Strengthened Senior High School

DepED
DEPARTMENT OF EDUCATION

Learning Activity Sheets for Domestic Refrigeration and Air-Conditioning Servicing

TECH-PRO ELECTIVE



Government Property
NOT FOR SALE

Learning Activity Sheets for Domestic Refrigeration and Air-Conditioning Servicing
Grade 12

This material is intended exclusively for the use of senior high school teachers participating in the implementation of the **Strengthened Senior High School Curriculum**. It aims to assist in delivering curriculum content, standards, and lesson competencies. Any unauthorized reproduction, distribution, modification, or utilization of this material beyond the designated scope is strictly prohibited and may result in appropriate legal actions and disciplinary measures.

Borrowed content included in this material is owned by their respective copyright holders. Every effort has been made to locate and obtain permission to use these materials from their respective copyright owners. The publisher and development team do not represent nor claim ownership over them.

Development Team

Writers: John Cedric Maling, Julius Japsay

Validator: Girald V. Donato

Resource Person: **Erwin R. Callo, EdD**
Philippine Normal University

Learning Area Specialist: **John Paul D. Francisco, PhD**
Senior Education Program Specialist

Bureau of Learning Delivery
Bureau of Curriculum Development
Bureau of Learning Resources

Every care has been taken to ensure the accuracy of the information provided in this material. For queries or clarifications, you may contact the Bureau of Learning Resources – Office of the Director at blr.od@deped.gov.ph or via telephone at (02) 8634-1072.

If you have feedback on the LE, please accomplish this form, which may be accessed through the following link: **https://tinyurl.com/sshstechprofeedbackform.**

Table of Contents

Lesson Exemplar 1: **1**
Lesson Exemplar 2: **2**
Lesson Exemplar 3: **3**
Lesson Exemplar 4: **4**
Lesson Exemplar 5: **5**
Lesson Exemplar 6: **6**
Lesson Exemplar 7: **7**
Lesson Exemplar 8: **12**
Lesson Exemplar 9: **19**
Lesson Exemplar 10: **23**

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	1	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 1: Career Pathways Mapping
II. Objective(s): At the end of this activity, you should be able to:
   1. Classify career opportunities in the DomRAC industry into Contracting, Merchandising, Manufacturing and Consulting.
   References:
III. Materials needed: Printed or handwritten table, pen
IV. Instructions: Below are job descriptions. Write **C** for Contracting, **M** for Merchandising, **MFG** for Manufacturing, and **CON** for Consulting.

1. _____ Selling copper tubes and compressors to contractors.
2. _____ Bidding to install 50 AC units for a new mall.
3. _____ Working in a Carrier factory assembling condenser coils.
4. _____ Advising a hospital on energy-efficient HVAC design.
5. _____ House-to-house window-type AC repair.
6. _____ Importing and distributing refrigerants.
7. _____ Designing a ventilation system for a BPO office.
8. _____ Installing split-type ACs for a hotel.

V. Synthesis: In 2–3 sentences, explain which career path interests you most and why.

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	2	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 2: Label the Components (CCME)

II. Objective(s): At the end of this activity, you should be able to:
1. Identify and describe the four major components of a vapor-compression refrigeration system.

III. Materials needed: Diagram of a refrigerator or window-type AC, pen

IV. Instructions: Using the acronym **CCME (Compressor, Condenser, Metering Device, Evaporator)**, label the parts in the diagram below (draw or describe). Then match each component to its function

Component Name	Function (Write letter)
1. _____	A. Releases heat to outside – gas turns to liquid
2. _____	B. Absorbs heat from room – liquid boils to gas
3. _____	C. Squeezes refrigerant – low to high pressure
4. _____	D. Drops pressure – creates cooling effect

V. Synthesis: Why is the compressor called the “heart” of the refrigeration system? Answer one sentence.

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	3	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 3: Cycle Sequencing Relay
II. Objective(s): At the end of this activity, you should be able to:
1. Sequence the four stages of the refrigeration cycle correctly.
III. Materials needed: Cut-out cards (or write on paper), pen
IV. Instructions: Arrange the stages in correct order (1–4). Write the stage name and color arrow

Order	Stage Name	Color Arrow	What happens?
1	_____	_____	Gas is squeezed → hot high-pressure gas
2	_____	_____	Gas condenses to liquid – heat released
3	_____	_____	Pressure drops – becomes cold liquid gas
4	_____	_____	Liquid boils to gas – heat absorbed

V. Synthesis: What happens to the cycle if the compressor stops running? Explain briefly.

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	4	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 4: Heat Type Sorting
II. Objective(s): At the end of this activity, you should be able to:
1. differentiate sensible heat, latent heat, superheat, and subcooling.
III. Materials needed: Pen, paper
IV. Instructions: Identify each scenario as Sensible Heat, Latent Heat, Superheat, or Subcooling.

1. _____ Water temperature rises from 25°C to 40°C.
2. _____ Ice melts at 0°C – temperature stays the same.
3. _____ Refrigerant gas leaving the evaporator is 12°C hotter than its boiling point.
4. _____ Liquid refrigerant leaving condenser is 6°C cooler than its condensing point.
5. _____ Steam condenses into water at 100°C.
6. _____ You feel that a copper pipe is warm.

V. Synthesis: Why is latent heat more important than sensible heat for the cooling effect in an evaporator? (2 sentences)

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	5	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 5: Pre-Installation Site Survey
II. Objective(s): At the end of this activity, you should be able to:
   1. Perform a basic site survey using the 9 factors.
III. Materials needed: Tape measure, checklist form (provided below), pen
IV. Instructions: Survey your classroom or room at home. Check each factor and write your findings.

Factor	Finding (e.g. 20 sq m, west window, etc)	Acceptable? (Yes/No/Needs Adjustment)
Room size & layout		
Heat load (people, appliances, lights)		
Airflow & ventilation		
Drainage possible?		
Insulation (ceiling/walls)		
Power supply (voltage, outlet)		
Structural support (wall type)		
Maintenance access		
Codes/permits		

V. Synthesis: Based on your survey, what AC capacity (HP) would you recommend?

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	6	**Date**	
Lesson Title/Topic:	**Overview of Refrigeration and Air Conditioning servicing**		
Name		**Grade & Section**	

I. Activity Sheet No. 6: Sequence the Steps
II. Objective(s): At the end of this activity, you should be able to:
1. Sequencing the six major steps of window-type AC installation.
III. Materials needed: pen
IV. Instructions: Number the steps from 1 (first) to 6 (last). Write your answer in the Order column.

Step	Description	Order
A	Apply insulation/foam sealant around gaps	
B	Slide unit into cavity with slight downward slope outside	
C	Install condensate drain hose	
D	Measure and prepare the cavity opening	
E	Connect to dedicated grounded outlet	
F	Install mounting bracket level and secure	

V. Synthesis: What is the most dangerous mistake in electrical installation for window-type AC? Why?

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	7	**Date**	
Lesson Title/Topic:	**Maintenance of Window-Type AC - Air Filter Cleaning (Types, Specs, Restricted Airflow Effects**		
Name		**Grade & Section**	

Learning Competency

Perform understanding and application of service power in relation to window-type air-conditioning units following safety standards and proper electrical procedures.

II. Objectives

Objectives

At the end of this activity, you should be able to:

- **(Knowledge)** Identify different types of air filters and explain the effects of restricted airflow.
- **(Skills)** Demonstrate the proper procedure for removing, cleaning, and reinstalling an air filter.
- **(Attitude)** Communicate professionally with a customer about filter maintenance and pricing.

III. Materials Needed

- Training window-type AC unit (or simulator)
- Dirty air filter (or filter with dust)
- Vacuum cleaner with brush attachment
- Basin with warm water and mild dish soap
- Soft brush
- Gloves, drop cloth
- Sample service report form
- Pen
- Timer

IV. Instructions:

This is a SINGLE activity with THREE parts. Complete ALL parts.

PART A: KNOWLEDGE (15 minutes)

Answer the following questions before you begin the hands-on work.

A1. Multiple Choice. Encircle the letter with the correct answer.

1. Which type of air filter is MOST common in standard window-type ACs?
   a) HEPA b) Carbon c) Foam/Mesh d) Fiberglass
2. How often should a filter be cleaned for a daily-used window-type AC?
   a) Everyday b) Every 2 weeks c) Every 6 months d) Once a year
3. What is the #1 effect of a severely clogged air filter on cooling performance?
   a) Louder noise b) Reduced cooling (mahina ang lamig) c) Water spraying d) Remote control stops working
4. A carbon filter is designed to remove:
   a) Dust only b) Odors (smoke, cooking smells) c) Bacteria d) Moisture
5. What happens to the evaporator coils when airflow is restricted?
   a) They overheat b) They freeze/ice up c) They rust d) Nothing

A2. Fill in the Blanks. Complete each sentence.

6. A filter that can be cleaned with soap and water is called a _____ filter.
7. The _____ rating indicates how well a filter traps particles (higher number = better filtration).
8. Restricted airflow causes the compressor to overheat, leading to _____.
9. You should NEVER install a _____ filter because it promotes mold growth.
10. The FIRST step before removing any AC filter is to _____ the unit.

A3. Short Answer. Write 2-3 sentences.

_____

_____

_____

PART B: SKILLS (20 minutes)

Perform the filter cleaning procedure. Your teacher will observe and check each step.

Procedure: Follow the steps in order. Check (✓) each box as you complete it.

Step	Task	Done? (✓)	Teacher Initials
1	Put on gloves.		
2	Unplug the AC unit.		
3	Place drop cloth below the unit.		
4	Remove the front grille.		
5	Carefully remove the filter. Note which direction it faces.		
6	Hold the filter up to a light. Can you see through it? (Yes/No): _____		
7	Vacuum loose dust from the filter.		
8	Prepare warm water with mild soap.		
9	Soak the filter for 5-10 minutes.		
10	Gently scrub with a soft brush.		
11	Rinse until water runs clear.		
12	Shake off excess water.		
13	Allow filter to dry completely (or use dry spare).		
14	While drying, vacuum the filter compartment.		
15	Reinstall the DRY filter in correct orientation.		
16	Reattach the front grille.		
17	Plug in and test airflow (should feel stronger).		
18	Document the service (write date and action on the service report).		

Teacher Evaluation (Skills):

Criteria	Pass/Fail
Unplugged unit before starting	
Wore gloves	
Removed filter without tearing	
Vacuumed before washing	
Used mild soap (not harsh chemicals)	
Rinsed until water clear	
Allowed filter to dry completely	
Reinstalled filter correctly	
Tested unit after reassembly	

PART C: ATTITUDE (15 minutes)

Complete the role-play and answer the reflection questions.

C1. Role-Play Scenario (perform with a partner - 5 minutes)

Situation: You have just finished cleaning the filter. The customer asks you questions.

Customer's Lines	Your Response (write what you would say)
"How much do I owe you?"	
"Do I really need to clean the filter every two weeks? That seems too often."	
"Why should I pay you ₱500? I could have done this myself."	

Customer's Lines	Your Response (write what you would say)
"Can I just use a vacuum without removing the filter?"	

C2. Self-Assessment (5 minutes) - Check your answer.

After performing the role-play, answer honestly:

Question	Yes	No	Partly
Did you explain the effects of a dirty filter clearly?			
Did you remain polite when the customer questioned your price?			
Did you offer to teach the customer how to clean the filter themselves?			
Did you provide a clear cleaning schedule (e.g., "every 2 weeks")?			
Did you show the dirty filter to the customer as proof?			

C3. Professional Pledge (5 minutes)

Read and sign below.

As a DomRAC technician, I pledge to:

- Always explain to customers WHY filter cleaning matters (not just DO it).
- Educate customers on proper cleaning frequency.
- Never shame customers for having a dirty filter (they may not know).
- Charge fairly and explain charges clearly.
- Document all work on a service report.

Signature: _____ **Date:** _____

V. Synthesis (5 minutes)

Write 3-5 sentences answering the question below.

Why is customer education (teaching them how to clean the filter and how often) just as important as the technical skill of cleaning it?

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	8	**Date**	
Lesson Title/Topic:	**Cleaning Methods of the Mechanical System (Tools, Disassembly, Cleaning Agents, Kink/Dent Effects**		
Name		**Grade & Section**	

Learning Competency

Perform understanding and application of service power in relation to window-type air-conditioning units following safety standards and proper electrical procedures.

I. Activity No. 1: "Deep Clean Like a Pro - Complete Technician Exercise

II. Objectives

At the end of this activity, you should be able to:

- **(Knowledge)** Identify tools and chemicals for mechanical cleaning and explain the effects of kinks/dents.
- **(Skills)** Partially disassemble a window-type AC, clean evaporator and condenser coils, and reassemble correctly.
- **(Attitude)** Demonstrate professional integrity by completing thorough cleaning (not just visible areas) and handling customer questions ethically.

III. Materials Needed

- Training window-type AC unit
- Screwdrivers, nut drivers, wrench set
- Vacuum with brush attachment
- Alkaline coil cleaner (HVAC-approved)
- Water sprayer (pump type)
- Plastic sheet (to cover electrical parts)
- Safety goggles, gloves, N95 mask
- Fin comb
- Sample service report
- Pen

IV. Instructions:

This is a SINGLE activity with THREE parts. Complete ALL parts.

PART A: KNOWLEDGE (15 minutes)

Answer the following questions before you begin the hands-on work.

A1. Matching. Match the tool/chemical to its use.

Column A	Column B
1. Fin comb	A. Chemical that dissolves dirt on coils
2. Vacuum with brush attachment	B. Straightens bent aluminum fins
3. Coil cleaner	C. Removes loose dust before applying chemical
4. Muriatic acid	D. Should NEVER be used on coils (destroys aluminum)
5. Safety goggles	E. Protects eyes from chemical splashes

Answers: 1=**, *2*=**, 3=**, *4*=**, 5=___

A2. True or False. Write TRUE or FALSE.

Statement	T/F
6. Alkaline coil cleaner (pH 8-11) is safe for evaporator coils.	
7. High-pressure washers are recommended for rinsing coils.	
8. Coil cleaner should be left on coils for 5-10 minutes before rinsing.	
9. A kink in a copper tube can be easily bent back to fix it.	
10. You should cover electrical parts before spraying water or chemicals.	

A3. Short Answer. Write 2-3 sentences.

11. What is a kink? What damage does it cause to the AC system?

---

12. Why should you clean the condenser coil even if it looks clean from the outside?

PART B: SKILLS (30 minutes)

Perform the disassembly, cleaning, and reassembly procedure. Your teacher will observe.

Procedure: Follow the steps in order. Check (✓) each box as you complete it.

SECTION 1: DISASSEMBLY (15 minutes)

Step	Task	Done? (✓)	Teacher Initials
1	Put on PPE (goggles, gloves, mask).		
2	Unplug the AC unit.		
3	Remove front grille and air filter.		
4	Remove control panel screws and label wires.		
5	Remove the top cover.		
6	Remove front casing (wrapper).		
7	Remove rear grille to access condenser.		
8	Cover electrical parts with plastic sheets.		

SECTION 2: CLEANING (10 minutes)

Step	Task	Done? (✓)	Teacher Initials
9	Vacuum loose dust from evaporator coils.		
10	Vacuum loose debris from condenser coils.		
11	Spray coil cleaner on evaporator coils.		
12	Spray coil cleaner on condenser coils.		
13	Allow 5-10 minutes of contact time.		

Step	Task	Done? (✓)	Teacher Initials
14	Rinse evaporator coils with low-pressure water.		
15	Rinse condenser coils from inside OUT.		
16	Check for bent fins; use a fin comb if needed.		
17	Check for kinks/dents; report findings to teacher.		

SECTION 3: REASSEMBLY (5 minutes)

Step	Task	Done? (✓)	Teacher Initials
18	Remove plastic covers from electrical parts.		
19	Reinstall rear grille.		
20	Reinstall front casing (ensure seal intact).		
21	Reinstall the top cover.		
22	Reconnect control panel wiring (use labels/photos).		
23	Reinstall air filter and front grille.		
24	Plug in and test unit (check airflow, noise, cooling).		

Teacher Evaluation (Skills):

Criteria	Pass/Fail
Wore complete PPE	
Unplugged before disassembly	
Labeled wires during disassembly	
Covered electrical parts before spraying	
Used correct coil cleaner (not muriatic acid)	
Used low-pressure rinse (not pressure washer)	
Inspected for kinks/dents	
Reassembled in correct order	
Tested unit after reassembly	

PART C: ATTITUDE (15 minutes)

Complete the case studies and pledge.

C1. Case Study Analysis (10 minutes)

Read each scenario. Choose the ethical response and explain why.

Case 1: The condenser coil looks clean from the outside. You are running late. Your helper says, "Just clean the evaporator. The customer won't know."

- A. Clean only the evaporator to save time
- B. Clean both evaporator and condenser (customer paid for general cleaning)
- C. Ask customer if they want to pay extra for condenser cleaning

Why did you choose this answer? _____

Case 2: While cleaning, you discover a small dent in the condenser coil that reduces efficiency but does not cause immediate failure. The customer did not ask about dents.

- A. Ignore it (customer didn't ask)
- B. Tell the customer about the dent and explain the effects
- C. Try to fix the dent without telling the customer

Why did you choose this answer? _____

Case 3: The customer says, "My neighbor paid only ₱500 for cleaning. Your price is ₱1,200. That's too expensive."

- A. Accept ₱500 to avoid conflict
- B. Argue loudly with the customer
- C. Calmly explain the value (full disassembly, coil cleaning, motor lube, documentation)

Why did you choose this answer? _____

C2. Professional Integrity Pledge (5 minutes)

Read and sign below.

V. Synthesis (5 minutes)

Write 3-5 sentences answering the question below.

Why is "doing the complete job" (not just what is visible) important for your reputation and business success?

_____

_____

_____

_____

PART C: ATTITUDE (15 minutes)

Complete the role-play and answer the reflection questions.

C1. Role-Play Scenario (perform with a partner - 5 minutes)

Situation: You have just finished cleaning the filter. The customer asks you questions.

C2. Self-Assessment (5 minutes) - Check your answer.

After performing the role-play, answer honestly:

Question	Yes	No	Partly
Did you explain the effects of a dirty filter clearly?			
Did you remain polite when the customer questioned your price?			
Did you offer to teach the customer how to clean the filter themselves?			
Did you provide a clear cleaning schedule (e.g., "every 2 weeks")?			
Did you show the dirty filter to the customer as proof?			

C3. Professional Pledge (5 minutes)

Read and sign below.

As a DomRAC technician, I pledge to:

- Always explain to customers WHY filter cleaning matters (not just DO it).
- Educate customers on proper cleaning frequency.
- Never shame customers for having a dirty filter (they may not know).
- Charge fairly and explain charges clearly.
- Document all work on a service report.

Signature: _____ **Date:** _____

V. Synthesis (5 minutes)

Write 3-5 sentences answering the question below.

Why is customer education (teaching them how to clean the filter and how often) just as important as the technical skill of cleaning it?

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	9	**Date**	
Lesson Title/Topic:	**Service Costing and Documentation (Following OHS)**		
Name		**Grade & Section**	

Learning Competency

Perform understanding and application of service power in relation to window-type air-conditioning units following safety standards and proper electrical procedures.

I. Activity No. 1: "Professional Business Technician - Complete Exercise"

II. Objectives

At the end of this activity, you should be able to:

- (Knowledge) Identify different types of air filters and explain the effects of restricted airflow.
- (Skills) Demonstrate the proper procedure for removing, cleaning, and reinstalling an air filter.
- (Attitude) Communicate professionally with a customer about filter maintenance and pricing.

III. Materials Needed

- Training window-type AC unit (or simulator)
- Dirty air filter (or filter with dust)
- Vacuum cleaner with brush attachment
- Basin with warm water and mild dish soap
- Soft brush
- Gloves, drop cloth
- Sample service report form
- Pen
- Timer

IV. Instructions:

This is a SINGLE activity with THREE parts. Complete ALL parts.

PART A: KNOWLEDGE (15 minutes)

Answer the following questions before you begin the hands-on work.

A1. Multiple Choice. Encircle the letter with the correct answer.

6. Which type of air filter is MOST common in standard window-type ACs?
   a) HEPA b) Carbon c) Foam/Mesh d) Fiberglass
7. How often should a filter be cleaned for a daily-used window-type AC?
   a) Everyday b) Every 2 weeks c) Every 6 months d) Once a year
8. What is the #1 effect of a severely clogged air filter on cooling performance?
   a) Louder noise b) Reduced cooling (mahina ang lamig) c) Water spraying d) Remote control stops working
9. A carbon filter is designed to remove:
   a) Dust only b) Odors (smoke, cooking smells) c) Bacteria d) Moisture
10. What happens to the evaporator coils when airflow is restricted?
    a) They overheat b) They freeze/ice up c) They rust d) Nothing

A2. Fill in the Blanks. Complete each sentence.

11. A filter that can be cleaned with soap and water is called a _____ filter.
12. The _____ rating indicates how well a filter traps particles (higher number = better filtration).
13. Restricted airflow causes the compressor to overheat, leading to _____.
14. You should NEVER install a _____ filter because it promotes mold growth.
15. The FIRST step before removing any AC filter is to _____ the unit.

PART B: SKILLS (20 minutes)

16. Perform the filter cleaning procedure. Your teacher will observe and check each step.
17. Procedure: Follow the steps in order. Check (✓) each box as you complete it.

Step	Task	Done? (✓)	Teacher Initials
1	Put on gloves.		
2	Unplug the AC unit.		
3	Place drop cloth below the unit.		
4	Remove the front grille.		
5	Carefully remove the filter. Note which direction it faces.		
6	Hold the filter up to a light. Can you see through it? (Yes/No): _____		
7	Vacuum loose dust from the filter.		
8	Prepare warm water with mild soap.		

9	Soak the filter for 5-10 minutes.		
10	Gently scrub with a soft brush.		
11	Rinse until water runs clear.		
12	Shake off excess water.		
13	Allow filter to dry completely (or use dry spare).		
14	While drying, vacuum the filter compartment.		
15	Reinstall the DRY filter in correct orientation.		
16	Reattach the front grille.		
17	Plug in and test airflow (should feel stronger).		
18	Document the service (write date and action on the service report).		

Teacher Evaluation (Skills):

Criteria	Pass/Fail
Unplugged unit before starting	
Wore gloves	
Removed filter without tearing	
Vacuumed before washing	
Used mild soap (not harsh chemicals)	
Rinsed until water clear	
Allowed filter to dry completely	
Reinstalled filter correctly	
Tested unit after reassembly	

PART C: ATTITUDE (15 minutes)

Complete the role-play and answer the reflection questions.

C1. Role-Play Scenario (perform with a partner - 5 minutes)

Situation: You have just finished cleaning the filter. The customer asks you questions.

Customer's Lines	Your Response (write what you would say)
"How much do I owe you?"	
"Do I really need to clean the filter every two weeks? That seems too often."	
"Why should I pay you ₱500? I could have done this myself."	
"Can I just use a vacuum without removing the filter?"	

C2. Self-Assessment (5 minutes) - Check your answer.

After performing the role-play, answer honestly:

Question	Yes	No	Partly
Did you explain the effects of a dirty filter clearly?			
Did you remain polite when the customer questioned your price?			
Did you offer to teach the customer how to clean the filter themselves?			
Did you provide a clear cleaning schedule (e.g., "every 2 weeks")?			
Did you show the dirty filter to the customer as proof?			

V. Synthesis (5 minutes)

Write 3-5 sentences answering the question below.

Why is customer education (teaching them how to clean the filter and how often) just as important as the technical skill of cleaning it?

LEARNING ACTIVITY SHEET (LAS)

Learning Area	DOMESTIC REFRIGERATION AND AIR-CONDITIONING SERVICING		
Lesson Exemplar	10	**Date**	
Lesson Title/Topic:	**Maintenance of Service Power (Electrical Controls, Circuit Connections, Power Source, Insulation Resistance)**		
Name		**Grade & Section**	

Learning Competency

Perform understanding and application of service power in relation to window-type air-conditioning units following safety standards and proper electrical procedures.

I. Activity No. 1: "Electrical Safety Detective - Complete Technician Exercise"

II. Objectives

At the end of this activity, you should be able to:

- **(Knowledge)** Identify electrical control devices and explain insulation resistance testing.
- **(Skills)** Use a multimeter to test voltage, continuity, and perform insulation resistance testing.
- **(Attitude)** Demonstrate a safety-first mindset and follow lock-out/tag-out procedures.

III. Materials Needed

- Multimeter (digital)
- Insulation resistance tester (megger) - or simulation
- Training AC unit with simulated electrical faults
- Safety gloves and goggles
- Lock-out/tag-out tag (sample)
- Wiring diagram of window-type AC
- Pen

IV. Instructions:

This is a SINGLE activity with THREE parts. Complete ALL parts.

PART A: KNOWLEDGE (15 minutes)

Answer the following questions before you begin the hands-on work.

A1. Matching. Match the component to its function.

Component	Function
1. Selector switch	A. Senses room temperature, turns compressor ON/OFF
2. Thermostat	B. Connects start winding during startup, then disconnects
3. Compressor relay (PTC)	C. Safety device that shuts off compressor if overheated
4. Overload protector	D. Allows user to select Off, Fan, Cool modes
5. Capacitor	E. Stores electrical energy to help motor start/run

Answers: 1=**, *2*=**, 3=**, *4*=**, 5=___

A2. Fill in the Blanks.

6. The acceptable minimum insulation resistance for a compressor motor is _____ MΩ.
7. A megger uses _____ volts (typical setting) to test insulation, while a multimeter uses only 3-9V.
8. If a compressor has insulation resistance below 0.5 MΩ, the compressor must be _____.
9. A _____ circuit means there is a break in the path and no current flows.
10. A _____ circuit causes the breaker to trip immediately when the AC is plugged in.

A3. Short Answer. Write 2-3 sentences.

11. Why is a megger (insulation tester) better than a multimeter for finding motor winding grounds?

PART B: SKILLS (25 minutes)

Perform electrical diagnostic tests. Your teacher will observe.

You will rotate through 4 stations. Complete ALL stations.

STATION 1: Power Source Verification

Step	Task	Measurement	Pass/Fail
1	Set multimeter to AC voltage (200V or 600V range).		
2	Measure voltage between Line and Neutral.	_____ V	(198-242V)
3	Measure voltage between Line and Ground.	_____ V	(198-242V)
4	Measure voltage between Neutral and Ground.	_____ V	(<5V)
5	Check the circuit breaker.	ON/OFF	

Fault identified (check one): □ No power □ Low voltage □ No ground □ Tripped breaker

STATION 2: Component Testing (Selector Switch and Thermostat)

Component	Test	Reading	Pass/Fail
Selector Switch (OFF)	Continuity L to any terminal	Open/Closed	
Selector Switch (FAN)	Continuity L to FAN	Open/Closed	
Selector Switch (COOL)	Continuity L to COOL	Open/Closed	
Thermostat (coldest)	Continuity across terminals	Open/Closed	
Fault identified (check one): □ Bad selector □ Bad thermostat □ All good			

Fault identified (check one): □ Bad selector □ Bad thermostat □ All good

STATION 3: Capacitor and Relay Testing

Component	Test	Reading	Pass/Fail
Run capacitor	Capacitance (μF) compared to label	_____ μF (label: ___)	Within ±10%?
PTC relay (cool)	Resistance across terminals	_____ Ω	Low (e.g., <50Ω)
Overload protector	Continuity	Open/Closed	

Safety: Did you discharge the capacitor before touching? □ Yes □ No

Fault identified (check one): □ Bad capacitor □ Bad relay □ Bad overload □ All good

STATION 4: Insulation Resistance Test (Megger)

Step	Task	Reading	Pass/Fail
1	Unplug unit. Access to compressor terminals (C, R, S).		
2	Remove wires from terminals.		
3	Set megger to 500V.		
4	Test terminal C to ground (compressor body).	___MΩ	>1 MΩ?
5	Test terminal R to ground.	___MΩ	>1 MΩ?
6	Test terminal S to ground.	___MΩ	>1 MΩ?

Fault identified (check one): □ Compressor grounded (replace) □ Acceptable

Teacher Evaluation (Skills):

Criteria	Pass/Fail
Correctly set multimeter to appropriate range	
Measured voltage correctly (leads in correct positions)	
Performed continuity test correctly	
Discharged capacitor before testing	
Performed megger test safely (no touching leads during test)	
Correctly identified the fault at each station	

PART C: ATTITUDE (15 minutes)

Complete the safety scenarios and pledges.

C1. Safety Violation Spotting (10 minutes)

For each scenario, identify the violation and explain the correct procedure.

Scenario	Violation(s)	Correct Procedure
The technician checks voltage on a live unit while standing on a wet floor.		
The technician removes a capacitor with bare hands and throws it in the trash.		
The technician says, "I'm just testing voltage. I don't need to unplug it."		
The technician removes wires without taking a photo or labeling them.		

C2. Lock-Out/Tag-Out Knowledge (5 minutes)

Answer the following:

1. Why is it not enough to just turn off the selector switch?
2. What should you do if you are working on a unit and someone else might accidentally plug it back in?
3. Draw a sample lock-out tag below (or describe what it should say):

V. Synthesis (5 minutes)

Write 3-5 sentences answering the question below.

Why do some experienced technicians become complacent about electrical safety? How can you avoid this mindset?