KS3 SCIENCE · PHYSICS

Electricity revision sheet

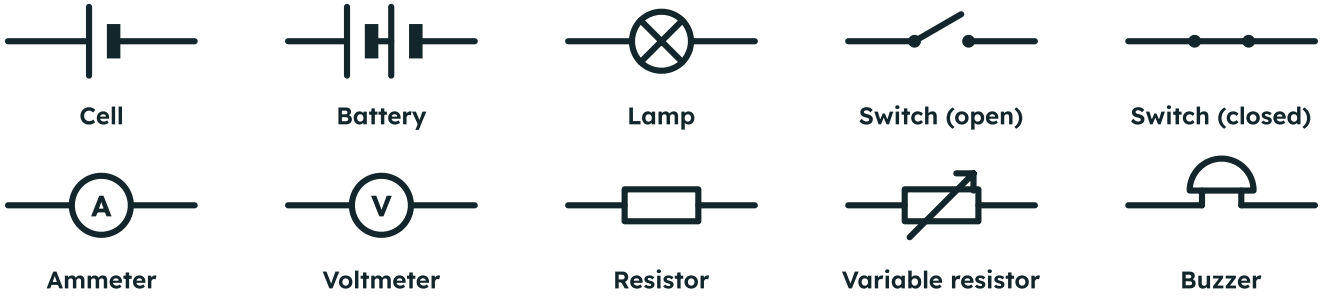
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1. Electric current

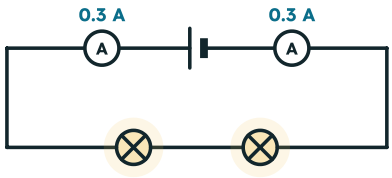
- An electric current is a **flow of charge**. In a wire, the charge is carried by **electrons**, which are negative.
- Current only flows in a **complete circuit**. A gap anywhere stops it.
- The cell pushes the electrons round. They are already in the wires, so they all start to move almost at once.
- Current is measured in **amperes (A)**, or amps, with an **ammeter**. An ammeter is connected in series.

2. Circuit symbols

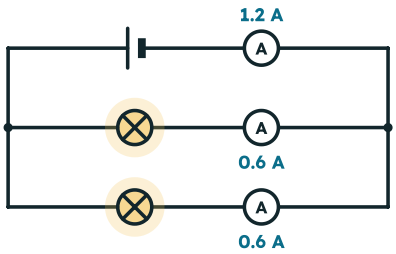


Wires are drawn as straight lines. A battery is two or more cells. The long line of a cell is its positive end.

3 and 4. Series and parallel circuits



Series: only one loop



Parallel: more than one branch

	SERIES CIRCUIT	PARALLEL CIRCUIT
Current	The same everywhere. It is not used up.	Splits at a junction and joins up again. Add the branch currents to get the total.
If one lamp breaks	They all go out.	The lamps on the other branches stay on.
Potential difference	Shared between the parts.	Every branch gets the full potential difference of the battery.

- In a series circuit, **more lamps** mean less current and dimmer lamps. **More cells** mean more current and brighter lamps.



5. Potential difference

- **Potential difference** is the push that makes charge flow. It is also called voltage.
- The small cell in the picture gives 1.5 V. The bigger battery has six cells inside it, so it gives 9 V.

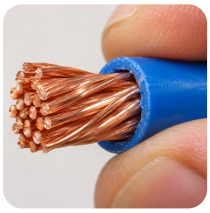
METER	MEASURES	UNIT	HOW IT IS CONNECTED
Ammeter	Current	Ampere (A)	In series, as part of the loop
Voltmeter	Potential difference	Volt (V)	In parallel, across the part



6. Resistance

resistance (Ω) = potential difference (V) ÷ current (A)

- **Resistance** tells you how hard it is for current to flow. It is measured in **ohms (Ω)**.
- More resistance means less current, if the potential difference stays the same.
- **Example:** a lamp has 12 V across it and a current of 3 A. Its resistance is 12 ÷ 3 = 4 Ω.
- When a current flows through a part with resistance, energy is transferred to the surroundings. The wires in a toaster get hot enough to glow.



7. Conductors and insulators

- A **conductor** lets current flow through it easily. It has a low resistance. Metals are good conductors because some of their electrons are free to move.
- An **insulator** does not. It has a very high resistance. Plastic, rubber, glass and dry wood are insulators.
- A wire is copper inside, to carry the current, and plastic outside, to keep you safe.



8. Static electricity

- Rubbing two different materials together can move **electrons** from one to the other.
- The object that **gains** electrons becomes **negative**. The object that **loses** electrons becomes **positive**.
- Only the electrons move. The positive charges stay where they are.
- **Like charges repel. Opposite charges attract.**



9. Electric fields

- A charged object has an **electric field** around it. Another charged object in the field feels a force.
- It is a **non-contact force**, like gravity and magnetism.
- The field is strongest close to the charged object and gets weaker further away.

Key words

Current: a flow of electric charge
Ampere: the unit of current
Series circuit: a circuit with only one loop
Potential difference: the push that makes charge flow
Voltmeter: measures potential difference
Ohm: the unit of resistance
Insulator: does not let current flow through it easily
Battery: two or more cells joined together
Electric field: the space where a charged object feels a force
Electron: a tiny particle with a negative charge
Ammeter: measures current
Parallel circuit: a circuit with more than one branch
Volt: the unit of potential difference
Resistance: how hard it is for current to flow
Conductor: lets current flow through it easily
Cell: pushes charge around a circuit
Static electricity: charge that builds up on an object

Pictures are illustrations made for this sheet, not real photographs.