when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

Notes to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

	Detergent	Removes dirt, grease, and stains from fabrics, dishes, and surfaces.	Surfactants and Enzymes	Surfactants – lifts dirt and grease. Enzymes – break down protein-based stains. Builders – softens water and enhances cleaning power. Bleaching Agents – stain removal and disinfection. - Fragrances and Dyes – adds scent and color.	
	Baking Soda	Acts as a leavening agent, odor neutralizer, and mild abrasive for cleaning.	Sodium Bicarbonate ($NaHCO_3$)	Carbon Dioxide (CO_2) – released in reactions, creating bubbles in baked goods.	
	Degreaser	Removes grease, oil, and stubborn residues from surfaces.	Solvents and Alkaline Builders	Surfactants – emulsify and disperse grease. Solvents – dissolve grease deposits. Alkaline Builders – adjust pH for	

				better cleaning. Chelating Agents – Prevent residue buildup. Corrosion Inhibitors - protect metal surfaces.	
	Air Freshener	Neutralizes odors and releases pleasant scents indoors.	Fragrances and Odor Neutralizers	Essential Oils provide scent. Propellants - helps disperse fragrance. Odor Neutralizers – absorb unwanted smells. Volatile Organic Compounds (VOCs) –found in some sprays, may affect air quality.	
	Fabric Softeners	Reduces static cling, softens fabrics, and adds fragrance to laundry.	Cationic Surfactants	Fragrances – provide a fresh scent. Silicones and Conditioning Agents – smooths fabric texture.	

				Preservatives and Stabilizers – maintains product effectiveness over time.	
	B. 3. Developing Mastery				
	Option 1: Decoding Product Labels: Understanding What We Use Daily				
	Directions: Examine the labels of selected household and personal care products. Focus on the ingredients, warnings, precautions, and product claims found on each label. Identify the active substances listed and determine their possible functions or effects. After examining the product labels, answer the following guide questions: **Guide Questions:** 1. Can you identify the active substances and their function using the product label? 2. Does the product label include warnings or precautions? 3. How do the substances found in a product help it perform its intended function?				The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Note to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	Option 2: Investigating the Cleaning Power of Household				
	Materials: Three types of cleaning agents (e.g., soap, shampoo, detergent, toothpaste), water, cotton fabric or white tiles (as test surfaces), cooking oil or a food-				The activity targets Learning Objectives 2 and 3 by allowing learners to practice, classify, compute, or organize ideas related to substances and functions in household and

	based stain (e.g., ketchup or coffee), small brushes or sponges, measuring cups, and pH strips. **Directions:** • Apply an equal amount of oil or food stain to separate sections of the test surface. Add a small amount of each cleaning product to the stained areas. Scrub each section for the same amount of time, then rinse with water. • Observe and compare the effectiveness of each product in removing the stain. Test the pH level of each cleaning product using pH strips and record your observations. After completing the investigation, answer the following guide questions: 1. Which product removes the stain most effectively? 2. What ingredients or substances in the product might have contributed to its cleaning ability? 3. What conclusions can you draw about the role of chemical properties in cleaning products?	personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
C. Demonstrating Knowledge and Skills	**C. 1. Finding Practical Application** Now that we've explored the functions and key substances in household and personal care products, let's take our learning beyond the classroom. How can we apply this knowledge to real-life situations?	
	Option 1: Analyzing Product Labels	
	Examine the labels of different household and personal care products. Identify the product name, key ingredients, and the function of each substance listed on the label.	The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior

Table Activity:
Directions: Complete the table provided. Compare and contrast the ingredients found in different products. After completing the table, present your findings and explain why a particular product may be more suitable for a specific purpose based on its ingredients and functions.

Product Name	Key Ingredient/ Substance	Function
Bleach		
Detergent		
Shampoo		
Soap		
Toothpaste		

Similarities:

_____
_____
_____

Differences:

_____
_____
_____

knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

Notes to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

For flexible or distance learning, learners may use available household and personal care products found at home. They may examine product labels, take photos of the labels, and complete the table independently. If face-to-face interaction is not possible, learners may submit their outputs through printed modules, digital documents, learning management systems, or online platforms. Virtual presentations and discussions may also be conducted through video conferencing tools or group chats

Option 2: Understanding Product Use

Directions:
Read the situation below and answer the questions that follow.

The activity targets Learning Objectives 2 and 3 by asking learners to apply the lesson concepts to practical situations or performance tasks related to substances and functions

	Situation: You are a kitchen staff member in a busy restaurant responsible for washing dishes and ensuring that utensils are properly cleaned. However, you have sensitive skin and experience irritation when using strong detergents. Since the restaurant is located near your home, changing jobs is not a practical option. Using the information found on product labels, choose a dishwashing product that is both effective in cleaning and safe for sensitive skin. Explain your choice by identifying the ingredients or substances found in the product and describing how they support its intended function. **Guide Questions:** 1. Which dishwashing product would you choose? 2. What ingredients or substances influence your decision? 3. Why do you think the product is effective and suitable for sensitive skin?	in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Note to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	C. 2. Making Generalization	
	Option 1: Complete the Generalization	
	Directions: Complete the statements below using what you learned from the lesson. 1. Household and personal care products contain _____ that help them perform their intended functions. 2. The function of a product depends on the _____ present in it. 3. Reading product labels is important because _____.	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

	4. Understanding product ingredients helps consumers _____. 5. Different products may contain similar ingredients because _____.	The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	Option 2: Exit Ticket: Connecting the Dots	
	Directions: Reflect on what you have learned about the substances found in household and personal care products and their functions. Complete the exit ticket below. 1. One important thing I learned today is _____ _____ 2. The function of substances in household and personal care products is _____ _____ 3. Reading product labels is important because _____ _____	The activity targets Learning Objectives 1, 2, and 3 by asking learners to synthesize important ideas and communicate generalizations about substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

		Notes to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
	C. 3. Evaluating Learning	
	Option 1: Modified True or False	
	Directions: Write TRUE if the statement is correct. If the statement is incorrect, write FALSE and rewrite the statement to make it correct. 1. Dishwashing liquid is primarily used to clean dishes and contains surfactants that help remove grease and food residues. 2. Toothpaste contains fluoride, which helps strengthen teeth and prevent cavities. 3. Bleach is a safe cleaning product for all types of surfaces, including wood and fabric. 4. Shampoo is designed to clean hair and often contains sulfates that help remove oil and dirt. 5. Air fresheners only contain fragrances and essential oils to neutralize odors. 6. Most hand soaps contain glycerin, which helps keep the skin moisturized after washing. 7. Toothpaste contains citric acid to strengthen teeth and prevent tooth decay. 8. Fabric softeners contain cationic surfactants that reduce static cling and soften fabrics. 9. Preservatives in shampoo, such as parabens and benzyl alcohol, help prevent microbial growth and maintain product quality. 10. Volatile Organic Compounds (VOCs) found in some air fresheners may affect indoor air quality.	The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Notes to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

Option 2: Substance–Function Matching

Directions:
Match each substance in Column A with its correct function in Column B. Write the letter of your answer on the space provided before each number.

Column A (Substance)	**Column B (Function)**
_____ 1. Sodium Hypochlorite	A. Strengthens teeth and prevents cavities
_____ 2. Surfactants	B. Retains moisture in the skin
_____ 3. Sodium Fluoride	C. Removes stains and disinfects surfaces
_____ 4. Glycerin	D. Removes dirt, oil, and grease
_____ 5. Sodium Bicarbonate	E. Neutralizes odors and acts as a leavening agent

The activity targets Learning Objectives 1, 2, and 3 by checking learners' ability to demonstrate the required knowledge and skills related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

Notes to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.

C. 4. Additional Activities

Option 1: Household and Personal Care Product Guide

Directions:
Create a tri-fold brochure featuring common household and personal care products. Include the following information:

The activity targets Learning Objective 1 by engaging learners in a task related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches

<table>
<tr>
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Product name
Classification (household or personal care product)
Key substance(s) or ingredient(s)
Function of each substance
Safety reminders or precautions

You may use English, Filipino, or your local language. Include illustrations, symbols, or pictures to make the brochure informative and appealing.

Scoring Rubric
<table>
<tr><th>Criteria</th><th>2 Points</th><th>1 Point</th><th>0 Point</th></tr>
<tr><td>Content Accuracy</td><td>All information about products, ingredients, and functions is accurate and scientifically correct.</td><td>Some information is accurate but contains minor errors or omissions.</td><td>Most information is inaccurate or missing.</td></tr>
<tr><td>Completeness of Information</td><td>Includes product classification, ingredients, functions, and safety reminders.</td><td>Includes some of the required information but lacks important details.</td><td>Contains very limited information or is incomplete.</td></tr>
<tr><td>Organization and Presentation</td><td>Information is well-organized, easy to understand, and visually appealing.</td><td>Information is somewhat organized but may be difficult to follow.</td><td>Information is poorly organized and difficult to understand.</td></tr>
</table>
</td>
<td>because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available.

Notes to Teachers: Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.</td>
</tr>
<tr>
<td></td>
<td colspan="2">Option 2: Product Label Hunt</td>
</tr>
<tr>
<td></td>
<td>Directions:
Examine at least five household or personal care products available at home. Read the product labels and identify one ingredient or substance found in each product.</td>
<td>The activity targets Learning Objective 1 by engaging learners in a task related to substances and functions in household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior</td>
</tr>
</table>

	Choose the ingredient that you think is most important and write a short explanation describing: • the product where it was found; • its function; and • why you think it is important in making the product effective. **Conclude your work by answering the question below:** • Which ingredient did you find most interesting and why?	knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is guided inquiry using product-label analysis, supported by peer sharing and teacher questioning. Literacy is integrated through reading product labels and describing ingredients and functions accurately. Numeracy is integrated through organizing ingredients, quantities, or product information in tables when available. EdTech is integrated through digital product images, online references, or spreadsheets when available. **Note to Teachers:** Ask learners to verify product ingredients from actual labels when possible. Clarify that some substances are used during production and may not be the active cleaning ingredient in the finished product.
V. ASSESSMENT **(Assessing Learnings)**	A. Read each item carefully and write the letter of the correct answer in a separate sheet of paper. 1. Which ingredient in bleach is primarily responsible for its disinfecting and whitening effects? A. Calcium hypochlorite [$Ca(ClO)_2$] B. Sodium hypochlorite (NaClO) C. Chlorine dioxide (ClO_2) D. Chlorine gas (Cl_2) 2. If you need to remove protein-based stains like food or blood, which component in detergents would be most effective? A. Builders B. Enzymes C. Fragrances D. Surfactants	

	3. Why are chelating agents important in degreasers? A. They dissolve grease deposits. B. They enhance cleaning power by adjusting pH. C. They protect metal surfaces during cleaning D. They remove metal ions to prevent residue buildup. 4. What is a potential environmental concern regarding air fresheners that contain Volatile Organic Compounds (VOCs)? A. They neutralize odors effectively. B. They contribute to indoor air pollution. C. They contain antibacterial properties D. They release pleasant scents into the air. 5. Which household product would be most suitable for neutralizing odors and cleaning surfaces with mild abrasiveness? A. Baking Soda B. Bleach C. Detergent D. Fabric Softener 6. Which ingredient in shampoo acts as a cleansing agent to remove dirt and oil? A. Conditioning Agents B. Fragrances C. Preservatives D. Surfactants 7. If a toothpaste is labeled as anti-cavity, which ingredient is most likely responsible for this property? A. Abrasives B. Flavoring Agents C. Fluoride D. Humectants

	8. Why are preservatives included in shampoo? A. To remove dirt and oil B. To soften and detangle hair C. To provide UV protection D. To prevent bacterial growth and extend shelf life 9. What is the role of glycerin in soap? A. To create foam B. To provide scent C. To retain moisture in the skin D. To act as a disinfecting compound 10. What is a potential concern regarding the use of antibacterial agents in soap? A. They improve the scent of the soap. B. They are ineffective against bacteria. C. They may cause skin irritation or dryness with frequent use and may raise environmental or resistance-related concerns for some antibacterial agents D. They reduce the soap's ability to hydrate the skin. **Answer Key:** 1.B, 2.B, 3.D, 4.B, 5.A, 6.D, 7.C, 8.D, 9.C, 10.C
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was the most difficult? 4. How many learners need enrichment or additional challenges? How many learners need remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.

Content - Topic	**Application of Chemical Substances in Household and Personal Care Products - Benefits, Risks, and Proper Use and Disposal**	Lesson Exemplar	14

I. OBJECTIVES	
A. Content Standard	The learners learn that household and personal care products contain chemical substances that determine their properties and guide their proper use and disposal.
B. Performance Standard	By the end of the quarter, learners apply research skills to discover how scientists have impacted our lives. They recognize the significant role of different agencies in the Philippines, such as DOST and DTI, in scientific innovation and development. They show critical thinking in explaining the different substances in household and personal care products, including their benefits and potential risks of using and disposing of them. They demonstrate appropriate and safe handling and use of chemicals. They explain that chemical reactions occur in human activities and the environment, and that several chemical solutions pose a threat to the community.
C. Learning Competencies	Prerequisite Knowledge and Skills
	Students can distinguish mixtures from pure substances through guided investigations. They understand that matter is made of particles and that substances in food and medicine are composed of these particles, which can be absorbed by the body as ions. They also explore how new materials are formed when atoms are rearranged during chemical reactions, resulting in useful compounds. Additionally, they recognize the importance of controlling conditions to ensure safe and effective chemical reactions.
	The learners explain the benefits and potential risks of using and disposing of household and personal care products by considering their chemical composition, environmental impact, and human health effects, referring to the Department of Trade and Industry (DTI), Food and Drug Administration (FDA), and the Department of Environment and Natural Resources (DENR).
II. REFERENCES and MATERIALS (Selecting Resources and Material)	**References:** Department of Trade and Industry (DTI). “DTI-PAB, DOH and FDA Seals Agreement to Harmonize Accreditation and Conformity Assessment Functions.” Department of Trade and Industry Philippines. Accessed June 10, 2026. Food and Drug Administration (FDA) Philippines. “Draft Implementing Guidelines of Household/Urban Hazardous Substances (HUHS), with Annexes.” 2020. Department of Trade and Industry (DTI). “FDA Food and Drug Regulations.” Accessed June 10, 2026.

	Microsoft Copilot. AI-generated content for FDA Safety Warning Presentation on household and personal care products. Generated June 10, 2026. NotebookLM. "Household and Personal Care Product Safety Notes." Accessed June 10, 2026. NotebookLM. "Regulations and Hazard Classification in Consumer Products." Accessed June 10, 2026. Journals, product labels, printed illustrations, digital materials (cellphones, laptops).
III. CONTENT (Sequencing Content)	Application of Chemical Substances in Household and Personal Care Products - Benefits, Risks, and Proper Disposal
IV. OBJECTIVES (Setting Clear Objectives and Analyzing the Tasks)	1. Identify the properties of household and personal care products that make them safe or hazardous in terms of chemical composition, environmental impact, and human health effects. 2. Identify the roles of FDA, DTI, and DENR in regulating the safe use, labeling, and disposal of household and personal care products. 3. Determine the different categories of hazards that a product may have, as indicated by its labeling and in accordance with the regulations established by the DTI, FDA, and DENR. 4. Suggest effective methods for the proper use and management of household and personal care products, ensuring adherence to the information provided on their labels and compliance with government standards.

IV. PROCEDURES	ANNOTATIONS
A. Activating Prior Knowledge	**A. 1. Activating Prior Knowledge**
	Option 1: Are all chemicals found at home safe? Why?
	Before the start of the activity, the teacher asks students the following questions: ● Are all chemicals found at home safe? Why? ● If not, can you identify some that you think are harmful? Activity: Understanding Chemical Substances in Household and Personal Care Products. **Instructions:** Examine household or personal care product labels and fill in the information/s needed in the table below based on the label. Product Investigation
	The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer

Product Name	Active ingredient/s	Function /Purpose	With warning/ Precaution? Yes or No	If Yes, what precautions are indicated?

Consumer Awareness & Environmental Impact

After doing the product investigation activity, teachers ask the following questions and solicit ideas from students.

- Eco-Friendly Considerations
  A. What words on the label suggest the product is environmentally friendly?
  B. Why do you think biodegradability is important?"
  C. How does this product help reduce environmental impact?
  D. Does the product label mention biodegradability, sustainability, or eco-friendly ingredients? If YES, describe one environmentally friendly aspect.

Encourage students to give specific evidence from the label.

  E. Have you heard of chemicals like parabens, sulfates, or bleach?"
  F. What could happen if hazardous chemicals are used frequently?"
  G. Should consumers be aware of certain potentially hazardous chemicals in personal care or cleaning products? Why?

Guide students to think about health and environmental risks.

sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

Option 2: Chemical Safety Classification Challenge

Chemical Safety Classification Challenge

This activity helps learners connect product labels, chemical properties, and hazard classification, preparing them to analyze safety, regulations, and proper product use.

Learner Safety: Use only sealed, intact containers, photographs, or digital labels. Do not open, taste, directly smell, mix, apply, spray, or test any product. Do not handle leaking, damaged, unlabeled, or expired containers. Report any concern to the teacher and base the investigation only on label information and reliable references.

Materials:

- Actual product containers OR printed labels (e.g., bleach, shampoo, insecticide, alcohol, lotion, detergent)
- Activity sheet or notebook
- Marker and board

Procedure:

Step 1: Group Formation. Divide the class into 5 or 6 groups.

Step 2: Product Analysis (5–7 minutes)

Use the following basis for classification:

- Safe/Mild means low risk when used as directed;
- Use with Caution means the product needs specific handling or storage precautions;
- Hazardous means the product may cause serious harm if misused, inhaled, ingested, spilled, or improperly disposed of.

Each group will examine their assigned products and complete the table below:

Product Name	Key Ingredients Observed	Warning Labels / Symbols	Instructions on Use	Initial Hazard Level (Safe / Caution / Hazardous)	Reason for Classification

The activity targets Learning Objective 1 by asking learners to recall prior knowledge and surface initial ideas about benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

	Guide for Students: • Look for chemical names (e.g., sodium hypochlorite, alcohol, parabens) • Identify hazard symbols (flammable, corrosive, toxic, irritant) • Read precautionary statements (e.g., "Keep out of reach of children") • Check usage and disposal instructions **Step 3: Categorization (3–5 minutes)** **On the board, prepare three columns:** Safe / Mild (Low risk when used as directed) • ⚠ Use with Caution (Moderate risk; requires proper handling) • ☠ Hazardous (High risk; may cause harm if misused) **Each group will:** 1. Present one product 2. Place it under one category 3. Justify their classification using evidence from the label **Guide Questions for Deeper Thinking:** Classification Justification • What specific chemical ingredients influenced your decision? • What do the signal words (e.g., Danger, Warning, Caution) indicate? • What hazard symbols are present, and what do they mean? Health and Environmental Impact • How might this product affect human health if misused? • Could it harm the environment (e.g., water, air, soil)? Regulatory Awareness • Why do you think products are required to include labels and warnings? • Which agencies (FDA, DTI, DENR) might regulate this product, and why?	

	Critical Thinking • Can a product classified as "Safe" still become harmful? Explain. • What factors (dose, frequency, improper use) can change a product's hazard level?	
	A. 2. Establishing the Purpose of the Lesson	
	Option 1: Hazard Symbol Matching Challenge (20 minutes)	
	Hazard Symbol Matching Challenge (20 minutes) **Instructions:** A. Divide students into small groups. B. Distribute flashcards with hazard symbols (flammable, toxic, corrosive, environmentally hazardous, etc.). C. Provide real-world product labels and have students match the correct hazard symbols to the products. D. Groups discuss what each symbol means, when they should be cautious, and how to handle/dispose of products properly. **Example Symbols & Meanings:** Toxic: Can cause serious harm if swallowed or inhaled. Flammable: May ignite when exposed to heat. Irritant: Can cause skin, eye, or respiratory discomfort. **Environmental Hazard: Can harm aquatic life or ecosystems** Real-Life Scenario Discussion (15 minutes) • Present different product misuse scenarios (e.g., someone handling bleach without gloves and face masks, disposing of batteries incorrectly).	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Note to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

	• **Ask: "What hazard symbols would be found on these products?"** • Groups propose correct handling and disposal methods using government safety guidelines. Conclusion & Reflection (10 minutes) • Class Discussion: How do hazard symbols help prevent accidents? **Reflection Prompt: "What can you do as a consumer to ensure safe product use and disposal?"**	
	Option 2: Why Should We Care? The Hidden Chemistry in Our Daily Products	
	Title: "Why Should We Care? The Hidden Chemistry in Our Daily Products" **Activity Procedure:** 1. Real-Life Scenario Presentation (Hook) **Present this situation (read aloud or display on screen):** "A student used bleach to clean the bathroom and mixed it with another cleaning product. After a few minutes, a strong smell filled the room, causing dizziness and difficulty breathing. The student had to be rushed outside for fresh air." 2. Guided Reflection (Think–Pair–Share) Ask students to reflect individually, then discuss with a partner: **Guide Questions:** • What do you think happened in this situation? • What might have caused the harmful effect? • Could this have been prevented? How? 3. Class Discussion (Connecting to Purpose) **Facilitate a short discussion and draw out key ideas:** • Chemicals in everyday products can react and become dangerous • Improper use or lack of knowledge can lead to health risks and accidents	The activity targets Learning Objectives 1 and 2 by helping learners connect familiar situations to the purpose of the lesson on benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Notes to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and

<table>
<tr><td></td><td>• Labels and instructions are not just suggestions—they are safety guides

4. Lesson Purpose Statement (Teacher Synthesis)
Clearly connect the activity to the lesson</td><td>LGUs. Connect safety recommendations to label instructions and proper waste management guidance.</td></tr>
<tr><td rowspan="3">B. Instituting New Knowledge</td><td colspan="2">B. 1. Presenting Examples</td></tr>
<tr><td colspan="2">Option 1: Class Activity: Regulatory Investigation of Household Products</td></tr>
<tr><td>Class Activity: Regulatory Investigation of Household Products
Objective:
Students will research, analyze, and evaluate key laws and regulations set by the Food and Drug Administration (FDA), Department of Trade and Industry (DTI), and Department of Environment and Natural Resources (DENR) concerning the safe use, labeling, and disposal of household products in the Philippines.

Materials Needed:
• FDA, DTI and DENR safety regulations (download video and other materials at http://bit.ly/43VdVhc)
• Internet access for research
• Printable Investigation Worksheets. (Refer to the LAS)
• Markers/highlighters
• Projector or digital presentation tools
I. Introduction (10 minutes)
1. Begin by asking students: "Have you ever checked the warning labels on the products you use daily? What do they tell us?"</td><td>The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect</td></tr>
</table>

	2. Briefly discuss the roles of FDA, DTI, and DENR in regulating household product safety, labeling, and environmental impact. 3. **Introduce the major laws these agencies enforce:** • FDA: Ensures safe formulations for personal care products, cosmetics, and pharmaceuticals. • DTI: Regulates product labeling standards for consumer safety. • DENR: Oversees waste disposal and environmental protection related to hazardous substances. **II. Group Activity – Product Label Investigation (20 minutes)** 1. Form small groups (3-4 students each). 2. Each group selects 2 household products (examples: disinfectants, shampoos, pesticides, cosmetics). 3. **Using the worksheet, students analyze product labels, identifying:** o Safety warnings (toxicity, irritation, allergens). o Hazard symbols (flammable, corrosive, eco-toxic). o Proper disposal instructions (recycling, hazardous waste management). 4. **Cross-check labels with FDA, DTI, and DENR regulations:** • Is the product compliant with labeling laws? • Are key safety warnings clearly indicated? • Does the disposal method follow DENR guidelines?	safety recommendations to label instructions and proper waste management guidance.

Product Label Investigation Rubric

Criteria	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Label Analysis	Identifies all required elements (warnings, hazard symbols, disposal instructions) with detailed explanations.	Identifies most required elements but lacks some detail.	Identifies some elements but with minimal explanation.	Incomplete identification of elements with little or no explanation.
Regulatory Cross-Check	Thoroughly compares labels with FDA, DTI, and DENR standards, providing strong evidence.	Cross-checks labels with most regulations but lacks full detail.	Basic attempt to compare with regulations but misses key aspects.	Does not adequately compare labels with regulations.
Accuracy & Critical Thinking	Information is precise, well-researched, and demonstrates strong analytical skills.	Information is mostly accurate with some minor issues in reasoning.	Shows basic understanding but lacks depth in analysis.	Contains inaccuracies or lacks logical evaluation.
Collaboration & Participation	All group members actively contribute and demonstrate effective teamwork.	Most members participate, though some contributions are uneven.	Minimal group engagement or participation is unbalanced.	Poor collaboration with little or no teamwork.
Presentation & Clarity	Findings are presented in a well-organized, clear, and visually engaging manner.	Presentation is clear but lacks some structural organization.	Somewhat unclear or disorganized presentation.	Presentation is difficult to understand or lacks coherence.

III. Research & Presentation (20 minutes)

1. Each group will conduct research on laws that apply to their selected products using official government resources (FDA, DTI, DENR websites).
2. **Prepare a brief presentation outlining:**
    - Summary of regulations governing the product
    - Common violations or gaps in labeling/use/disposal
    - Suggested improvements for safety and environmental responsibility
3. Groups present findings to the class, followed by a short discussion comparing different product regulations.

Research & Presentation Rubric

Criteria	**Excellent (4)**	**Good (3)**	**Satisfactory (2)**	**Needs Improvement (1)**
Research Quality	Uses credible sources (FDA, DTI, DENR websites), thoroughly analyzes regulations, and provides strong evidence.	Uses credible sources but lacks depth in analysis or supporting details.	Uses some sources but lacks comprehensive research or critical evaluation.	Research is incomplete, lacks reliable sources, or misinterprets key regulations.
Summary of Regulations	Clearly explains relevant laws governing the selected product with	Provides a summary of key regulations but lacks full clarity.	Basic summary with minimal explanation of laws.	Summary is unclear or missing key regulations.

	strong understanding			
Identification of Violations & Gaps	Thoroughly highlights common labeling/disposal violations with insightful analysis.	Identifies some violations but lacks depth or supporting evidence.	Mentions a few violations but lacks analysis or relevance.	Does not adequately address violations or gaps.
Suggested Improvements	Provides well-thought-out, practical, and innovative suggestions for improving safety and environmental responsibility.	Suggestions are reasonable but could be more detailed or impactful.	Basic ideas for improvement with minimal explanation.	Lacks relevant or practical suggestions for improvement.
Presentation & Organization	Clearly structured, engaging, and effectively communicated findings with strong visuals and explanations.	Organized presentation with good communication but lacks some engagement or clarity.	Presentation is somewhat unclear or lacks strong supporting visuals.	Disorganized presentations that are difficult to follow.
Discussion & Engagement	Actively encourages discussion, compares regulations effectively, and responds thoughtfully to peer questions.	Engages in discussion but lacks deeper comparison or thoughtful responses.	Participates in discussion but with minimal engagement or analysis.	Limited or no participation in discussion.

	IV. Conclusion & Reflection (10 minutes) 1. **Class Discussion:** o What are the biggest risks found in household products? o How do government regulations protect consumers and the environment? o What changes should be made to improve product safety? 2. **Reflection Activity:** • **Prompt: "How can you use this knowledge to become a more responsible consumer?"** • Students write a short response (10 sentences) summarizing their insights from the investigation	
	Option 2: DIY Product Label Design Challenge	
	DIY Product Label Design Challenge • Setup: Assign groups to redesign labels of common household items according to government standards (FDA, DTI, DENR). • **Task:** o Ensure labels include clear hazard warnings and proper disposal instructions. o Use creative but compliant packaging ideas. • Outcome: Strengthens students' ability to interpret laws and apply them to real-world consumer protection. DIY Product Label Design Challenge Rubric	The activity targets Learning Objectives 1 and 2 by presenting concrete examples that help learners identify key ideas related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency

Criteria	Excellent (4)	Good (3)	Satisfactory (2)	Needs Improvement (1)
Compliance with Regulations	Label fully adheres to FDA, DTI, and DENR standards, including all required safety warnings and disposal instructions.	Mostly follows regulations but has minor omissions.	Includes some regulatory elements but lacks clarity or completeness.	Does not adequately follow government standards.
Hazard Warnings & Disposal Instructions	Warnings are clear, well-placed, and easy to understand; disposal instructions are accurate and responsibly outlined.	Warnings and disposal instructions are present but could be clearer or better positioned.	Some warnings or disposal instructions are unclear or incomplete.	Hazard warnings and disposal details are missing or ineffective.
Creativity & Design Aesthetics	Label is visually appealing, innovative, and enhances consumer engagement while remaining compliant.	Shows creativity with an engaging design but minor flaws.	Some creativity present but lacks strong visual impact.	Design is unappealing or lacks originality.
Consumer Clarity & Readability	Text is legible, well-organized, and easy to comprehend, making important information stand out.	Mostly readable and organized, though some areas could be improved.	Some readability issues or cluttered organization.	Labels are difficult to read or confusing to consumers.
Presentation & Explanation	Group presents label design effectively, explaining key elements and rationale clearly.	The presentation is well structured but could be more detailed.	Explanation is somewhat unclear or lacks depth.	Poor presentation with minimal justification for design choices.

websites, digital labels, videos, or presentation tools when available.

Notes to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

B. 2. Discussing New Concept

Option 1: Hazard Label Scavenger Hunt (Hands-on Exploration)

Hazard Label Scavenger Hunt (Hands-on Exploration)

Objectives: Students will analyze household product labels to determine different hazard categories and assess compliance with government regulations.

Instructions:

1. Gather Household Products – Bring a selection of cleaning agents, cosmetics, disinfectants, and other labeled items.
2. Identify Hazard Symbols – Students examine labels for warnings like toxicity, flammability, corrosivity, and environmental risks.
3. Match Regulations – Using a provided reference sheet, they connect each warning symbol to the DTI, FDA, or DENR regulations that require it.
4. Discussion & Reflection – Groups present findings and suggest improvements in labeling or safer formulations.

Hazard Label Scavenger Hunt Rubric

Criteria	**Excellent (4)**	**Good (3)**	**Satisfactory (2)**	**Needs Improvement (1)**
Identification of Hazard Symbols	Accurately identifies all relevant hazard symbols with clear descriptions of their meanings.	Identifies most symbols correctly but with minor gaps in explanation.	Identifies some hazard symbols but lacks clarity or full understanding.	Misses key hazard symbols or provide unclear explanations.
Matching to Regulations	Thoroughly connects hazard symbols to appropriate DTI, FDA, or DENR regulations with strong	Matches most hazard symbols to regulations but lack full detail.	Basic attempts to match symbols to regulations, but some connections are	Little to no connection made between symbols and

The activity targets Learning Objectives 1, 2, and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

	supporting evidence.		weak or incorrect.	regulations.	
Analyss & Interpretation	Provides insightful explanations of product safety issues and regulatory compliance.	Analysis is clear but lacks depth in evaluating compliance.	Shows basic understanding but lacks detailed evaluation.	Conclusions are unclear or not well-supported.	
Group Collaboration & Participation	All members actively contribute with equal engagement and teamwork.	Most members participate, but some contributions vary.	Limited group engagement, with uneven participation.	Minimal collaboration with little teamwork.	
Presentation & Reflection	Findings are well-organized, clearly presented, and include thoughtful recommendations for safer labeling or formulations.	The presentation is mostly clear but could be more detailed.	Somewhat unclear presentation with basic recommendations.	Presentation lacks organization or meaningful reflections.	

Option 2: Community Awareness Campaign (Action-Based Learning)

Community Awareness Campaign (Action-Based Learning)

Objective: Students create awareness materials educating consumers on proper identification of hazardous products.

Instructions:

1. Research common labeling issues and misconceptions.
2. Design infographics, posters, or social media posts explaining hazard symbols and safe disposal practices.
3. Present findings through a mini campaign within the school or local community.

The activity targets Learning Objectives 1, 2, and 3 by guiding learners to explain concepts, compare examples, and clarify relationships related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

4. Reflect on how consumer education affects safety and environmental responsibility.
5. Posters and other outputs maybe presented in Filipino or using the local language for clearer understanding of the information written in the materials.

Community Awareness Campaign Rubric

Criteria	**Excellent (4)**	**Good (3)**	**Satisfactory (2)**	**Needs Improvement (1)**
Research & Accuracy	Use credible sources to analyze labeling issues and misconceptions with strong supporting evidence.	Research is thorough but lacks some depth in analysis.	Covers basic labeling issues but lacks comprehensive evidence.	Research is weak, incomplete, or lacks reliable sources.
Creativity & Design	Infographics, posters, or social media materials are visually engaging, innovative, and clearly convey safety information.	Creative and effective design, but minor areas need improvement .	Some creativity, but materials lack strong visual impact or clarity.	Design is unclear, unappealing, or ineffective in conveying information.
Communication & Clarity	Messages are well-structured, easy to understand, and effectively educate the audience.	Mostly clear and informative but could improve in organization.	Somewhat unclear or lacking key information.	Messages are confusing or fail to educate effectively.
Presentation & Outreach	Campaign is well-organized, engaging, and effectively reaches the target audience.	Good effort in reaching the audience but lacks full impact.	Minimal outreach or weak engagement with the audience.	Campaign is poorly executed with little or no outreach.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

Reflection & Impact Analysis	Thoughtful reflection on consumer awareness, safety, and environmental responsibility with meaningful insights.	Reflection is present but lacks depth or strong analysis.	Basic reflection but misses key insights.	Little to no reflection on campaign impact.	

B. 3. Developing Mastery

Option 1: Safe and Responsible Use of Household and Personal Care Products

Safe and Responsible Use of Household and Personal Care Products

Objective:

Students will analyze effective methods for the proper use, storage, and disposal of household and personal care products, ensuring adherence to label instructions and government standards set by FDA, DTI, and DENR.

Option 1: Group Research: Safe Usage, Storage, and Disposal (20 minutes)

Instructions:

1. Form small groups and assign each group to a category of products (e.g., personal care, cleaning agents, pesticides).
2. **Each group chooses 2 products, then:**

- Reads and analyzes the labels for instructions on safe usage.
- Identify hazards and disposal methods based on FDA, DTI, and DENR standards.
- Research risks of improper handling (e.g., mixing bleach with ammonia creates toxic fumes).

The activity targets Learning Objectives 2, 3, and 4 by allowing learners to practice, classify, compute, or organize ideas related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect

<table>
<tr><td></td><td></td><td>safety recommendations to label instructions and proper waste management guidance.</td></tr>
<tr><td></td><td colspan="2">Option 2: Chemical Safety Investigation: From Label to Practice</td></tr>
<tr><td></td><td>Title: “Chemical Safety Investigation: From Label to Practice”
Purpose of the Activity
To deepen students’ understanding by applying concepts on:
• Chemical properties and safety
• Hazard classification
• Government regulations (FDA, DTI, DENR)
• Proper use and management of products
Materials Needed:
• Sample product labels or actual containers (cleaning agents, cosmetics, disinfectants, etc.)
• Activity worksheet
• Manila paper / cartolina
• Marker / pen
Activity Procedure:
Part A: Group Investigation (10–15 minutes)
Step 1: Group Assignment
Divide students into groups of 4–5. Assign each group one product category, such as:
• Cleaning agents (e.g., bleach, detergent)
• Personal care products (e.g., lotion, shampoo)
• Disinfectants and sanitizers
• Cosmetics
Step 2: Product Analysis Task
Each group will analyze their assigned product using the guide below:
Investigation Guide Table:
<table>
<tr><th>Category</th><th>Guide Questions</th></tr>
<tr><td>Chemical Composition</td><td>What are the main ingredients? Are they natural, synthetic, or both?</td></tr>
<tr><td>Properties</td><td>Are the substances corrosive, flammable, toxic, or irritant?</td></tr>
</table>
</td><td>The activity targets Learning Objectives 2, 3, and 4 by allowing learners to practice, classify, compute, or organize ideas related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.</td></tr>
</table>

Hazard Classification	What warning symbols or signal words are present?
Health Effects	What are the possible effects on skin, eyes, or breathing?
Environmental Impact	Can this product harm water, soil, or air? How?
Regulatory Compliance	What label information suggests compliance with FDA, DTI, or DENR?
Proper Use & Disposal	What instructions are given? Are they clear and complete?

Part B: Regulatory and Hazard Mapping (10 minutes)
Each group will create a Visual Summary Poster including:
Required Elements:

1. Product Overview
2. Hazard Category (Safe / Caution / Hazardous)
3. Key Label Information
4. Applicable Government Agency
    - FDA → personal care/cosmetics
    - DTI → labeling and consumer standards
    - DENR → environmental safety and waste disposal
5. Recommended Safe Practices
    - Correct usage
    - Storage
    - Disposal

Part C: Group Reporting and Justification (10 minutes)
Each group presents their findings briefly (2–3 minutes per group).
They must explain:

- Why their product falls under a specific hazard category
- What evidence from the label supports their claim
- How regulations ensure safety
- Suggested improvements (if any) for safer use

Higher-Order Thinking Questions (Teacher Facilitation)
During reporting, ask:
Analysis Questions

- How do chemical properties influence a product's safety level?
- Can two products individually safe become hazardous when combined?

Evaluation Questions

- Do you think the label provides enough safety information? Why or why not?
- Which agency plays the most critical role for this product?

Application Questions

- How will this knowledge change the way you use household products?
- What advice would you give to your family about product safety?

Performance Output
Each group produces:

- Completed investigation table
- Visual summary poster
- Oral explanation

Suggested Rubric Criteria (Optional)

Criteria	**Description**
Accuracy of Analysis	Correct identification of properties, hazards, and effects
Use of Evidence	Clear reference to label information
Understanding of Regulations	Correct association with FDA, DTI, DENR
Practical Recommendations	Realistic and applicable safety practices
Presentation Skills	Clear, organized, and logical explanation

<table>
<tr><td rowspan="6">C. Demonstrating Knowledge and Skills</td><td colspan="2">C. 1. Finding Practical Application</td></tr>
<tr><td colspan="2">Option 1: Make an advertisement promoting responsible consumer choices.</td></tr>
<tr><td>Consumer Awareness Campaign:
Have students design public safety posters or digital presentations that promote responsible product use based on their findings! Or
Make an advertisement promoting responsible consumer choices.

1. Making Generalization
Students will prepare an outline for a short presentation (or poster/infographic) that explains their consumer guide. Include:
• Introduction to the Product: Briefly describe the product and why it is commonly used.
• Key Risks Identified: List the main health or environmental hazards based on the label.
• Safety Guidelines: Summarize your recommendations for safe use, proper storage, and responsible disposal.
• Compliance Check: Explain how your recommendations align with government standards and certifications.
Reflection:
• How does understanding product labels help consumers make safer choices?
• If you were to design a household or personal care product, how would you ensure it is safe and effective?</td><td>The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Notes to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.</td></tr>
<tr><td colspan="2">Option 2: Practical Application: Creating a Consumer Safety Guide</td></tr>
<tr><td>Practical Application: Creating a Consumer Safety Guide
Task: Each group designs a consumer guide listing best practices for safe use, storage, and disposal, including:</td><td>The activity targets Learning Objectives 3 and 4 by asking learners to apply the lesson concepts to practical situations or performance tasks related</td></tr>
</table>

	• Dos and Don'ts for common household products. • Clear labeling of hazards and proper disposal methods. • Eco-friendly alternatives or safer handling tips. • The use of Filipino and local language may be considered in making outputs. Groups present their guide to the class, linking their recommendations to government regulations. Teacher may adopt suggested rubric for Community Awareness Campaign Activity	to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Note to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.
	C. 2. Making Generalization	
	Option 1: Complete the Key Ideas	
	Activity Title: "Complete the Key Ideas" Students complete structured statements: **Task: Complete the Sentences** 1. Household and personal care products are safe or harmful depending on their _____. 2. Hazard symbols and warning labels help us identify _____. 3. The _____, _____, and _____ regulate the safety and proper labeling of products in the Philippines.	The activity targets Learning Objectives 1, 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss

	4. Misusing products may affect _____ and the _____. 5. To ensure safety, I should always _____ and follow _____. **Output: Written responses (individual or pair work)** Concept Mapping (For Average Learners) **Activity Title: "From Chemicals to Safety"** Students create a concept map connecting key ideas: **Required Connections:** • Chemical Composition → Safety / Hazard • Hazard Symbols → Risk Level • Government Agencies → Regulations • Product Labels → Proper Use & Disposal **Instruction:** • Use arrows and linking words (e.g., "affects," "indicates," "regulates") • Include at least 2 examples of products **Output: Visual diagram**	ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Note to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.
	Option 2: Make a Rule, Support It	
	Analytical Generalization **Activity Title: "Make a Rule, Support It"** Students write a generalization statement supported by reasoning. **Task:** **Write 2–3 generalization statements such as:** "The safety of household products depends on both their chemical composition and how they are used, because…" **Include:** • At least one example product • Reference to hazard classification • Mention of government regulation	The activity targets Learning Objectives 1, 2, 3, and 4 by asking learners to synthesize important ideas and communicate generalizations about benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer

	Output: Short paragraph (5–7 sentences) **Activity Title: "Safety Advocate Statement"** Students create a practical rule or advisory message. **Task:** **Write a public safety reminder:** "To ensure safety when using household and personal care products, people must…" **Must include:** • Label interpretation • Hazard awareness • Proper use and disposal • Role of regulations **Can be presented as:** • Poster slogan • Social media post • Short advisory message Whole-Class Synthesis After differentiating tasks, 2–3 students will share outputs. **Then, guide the class toward a unified generalization:**	sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Note to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.
	C. 3. Evaluating Learning	
	Option 1	
	Self-Reflection Journal This self-reflection journal encourages students to take personal ownership of their learning and reflect on what they've discovered about product labels, chemical risks, and best practices. **Prompts:** • What are your key takeaways about the importance of reading and understanding product labels?	The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss

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Describe one incident at home or in society that demonstrates the risks of hazardous chemicals.
How do you plan to apply what you've learned to make safer choices in your daily life?
What challenges did you encounter while analyzing a product label, and how would you address these in the future?

Instructions: Have students write a one-page reflection after completing their group projects and individual worksheets.
</td>
<td>ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste-management guidance.</td>
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<tr>
<td></td>
<td colspan="2">Option 2: Evaluate and Recommend</td>
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<td></td>
<td>
Activity Title: "Evaluate and Recommend"
Directions:
Analyze the given product (actual item or sample label provided by the teacher) and complete the table:
<table>
<tr><th>Criteria</th><th>Response</th></tr>
<tr><td>Product Name</td><td></td></tr>
<tr><td>Key Ingredients</td><td></td></tr>
<tr><td>Hazard Classification (Safe / Caution / Hazardous)</td><td></td></tr>
<tr><td>Evidence from Label</td><td></td></tr>
<tr><td>Possible Health Effects</td><td></td></tr>
<tr><td>Environmental Impact</td><td></td></tr>
<tr><td>Regulating Agency (FDA / DTI / DENR)</td><td></td></tr>
</table>
</td>
<td>The activity targets Learning Objectives 1, 2, 3, and 4 by checking learners' ability to demonstrate the required knowledge and skills related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is formative assessment and feedback, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels,</td>
</tr>
</table>

Proper Use		
Proper Disposal		
Safety Recommendation		

Optional Oral Explanation (if time allows):
Students explain their answers in 2–3 minutes, focusing on:

- Justification of hazard classification
- Correct interpretation of label
- Practical safety recommendations

warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

Note to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

C. 4. Additional Activities

Option 1: Group Presentations & Consumer Guides

Students will collaborate in small groups to design and present a comprehensive "Consumer Safety Guide" for common household products.

Presentations must explicitly address the following criteria:

- **Safety Protocols:** Summarize standard safety practices for the proper handling, storage, and disposal of household chemicals and materials.
- **Label Literacy:** Emphasize the critical importance of reading product labels, interpreting warning symbols, and adhering to manufacturer instructions to prevent accidents.
- **Sustainable Alternatives:** Recommend eco-friendly, highly compliant, and safer product substitutes to promote environmental health and sustainability.

Criteria	4 - Exemplary	3 - Proficient	2 - Developing
Safety Practices (25%)	Provides a comprehensive, highly	Provides an accurate summary	Mentions of safety practices, but the

The activity targets Learning Objective 1 by engaging learners in a task related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss ideas with peers, and respond to teacher-guided prompts.

The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available.

	accurate summary of safety practices for handling, storing, and disposing of household products.	of general safety practices but may lack detail on specific handling or storage procedures.	information is vague, incomplete, or slightly inaccurate.	information provided is dangerously incorrect.	
Label Literacy & Directions (25%)	Strongly emphasizes the importance of reading labels. Clearly explains how to interpret hazard symbols and follow manufacturer directions.	Explains the importance of reading labels and following directions, though the explanation of warning symbols may be brief.	Briefly mentions reading labels but does not explain *why* it is important or how to interpret warnings.	Does not mention the importance of reading labels, hazard symbols, or following directions.	
Eco-Friendly Alternatives (25%)	Suggests multiple highly practical, realistic, and well-researched eco-friendly or compliant alternatives to hazardous household products.	Suggests valid eco-friendly alternatives, but they may be somewhat generic (e.g., "use less plastic" instead of specific product swaps).	Mentions eco-friendly alternatives, but the suggestions are unrealistic, lack of research, or are barely explained.	Does not provide any eco-friendly or compliant alternatives.	
Presentation & Collaboration (25%)	Presentation is highly engaging, well-organized, and utilizes clear visual aids (e.g., brochure, slides). All group members participate equally and speak clearly.	Presentation is organized, and visual aids are adequate. Group members participate, but the workload or speaking time may be slightly unequal.	Presentation lacks clear organization or effective visual aid. Only one or two group members dominate the presentation.	Presentation is highly disorganized, lacks visual aids, and shows no evidence of group collaboration or preparation.	

Notes to Teachers: Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.

Option 2:

Exit Ticket: Daily Application Reflection Instructions:
In 2–3 sentences, answer the following reflection question:

"Identify one crucial safety guideline you learned today about handling household or personal care products.

The activity targets Learning Objective 1 by engaging learners in a task related to benefits, risks, labeling, regulation, and disposal of household and personal care products. It applies to the Constructivist, Collaborative, and Interactive approaches because learners build understanding from prior knowledge, discuss

	Explain exactly how you plan to apply this practice in your daily routine to keep yourself and your family safe."	ideas with peers, and respond to teacher-guided prompts. The pedagogical strategy used is risk analysis and label-based decision making, supported by peer sharing and teacher questioning. Literacy is integrated through interpreting product labels, warnings, and regulatory information. Numeracy is integrated through classifying risks, comparing hazard levels, or organizing evidence in tables. EdTech is integrated through official agency websites, digital labels, videos, or presentation tools when available. **Notes to Teachers:** Remind learners to distinguish the roles of DTI, FDA, DENR, and LGUs. Connect safety recommendations to label instructions and proper waste management guidance.
V. ASSESSMENT **(Assessing Learnings)**	Household Product Safety Assessment **Instructions:** Answer the following questions based on your knowledge of household product safety, proper usage, labeling, and government regulations (DTI, FDA, DENR). Part 1: Multiple Choice. Write the letter of the correct answer. 1. Which agency regulates the safety of personal care and cosmetic products in the Philippines? A. DENR B. FDA C. DTI D. DOH	

2. What symbol on a product label indicates that it may be highly flammable?
   A. ☣
   B. ♻
   C. 🔥
   D. ☠

3. Which practice is recommended for proper disposal of hazardous household waste?
   A. Pouring excess chemicals down the drain
   B. Disposing of items in regular trash bins
   C. Following DENR guidelines for waste segregation
   D. Burning leftover household products in an open area
4. What should consumers do before using a household chemical product?
   A. Shake the bottle vigorously
   B. Read the label for warnings and instructions
   C. Mix it with another cleaner for enhanced effect
   D. Store it in a warm place for better consistency

Part 2: True or False (Write T for True, F for False)

___ 1. The DTI helps enforce consumer product standards and labeling requirements for products under its jurisdiction.

___ 2. The FDA regulates the safety and authorization of health products; disposal of expired medications and hazardous household waste should follow product-label instructions and DENR/LGU waste-management guidelines.

___ 3. Mixing certain household products like bleach and ammonia is safe and improves effectiveness.

___ 4. DENR guidelines help prevent environmental contamination from hazardous waste.

Part 3: Scenario-Based Question

A family uses pesticides to control insects in their homes. However, they notice strong fumes and irritation. What steps should they take based on government safety regulations? (Write 3 key actions they should follow.

Part 4: Short Answer (Critical Thinking)

How can responsible consumer behavior improve household product safety for families and the environment? (Write at least 3 sentences.) Refer to the rubric in the answer key provided.

	To access the Answer Key, scan the QR code below and sign in using your DepEd email account. Answer Key: Part 1 - 1.B, 2.C, 3.C, 4.B; Part 2 - 1.T, 2.F, 3.F, 4.T. Clarification: FDA regulates health-product safety and authorization, while disposal of hazardous or special household waste should follow DENR/LGU waste-management guidelines and product-label instructions. Scenario-Based Question Suggested Answer: Stop using the pesticide immediately, move to a well-ventilated area, read and follow the label instructions, avoid mixing it with other products, wear appropriate protection when handling it, keep it away from children and pets, and contact proper health or local authorities if irritation continues or accidental exposure occurs. Short Answer Expected Points: Responsible consumers read labels, follow safety instructions, avoid harmful product mixing, store products properly, use only the needed amount, and dispose of hazardous household waste according to local/DENR waste-management guidance.
VI. REFLECTION (Feedback and Continuous Improvement)	Use the following reflection prompts to guide your evaluation of the lesson after implementation. Reflect on learners' performance, determine which activities and lesson parts were most and least effective, identify learners who need enrichment or remediation, analyze the assessment results, and note possible improvements to enhance future lesson delivery. 1. How many learners successfully demonstrated the learning objectives based on the assessment results? 2. Which activity helped learners understand the lesson the most? Which activity helped the least? 3. Which part of the lesson was easiest for learners? Which part was most difficult? 4. How many learners needed enrichment or additional challenge? How many learners needed remediation or additional support? 5. What did the assessment results show about learners' understanding of the lesson? *6.* What improvement would you make if you taught this lesson again?
VII. USE OF GENERATIVE AI	In preparing this Learning Exemplar (LE), the author(s) used generative AI tools to assist in checking alignment, clarity, grammar, formatting consistency, annotation wording, and answer-key accuracy. The author(s) reviewed, verified, and finalized all content and took full responsibility for the accuracy and appropriateness of this LE.