



TECHNOLOGY AND LIVELIHOOD EDUCATION

IA - RESIDENTIAL PLUMBING

Grade 9 or 10

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

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IA
Grade 9 and Grade 10

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Please note that each sector under TLE: IA is studied for one term. This is applicable under Grades 9 and 10.

Term		
Sector	Residential Plumbing	
Performance Standard	The learners draft floor plan with plumbing layout and its diagram with dimensions. The learners perform pipeline services following the safety precautions. The learners compute pipeline services cost.	
Content Standard	• Demonstrate an understanding of the concepts and principles in residential plumbing works. • Demonstrate an understanding in repair service cost.	
Week	Learning Competency	Suggested Activities
1	• Discuss the residential plumbing system and its components. • Discuss the different features of a residential floor plan with plumbing layout.	• Individual Plumbing System Diagram Analysis ○ Learners individually study diagrams of residential plumbing systems, identify major components such as water supply lines, drainage, fixtures, and valves, and explain their functions and relationships.

		○ Individually examine a plumbing system diagram and identify its components and their functions. ● Individual Plumbing Components Research and Report ○ Learners research different components of a residential plumbing system, including pipes, faucets, valves, traps, and tanks, and prepare a short report or presentation describing their purpose, types, and importance. ○ Individually research residential plumbing components and write a report explaining their types, functions, and importance. ● Individual Floor Plan Feature Analysis ○ Learners individually study sample single-story residential floor plans with plumbing layouts, identifying features such as water supply lines, drainage, fixture locations, and pipe routing. ○ Individually examine a residential floor plan and identify plumbing features, including water lines, drainage, and fixture placements. ● Individual Floor Plan Annotation
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		Exercise ○ Learners individually annotate a blank or sample residential floor plan by marking plumbing components, including pipes, fixtures, valves, and drainage points, and briefly describing each feature. ○ Individually annotate a residential floor plan with plumbing features and provide a short description of each component.
2	● Draft the floor plan with the plumbing layout.	● Individual Plumbing Floor Plan Drafting ○ Learners individually draft a simple single-story residential floor plan, including walls, rooms, doors, and windows, and add a plumbing layout showing water supply lines, drainage, fixtures, and valves. ○ Individually draft a residential floor plan with plumbing layout, marking all rooms and plumbing components accurately. ● Individual Scaled Plumbing Floor Plan ○ Learners create a scaled drawing of a residential floor plan with plumbing features on graph paper or using

		drawing software, ensuring proper proportions, labels, and placement of pipes, fixtures, and drainage. Individually draw a scaled residential floor plan with plumbing layout, labeling all components correctly.
3	Draft the fixtures, signs, and symbols on the floor plan with plumbing layout and its diagram.	Individual Plumbing Symbols Identification and Drafting - Learners individually study standard plumbing symbols for fixtures such as sinks, toilets, showers, faucets, and pipes, and practice placing them accurately on a sample residential floor plan. - Individually identify plumbing symbols and draft them correctly on a residential floor plan. Individual Plumbing Layout Diagram with Labeled Fixtures - Learners create a complete plumbing layout diagram of a residential floor plan, adding labeled fixtures, signs, and symbols, and illustrating the connections between supply and drainage lines. - Individually draw and label a

		residential plumbing layout diagram with all fixtures, symbols, and connections accurately.
4	• Label the floor plan with plumbing layout and its diagram with dimensions. • Discuss the handling and storing of consumables.	• Individual Floor Plan Dimensioning and Labeling ◦ Learners individually take a residential floor plan with plumbing layout and accurately label rooms, fixtures, water lines, and drainage while adding proper dimensions for walls, doors, and plumbing components. ◦ Individually label a floor plan with plumbing features and add accurate dimensions for rooms, fixtures, and piping. • Individual Complete Plumbing Diagram with Labels and Dimensions ◦ Learners create a detailed plumbing layout diagram from a residential floor plan, labeling all fixtures, pipes, valves, and drainage points with corresponding measurements and dimensions for clarity. ◦ Individually draw and label a plumbing diagram with all fixtures, piping, and dimensions correctly indicated.

		• Individual Consumables Identification and Handling Analysis ○ Learners individually examine common Industrial Arts consumables (e.g., adhesives, paints, nails, screws, sand, cement) and analyze proper handling techniques, potential hazards, and safe usage procedures. ○ Individually identify common consumables and describe safe handling procedures for each. • Individual Storage Organization Exercise ○ Learners individually plan or design a storage layout for consumables, considering safety, accessibility, labeling, and protection from damage or contamination. ○ Individually design a safe and organized storage plan for consumables following proper handling and safety rules.
5	• Demonstrate the use of hand tools and equipment following the safety precautions.	• Individual Hand Tool Handling Practice ○ Learners individually practice using basic hand tools such as hammers, screwdrivers, pliers, chisels, and saws, focusing on correct handling, proper

		techniques, and adherence to safety rules. - Individually demonstrate the correct use of hand tools safely by following proper handling techniques. Individual Equipment Operation Exercise - Learners individually operate small equipment or simple machinery used in Industrial Arts (e.g., hand drills, planers, sanding machines), applying safety precautions such as wearing PPE and following operational guidelines. - Individually operate hand equipment safely, following proper procedures and safety precautions.
6	Demonstrate the maintenance of hand tools following the safety precautions.	Individual Cleaning and Inspection of Hand Tools - Learners individually clean, inspect, and check hand tools (e.g., hammers, screwdrivers, pliers, chisels) for damage, rust, or wear, ensuring they are safe and in good working condition. - Individually clean and inspect hand tools to ensure they are safe and

		properly maintained. • Individual Sharpening and Lubrication Exercise ○ Learners individually sharpen cutting tools (e.g., chisels, saws) and lubricate moving parts on hand tools where applicable, following safety precautions to prevent accidents. ○ Individually sharpen and lubricate hand tools safely, following proper maintenance procedures.
7	• Apply procedures in pipe installation with safety precautions.	• Individual Pipe Cutting and Fitting Practice ○ Learners individually measure, cut, and prepare pipes for installation, including deburring, aligning, and dry-fitting, while following safety precautions and using appropriate personal protective equipment (PPE). ○ Individually measure, cut, and fit pipes safely according to installation procedures. • Individual Pipe Connection and Assembly Exercise ○ Learners individually assemble and connect pipes (e.g., PVC or metal)

		using fittings, adhesives, or mechanical joints, ensuring proper alignment, secure connections, and adherence to safety rules. Individually assemble and connect pipes safely, following proper procedures and safety precautions.
8	Apply procedures in testing pipe installation with safety precautions.	Individual Pressure Testing of Pipe System - Learners individually test a small-scale pipe installation for leaks and proper water flow using a manual pump or water supply, checking joints, fittings, and connections while following safety precautions. - Individually test a pipe system for leaks and proper flow safely, following standard testing procedures. Individual Inspection and Fault Identification Exercise - Learners individually inspect a completed pipe installation, identify potential issues like loose fittings, blockages, or misaligned joints, and document necessary corrective actions while observing safety rules.

		Individually inspect a pipe installation to identify faults and ensure it meets safety and functional standards.
9	Apply procedures in pipeline testing and troubleshooting following the safety precautions.	Individual Pipeline Pressure Testing and Leak Detection - Learners individually test a small-scale pipeline system using water or air pressure to detect leaks, checking joints, valves, and fittings while following safety precautions and using appropriate PPE. - Individually test a pipeline for leaks and proper flow safely, following standard procedures and safety rules. Individual Pipeline Troubleshooting Exercise - Learners individually identify, diagnose, and suggest solutions for common pipeline problems such as blockages, misaligned joints, or faulty valves, while observing all safety measures. - Individually troubleshoot a pipeline system safely by identifying issues and proposing corrective actions.

10	• Apply procedures in pipeline repair following the safety precautions. • Compute repair service cost.	• Individual Small-Scale Pipe Repair Practice ◦ Learners individually repair a small section of a damaged pipeline, such as fixing leaks, replacing faulty joints, or sealing cracks, while following safety precautions and using appropriate tools. ◦ Individually repair a damaged pipeline section safely using proper tools and techniques. • Individual Component Replacement Exercise ◦ Learners individually replace faulty pipeline components such as valves, connectors, or pipe segments, ensuring proper alignment, secure fittings, and adherence to safety procedures. ◦ Individually replace faulty pipeline components safely following standard repair procedures. • Individual Cost Computation for Plumbing Repair ◦ Learners are given a plumbing repair scenario, such as fixing a leaking pipe or replacing a faucet, and compute the total service cost including materials, labor, and consumables. ◦ Individually calculate the total cost of a plumbing repair by adding material,
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		labor, and consumable expenses. • Individual Cost Computation for Carpentry or Masonry Repair ○ Learners are provided with a small carpentry or masonry repair task (e.g., repairing a wooden door or patching a wall) and compute the service cost, considering materials, tools used, and labor hours. ○ Individually compute the total cost of a repair project by including materials, labor, and related expenses.
Suggested Performance Tasks	• Individual Floor Plan and Plumbing Layout Draft ○ The learner independently drafts a simple residential floor plan that includes a basic plumbing layout and properly labeled diagrams with accurate dimensions. ○ Draft a simple floor plan with a plumbing layout and labeled dimensions using proper drafting conventions. • Group Floor Plan and Plumbing System Design ○ In groups, learners collaboratively create a complete floor plan with plumbing layout and detailed diagrams, showing correct dimensions and proper placement of fixtures and pipelines. ○ Work as a group to design and draft a floor plan with plumbing layout and complete dimensional details. • Individual Safe Pipeline Assembly Task ○ The learner independently performs a basic pipeline service activity such as cutting, fitting, and assembling pipes while correctly using tools and strictly observing safety precautions. ○ Assemble a simple pipeline section by following correct procedures and observing	

	all safety precautions. • Group Pipeline Installation and Safety Demonstration ○ In groups, learners work together to install a basic pipeline system, demonstrating teamwork, correct installation procedures, and consistent application of safety precautions. ○ Collaboratively install a basic pipeline system while strictly following safety rules and proper work procedures. • Individual Pipeline Service Cost Computation ○ The learner independently computes the total cost of a basic pipeline service by determining material quantities, labor cost, and overall service expenses using given measurements and price data. ○ Compute the total cost of a pipeline service using the given measurements, material prices, and labor rates. • Group Pipeline Cost Estimation Project ○ In groups, learners analyze a sample pipeline installation scenario and collaboratively prepare a complete and organized cost estimate that includes materials, labor, and total service cost. ○ Work as a group to prepare and present a detailed cost estimate for an assigned pipeline service project.
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