

Lesson Exemplar in Electrical Installation and Maintenance (EIM)

Quarter 1

LE

2.1

Lesson Exemplar for Electrical Installation and Maintenance

Quarter 1: LC 2. Discuss the electrical plans, tools and requirements for roughing-in, wiring and cabling works

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UNIT LESSON EXEMPLAR			
Learning Area	Electrical Installation and Maintenance	Grade Level	11
Semester	First	Quarter	First

I. OBJECTIVES *(Identifying the Goals)*

Content Standard	The learners demonstrate an understanding of roughing-in activities for residential/building wiring systems.
Performance Standard	The learners perform roughing-in activities for residential/building in accordance with PEC standard.

(These parts shall be accomplished per topic)

Learning Competencies	LC 2. Discuss the electrical plans, tools and requirements for roughing-in, wiring and cabling works.
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II. REFERENCES and MATERIALS <i>(Selecting Resources and Material)</i>	<p><u>TESDA Training Regulation EIM NC 2, s. 2015 Curriculum Guide</u></p> <p>Technical Education and Skills Development Authority (TESDA). Training Regulations for Electrical Installation and Maintenance NC II (Amended). Promulgated Dec. 16, 2015. https://tesda.gov.ph/Downloadables/TR-Electrical%20Installation%20and%20Maintenance%20NC%20II.pdf Technical Education and Skills Development Authority (TESDA). Training Regulations for PV Systems Installation NC https://e-tesda.gov.ph/course/index.php?categoryid=1287</p>
	<p><u>Activity Materials</u></p> <p>✓ A Socialized Classroom Discussion</p> <ul style="list-style-type: none"> <input type="checkbox"/> Manila paper or meta cards with selected symbols and plan snippets <input type="checkbox"/> Electrical plan legend / glossary (optional handout or visual aid) <input type="checkbox"/> Markers <input type="checkbox"/> Group discussion roles (Leader, Secretary, Reporter, Timekeeper) <input type="checkbox"/> Tape or board for posting outputs

III. CONTENT <i>(Sequencing Content)</i>	1. Electrical Plans <ul style="list-style-type: none"> • Wiring diagram interpretation
IV. OBJECTIVES <i>(Setting Clear Objectives and Analyzing the Tasks)</i>	<p><i>By the end of the lesson, the learner must be able to:</i></p> <ol style="list-style-type: none"> 1. Define Electrical plans. 2. Discuss different electrical symbols. 3. Interpret Electrical plans
IV. PROCEDURES	ANNOTATION
A. Activating Prior Knowledge (10mins)	<p>A.1 Activating Prior Knowledge</p> <p>Begin the class with a KWL chart: What I Know – What I Want to Know – What I Learned.</p> <p>OPTION 1. 1.1. Brainstorming / KWL Chart</p> <p>Strategy: Ask students to fill out a KWL chart: K – What do you already know about wiring diagram? W – What do you want to know? L – What did you learn? (to be completed after the lesson) Example: - What comes into your mind when you hear the term <i>wiring diagram</i>?</p> <p>OPTION 2. 1.2. Real-life Connections</p> <p>Strategy: Start with a discussion about experiences at home or in the community. Example: What fixtures can you see in your house? How do you think they are connected? (This connects familiar situations to formal concepts like wiring or cabling).</p> <p>OPTION 3. 1.3. Use Images</p> <p>Strategy: Let the learners bring a copy of blueprint of electrical plan Activity: “Look at your electrical diagram— Have you seen this kind of diagram before (showing blueprint)?</p> <p><i>The teacher will choose one activity from the three options based on the context and the types of learners. After the selected activity has been completed, they will answer the processing questions.</i></p> <p><i>In this part of the lesson, the SHS IDF present in this plan is reflective and ideational. Reflective because the teacher’s questions will encourage learners to connect their personal experiences or previous encounters with wiring diagrams, either from home, media or in the school allowing them to evaluate and expand their existing knowledge. Ideational since learners are prompted to express their thoughts and prior knowledge about wiring diagrams, fostering a deeper understanding of the subject matter.</i></p> <p><i>Furthermore, the lesson adopts the following: Relevant, as learners make direct connections between the lesson on electrical diagrams and familiar</i></p>

	<p>What do you think this diagram is used for? This helps students recall and link their visual memory with new terms and concepts.</p> <p>Pair-sharing discussion (10 minutes) on what they observe in the diagram What are the common electrical symbols present in the diagram? What do you think this is used for?</p> <p>A.2 Establishing the Purpose of the Lesson Connect to Real-Life Context:</p> <p>Learners understand what they're expected to learn and why.</p> <ul style="list-style-type: none"> - How can this help you in real life? - What could happen if a wiring system isn't properly planned or followed? - What jobs or careers involve reading or creating these plans? <p><i>"I think our activity has teach you the relevance of planning and being safe and this leads learning to electrical plans.</i></p>	<p><i>real-life contexts such as home and community electrical setups.</i></p> <p>Responsive, because the strategies are adapted to the learners' backgrounds and lived experiences, allowing them to feel recognized and actively involved in the learning process. Explore – Learners investigate and examine diagrams or blueprints, asking questions and forming hypotheses about their functions. Lastly, Collaboration – Through pair-sharing and group discussions, students exchange ideas, clarify concepts, and learn from one another.</p> <p><i>The teacher will tell to the class:</i></p> <p><i>"By the end of the lesson, the learner must be able to"</i></p> <ol style="list-style-type: none"> 1. Define Electrical plans. 2. Discuss different electrical symbols. 3. Interpret Electrical plans
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B. Instituting New Knowledge (25mins)

B1. Presenting Examples

1.1. Example of an Electrical Plan (Drawing)

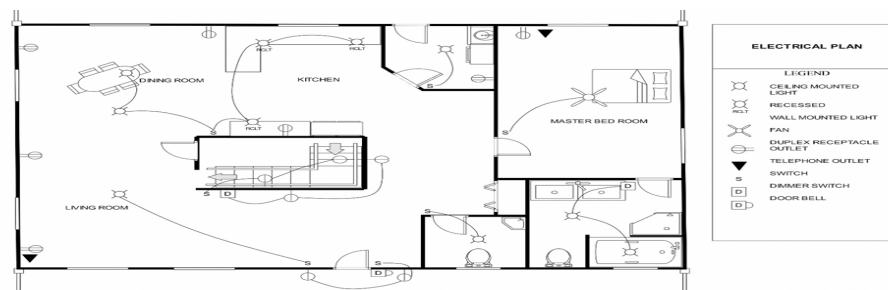


Figure 1. Schematic diagram of electrical plan

Electric plan is a detailed drawing that shows the layout of electrical wiring, components, and devices in a building or structure. It serves as a guide for electricians to properly install electrical systems according to safety standards and functional requirements.

Electrical symbols are standardized icons or drawings used in electrical plans to represent various electrical components such as switches, outlets, lights, and wires. These symbols help electricians and engineers understand the design and ensure accurate installation.

Common Electrical Symbols and Their Meanings

Below is a list of common electrical symbols used in residential and building wiring plans, along with their names and meanings. These symbols are essential in reading and interpreting electrical plans for safe and efficient installation

Symbol	Name	Meaning
●	Lighting Outlet	Represents a light or bulb outlet
■	Duplex Convenience Outlet	Standard wall outlet for appliances

This part of the lesson is designed to provide learners with a **visual and conceptual understanding** of an electrical plan and the **standard symbols** used in the trade.

What the teacher should do:

- Begin by **displaying a sample electrical plan drawing**—preferably from an actual residential or classroom wiring layout.
- Explain that the **purpose** of the plan is to guide the safe and organized installation of electrical systems.
- Highlight and **define key parts** of the plan, such as circuit lines, switch placements, outlets, lighting fixtures, and legends.
- Introduce **standard electrical symbols** one by one (e.g., switch, outlet, light bulb, ground, circuit breaker) using a **printed chart, slide, or projector**.
- Emphasize the **importance of standardized symbols** in ensuring clear communication and error-free installation, especially when professionals from different backgrounds collaborate.

○	Single Convenience Outlet	Single socket outlet
S	Single Pole Switch	Controls one light or outlet from one location
S3	Three-Way Switch	Controls one light from two locations
S4	Four-Way Switch	Controls one light from three or more locations
⚡	Circuit Breaker	Interrupts electrical flow for safety
■	Junction Box	Point where multiple wires are joined
□	Ceiling Fan	Represents a ceiling fan location
□	Panel Board	Location of circuit breakers or fuses
—	Wiring Line	Path of electrical wiring shown as lines
⏏	Ground Symbol	Indicates grounding connection for safety
Δ	Bell/Buzzer	Represents a doorbell or buzzer
*	Fluorescent Lamp	Symbol for a fluorescent light fixture
⊗	Wall Lamp	Represents a wall-mounted light fixture
⊙	Ceiling Mounted Lamp	Ceiling-mounted lighting outlet

Sources: https://www.rapidtables.com/electric/electrical_symbols.html
<https://www.tlc-direct.co.uk/Technical/Symbols/Index.htm>

B2. Discussing the Concept

Socialized Classroom Discussion

“Decode & Discuss: Making Sense of Electrical Plans”

Procedure:

1. Group Task Setup

Learners will be grouped into 3-5. Each group receives a set of 3–4 unfamiliar or essential **symbols, lines, or components** from the plans they previously analyzed.

2. Term Discovery Challenge (5 mins)

- Encourage students to **ask questions** about unfamiliar symbols and **relate them to real-life applications** (e.g., identifying them at home or in school).
- Optional: Provide students with **blank floor plans** and ask them to place symbols based on a simple scenario (like wiring a bedroom or classroom).


Goal of this segment: Ensure learners recognize and understand the function of electrical symbols in context and appreciate the role of electrical plans in actual fieldwork.


The teacher's role here is to act as a facilitator—circulating during group analysis, prompting deeper thinking, and ensuring on-task behavior. This student-centered approach also provides the teacher with authentic opportunities for formative assessment.

*This game-based activity—develops collaboration, careful planning, and safety awareness in the context of interpreting electrical plans. It is **relevant** (as it mirrors real-world EIM*

	<ul style="list-style-type: none">○ Each group discusses their assigned items and collaboratively defines what those symbols or components represent in an electrical plan.○ They'll also identify where they encountered them during the Gallery Walk and how those elements function in a real layout.○ They write definitions and explanations on meta cards or manila paper for sharing. <p>3. Socialized Discussion Round (5 mins)</p> <ul style="list-style-type: none">○ Groups take turns presenting and explaining their assigned plan elements to the class.○ After each presentation, open the floor for questions, clarifications, or validation from other groups (prompt students to agree/disagree and give reasoning).○ Encourage connections like: “Do you think this symbol is always placed before an outlet?” or “What would happen if this wasn’t included in the plan?” <p>4. Teacher Clarification & Reinforcement</p> <p>After all groups present, the teacher highlights common misconceptions, reinforces standard PEC symbols, and summarizes key points.</p> <p>B3. Developing Mastery</p> <p>3.1. Wiring Race: Circuit Relay Challenge</p> <p>Using Figure 1. Schematic diagram of electrical plan</p> <p>Learners will work in teams to interpret simplified electrical diagrams and simulate correct wiring paths using color-coded strings or yarn, symbol cards (e.g., switch, outlet, light), and blueprint mats—while following safety rules and proper sequencing. Let the learners execute the game. Evaluate how was team were able to succeed? Why did they fail?</p>	<p><i>blueprint interpretation and application) and reflective (as learners assess their group strategies and recognize wiring and safety mistakes). It is inclusive, allowing all learners to participate through hands-on and visual roles, and integrative, as it fuses technical knowledge with soft skills like teamwork and communication. The task fosters contextual learning by grounding the activity in familiar real-life scenarios, and builds strong connections between theory and practical use. Learners are engaged through competition and peer collaboration, and they experience blueprint interpretation in a safe, simulated environment that mimics real-life wiring layout challenges.</i></p> <p><i>Note:</i></p> <ul style="list-style-type: none">✓ Ensure teams use correct symbol placements and string connections.✓ Monitor for teamwork, sequencing, and understanding of components.✓ Use debriefing to reinforce safety and layout logic.✓ Consider a short oral or written check-in after the activity.
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<p>C. Demonstrating Knowledge and Skills (10mins)</p>	<p><u>1) Finding Practical Application</u></p> <p>Activity 1: Symbol Matching Instructions: Match the electrical symbols (numbered) to their correct names and functions (lettered). Write the letter that corresponds to the correct description.</p> <ol style="list-style-type: none"> 1. ____ Switch 2. ____ Duplex Outlet 3. ____ Lighting Fixture 4. ____ Junction Box 5. ____ Ground Symbol <p>Choices:</p> <p>A. Connects the circuit to the ground for safety. B. Allows or interrupts the flow of electric current. C. Used to illuminate an area. D. Provides two socket connections for appliances. E. Protects and joins electrical wires inside a circuit.</p> <p>Activity 2: Draw and Label Electrical Symbols Instructions: Draw the following symbols neatly and accurately. Label each one.</p> <ol style="list-style-type: none"> 1. Switch ✎ _____ 2. Duplex Outle ✎ _____ 3. Lighting Fixture ✎ _____ 4. Junction Box ✎ _____ 5. Ground Symbol ✎ _____ <p>Activity 3: Error Hunt in a Sample Wiring Diagram. Instructions: Examine the sample wiring plan given by your teacher. Identify at least three (3) errors. List and explain the corrections below.</p>	<p>Identify and understand the functions of basic electrical symbols.</p> <p>Demonstrate ability to draw and label electrical symbols correctly.</p> <p>Analyze and critique a faulty wiring diagram</p> <ul style="list-style-type: none"> • Task: Groups receive a sample wiring plan with 3–5 intentional errors (e.g., wrong symbol used, improper placement). • Instructions: Identify and explain each error and suggest the correction. <p><i>Output:</i> Group presentation or write-up.</p>
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	Error # 1. 2. 3.	What's Wrong? 	What Should Be Corrected? 	
	<p><u>2 Making Generalization</u></p> <p>1. Reflective Discussion Questions (Class Wrap-Up) Ask learners to answer the following in pairs or small groups before sharing with the class:</p> <ul style="list-style-type: none"> • What did you learn about electrical plans that you didn't know before? • Why is it important to understand the types of wiring and cabling in a household or building? • How do wiring diagrams help electricians in their work? • If you were to explain a household wiring plan to someone at home, how would you do it? <p>2. Concept Mapping (Visual Generalization Activity)</p> <p>Instructions for Learners:</p> <ul style="list-style-type: none"> • Draw a concept map starting with the central idea:  "Electrical Plans and Wiring Diagrams" • Branch out to key topics such as: <ul style="list-style-type: none"> ◦ Symbols Used • Include arrows to show relationships (e.g., "used for," "helps with," "requires understanding of") 			<p><i>This lesson includes several activity choices to support learning. You may:</i></p> <p>Select the most suitable activity based on your learners' needs and time.</p> <p><i>These reflection questions help learners connect concepts to real-life situations and allow for deeper personal insight. They also reinforce the purpose of the lesson through peer sharing.</i></p> <p><i>This visual activity helps consolidate understanding by showing how the parts of the lesson connect. It can also serve as a formative assessment tool.</i></p>
	<p><u>3 Evaluating Learning</u></p> <p>Total: 10 points</p> <p>Name: _____</p> <p>Date: _____</p>			<p><i>To assess learners' understanding and practical application of electrical plans and electrical work concepts through a written quiz, performance task, and reflection.</i></p>

	<p>I. Multiple Choice (1 point each – 5 points)</p> <p>Choose the letter of the correct answer.</p> <ol style="list-style-type: none"> Which of the following is the symbol used to represent a light bulb in an electrical plan? A. <input type="checkbox"/> B. <input type="radio"/> C. * D. ⚡ What type of wiring is commonly used in residential houses for lighting and outlets? A. Coaxial B. Fiber optic C. Non-metallic sheathed cable (NM) D. Ethernet cable What is the purpose of a wiring diagram? A. To measure current B. To install circuit breakers C. To show the layout of electrical connections D. To repair broken appliances Which color wire is typically used for grounding? A. Red B. Black C. White D. Green What is the Philippine standard guide used in electrical installation? A. IEC B. PEC C. PSE D. ISO 	<p>Short Written Quiz</p>
	<p><u>4) Additional Activities (as take home activity)</u></p> <p>Part 1: Enrichment Activities (Choose one if you finish early or want to challenge yourself)</p> <p><input type="checkbox"/> Mini Project – Design Your Own Electrical Plan Create a basic electrical layout for a bedroom, kitchen, or small store. Include at least 5 symbols and a materials list.</p>	<p> General Instructions:</p> <ul style="list-style-type: none"> Explain that these activities are self-paced and interest-based, but completion of at least one per category (over time) is encouraged. Use these activities as early finisher tasks, supplementary homework, or alternative assessments. Prepare materials (e.g., flashcards, worksheets, access

	<p>Part 2: Reinforcement Activities (To review and strengthen your understanding)</p> <p><input type="checkbox"/> Electrical Plan Reading Practice Study a sample plan. Identify and label outlets, switches, and light fixtures. Write how many of each are included.</p>	<p>to videos or Tinkercad) in advance.</p> <ul style="list-style-type: none"> Allow students to choose activities based on their readiness and learning needs.
<p>V. ASSESSMENTS</p> <p><i>(Assessing Learnings)</i></p>	<p>I. MULTIPLE CHOICE</p> <p>(Choose the letter of the correct answer. Write your answer on the space provided before each number.) (1 point each – 15 points)</p> <ol style="list-style-type: none"> What is the main purpose of an electrical wiring diagram? <ul style="list-style-type: none"> A. To calculate voltage B. To locate electric meters C. To guide in making electrical connections D. To repair electrical tools Which symbol is typically used to represent a lighting outlet in a wiring plan? <ul style="list-style-type: none"> A. ○ B. ■ C. * D. ■ What code or standard is followed for electrical installation in the Philippines? <ul style="list-style-type: none"> A. IEEE B. PEC C. ISO D. IEC What type of wire is most commonly used for lighting installations in homes? <ul style="list-style-type: none"> A. THHN B. Coaxial C. Fiber optic D. Romex (NM cable) In a wiring diagram, what does a zigzag line usually represent? <ul style="list-style-type: none"> A. Switch B. Conduit C. Ground D. Resistor What does the green wire typically indicate in residential electrical systems? <ul style="list-style-type: none"> A. Live wire B. Ground wire C. Neutral wire D. Hot wire What device is used to control the ON and OFF function of a lighting circuit? <ul style="list-style-type: none"> A. Receptacle B. Circuit breaker C. Switch D. Lamp holder Which of the following tools is used to remove the insulation of wires safely? <ul style="list-style-type: none"> A. Long nose pliers B. Wire stripper C. Hacksaw D. Screwdriver 	

9. In an electrical plan, the line that shows the route of the wire is called:
 A. Circuit line
 B. Plan line
 C. Wire line
 D. Raceway
10. What kind of drawing shows the placement and connection of electrical components?
 A. Plumbing plan
 B. Location plan
 C. Electrical plan
 D. Site plan
11. Why is a wiring plan important in electrical installations?
 A. For appliance repair
 B. For painting walls
 C. For safe and efficient electrical work
 D. For battery replacement
12. Which of the following is NOT commonly found in an electrical plan?
 A. Outlet B. Switch C. Foundation beam D. Circuit line
13. What color is typically used for neutral wires in residential wiring?
 A. Red B. Black C. White D. Blue
14. What does “PEC” stand for in Philippine electrical practice?
 A. Philippine Electrical Code
 B. Primary Electrical Current
 C. Professional Electrical Course
 D. Practical Engineering Criteria
15. What do we call the section of an electrical plan that explains the meaning of each symbol?
 A. Index B. Diagram C. Legend D. Schedule

Lesson Assessment: Electrical Installation and Maintenance – Electrical Plans and Wiring Diagrams
Answer Key.

1. C	6. B	11. C
2. A	7. C	12. C
3. B	8. B	13. C
4. D	9. A	14. A
5. D	10. C	15. C

II. SKETCH AND LABEL

(Each item is worth 1 point – 5 points)

Rubric: Drawing and Labeling Electrical Symbols

Activity: Draw and label five (5) basic electrical symbols. Choose from the following: Switch, Duplex Outlet, Lighting Fixture, Junction Box, Ground Symbol.

Criteria	Excellent (4 pts)	Good (3 pts)	Fair (2 pts)	Needs Improvement (1 pt)
Accuracy of Symbols	All 5 symbols are correct and conform to standard electrical symbols.	4 symbols are correct and standard.	2–3 symbols are correct and standard.	Only 0–1 symbol is correct or recognizable.
Labeling	All 5 symbols are correctly and clearly labeled.	4 symbols are correctly labeled.	2–3 symbols are labeled correctly.	0–1 correct label or labeling is missing/incorrect.
Neatness and Clarity	Drawing is very neat, clear, and easy to understand.	Drawing is mostly neat and understandable.	Drawing is somewhat messy but still readable.	Drawing is messy and hard to understand.
Completeness	All 5 required symbols are drawn and labeled.	4 symbols drawn and labeled.	2–3 symbols drawn and labeled.	Fewer than 2 symbols drawn and labeled.
Effort and Presentation	Shows outstanding effort and attention to detail.	Shows good effort.	Minimal effort shown.	No evident effort or rushed work.

Scoring Guide:

16–20 points – Outstanding

11–15 points – Good

6–10 points – Needs Improvement

1–5 points – Poor

VI. REFLECTION

Sample reflection questions that learners can answer after completing the unit:

Reflection Questions

<i>(Feedback and Continuous Improvement)</i>	<ol style="list-style-type: none"> 1. What new knowledge or skills did you gain from learning about electrical plans <i>(Encourages learners to recall and internalize key takeaways.)</i> 2. What part of the lesson did you find most challenging, and how did you overcome it? <i>(Promotes self-awareness and learning from struggle.)</i> 3. How can you apply what you learned in real-life situations at home or in future work as an electrician? <i>(Helps learners connect theory to practical, real-world use.)</i> <p>Teacher's Reflection Questions</p> <ol style="list-style-type: none"> 1. Were the learners able to identify and correctly draw the five basic electrical symbols? What does this tell me about their understanding of electrical plans? 2. Which parts of the lesson were most difficult for my students to grasp, and what strategies did I use to help them? 3. How effectively did the activity engage the students in meaningful learning? What could be improved in future lessons? 4. Did the learners demonstrate the ability to connect this lesson to real-life applications? How can I better facilitate this connection next time? 5. What adjustments should I make to improve this lesson's delivery and assessment for diverse types of learners?
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