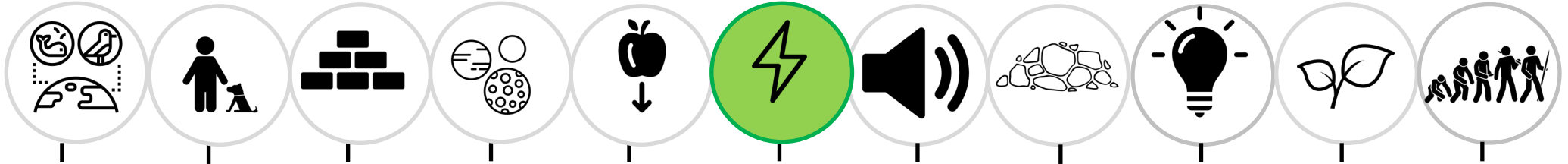
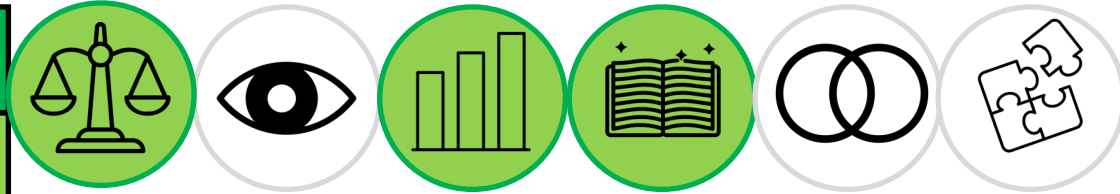


# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## KEY VOCABULARY:

Circuit	A circuit is a complete path around which electricity can flow.
Circuit diagram	Circuit diagrams are visual representations of electrical circuits, using lines and symbols.
Cell	An electrical cell is a device used to generate electricity.
Bulb	a simple apparatus that converts electric energy into light energy.
Buzzer	a component in a circuit that makes a sound when electricity goes through it.
Motor	An electric motor changes electrical energy into mechanical movement.
Switch	A component within an electrical Circuit which enables the flow of electricity to be turned on and off.
Voltage	Voltage is a measure of how strong the current is in a circuit.

### Key Questions:

- 1) Can you draw a simple circuit diagram using the correct symbols?
- 2) What happens to the brightness of a lamp, or the volume of a buzzer when we change the number and voltage of cells used?
- 3) What will happen to the brightness of bulbs, the loudness of buzzers when we vary components in the circuit?

## As Scientists we will...

- 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.

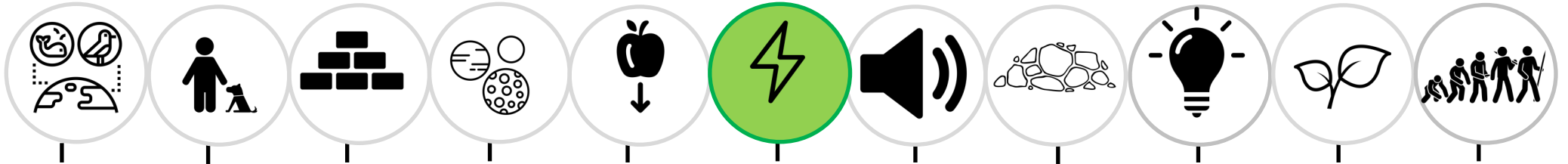
### Working scientifically:

- plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary,
- Report and present findings from enquiries in written forms.

**Notable scientist: Edith Clarke**

# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## What I need to know:

Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. 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. You can use recognised circuit symbols to draw simple circuit diagrams.

## Opportunities for science capital

Invite in electrical engineers.

Book a workshop with *Working Science*

Part of science capital includes scientific media consumption- documentaries, reports etc. Here are links that provide daily science news for children. Checking in on these every now and then would be beneficial to help children see science in the wider world.

<https://www.sciencenewsforstudents.org/>

<https://www.sciencejournalforkids.org/>

## Assessment:

By the end of this unit of work, pupils should be able to 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 and be aware of the work of Edith Clarke.

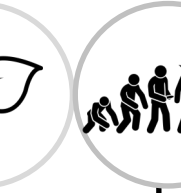
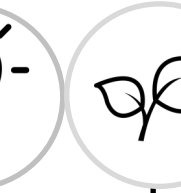
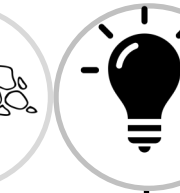
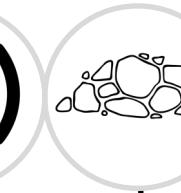
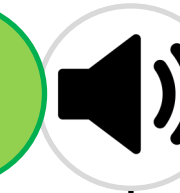
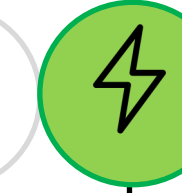
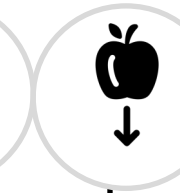
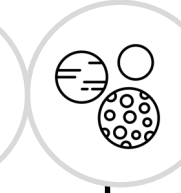
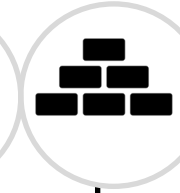
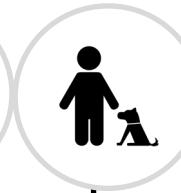
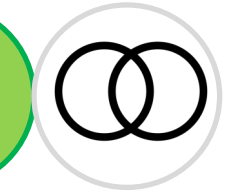
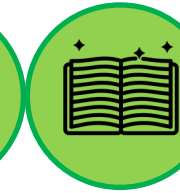
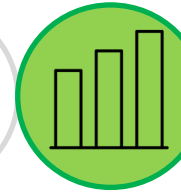
Working scientifically:

By the end of this unit of work, pupils should be able to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary,

record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## Theme 1: Circuit diagrams

### Starter:

Complete KWL grid

Year 4 electricity recap quiz

Draw a circuit starter activity: <https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00290/activities/starter>

### Main:

#### Substantive knowledge:

Play film: <https://www.tigtagworld.co.uk/mindmap/#/lessons/CLASS00290/activities/starter>

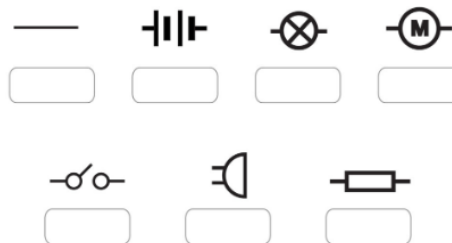
Hide circuit symbols around the room for children to search for and match up with the circuit symbol activity sheet. LA: complete with pre-made symbols, MA/HA: to draw.

### Plenary/assessment:

Ask the groups to think about how they would create a circuit for a torch. Physically build and then draw in books.

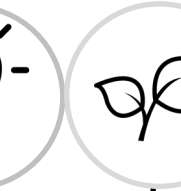
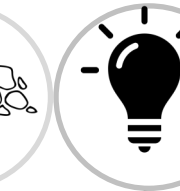
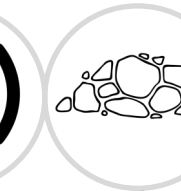
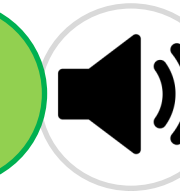
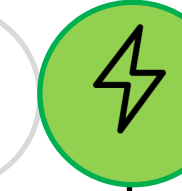
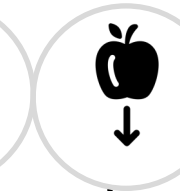
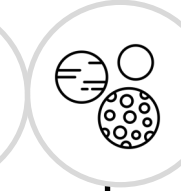
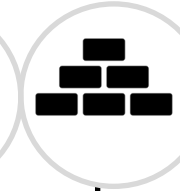
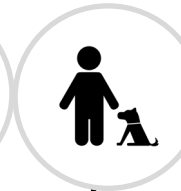
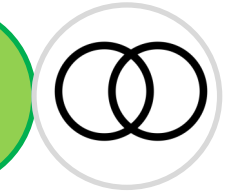
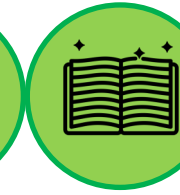
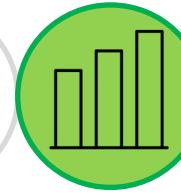
Ask the groups to make a circuit for a doorbell. What components would we need for this kind of circuit? Physically build and draw.

Ask the groups to make a circuit for a fan. What components would we need for this kind of circuit? Physically build and draw.



# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## Theme 2: Bulb Brightness

### Starter:

Recap: Find the problem with the electrical circuit. Using the diagrams, why wouldn't these circuits work?

### Main:

#### Disciplinary knowledge:

Comparative/fair test

#### Working scientifically objective: Plan a scientific enquiry to answer a question, recognising and controlling variables.

*Today we are going to be electrical engineers.* Investigate how they can change the brightness of the bulb by changing voltage of and/or number of batteries. Using planning sheet, each group to generate a list of dependent variables identifying how they will observe/measure the effect of this change. Create a scientific question which identifies the 'change' and 'measure'.

### Plenary/assessment:

Independently, in books, children generate a list of variables they will have to control. HA to think about which of these will be easy to control, which will be hard to control and why.

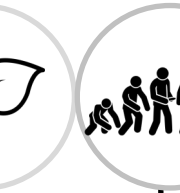
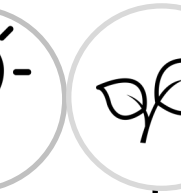
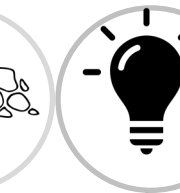
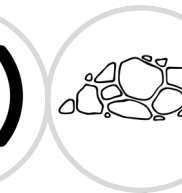
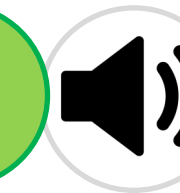
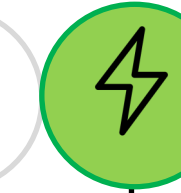
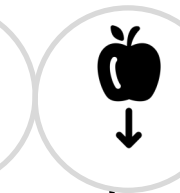
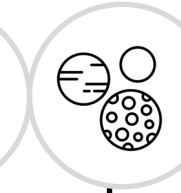
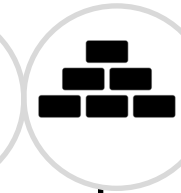
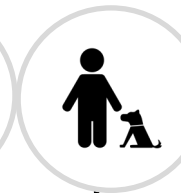
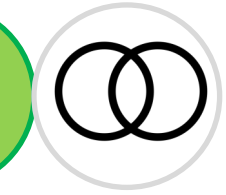
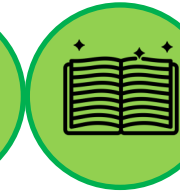
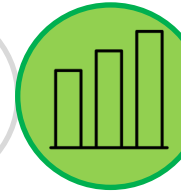
Carry out investigation recording results in a simple table.

### Substantive knowledge:

Once completed, ask: what does happen to bulb brightness when the voltage of/number of batteries in a circuit is changed?

# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## Theme 3: Variation in component function

### Starter:

Recap: nando's takeaway spicy recap.

### Main:

#### Disciplinary knowledge:

Comparative/fair test

**Working scientifically objective: Plan a scientific enquiry to answer a question, focusing on independent and dependent variables.**

*Today we are going to be electrical engineers.*

Investigate how they can vary the function of different components, choosing from the available equipment (to include different lamps, cells and different thickness/length of high resistance/fuse wires). Independently in books, children generate a list of variables which could be changed in their circuit and how they will observe/measure the effect of this change. Create a scientific question which identifies the 'change' and 'measure'. In groups, make a prediction and then carry out and discuss investigations, recording a group set of results.

See full TAPS plan: [Bulb brightness](#)

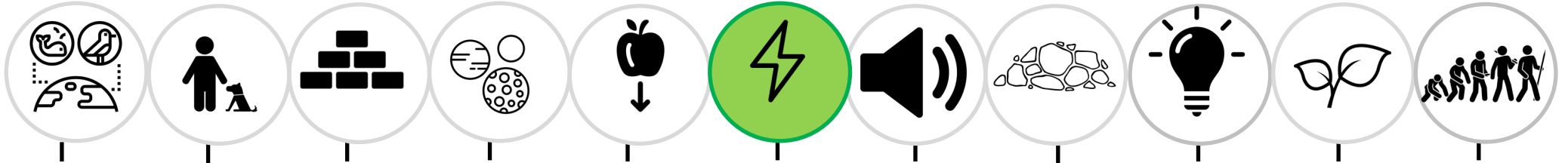
### Plenary/assessment:

Present findings in a written conclusion. Ask: what do your results show?

Can you give reasons for these variations?

# Year 6: Electricity

SCIENTIFIC CONTEXT: Physics



## Theme 4: Edith Clarke

### Starter:

Kahoots quiz recapping learning from unit of learning. Results to be printed and stuck in books.

### Main:

Disciplinary knowledge:

Research

Working scientifically objective: Report and present findings from enquiries in written forms.

Carry out research on Edith Clarke and present findings in an infographic style.

Questions to research:

- 1) Who is Edith Clarke?
- 2) Her career in science.
- 3) Her legacy.

### Plenary/assessment:

Complete KWL grid.