Electricity | Science | Years 5 & 6 | Spring & Summer Term 2024-25

National Curriculum Science - Knowledge

- 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.

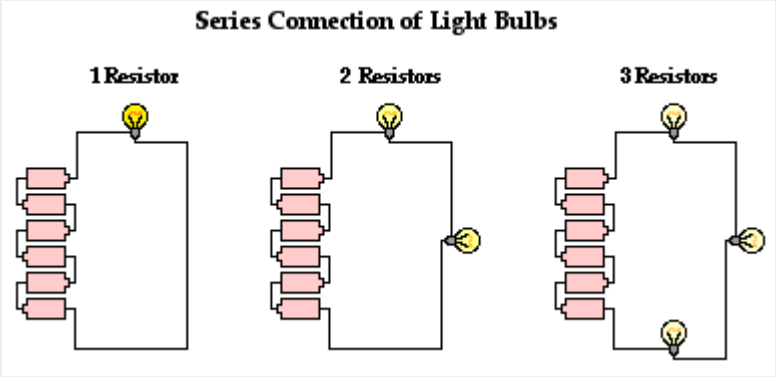
Key Learning

The brightness of a bulb, the loudness of a buzzer or the speed of a motor is affected by the number of cells in a circuit.

The brightness of a bulb, the loudness of a buzzer or the speed of a motor is affected by the voltage of cells in a circuit.

The number of components in a circuit can affect how they function. For example:

- Adding more bulbs to a circuit will make each bulb less bright;
- Using more motors will make each motor spin more slowly;
- When more buzzers are added, each buzzer will be quieter.



The arrangement of components in a circuit can affect how they function.

The length of wires in a circuit can affect how the components function.

Vocabulary

Electricity: a form of energy caused by electrons moving.
Circuit: a closed loop for electricity to travel around.
Component: a part used in an electrical circuit.
Cell / battery: a stored source of electricity.
Bulb: a component that turns electrical energy into light energy.
Buzzer: a component that turns electrical energy into sound.
Motor: a component that turns electrical energy into movement.
Switch: a device for making and breaking the connection in an electric circuit.
Wire: a long thin piece of metal that carries an electrical current often covered in plastic for safety.
Voltage: a force that makes electricity flow through a wire (it is measured in volts).
Current: a flow of electricity which results from the ordered directional movement of electrically charged particles.
Conductor: a material or device that allows electricity to flow through it easily (objects made of metal are good conductors).
Insulator: an object that does not allow electricity to flow through it easily.
Resistor: an object

***Note**: Children do not need to understand what voltage is but will use volts and voltage to describe different batteries.*
***Note**: The words cells and batteries are now used interchangeably*

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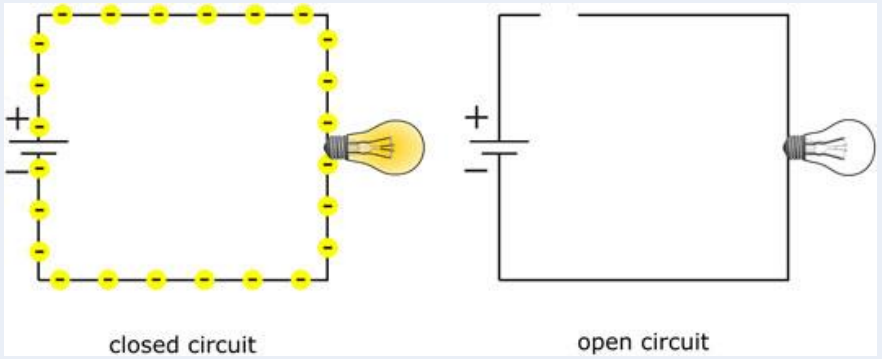
National Curriculum Science – working scientifically

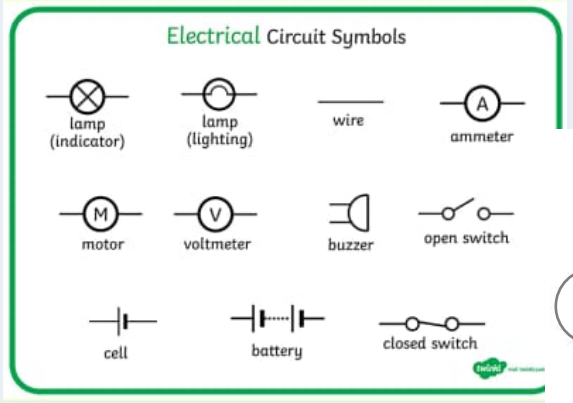
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

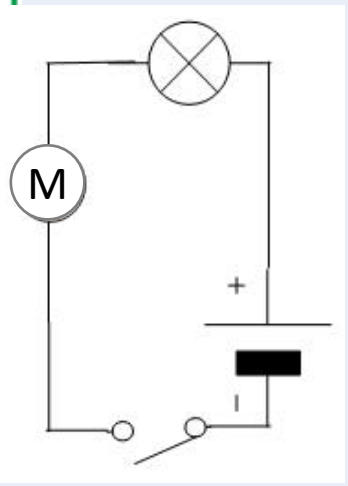
Key Learning continued…

Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.



Scientific symbols are used to represent the components (parts) of a circuit in a simple circuit diagram.





Scientific investigations

1) Does the number of components in a circuit affect their performance?
- Plan and conduct an experiment to investigate how the brightness of a bulb changes when extra lamps are added to a series circuit.
- Make observations and record results using tables and diagrams.
- Interpret results, linking to knowledge of voltage.
- Use findings to predict how adding more or less buzzers to a circuit might affect their sound.

2) Which factors affect how a motor spins?
- Ask scientific questions to decide factor to investigate.
- Plan and conduct an experiment scientific question asked, ensuring necessary variables are controlled.
- Conclude on results using scientific understanding and language to explain observations.

3) Draw scientifically accurate circuit diagrams to represent circuits. Analyse circuit diagrams to identify problems and make suggestions for how they may be resolved.

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Key Learning: Work scientifically to identify factors affecting the performance of components in a circuit and to draw accurate circuit diagrams.

1	**What are voltage and current?** Complete a 'physical' model to understand and explain the concepts of voltage and current. Write an explanation of each.
2	**What is a circuit diagram and why are they used?** Introduce circuit symbols for given components of an electrical circuit. Discuss advantages of using standardised circuit diagrams in communication of ideas e.g. in industry. Apply knowledge to draw provided photos of circuits as scientific circuit diagrams. Construct, identify and name parts of a series circuit, then draw scientifically accurate diagrams to represent these. Evaluate circuit diagrams – will they all work? Which will not? Explain why?
3	**Does the number of components in a circuit affect their performance?** Plan and conduct an experiment to investigate how the brightness of a bulb changes when extra lamps are added to a series circuit. Conclude on results using scientific understanding and language to explain observations. Use findings to predict how adding more or less buzzers to a circuit might affect their sound.
4	**Which factors affect how a motor spins?** Ask scientific questions, plan and conduct an experiment to investigate factors that make a motor spin. Conclude on results using scientific understanding and language to explain observations.
5	**Why is my product faulty?** Analyse circuits to determine whether they will work or not. Explain your decisions using scientific knowledge about electricity. Propose solutions for those circuits deeming faulty.
6	**Electricity: Escape Room.** Apply knowledge of electricity from throughout the unit to complete an Escape Room challenge.