

DOMESTIC APPLIANCE MAINTENANCE

Lesson 2: Teacher's guide

Voltage Ratings and Continuity Test



A. Understanding the importance of correct voltage ratings for the proper and safe operation of an electrical device



B. Competencies

Main competency: Identify and mitigate potential electrical hazards in appliances and work environments.

Sub competencies:

1. Recognise common electrical hazards (e.g., exposed wires).
2. Correctly identify components such as switches, fuses, wires, and bulbs in electric circuits.

C. Learning outcomes

By the end of this lesson, students should be able to:

1. explore the effects of mismatched voltage ratings
2. perform a continuity test using a multimeter

D. Resources and materials

Set of items for students working in groups of 4:

For Activity 1:

- Two 1.5 V cells type C cell and holder
- Connection wires
- Switch
- Bulbs of different voltage ratings (e.g., 3.0 V and 6 V)
- Bulb holders

For Activity 2:

- One multimeter
- Connection wires
- Bulbs

For worksheet:

- Four 1.5 V cells type C cells and cell holders
- Connection wires
- Switch
- Three identical 3.0 V bulbs and bulb holders
- One fused bulb (which appear identical to the other bulbs)

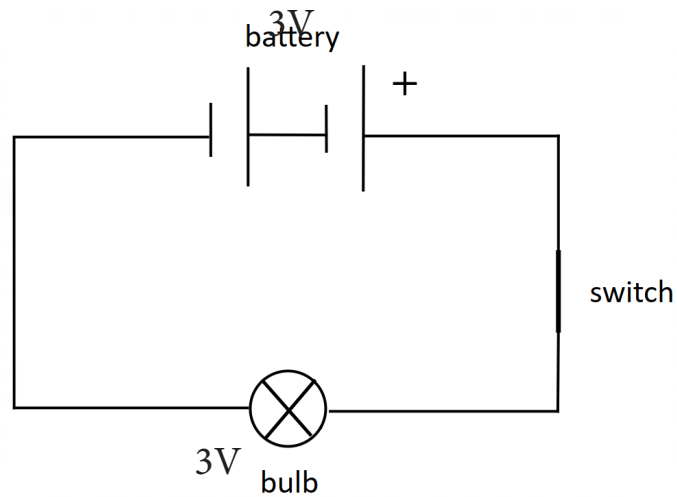
E. Implementation guidelines

Introduction

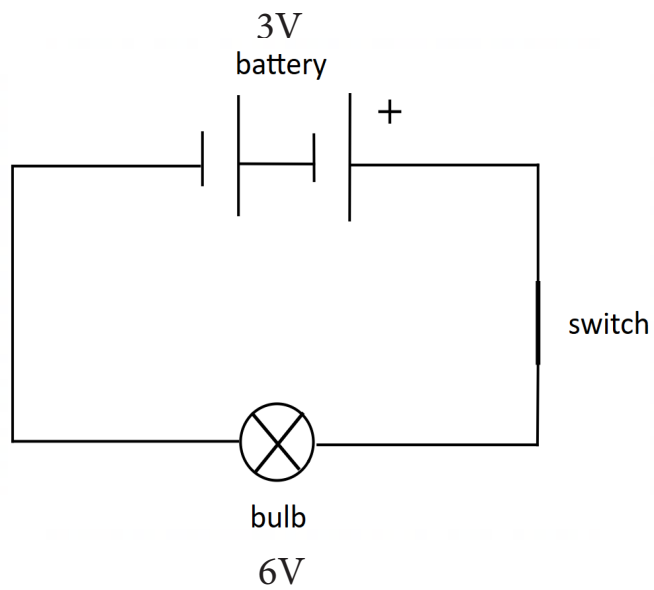
- Begin with a brief discussion on electrical safety:
- Discuss what happens if a bulb is connected to a voltage higher or lower than its rating.

Activity 1: Exploring Bulb Voltage Ratings

1. Provide each group with two 1.5 V cell and two bulbs: one rated for 3.0 V and another rated for 6 V.
2. Ask students to connect the 3.0 V bulb to the circuit and observe what happens.



3. Repeat step 2 by replacing the 3.0 V bulb with the 6 V bulb.

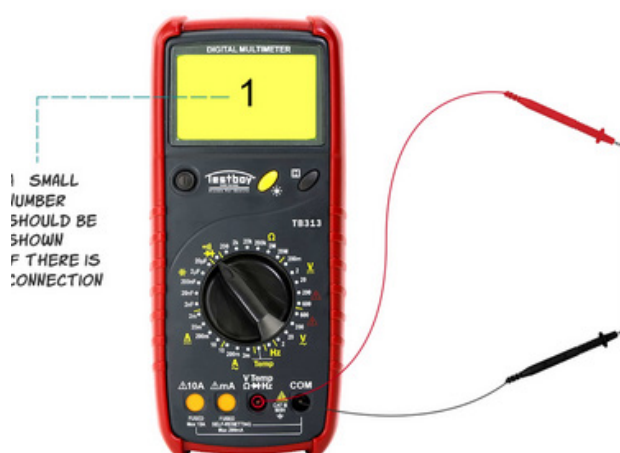


4. Discuss the results:
- Why does the 3V bulb light up normally?
 - Why does the 6 V bulb either not light up or lights up dimly?
 - Use analogies (e.g., water pressure) to explain why mismatched voltages don't work well.

Activity 2: Continuity Test Using a Multimeter

Instructions:

1. Demonstrate how to use a multimeter to check for continuity in a wire.
 - Set the multimeter to the continuity mode.
 - Touch the probes to both ends of the wire and listen for a beep (indicating continuity).



2. Advise students that this technique can be used to test their wires and bulbs to ensure they are functioning correctly before constructing any circuit.

Provide labelled diagrams of the multimeter settings and guide the student through the process step by step.

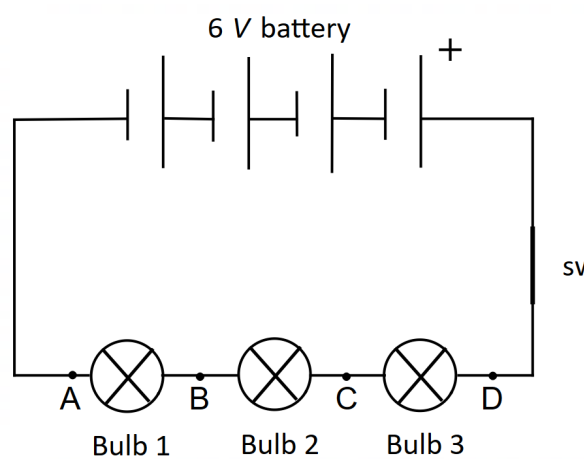
Conclusion

- Recap the key points:
 - Importance of using the correct voltage for bulbs.
 - How series circuits work and their limitations.
 - The role of continuity testing in ensuring safe and functional circuits.
- Encourage students to reflect on what they learned about safety and troubleshooting.
- Always match the bulb voltage to the power source to ensure safe and efficient operation.

F. Assessment(in worksheet)

Note to the teacher:

Set up the circuit as shown below. Bulb 3 must be a fused/blown out bulb. Students will be required to identify the faulty bulb.



G. Extension activity

1. For advanced learners: Ask them to identify and explain why a broken wire or burnt-out bulb would fail the continuity test.
2. In worksheet.