

Year 6-Light- Autumn 1 Term Knowledge Organiser

What should I already know?

In Year 3, children learn how light travels and is reflected off a surface. They understand that light travels in a straight line. When light hits an object, it's reflected. If the reflected light hits our eyes, we can see the object.

National Curriculum objectives:

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.



How did WW2 impact the local area?

Key vocabulary

Light- a form of energy that travels in a wave from a source.

Light source- an object that makes its own light.

Reflection-when light bounces off a surface, changing the direction of a ray of light.

Incident ray-a ray of light that hits a surface.

Reflected ray-a ray of light that has bounced back after hitting a surface.

The law of reflection- the law states that the angle of the incident ray is equal to the angle of the reflected ray.

Refraction-this is when light bends as it passes from one medium to another. E.g. Light bends when it moves from air into water.

Visible spectrum-light that is visible to the human eye. It is made up of a colour spectrum

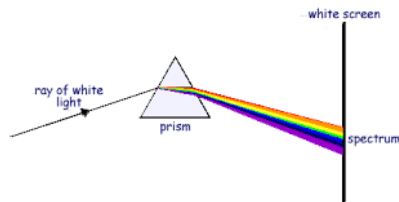
Prism- a prism is a solid 3D shape with flat sides.

The two ends are an equal shape and size. A transparent prism separates out visible light into all the colours of the spectrum.

Shadow- an area of darkness where light has been blocked.

Transparent- describes objects that let light travel through them easily, meaning you can see through the object. Translucent-describes objects that things let some light through, but scatters the light so we can't see through them properly.

Opaque-describes objects that do not let any light pass through them.



Knowledge:

We need light to be able to see things. Light waves travel out from sources of light in straight lines. These lines are often called rays or beams of light. Light from the sun travels in a straight line and hits an object. The light ray is then reflected off the object and travels in a straight line to the person's eye, enabling them to see the object. 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. The angle of incidence is the angle between the normal line and the incident ray of light. The angle of reflection is the angle between the normal line and the reflected ray light. Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means light can travel through a vacuum - a completely airless space. When a spoon is placed in water, it looks as if it is bent. This is because light bends when it moves from air to water. When light bends in this way, it is called refraction

-Isaac Newton

*Newton shone a light through a transparent prism, separating out light into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the spectrum. All the colours together merge and make visible light

-Shadows

*A shadow is always the same shape as the object that casts it. This is because when an opaque object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling. Shadows can also be elongated or shortened depending on the angle of the light source. A shadow is also larger when the object is closer to the light source. This is because it blocks more of the light

Skills and enquiry

Pupils should build on the work on light in Year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Year 6- Living things and their habitats-Autumn 2 Term Knowledge Organiser

What should I already know?

In Yr 1, 2 and 4, children have classified plants and animals based on their characteristics and appearance.

What will our coastline look like in 20 years' time?

Key vocabulary

Characteristics-special qualities or appearances that make an individual or group of things different to others.

Classify- to sort things into different groups.

Taxonomist- a scientist who classifies different living things into categories.

Key- a key is a series of questions about the characteristics of living things. A key is used to identify a living thing or decide which group it belongs to by answering 'yes' or 'no' questions.

Bacteria- a single-celled microorganism.

Microorganism- an organism that can only be seen using a microscope, e.g. bacteria, mould and yeast.

Microscope- a piece of equipment that is used to view very tiny (microscopic) things by magnifying their appearance.

Species-a group of animals that can reproduce to produce fertile offspring

National Curriculum objectives:

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

Helpful Microbes	Harmful Microbes
Bacteria – cheese	Bacteria – salmonella is a bacterium that can lead to food poisoning
Yeast – wine	Virus – chicken pox and flu are examples of viral diseases
Bacteria – yoghurt	Fungi – athlete's foot
Yeast – bread dough	Bacteria – plaque
Penicillium fungi - antibiotics	Fungi - mould

Knowledge:

In 1735, Swedish Scientist Carl Linnaeus first published a system for classifying all living things. An adapted version of this system is still used today: The Linnaeus System. Living things can be classified by these eight levels. The number of living things in each level gets smaller until the one animal is left in its species level. The eight levels are: Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species. Each group allows scientists to observe and understand the characteristics of living things more clearly. They group similar things together then split the groups again and again based on their differences. Scientists, called Taxonomists, sort and group living things according to their similarities and differences.

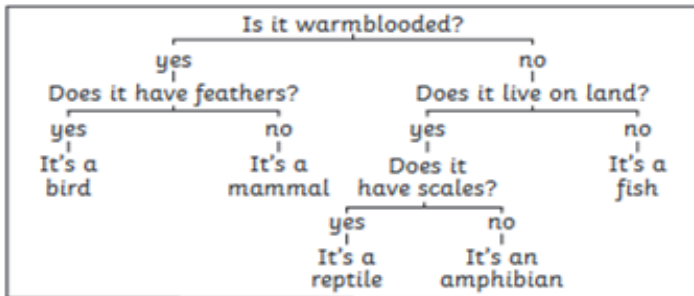
-Microorganisms

*Microorganisms are viruses, bacteria, moulds and yeast. Some animals (dust mites) and plants (phytoplankton) are also microorganisms.

*Microorganisms are tiny living things that can only be seen using a microscope. They can be found in and on our bodies, in the air, in water and on objects around us.

Skills and enquiry

Pupils should build on their learning about grouping living things in Year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as microorganisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.



Year 6- Animals including humans-Spring Term Knowledge Organiser

What should I already know?

In Year 3, children learn about how to achieve a balanced diet and the nutritional value of different types of food.

National Curriculum objectives:

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Knowledge:

The heart pumps blood to the lungs to get oxygen. It then pumps this oxygenated blood around the body. Mammals have hearts with four chambers. The blood that has come from the body is deoxygenated, and the blood that has come from the lungs is oxygenated again. The blood isn't actually red and blue: we just show it like that on a diagram. Capillaries are the smallest blood vessels in the body and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place. Arteries carry oxygenated blood away from the heart. Veins carry deoxygenated blood toward the heart. If you linked up all of the body's blood vessels, including arteries, capillaries, and veins, they would measure over 60,000 miles.

Blood transports: gases (mostly oxygen and carbon dioxide); nutrients (including water) and waste products. The liquid part of blood contains water and protein. This is called plasma. Plasma is liquid. The other parts of your blood are solid. We have platelets, that help you stop bleeding when you get hurt. White blood cells fight infection when you're sick. Red blood cells carry oxygen through your body.

-Diet and exercise:

"Drugs, alcohol and smoking have negative effects on the body. A healthy diet involves eating the right types of nutrients in the right amounts.

"Regular exercise: strengthens muscles (including the heart muscle), improves circulation, increases the amount of oxygen around the body, releases brain chemicals which help you feel calm and relaxed, helps you sleep more easily and strengthens bones. It can even help to stop us from getting ill.



Skills and enquiry

Pupils should build on their learning from Years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

What did the Romans ever do for us?

Key vocabulary

Circulatory system- a system which includes the heart, veins, arteries and blood transporting substances around the body.

Heart- an organ which constantly pumps blood around the circulatory system.

Blood vessels- the tube-like structures that carry blood through the tissues and organs. Veins, arteries and capillaries are the three types of blood vessels.

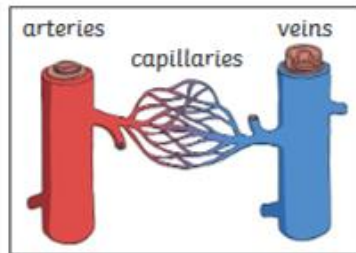
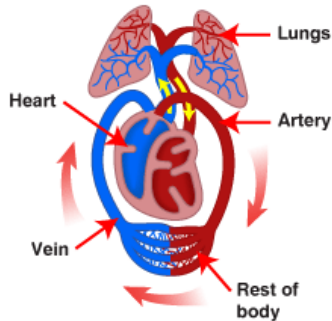
Oxygenated blood- oxygenated blood has more oxygen. It is pumped from the heart to the rest of the body.

Deoxygenated blood- deoxygenated blood is blood where most of the oxygen has already been transferred to the rest of the body

Drug- a substance containing natural or man-made chemicals that has an effect on your body when it enters your system.

Alcohol- a drug produced from grains, fruits or vegetables when they are put through a process called fermentation.

Nutrients- substances that animals need to stay alive and healthy



Year 6-Electricity-Summer Term 1 Knowledge Organiser

What should I already know?

In Year 4, children are able to identify common appliances that run on electricity, construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. They can identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. They are able to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.

Why are the Americas so diverse?

Key vocabulary

Circuit- a path that an electrical current can flow around.

Symbol- a visual picture that stands for something else.

Cell/battery- 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- the flow of electrons, measured in amps.

Amps- how electric current is measured.

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.

National Curriculum objectives:

- 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:

A series circuit is A circuit that has only one route for the current to take. If more bulbs or buzzers are added, the power has to be shared and so they will be dimmer or quieter. If just one part of this series circuit breaks, the circuit is broken and the flow of current stops.

-What will make a bulb brighter or a buzzer louder?

*More batteries or a higher voltage create more power to flow through the circuit.

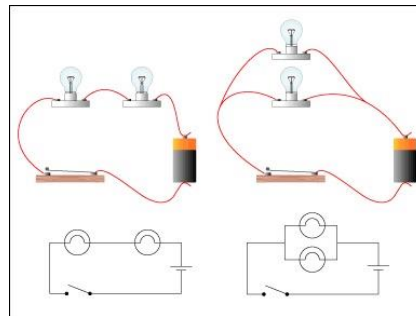
*Shortening the wires means the electrons have less resistance to flow through

-What will make a bulb dimmer or a buzzer quieter?

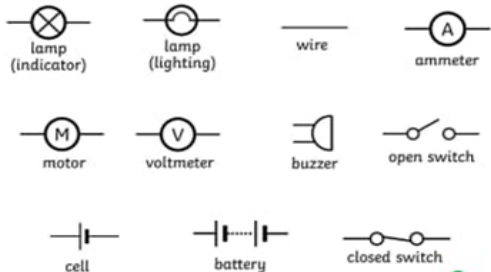
*Fewer batteries or a lower voltage give less power to the circuit.

*More buzzers or bulbs mean the power is shared by more components.

*Lengthening the wires means the electrons have to travel through more resistance.



Electrical Circuit Symbols



Skills and enquiry

Building on their work in Year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Year 6- Evolution and inheritance-Summer 2 Term Knowledge Organiser

What should I already know?

In Year 2, children looked at how animals are suited to their environments. Now children are looking at how these adaptations can lead to evolution.

National Curriculum objectives:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

What happened to the Mayans?

Key vocabulary

Offspring-the young animal or plant that is produced by the reproduction of that species.
 Inheritance-this is when characteristics are passed onto offspring from their parents.
 Variations- the differences between individuals within a species.
 Characteristics-the distinguishing features or qualities that are specific to a species.
 Adaptation- an adaptation is a trait (or characteristic) changing to increase a living thing's chances of surviving and reproducing.
 Habitat- refers to a specific area or place in which particular animals and plants can live.
 Environment- an environment contains many habitats and includes areas where there are both living and nonliving things.
 Evolution- adaptation over a very long time.
 Natural selection-the process where organisms that are better adapted to their environment tend to survive and produce more offspring.
 Fossil-the remains or imprint of a prehistoric plant or animal, embedded in rock and preserved.
 Adaptive traits- genetic features that help a living thing to survive.
 Inherited traits- these are traits you get from your parents. Within a family, you will often see similar traits, e.g. curly hair

Knowledge:

Animals and plants produce offspring that are similar but not identical to them. Offspring often look like their parents because features are passed on. In the same way that there is variation between parents and their offspring, you can see variation within any species, even plants.

Adaptive traits are characteristics that are influenced by the environment the living things live in. These adaptations can develop as a result of many things, such as food and climate. Inherited traits are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

-Environments:

*A good habitat should provide shelter, water, enough space and plenty of food.

*There are many types of environment around the world. Polar regions, deserts, rainforests, oceans, rivers, and grasslands are all environments.

-Evolution

*Evolution is the gradual process by which different kinds of living organism have developed from earlier forms over millions of years. Scientists have proof that living things are continuously evolving - even today!

*Fossils are the preserved remains, or partial remains, of ancient animals and plants. Fossils let scientists know how plants and animals used to look millions of years ago. This is proof that living things have evolved over time

-Natural selection

*Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually evolved through natural selection to have longer necks so that they can reach the top leaves on taller trees.

Skills and enquiry

Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work. Science – key stages 1 and 2 33 Notes and guidance (non-statutory) Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

