

Electricity and Circuits

Circuit symbols, current and potential difference, series and parallel circuits, $V = IR$ and static charge.

Name _____ Date _____ Class _____

Learning objective: I can describe and calculate current, potential difference and resistance in circuits.

✓ I can name circuit symbols ✓ I can compare series and parallel ✓ I can use $V = I \times R$

1 Circuit symbols Name each component.

1  _____	2  _____	3  _____	4  _____
5  _____	6  _____	7  _____	8  _____

2 Key ideas Use the word bank.

Word bank: smaller conductor insulator ohms parallel charge series
ammeter volts

- Current is the flow of electric _____ and is measured in amperes (amps) using an _____.
- Potential difference is measured in _____ using a voltmeter connected in _____ with a component.
- Resistance is measured in _____. A higher resistance means a _____ current for the same potential difference.
- Copper is a good electrical _____; plastic is an _____.

3 Series or parallel? Circle the correct answer.

- In a **series** circuit, the current...
(A) is the same everywhere (B) splits between branches (C) is zero
- In a **parallel** circuit, if one lamp breaks, the other lamps...
(A) all go out (B) stay on (C) get dimmer

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Potential difference = current × resistance $V = I \times R$ (V in volts, I in amps, R in ohms, Ω)

4 Use $V = I \times R$ (Year 9) Show your working.

1 $I = 2 \text{ A}$, $R = 6 \Omega$. Find V.

Answer

2 $V = 12 \text{ V}$, $R = 4 \Omega$. Find I.

Answer

3 $V = 9 \text{ V}$, $I = 3 \text{ A}$. Find R.

Answer

4 $V = 230 \text{ V}$, $R = 46 \Omega$. Find I.

Answer

5 Currents in circuits

1 A series circuit has an ammeter reading of 0.4 A next to the cell. What is the current through each lamp? [1 mark]

2 In a parallel circuit, the branch currents are 0.3 A and 0.5 A. What is the current from the cell? [1 mark]

3 Explain why the lights in a house are wired in parallel, not in series. [2 marks]

4 A balloon rubbed on a jumper sticks to a wall. Explain this using charges. [3 marks]

Answer Key

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Question	Answers
1 Circuit symbols	1 lamp; 2 cell; 3 resistor; 4 switch (open); 5 voltmeter; 6 battery; 7 ammeter; 8 motor
2 Key ideas	1 charge / ammeter; 2 volts / parallel; 3 ohms / smaller; 4 conductor / insulator
3 Series or parallel?	1 A (is the same everywhere); 2 B (stay on)
4 Use $V = I \times R$ (Year 9)	1 $V = 2 \times 6 = 12 \text{ V}$; 2 $I = 12 \div 4 = 3 \text{ A}$; 3 $R = 9 \div 3 = 3 \Omega$; 4 $I = 230 \div 46 = 5 \text{ A}$
5 Currents in circuits	0.4 A – the current is the same everywhere in a series circuit. 0.8 A – branch currents add up to the total. - Each light can be switched on and off on its own, and if one bulb breaks the others stay on; each gets the full potential difference. - Friction transfers electrons from the jumper to the balloon, so the balloon becomes negatively charged; it attracts (induces) opposite charge in the wall, so it sticks.

Teaching note: an ammeter is connected in series; a voltmeter is connected in parallel. Answers to $V = I \times R$ are computed exactly; check units are included.