Year 6 – Science—Let it Shine

Spring 1 Knowledge Organiser

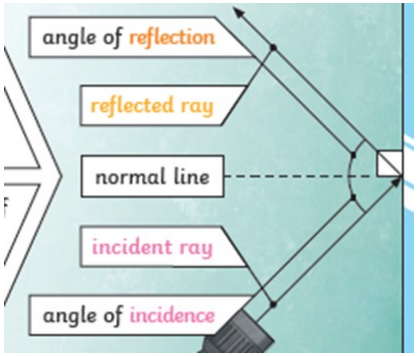
HeathfieldSchools'Partnership

This Science unit follows on from the children's previous study of light. In Year 3. This unit will deepen the children's understanding of how light travels, how we see light and the link between light and shadows. They will learn about the features and functions of the eye and practically investigate what can affect the shape and size of shadows.

Key knowledge

Light travels as a ***wave. Light waves*** travel out from sources of light in ***straight lines***. These lines are often called rays or beams of ***light***. When a ray or beam of ***light*** hits any object it is ***reflected*** in a ***straight line*** too.

Reflection is when ***light*** bounces off a surface, changing the direction of the ray of *light.*
The ***light ray*** that hits the object is described as the ***incident ray*** and they ray of light that bounces off the object is known as the ***reflected ray.*** The ***law of reflection*** states that the ***angle of incidence*** is equal to the ***angle of reflection***. Whenever ***light*** is ***reflected*** from a surface, it obeys this law.



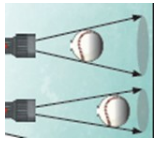
Light waves, unlike waves of water, or sound waves, does not need any ***medium*** (solid, liquid or gas) to travel through. This means light can travel through a ***vacuum*** - a completely airless space.

Rays of light can travel from a ***light source*** directly to our ***eyes.*** Tthis is how we see the ***light source.*** This also means that we can see a light source in a dark room.

Rays of light travel from a ***light source*** and hit objects around us.
The ***rays of light reflect***, or bounce, off an object, and then travel into our ***eyes.***
This ***reflection of light*** allows us to see the object.

Light waves travel at a different speed when they go through other ***transparent*** materials, such as water or glass. This causes the rays of light to change direction and bend. This is known as ***refraction.***

A ***shadow*** always has the same outline as the object that casts it. A ***shadow*** can change size depending on the distance the object casting it is from the ***light source***.



Key Vocabulary

Incident ray — a ray of light that strikes a surface.

Reflected ray — a ray of light that bounces back from the surface of reflection.

Angle of incidence — the angle between the normal line and the incidence ray.

Refraction — the redirection of a wave as it passes from one medium to another.

Transparent — allowing light to pass through. Able to be seen right through,

Opaque — not able to be seen through.

Translucent — allowing light, but not detailed shapes, to pass through .

Key Questions

How does light travel?
What is reflection?
What is the ray of incident?
What is the ray of reflection?
What is the law of reflection?
What is the angle on incidence?
What is the angle of reflection?
What can light waves do that water and sound waves can't?
How do we see light sources?
How do we see an object?
What is refraction? What does refraction create?
Why is a shadow the same shape of as the object?
When is a shadow larger? Why is it larger?
When is a shadow smaller? Why is it smaller?
How can you elongate or shorten a shadow?

Year 6 – Science—Electrifying

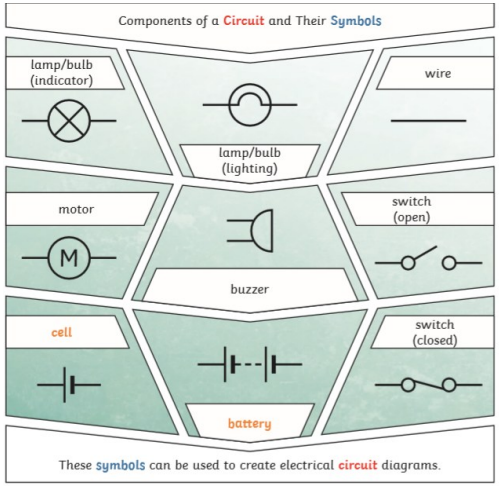
Spring 2 Knowledge Organiser

HeathfieldSchools'Partnership

This Science unit follows on from the children's previous study of electricity In Year 4. This unit will deepen the children's understanding of simple circuits. They will develop their knowledge on symbols used in circuits, the links between input and output in circuits and the effect switches having on complete circuits.

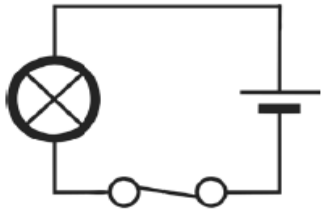
Key knowledge

Circuit Symbols:

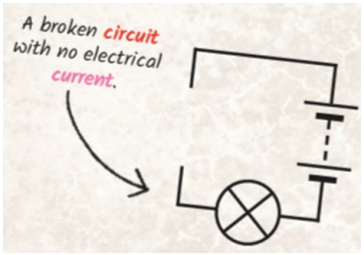


More batteries or a higher ***voltage*** create more power to flow through the ***circuit.***
Fewer batteries or a ***lower voltage*** give less power to the ***circuit.***
Shortening the wires means the ***electrons*** have less ***resistance*** to flow through.
More buzzers or bulbs mean the power is shared by more components.
Lengthening the wires means the e***lectrons*** have to travel through more ***resistance.***

In a ***series circuit*** there is only one route for the ***current*** to take:



If just one part of this ***series circuit*** breaks, the circuit is broken and the flow of ***current*** stops:



If a ***switch*** is 'on' (closed) in a ***series circuit*** the bulb will light up or the buzzer will make a noise. This is because the circuit is complete and therefore the ***current*** can flow.
If a switch is 'off' (opened) in a ***series circuit*** the bulb will not light up or the buzzer will not make a noise. This is because there is a break in the circuit and therefore the ***current*** will not be able to flow.

Key Vocabulary

Battery/cell: A device that stores energy as a chemical until it is needed. A cell is a single unit. A battery is a collection of cells.
Current: Flow of ***electrons.*** Measured in ***amps***.
Circuit: A path that an electrical current can flow around.
Voltage: The force that makes the electric ***current*** move through the wires. The greater the voltage, the more current will flow.
Resistance: The difficulty that the electric ***current*** has when flowing around a circuit.
Electrons: Very small particles that travel around an electrical circuit. They are negatively charged.
Switch: A component in an electrical circuit that can both open and close.

Key Questions

What is a series circuit?
What happens if one part of a series circuit breaks?
Apart from the number of cells, what else makes a bulb brighter or a buzzer louder?
Apart from the number of cells, what will make a bulb dimmer or a buzzer quieter?
How does the position of the switch in a series circuit (e.g. if it is 'on' (closed) or 'off' (open)) effect the brightness of the bulb or the loudness of a buzzer?
How will the number of cells make a bulb brighter or a buzzer louder?
How will the number of cells make a bulb dimmer or a buzzer quieter?

Science – Enquiry Approaches
Knowledge Organiser

Heathfield Schools' Partnership
ambitious for the future

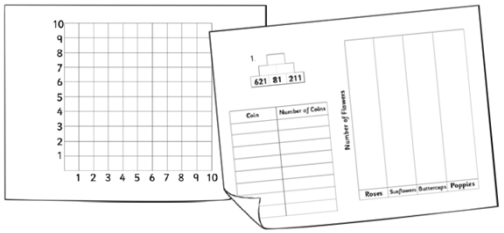
Scientific enquiry approaches are part of our science curriculum and are the different ways that we can carry out scientific investigations.

Observing over time

We measure events and changes in living things, processes or materials. These observations (using our senses) may take place over different periods of time; minutes, hours, weeks or months. several weeks or months.

How does the moon appear to change shape during a week?

Pattern Seeking



We conduct investigations where there are variables we cannot control (practically or ethically).

We don't look for cause and effect in Pattern Seeking, but possible relationships may be identified.

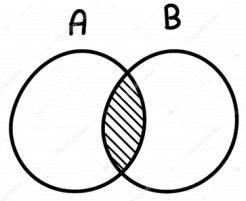
Do sounds get quieter the further away you are from the sound source?

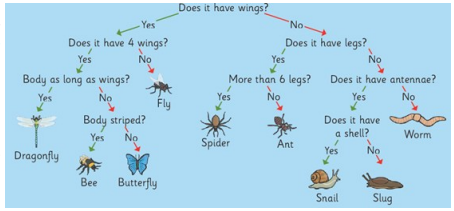
Researching using Secondary Sources

Sometimes we research when we ask questions that can not be answered practically. We can use secondary sources, such as books, the internet, or an expert.

What are the main parts of the circulatory system and what are their functions?

Identifying and Classifying





Identification: Naming things by looking at differences.

Classification: Organising things into group by making connections and looking at similarities or differences.

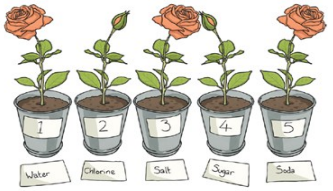
How can we classify animals using a classification key?

Fair testing

One variable (independent variable) is changed and all other variables must be controlled. The variable that is changed is quantitative (numbered).

How does the size of the parachute effect the time it takes to fall?

Comparative testing



One variable (independent variable) is changed and all other variables must be controlled. The variable that is changed is qualitative (words).

Which material is the best thermal insulator?