Electric Circuits: Current, Voltage & Resistance

Ages 12–15 · Science

Name _____ Class _____ Date _____

A Key terms: match each term to its meaning

Write the letter of the correct meaning in the box next to each term.

1 Electric current	☐	**A** A circuit with two or more branches, where each branch has the full supply voltage and the branch currents add up.
2 Potential difference (voltage)	☐	**B** A circuit with one path, where the current is the same everywhere and the voltage is shared.
3 Resistance	☐	**C** The agreed direction of current, from the positive to the negative terminal outside the cell; electrons move the opposite way.
4 Ohm's law	☐	**D** The energy transferred per unit of charge between two points, measured in volts (V) with a voltmeter.
5 Series circuit	☐	**E** For a component at constant temperature, the current is proportional to the potential difference: V = IR.
6 Parallel circuit	☐	**F** How much a component opposes the current, measured in ohms (Ω); R = V ÷ I.
7 Conventional current	☐	**G** The rate of flow of electric charge, measured in amperes (A) with an ammeter.

B Quick quiz

Circle the best answer, write its letter, then explain your choice in a few words.

1 Where should an ammeter be connected to measure the current through a lamp?

a) In parallel across the lamp **b)** In series with the lamp
c) Across the battery only **d)** It does not matter

Answer: _____ Why? _____

2 A resistor has 12 V across it and a current of 3 A through it. What is its resistance?

a) 36 Ω **b)** 15 Ω
c) 9 Ω **d)** 4 Ω

Answer: _____ Why? _____

3 In a series circuit, the current before a lamp is 0.2 A. What is the current after the lamp?

a) 0.2 A **b)** 0.1 A
c) 0 A **d)** 0.4 A

Answer: _____ Why? _____

4 A parallel circuit has two branches carrying 0.3 A and 0.5 A. What current flows from the battery?

a) 0.2 A **b)** 0.5 A
c) 0.8 A **d)** 0.15 A

Answer: _____ Why? _____

5 Why are the lights in a house wired in parallel?

a) So each light can be switched on or off on its own **b)** So the current is the same in every light
c) So the lights share the mains voltage **d)** So the total resistance is as large as possible

Answer: _____ Why? _____

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Answer key for teachers · Ages 12–15 · Science

A Key terms

1 **Electric current**	**G**	The rate of flow of electric charge, measured in amperes (A) with an ammeter.
2 **Potential difference (voltage)**	**D**	The energy transferred per unit of charge between two points, measured in volts (V) with a voltmeter.
3 **Resistance**	**F**	How much a component opposes the current, measured in ohms (Ω); R = V ÷ I.
4 **Ohm's law**	**E**	For a component at constant temperature, the current is proportional to the potential difference: V = IR.
5 **Series circuit**	**B**	A circuit with one path, where the current is the same everywhere and the voltage is shared.
6 **Parallel circuit**	**A**	A circuit with two or more branches, where each branch has the full supply voltage and the branch currents add up.
7 **Conventional current**	**C**	The agreed direction of current, from the positive to the negative terminal outside the cell; electrons move the opposite way.

B Quick quiz

1 b) In series with the lamp

An ammeter measures the current that passes through it, so it must be in series, in the same loop as the lamp. A voltmeter is the meter that goes in parallel.

2 d) 4 Ω

R = V ÷ I = 12 ÷ 3 = 4 Ω.

3 a) 0.2 A

Current is not used up by a component. In a series circuit the current is the same at every point; the lamp transfers energy, not charge.

4 c) 0.8 A

In a parallel circuit the branch currents add up to the total: 0.3 + 0.5 = 0.8 A.

5 a) So each light can be switched on or off on its own

In parallel, each light has its own branch with the full supply voltage, so it can be switched independently and keeps working if another light fails.