

Building and drawing simple circuits

Grade 6 science (Year 7 · Class 6) · Worksheet

Name: _____ Date: _____ Class: _____

These problems train you to name circuit components, decide whether a circuit is open or closed, read and use circuit symbols, and classify conductors and insulators. They end with fault-finding, design and evaluation tasks.

The worksheet suits Grade 6, Year 7 and Class 6 students working with NGSS middle school physical science or similar curricula.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-PS2-3

Problem 1 Component jobs (easy)

Match each component with its job: cell, bulb, switch, wire.

1. It carries the current between components.
2. It opens or closes the circuit.
3. It gives out light.
4. It provides the energy that pushes the current.

Problem 2 Conductor or insulator? (easy)

Classify each object as a conductor or an insulator: copper wire, rubber glove, aluminium foil, glass tumbler, steel spoon, wooden pencil case.

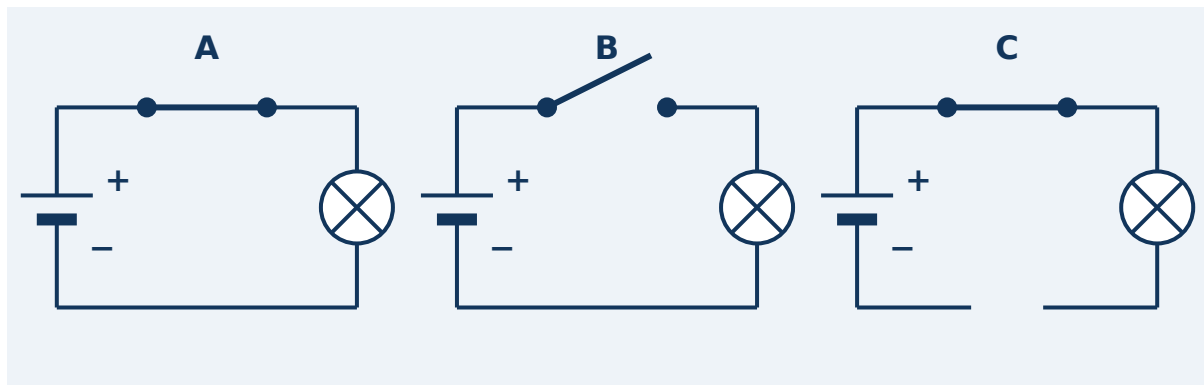
Problem 3 Will it light? (easy)

A cell, a bulb and a switch are joined by wires. State whether the bulb lights in each case.

1. The switch is closed and all wires are joined.
2. The switch is open.
3. One wire is cut in the middle.
4. The cell is taken out of the circuit.

Problem 4 Comparing three circuits (easy)

The figure shows three circuits.



Three circuits to compare. None of the bulbs is drawn lit.

1. State which bulb will light.
2. Name the reason the bulb in B stays off.
3. Name the reason the bulb in C stays off.

Problem 5 The torch switch (easy)

Chiamaka's torch in Lagos has a plastic case and a metal switch strip.

1. Explain why a torch needs a switch.
2. Explain why the case is made of plastic.

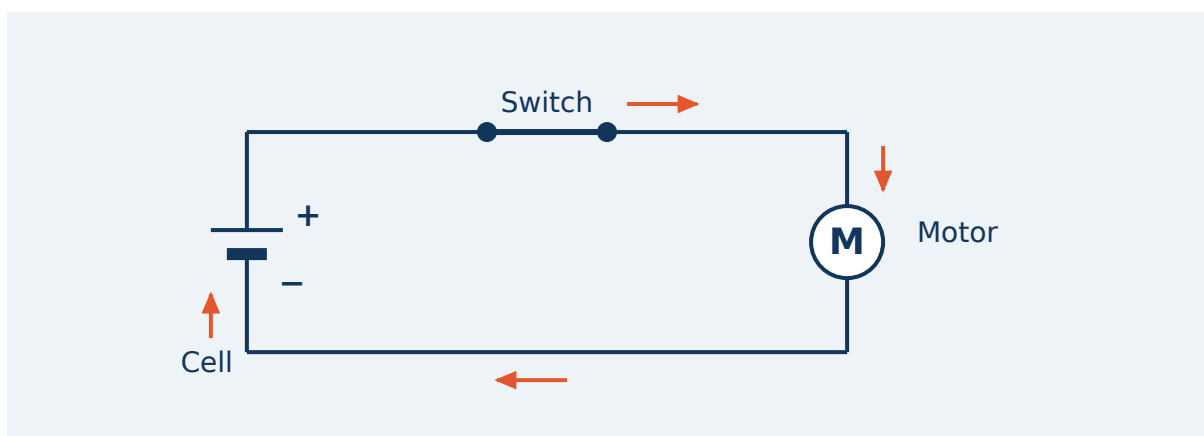
Problem 6 Safe or not? (easy)

Bilal asks if he can use a mains socket in Lahore to test whether a wire conducts.

1. Give your answer.
2. Explain why.
3. State a safe source to use instead.

Problem 7 Circuit with a motor (medium)

The figure shows a circuit with a motor.



A circuit with a motor.

1. Name the three components.
2. Describe the path of the conventional current.
3. State what happens to the motor when the switch is opened, and why.

Problem 8 Testing objects (medium)

Hina tests objects in a tester circuit.

Object	Bulb
Steel key	Bright
Plastic comb	Off
Copper coin	Bright
Rubber band	Off
Pencil lead	Dim
Glass marble	Off

1. List the conductors.
2. List the insulators.
3. Explain what the dim bulb tells you.

Problem 9 Missing return wire (medium)

Kofi connects a wire from the positive end of a cell to a bulb but does not connect the bulb back to the cell. He says: "The electricity goes one way, so the bulb will light."

1. Explain what is wrong with his idea.
2. Say how to fix the circuit.

Problem 10 Faulty circuit (medium)

Wanjiru's bulb will not light. The switch is closed and the wires are joined, but the bulb is only loosely screwed into its holder.

1. Explain why the bulb stays off.
2. Describe how to test that the cell is not the problem.

Problem 11 Choosing materials (medium)

Choose the best material for each use: copper, plastic or rubber.

1. The metal core of a phone charger wire.
2. The case of a plug.
3. The handle of an electrician's screwdriver.

Problem 12 Testing a material (medium)

The figure shows a tester circuit with a gap.



A tester circuit used to find out whether a material conducts.

1. State what the bulb must do for the material to be a conductor.
2. Predict the result for a steel paper clip, a rubber band and an aluminium strip.
3. Explain your predictions.

Problem 13 Complete the paragraph (medium)

Complete the paragraph using these words: closed, insulator, cell, switch, conductor.

"A bulb lights only when the circuit is __ (1) __. The __ (2) __ provides the energy. A __ (3) __ can open the circuit. Copper is a __ (4) __ and rubber is an __ (5) __."

Problem 14 Kites and power lines (medium)

Bilal flies a kite in Lahore. The string gets tangled in an overhead power line.

1. Explain why he must not pull on the string.
2. Explain why a wet string is more dangerous than a dry one.

Problem 15 Building a circuit (medium)

Put these steps in a sensible order for building and testing a circuit: (A) close the switch, (B) join the bulb, switch and cell with wires, (C) check that all connections are tight, (D) draw the circuit diagram.

1. Write the correct order.
2. Explain why the diagram comes first.

Problem 16 Predicting with a table (hard)

Predict whether the bulb lights in each circuit and give a reason.

Circuit	Cell	Switch	Bulb fitted	Wires
1	Yes	Closed	Yes	All joined
2	Yes	Closed	No	All joined
3	No	Closed	Yes	All joined
4	Yes	Closed	Yes	One loose

Problem 17 Key-activated lamp (hard)

Aarav wants a lamp that lights only when a metal key is placed across a gap in a circuit.

1. Describe the circuit using a cell, a bulb and two clips.
2. Explain why a plastic key fob would not work.
3. Name one additional safety rule he should follow.

Problem 18 Wire material data (hard)

Mei tests four wires of equal length and thickness in a circuit with one bulb.

Wire	Bulb brightness
Copper	Very bright
Aluminium	Bright
Steel	Medium
Graphite rod	Dim

1. Rank the wires from best to worst conductor.
2. Choose the best material for long wires and give a reason.
3. Explain why a wire with plastic covering is used in a house.

Problem 19 Does water conduct? (hard)

Emma wants to find out if tap water, salt water and sugar solution conduct. She has a cell, a bulb and two wires.

1. State the variable she changes and the variable she measures.
2. Name two variables she must keep the same.
3. Explain how she can make the test safe.

Problem 20 Switch position (hard)

Diego says: "If I put the switch next to the cell, the bulb will stay on, because the switch is far from the bulb."

1. Evaluate his statement.
2. Explain what happens if the switch is moved to the other side of the bulb.