



DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING

TECHNICAL-PROFESSIONAL

Grade 12

**Three-Term Budget Of Work (BOW)
for Learning Competencies**

**TECHNICAL-PROFESSIONAL
INDUSTRIAL TECHNOLOGIES
Grade 12**

**Three-Term Budget of Work
For Learning Competencies**

Please note that each Tech-Pro elective is completed within one term if delivered at Grade 12.

Elective	Domestic Refrigeration and Air-Conditioning Servicing
Prerequisite	None

Performance Standard	The learner performs the installation of domestic refrigeration and air-conditioning units with safety precautions.
Content Standard	Understands the concepts and principles of installing domestic refrigeration and air-conditioning units.

Week	Learning Competency	Suggested Activities
1	Discuss overview of Refrigeration and Air Conditioning servicing.	Service Cycle Exploration - Learners study the basic steps and sequence of refrigeration and air conditioning servicing, including maintenance and troubleshooting tasks. - Observe a demonstration or video of the service cycle, then identify and list the key steps involved.

Week	Learning Competency	Suggested Activities
		• Servicing Tools Identification ○ Learners identify common tools and equipment used in refrigeration and air conditioning servicing. ○ Examine each tool, describe its purpose, and demonstrate correct handling.
2	• Discuss refrigeration and air conditioning concepts and principles.	• Principle Mapping ○ Learners explore key concepts like the refrigeration cycle, heat transfer, and thermodynamic principles used in air conditioning systems. ○ Create a concept map showing components, flow of refrigerant, and energy transfer in a refrigeration system. • Case Study Analysis ○ Learners analyze real-world air conditioning problems to understand practical applications of refrigeration principles. ○ Review a case study of a malfunctioning AC system and explain which principles are involved in diagnosing the problem.

Week	Learning Competency	Suggested Activities
3	Perform pre-installation procedure for an air-conditioning unit.	Site Inspection Drill - Learners assess the installation site for window or split-type AC units, checking measurements, power supply, and support structures. - Inspect the designated site, measure openings, and verify electrical and structural requirements before installation. Component Preparation - Learners prepare AC unit components (filters, brackets, screws, electrical wires) for installation. - Collect, organize, and inspect all AC components to ensure readiness for installation.
4	Perform procedures in installing a window-type air-conditioning unit.	Mounting Practice - Learners practice mounting a window-type AC unit securely in a frame or window opening. - Position the AC unit in the window opening, level it, and secure it using brackets and screws. Electrical and Functional Check - Learners connect the AC unit to a power supply and verify correct

Week	Learning Competency	Suggested Activities
		operation, cooling, and safety features. ○ Plug in the unit, turn it on, and check for proper cooling, airflow, and safe electrical function.

Suggested Performance Tasks	● Individual Performance Task - Window-Type AC Installation ○ Each learner independently installs a window-type air-conditioning unit, ensuring correct placement, secure mounting, proper electrical connection, and adherence to safety procedures. ○ Measure and prepare the installation site, mount the unit securely, connect the power supply safely, and test for proper operation. ● Group Performance Task - Domestic Refrigerator Setup Project ○ In groups, learners collaboratively install a domestic refrigeration unit, dividing tasks such as positioning, leveling, electrical connection, and safety checks, ensuring proper installation and operation. ○ Work as a team to position the refrigerator, connect power safely, verify leveling and clearance, and test all functions according to safety standards.
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Performance Standard	The learner performs the maintenance of domestic refrigeration and window-type air-conditioning units with safety precautions.
Content Standard	Understands the concepts and principles of maintaining domestic refrigeration and window-type air-conditioning units.

Week	Learning Competency	Suggested Activities
5	Perform maintenance of window-type air-conditioning units.	Air Filter and Coil Cleaning - Learners clean and inspect the air filters and evaporator/condenser coils to ensure proper airflow, efficiency, and unit longevity. - Remove the filters and coils, clean them using water, brushes, or compressed air, inspect for damage, and reinstall correctly. Electrical and Drainage System Check - Learners inspect the unit's electrical connections, controls, and drainage system to ensure safe operation and proper water flow. - Check wiring and terminals, test fan and thermostat functions, and clear the drain pan and pipe of debris.

Suggested Performance Tasks	• Individual Performance Task - Routine AC and Refrigerator Maintenance ○ Each learner independently performs routine maintenance on a domestic refrigerator or window-type AC unit, including cleaning filters, coils, and drainage, and checking electrical connections safely. ○ Follow a step-by-step maintenance procedure, clean and inspect all components, and ensure proper operation while observing safety precautions. • Group Performance Task - Comprehensive Maintenance Workshop ○ In groups, learners collaboratively perform full maintenance on multiple refrigeration and AC units, dividing tasks such as coil cleaning, filter replacement, electrical inspection, and drainage verification, while following safety protocols. ○ Work as a team to perform thorough maintenance on assigned units, checking all mechanical and electrical systems, and confirm proper operation safely.
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Performance Standard	The learner performs troubleshooting of domestic refrigeration and window-type air-conditioning units with safety precautions.
Content Standard	Understands the concepts and principles of troubleshooting domestic refrigeration and window-type air-conditioning units.

Week	Learning Competency	Suggested Activities
6	• Discuss pre-troubleshooting of domestic refrigeration and window-type air conditioning units.	• Common Fault Identification ○ Learners study typical problems in domestic refrigerators and window-type AC units, such as poor cooling, strange noises, leaks, and electrical issues.

Week	Learning Competency	Suggested Activities
		- Examine demonstration units or case examples and list common faults, their possible causes, and observable symptoms. Troubleshooting Checklist Creation - Learners develop a pre-troubleshooting checklist to guide systematic inspection before performing maintenance or repairs. - Create a step-by-step checklist covering electrical, mechanical, and operational aspects of the units to identify potential issues efficiently.
7 - 8	Perform troubleshooting of domestic refrigeration and window-type air-conditioning units.	Fault Diagnosis Drill - Learners identify and diagnose common operational problems in domestic refrigerators and window-type AC units, such as cooling issues, leaks, or abnormal noises. - Inspect the unit, test electrical and mechanical components, and determine the root cause of the malfunction. Problem-Solving Simulation - Learners simulate troubleshooting scenarios to practice correcting faults safely, including replacing or repairing defective components. - Follow a systematic troubleshooting sequence using the checklist, perform

Week	Learning Competency	Suggested Activities
		necessary repairs or adjustments, and verify the unit operates correctly.

Suggested Performance Tasks	Individual Performance Task - Fault Diagnosis Challenge - Each learner independently troubleshoots a malfunctioning domestic refrigerator or window-type AC unit, identifying electrical, mechanical, or operational faults while following safety protocols. - Inspect the unit systematically, test components, identify the root cause of the problem, and record findings safely. Group Performance Task - Collaborative Troubleshooting Exercise - In groups, learners work together to troubleshoot multiple refrigeration and AC units, sharing responsibilities such as checking circuits, testing compressors, and verifying airflow, ensuring safe procedures throughout. - Divide tasks among team members to diagnose all system components, identify faults, and recommend corrective actions while observing all safety precautions.
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Performance Standard	The learner performs repairing domestic refrigeration and window-type air-conditioning units with safety precautions.
Content Standard	Understands the concepts and principles of repairing domestic refrigeration and window-type air-conditioning units.

Week	Learning Competency	Suggested Activities
9	Understands the concepts and principles of repairing domestic refrigeration and window-type air-conditioning units.	Component Repair Analysis - Learners study the repair procedures for common components of domestic refrigerators and window-type AC units, such as compressors, thermostats, fans, and coils. - Examine sample components, identify possible faults, and explain step-by-step repair methods and safety precautions. Repair Procedure Demonstration - Learners observe and discuss actual repair techniques for refrigeration and AC units, including replacing faulty parts and restoring proper operation. - Watch a guided demonstration of repairs, take notes on procedures and tools used, and explain the sequence of steps required for safe and effective repair.

Week	Learning Competency	Suggested Activities
10	Perform repairing of domestic refrigeration and window-type air-conditioning units.	Component Replacement Practice - Learners practice repairing defective components such as thermostats, compressors, fans, and electrical connections in refrigeration and window-type AC units. - Identify the faulty component, safely remove it, replace it with a new or repaired part, and reassemble the unit correctly. Functional Restoration Drill - Learners perform end-to-end repair procedures, ensuring the refrigeration or AC unit is restored to proper operation and tested for safety and efficiency. - Follow a step-by-step repair sequence, test all functions, and verify that cooling, airflow, and electrical systems operate correctly.
Suggested Performance Tasks	Individual Performance Task - Component Repair Challenge - Each learner independently repairs a defective component (e.g., thermostat, fan, compressor, or electrical connection) in a domestic refrigerator or window-type AC unit while following safety protocols. - Identify the faulty component, perform the repair or replacement safely, and test the unit to ensure proper operation.	

	• Group Performance Task - Full-System Repair Project ○ In groups, learners collaboratively repair multiple refrigeration or AC units, dividing tasks for diagnosing faults, replacing defective parts, and restoring full functionality safely. ○ Work as a team to troubleshoot, repair, and test each unit, ensuring all electrical and mechanical systems are safely restored to proper operation.
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