

# Year 7 Science knowledge organiser

**Module** – Electromagnets

**Topic** – Voltage, resistance and current

**Length of topic** – Approx. 10 lessons

**Method of assessment** – Summative assessment

## Links to prior learning

KS2 Year 6 Electricity topic

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram

## Knowledge to be taught.

- We can model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway.
- In a series circuit, voltage is shared between each component. In a parallel circuit, voltage is the same across each loop.
- Components with resistance reduce the current flowing and shift energy to the surroundings. Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work.
- Around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled. The field strength decreases with distance.

## Skills to be covered

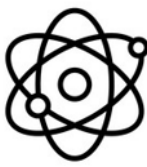
- Calculate resistance using the formula: resistance ( $\Omega$ ) = potential difference (V)  $\div$  current (A).
- Building series and parallel circuits to measure voltage, resistance and current.

## Working scientifically strands covered

Analyse patterns	✓
Discuss limitations	
Draw conclusions	✓
Present data	✓
Communicate ideas	✓
Construct explanations	✓
Critique claims	
Justify opinions	
Collect data	✓
Devise questions	✓
Plan variables	✓
Test hypothesis	✓
Estimate risks	
Examine consequences	
Review theories	
Interrogate	

## Assessment

Summative assessment based on knowledge taught through the topic

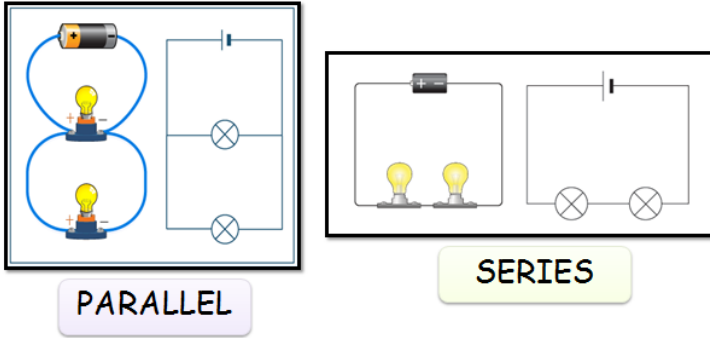


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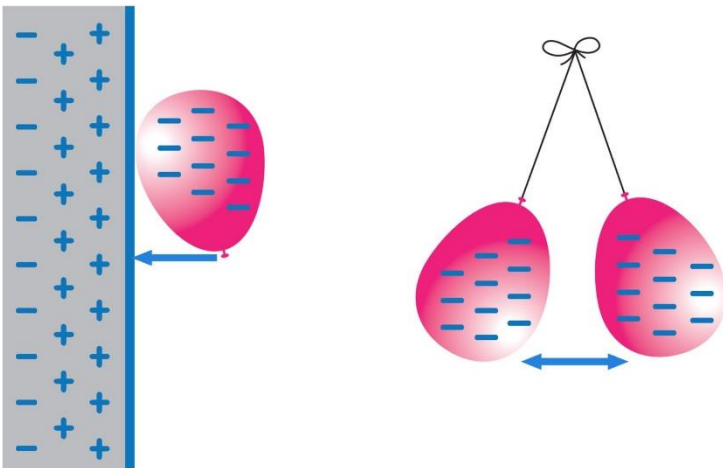
## Facts

In a series circuit, voltage is shared between each component. In a parallel circuit, voltage is the same across each loop.

## Series vs. Parallel



Two similarly charged objects repel, two differently charged objects attract.



## Keywords

**Charged up:** When materials are rubbed together, electrons move from one surface to the other.

**Current:** Flow of electric charge, in amperes (A).

**Electrical conductor:** A material that allows current to flow through it easily, and has a low resistance.

**Electrical insulator:** A material that does not allow current to flow easily, and has a high resistance.

**Electrons:** Tiny particles which are part of atoms and carry a negative charge.

**Electrostatic force:** Non-contact force between two charged objects.

**Field:** The area where other objects feel an electrostatic force.

**In parallel:** If some components are on separate loops.

**In series:** If components in a circuit are on the same loop.

**Negatively charged:** An object that has gained electrons as a result of the charging process.

**Positively charged:** An object that has lost electrons as a result of the charging process.

**Potential difference (voltage):** The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).

**Resistance:** A property of a component, making it difficult for charge to pass through, in ohms ( $\Omega$ ).