

DOMESTIC APPLIANCE MAINTENANCE

Lesson 4: Teacher's guide

Neon tester and its working principle



A. Making safe use of neon tester



B. Competencies

Main competencies:

- Safely handle simple tools, electrical components, and potentially hazardous materials.
- Identify and mitigate potential electrical hazards in appliances and work environments.
- Use basic tools safely for maintenance and repairs of domestic appliances.
- Recognise when a problem requires the expertise of a qualified technician and avoid attempting repairs beyond one's skill level.

Sub competencies:

1. Demonstrate proper handling of basic tools (e.g., screwdrivers, pliers).
2. Recognise common electrical hazards (e.g., exposed wires, water near appliances).
3. Select appropriate tools for the task (e.g., screwdriver for screws, pliers for wires).
4. Follow safety precautions while using tools.
5. Avoid attempting dangerous or complex repairs that require professional training.
6. Identify complex issues that are beyond their ability to repair.

C. Learning outcomes

By the end of this lesson students should be able to show an understanding of:

1. how to safely use a neon tester
2. understand its working principle
3. recognise its importance as a tool for electrical safety

D. Resources and materials

For demonstration by the teacher:

- Neon tester
- access to a wall socket (if safe and supervised).

For worksheet:

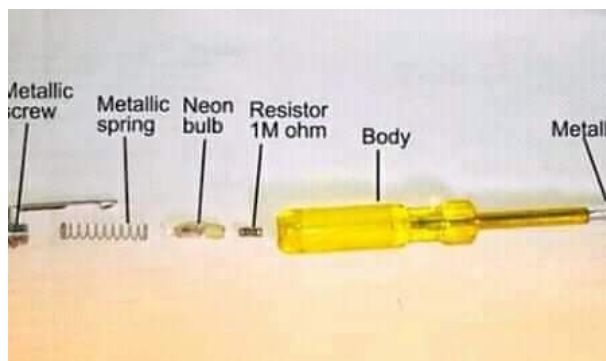
One neon tester for each group.

E. Implementation guidelines

Introduction

1. Begin with a brief discussion about electrical safety:
 - Ask students: “How do we know if a wire or socket is live (has electricity)?”
 - Introduce the neon tester as a simple tool that is used to check if electricity is present in wires, sockets, or switches.
 - Explain that this tool helps electricians and homeowners to work safely by identifying live wires.
2. Discuss safe practices when using a neon tester:
 - Always hold the screwdriver by the plastic handle.
 - Never touch the metal tip directly.
 - Do not use the screwdriver on high-voltage systems.
 - Neon testers are only for testing low-voltage circuits or household sockets (240 V).
 - Keep the screwdriver dry and avoid using it in wet conditions.

3. Show students a neon tester and point out its parts:



- The tip (metal part that touches the wire/socket).
 - The handle (plastic casing with a neon bulb inside).
 - The metal cap (where your finger goes).
 - Its carbon resistor and its importance
4. Inform students to check for the presence of the resistor in the Neon tester before using it and highlight the safety aspect of this.

Activity: Demonstration of how the Neon tester works (OPTIONAL)

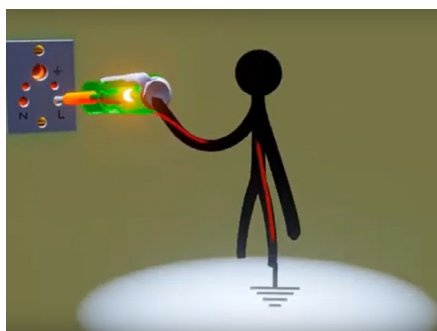
Teacher may opt for this demonstration activity if they consider it safe to be carried out in the class and they should not involve students in the demonstration.

There will be no live test of appliances during maintenance throughout the whole implementation of this elective.

Instructions:

1. Demonstrate how the neon tester works:
 - Hold the screwdriver by its handle and place your thumb or first finger on the metal cap.
 - Touch the tip of the screwdriver to the exposed wire or socket.
 - Ask students to observe whether the neon bulb lights up.
 - If the wire/socket is live, the neon bulb inside the screwdriver will glow.
 - Test both live and non-live wires/sockets to show the difference.

INFORM THE STUDENTS THAT THEY SHOULD NOT TRY THIS (DEMONSTRATION) ON THEIR OWN AT HOME



2. Explain the working principle:

- When the tip touches a live wire, a small current flows through the neon bulb to your body to the ground, making it glow.
- The current is very small and safe because it passes through a carbon resistor before and then to your body to the ground (your body acts as part of the circuit).
- Emphasize that the tool is designed to be safe for this purpose but should be used properly.

Reminder of the Safety Aspect:

- Remind students that neon testers are only for testing low-voltage circuits or household sockets.
- Never use the screwdriver on high-voltage systems.
- Always keep the screwdriver dry and avoid using it in wet conditions.

Conclusion

- Recap the key points:
 - A neon tester is a tool used to check if a wire or socket is live.
 - It works by allowing a small current to flow through the neon bulb, making it glow.
 - Always use the neon tester safely and follow proper practices.
- Ask students to share one thing they learned about the neon tester today.

F. Assessment(in worksheet)

Provide each group of students with a neon tester

G. Extension Activity

Teacher can provide students with a faulty neon tester (e.g., one with a burnt-out neon bulb or a broken resistor) and explain the importance of performing a continuity test to verify that the neon tester is functioning properly before using it to determine whether a wire is live.

Highlight the risks associated with using a faulty neon tester, emphasizing the potential danger of incorrect live wire detection and the importance of verifying the tool's functionality before use.