



Energy

Electric circuits: Learning pathway

Activate

Acquire

Apply

Assess

Analyse

Electric current

- | | | | | |
|-----------------------------------|--|--|--|--|
| <input type="checkbox"/> Circuits | <input type="checkbox"/> Construct circuits with switches and bulbs to show how current flows in one or more loops
<input type="checkbox"/> Use models of current to explain readings in series and parallel circuits | <input type="checkbox"/> Predict effect of switches in series and parallel circuits
<input type="checkbox"/> Predict ammeter readings in circuits | <input type="checkbox"/> Acquire
<input type="checkbox"/> Apply | <input type="checkbox"/> Troubleshoot faulty circuits, showing your deductions |
|-----------------------------------|--|--|--|--|

Resistance

- | | | | | |
|---|---|---|--|--|
| <input type="checkbox"/> Electric current | <input type="checkbox"/> Investigate the effect of having more bulbs on components on current | <input type="checkbox"/> Predict how the current changes when components are added or removed | <input type="checkbox"/> Acquire
<input type="checkbox"/> Apply | <input type="checkbox"/> Make deductions about the resistance of a component from observations or data |
|---|---|---|--|--|



Electrical engineer

Act

Build a 'dance pad' circuit with a foot switch that operates a lights or buzzer



Electric circuits: Big ideas

Energy

What expert understanding do we want after 5 years?

Electricity transfers energy

Big idea

Energy can be transferred from place to place by electric current. Electricity is produced from many energy resources by driving a turbine, and stored by a battery or transmitted by currents. Batteries produce voltage that drive current around a circuit, supplying power to components. All these quantities can be calculated and controlled.

How does the unit develop this?

Electric current

Key Concept

Electric current is the movement of electrons from a source through a conductor and back, around a complete circuit

Sub-concepts

Series circuit, parallel circuit

Facts

- Ammeters measure current in A
- Circuit symbols: buzzer, bulb, resistor, cell, switch, ammeter

Resistance

Key Concept

Resistance is a property of materials that reduces current flow and transfers energy to the surroundings

Facts

- Components add resistance



Energy

Electric circuits: Scientific thinking, maths & literacy

How are investigation skills integrated with the concepts?

Resistance
Collect evidence
Plan the data collection for the independent and dependent variables

Act
Engineering
Devise a solution to a problem that involves developing an object, process or system

How are practical skills integrated with the concepts?

Apparatus and techniques	AT.6.P AT.7.P
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Electric circuits: Curriculum links

Energy

Which parts of KS3 are covered?

AQA KS3 syllabus: 3.2.1 Voltage and resistance (part)
3.3.2 Current

Which parts of GCSE are covered?

(AQA Trilogy combined science)

Electric current	✓ 6.2.1.1 Standard circuit diagram symbols	✓ 6.2.2 Series and parallel circuits
Specialised cells	✓ 4.1.1.3 Cell specialisation	
Develop models	✓ WS 1.2 Use a variety of models	
Develop hypotheses	✓ WS 3.6 Presenting reasoned explanations including relating data to hypotheses	

What resources are there to teach this unit?

Visit shop.masteryscience.com



[CPD](#)



[Teaching](#)



[Assessment](#)



Electrical engineer

Act Student can use folded over cardboard for the switch contacts, and attach aluminium foil on the inside so that they make electrical contact only with pressure.