# Electricity in Our World

## A. Fill in the Blanks

**Complete the sentences with the correct term from the word bank.**

1. A complete path through which electricity can flow is called a _____.

2. The "push" or electrical potential difference that causes current to flow is known as _____.

3. In a _____ circuit, there are multiple paths for the current to take.

4. An electric current is the flow of tiny particles called _____.

5. A material like rubber that does not allow electricity to pass through it easily is called an _____.

## B. Match the Following;

**Match the term or symbol in Column A with its correct description or unit in Column B.**

| Column A | Column B |
|---|---|
| 1. Voltage | A. A device that opens or closes a circuit. |
| 2. Current | B. A material that blocks the flow of electricity. |
| 3. Resistance | C. Measured in Ohms (Ω). |
| 4. Conductor | D. The symbol for a lamp or light bulb. |
| 5. Insulator | E. Measured in Volts (V). |
| 6. Switch | F. A material that allows electricity to flow easily. |
| 7. | G. Measured in Amperes (A). |

## C. Practice Problems

**Apply your knowledge of circuits and electrical concepts.**

1. What are the three essential components of a simple working circuit? _____, _____, and _____.
2. If a circuit has a voltage of 12 volts (V) and a resistance of 4 ohms (Ω), what is the current (I) flowing through it? (Formula: $V = I \times R$)

3. A light bulb has a resistance of 3 Ω and a current of 2 A is flowing through it. What is the voltage of the battery powering it?

4. Draw a simple circuit diagram for a series circuit containing one battery, one switch, and two lamps.

5. Draw a simple circuit diagram for a parallel circuit containing one battery, one switch, and two lamps.

6. In a string of old holiday lights (a series circuit), if one bulb burns out, what happens to the other lights? Why?

7. In a modern home, all the outlets in a room are wired in a parallel circuit. Why is this better than a series circuit?

8. What is the unit of measurement for electrical resistance?

9. Why are the handles of an electrician's screwdriver typically made of plastic or rubber?

10. What is the difference between an open circuit and a closed circuit?

## D. Warm-up Questions

**Answer these quick questions to get your brain buzzing!**

1. What is the flow of electrons called?

2. Name one material that is a good electrical conductor.

3. What is the purpose of a switch in an electrical circuit?

4. What are the two types of electrical circuits? _____ and _____

5. What type of electricity is responsible for a lightning strike?

## E. Challenge Questions

**Think critically and combine different concepts to solve these problems.**

1. Two resistors, one with 5 Ω and another with 10 Ω, are connected in series to a 30 V battery. What is the total resistance of the circuit? (Hint: In a series circuit, $R_{total} = R1 + R2$)

2. Using the information from the question above, what is the total current flowing out of the battery? (Formula: $V = I \times R_{total}$)

3. Explain why a bird can sit on a high-voltage power line without getting electrocuted.

4. What is the purpose of a fuse or a circuit breaker in a household electrical system? How does it work?

5. Describe the energy transformations that occur when you turn on a battery-powered flashlight.

## F. Word Problems & Application

**Connect electricity concepts to real-world situations.**

1. The Phone Charger: A phone charger supplies a current of 2 Amperes (A) to a phone. If the charger has a resistance of 2.5 Ohms (Ω), what voltage is it supplying?
2. The Toaster: A toaster is plugged into a 120 V wall outlet. It draws a current of 10 A to toast your bread. What is the resistance of the heating element inside the toaster?
3. Safety First: Maya is drying her hair with a hairdryer while standing in a small puddle of water. Explain, using the terms 'conductor' and 'insulator', why this is extremely dangerous.
4. Holiday Lights: You have two sets of holiday lights. Set A is wired in series, and Set B is wired in parallel. Which set will have all its lights go out if just one bulb breaks? Explain your answer.
5. Building a Circuit: You are given a battery, a light bulb, and a single copper wire. Can you make the bulb light up? If so, describe or draw how. If not, explain why not.

## G. True or False

1. In a parallel circuit, the electric current has only one path to follow. _____
2. The unit for measuring electric current is the Volt. _____
3. A closed switch breaks the circuit and stops the flow of electricity. _____
4. Metals like silver and aluminum are good electrical insulators. _____
5. Resistance is the measure of how easily electric current can flow through a material. _____