St Clare's Curriculum

Science

Early Years Statutory Framework

Understanding the World

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

ELG: The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

In EYFS, children are taught to be curious about the world around them. They have an outdoor area which they can investigate everyday, including plants and minibeasts, but also exploring forces through sand, water play and building.

Children recognise some environments that are different to the one in which they live and are shown different environments around the world, including polar regions. They make comparisons of temperature, native animals and the weather.

Children draw pictures of animals and plants and are encouraged to ask questions about what they observe. They grow plants from seeds and bulbs.

They notice changes in the natural world around them, including the seasons and changing states of matter, such as snow melting.

National Curriculum Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

National Curriculum Aims

The national curriculum for art and design aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Key Stage One			
	Pupils should be taught to:	Year 1	Year 2
Plants	identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees	Plants	
Animals, including humans	identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe & compare the structure of a variety of common animals (fish, amphibians, reptiles, birds & mammals including pets) identify, name, draw & label the basic parts of the human body & say which part of the body is associated with each sense	Animals, including Humans	
Everyday materials	distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties	Everyday Materials	
Seasonal changes	observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies	Seasonal Change	
Living things and their habitats	explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, identify and name different sources of food		Living things and their habitats
Plants	observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy		Plants
Animals, including humans	notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene		Animals, including Humans
Uses of everyday materials	identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting & stretching		Everyday Materials
During years 1 & 2, pupils should be taught to use the following practical scientific methods, processes & skills through the teaching of the programme of study content:			
Working Scientifically	asking simple questions and recognising that they can be answered in different ways	Everyday Materials	Everyday Materials
	observing closely, using simple equipment	Plants; Seasonal Change	Living things & their habitats
	performing simple tests	Everyday Materials; Seasonal Change	Plants; Everyday Materials
	identifying and classifying	Everyday Materials	Animals, including Humans
	using their observations and ideas to suggest answers to questions	Throughout	Plants; Everyday Materials
	gathering and recording data to help in answering questions	Throughout	Throughout

	Key Stage Two				
	Pupils should be taught to:	Year 3	Year 4	Year 5	Year 6
Plants	identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation & seed dispersal	Plants			
Animals including humans	identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement	Animals including humans			
Rocks	compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter	Rocks			
Light	recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change	Light			
Forces and magnets	compare how things move on different surfaces notice that some forces need contact between 2 objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing	Forces and magnets			
Living things & their habitats	recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things		Living things & their habitats		
Animals, including humans	describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey		Animals, including humans		
States of matter	compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		States of matter		

Sound	identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases		Sound		
Electricity	identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches & buzzers 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 recognise that a switch opens & closes a circuit & associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors		Electricity		
Working Scientifically	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:				
	asking relevant questions and using different types of scientific enquiries to answer them	Throughout	Throughout		
	setting up simple practical enquiries, comparative and fair tests	Forces; Rocks; Light; Plants	States of Matter, Electricity, Sound		
	making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Animals, including Humans; Plants	All Living Things and their Habitats		
	gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	Throughout	Throughout		
	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Throughout	Throughout		
	reporting on findings from enquiries, including oral & written explanations, displays or presentations of results & conclusions	Throughout	Throughout		
	using results to draw simple conclusions, make predictions for new values, suggest improvements & raise further questions	Throughout	Throughout		
	identifying differences, similarities or changes related to simple scientific ideas and processes	Rocks; Plants	All living things & their habitats; States of Matter		
	using straightforward scientific evidence to answer questions or to support their findings.	Throughout	Throughout		
Living things & their habitats	describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals			Living things & their habitats	

Animals, including humans	describe the changes as humans develop to old age			Animals, including humans	
Properties and changes of materials	compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda			Properties and changes of materials	
Earth and space	describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth describe the sun, Earth and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky			Earth and space	
Forces	explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect			Forces	
Living things & their habitats	describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics				Living things & their habitats
Animals including humans	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				Animals including humans
Evolution and inheritance	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				Evolution and inheritance

Light	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 & 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				Light
Electricity	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				Electricity
Working Scientifically	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:				
	planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary			Throughout	Throughout
	taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate			Throughout	Throughout
	recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs			Throughout	Throughout
	using test results to make predictions to set up further comparative and fair tests			Throughout	Throughout
	reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations			Properties & Changes in Materials	Electricity
	identifying scientific evidence that has been used to support or refute ideas or arguments			Earth & Space	Evolution & inheritance

Science Long Term Plan – 2023/24

	Advent 1	Advent 2	Lent 1	Lent 2	Pentecost 1	Pentecost 2
EYFS			Recognise some environments that are different to the one in which they live Explore the natural world around them		Explore the natural world around them making observations and drawing pictures of animals and plants	Knows some similarities and differences between the natural world around them and contrasting environments drawing on their experiences and what has been read in class Understand s some important processes and changes in the natural world around them, including the seasons and changing states of matter

Year 1	**Plants** What is a plant and what different types are there?	**Seasonal change** What changes as we move from season to season? **Animals, including humans** How are animals & humans the same/different?	**Seasonal change** What changes as we move from season to season?	**Seasonal change** What changes as we move from season to season?	**Everyday materials** What materials do we use in everyday life?	**Seasonal change** What changes as we mov from season to season?
Year 2	**Plants** What do plants need to grow and how do they reproduce?		**Everyday Materials** What are different materials used for and why?		**Animals, including Humans** What do animals, including humans, need to survive & how do they reproduce?	**All Living Things and their Habitats** What is a habitat and what do you find in one?
Year 3	**Forces** How do forces make objects move?	**Animals, including Humans** What does our body do for us & how do we keep it healthy?	**Rocks** How can we classify rocks?	**Light** How does light travel and how are shadows formed?	**Plants** What is the life cycle of a flowering plant and what do they need to stay healthy?	
Year 4	**All Living Things and their Habitats** How can we classify living things & how can their environments change?		**Animals, including Humans** What happens when animals eat & do they eat the same types of food?	**States of Matter** Can materials change state?	**Electricity** What is electricity and how is it used?	**Sound** What is sound?
Year 5	**All living things and their habitats.** How do plants and animals develop?	**Animals including humans.** How do we change as we grow older?	**Properties and change in materials.** Are all changes irreversible?		**Earth and Space** How do different celestial bodies move & how does this affect us here on Earth?	**Forces** What are different forces and what do they do?
Year 6	**Living things and their habitats** What are living things & how do we tell them apart?	**Evolution and Inheritance** Have living things always been the same?	**Electricity** How do you make a bulb brighter or a buzzer louder?	**Light** How do we see in the dark and around corners?	**Animals, Including humans.** How can we power our bodies?	

Strands of learning

Substantive knowledge (knowledge of the products of science, such as concepts, laws, theories and models): this is referred to as scientific knowledge and conceptual understanding in the national curriculum.

These three strands run through the St Clare's art & science curriculum:

Strand	Definition
Biology	The study of living organisms, their structure, adaptations and environment
Chemistry	The study of the properties of matter and how matter interacts with energy
Physics	The study of matter and the smaller composite parts that make up matter, its motion and behaviour through space and time, and the related entities of energy and force

Biology					
The study of living organisms, their structure, adaptations and environment					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Chemistry					
The study of the properties of matter and how matter interacts with energy					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Physics

The study of matter and the smaller composite parts that make up matter, its motion and behaviour through space and time, and the related entities of energy and force

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Working Scientifically

Disciplinary knowledge (knowledge of how scientific knowledge is generated and grows): this is specified in the 'working scientifically' sections of the national curriculum and it includes knowing how to carry out practical procedures.

The Primary Science Teaching Trust identifies five types of working scientifically:

- comparative / fair testing
- research
- observation over time
- pattern seeking
- identifying, grouping and classifying

These are mapped out as follows.

Comparative/Fair Testing					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Research					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Observation over time					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Pattern-seeking					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Identifying, grouping and classifying					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	Plants	Forces	All Living Things and their Habitats	All Living Things and their Habitats	All Living Things and their Habitats
Seasonal Change	Everyday Materials	Animals. Including Humans	Animals, including Humans	Animals, including Humans	Evolution and Inheritance
Animals, including Humans	Animals, including Humans	Rocks	Electricity	Properties and Changes in Materials	Electricity
Everyday Materials	All Living Things and their Habitats	Light	States of Matter	Earth and Space	Light
		Plants	Sound	Forces	Animals, including Humans

Year 1 – What is a plant and what different types are there? (Plants)

St Clare's Unit Plan:

I can identify describe and compare plants, seeds and bulbs
I can name parts of a plant
I can identify and name some common garden and wild plants
I can identify and name some common trees
I can name, sort and compare some common fruit and vegetable plants
I can explain what a plant is and what different types there are

Learning enhancements:

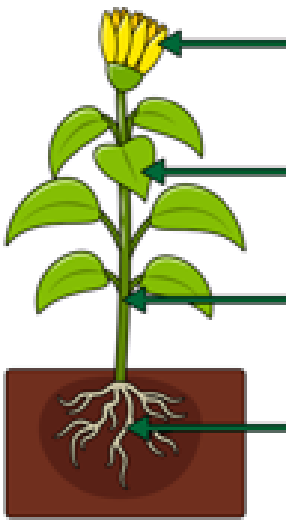
- Chn grow a plant

Links to prior learning:

- EYFS – planting and growing cress; talking about what a plant needs to grow; exploring the world around them

What is a plant and what different types are there?

Parts of a plant



Trees

All **trees** have **roots, a trunk, branches** and **leaves.**

Deciduous trees lose their leaves each year. They grow back again though.

Evergreen trees don't lose their leaves at all. They keep them all year round, even in winter

Working Scientifically

- Children can make careful observations, sometimes using equipment to help them, of seeds and plants.
- They can explore the world around them, leading them to ask some simple scientific questions about how and why things happen.
- Children can make close observations of plants.
- Children can observe the natural world around them.
- Children can observe closely. They can identify, classify and sort plants from their observations. They begin to explain their choices using simple scientific language.
- Children can identify similarities and differences between plants and begin to sort them according to a given criteria.

Year 1 – What changes as we move from season to season? (Seasonal Change - Autumn)

St Clare's Unit Plan:

I can explain what autumn is and what happens to the weather in autumn
I can explain what happens to animals during autumn
I can identify the types of clothes we wear during autumn
I can observe changes across the four seasons
I can explain what happens in autumn

Learning enhancements:

- School grounds evidence hunt

Links to prior learning:

- Year 1 – plants
- Own experiences of different types of weather

What changes as we move from season to season?

Autumn

Autumn is usually in the months September, October and November. In autumn the amount of time it is light becomes less which means it gets darker earlier. The leaves start to change colour and fall off the trees.

Seasons

Autumn Winter Spring Summer

Each year we experience these four seasons.

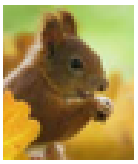
The seasons are caused because the Earth is spinning on a tilt.

Weather

Sun rain wind snow thunder and lightening

Animals

Many animals grow warm winter coats in the autumn months . Other animals enter a state of hibernation.



Working Scientifically

- Interpret simple data
- Record data
- Make detailed observations

Clothes

Year 1 – What changes as we move from season to season? (Seasonal Change - Winter)

St Clare's Unit Plan:

I can explain what winter is and what happens to the weather in winter
I can explain what happens to plants and animals during winter
I can identify the types of clothes we wear during winter
I can observe changes across the four seasons
I can explain what happens in winter

Learning enhancements:

- Artwork – winter trees

Links to prior learning:

- Year 1 – plants
- Year 1 - autumn

What changes as we move from season to season?

Winter

Winter is usually in the months **December, January** and **February.**
In winter we have **colder weather**, sometimes **snow** and **frost,** the trees have **no leaves** and the amount of time it is light during the day is at its **shortest.**

winter

Seasons

Autumn Winter Spring Summer
Each year we experience these four seasons.
The seasons are caused because the Earth is spinning on a tilt.

Weather

Sun rain wind snow thunder and lightening

Animals

Some animals **hibernate.**

Some animals **travel** to **warmer places**

Some animals **fur changes colour**

Working Scientifically

- Comparing and grouping
- Observing
- Gather record and classify data

Clothes

Year 1 - How are animals and humans the same/different? (Animals, including humans)

St Clare's Unit Plan:

I can identify and name a variety of common animals, including fish, amphibians, reptiles, birds and mammals
I can compare a variety of common animals, including fish, amphibians, reptiles, birds and mammals
I can identify animals that are carnivores, herbivores and omnivores
I can identify, name, draw and label the basic parts of the human body and understand that humans are all different
I can identify which part of the body is associated with each sense
I can explain how animals and humans are the same/different

Learning enhancements:

- Senses Quiz Carousel

Links to prior learning:

- EYFS – farm visit; dinosaurs; minibeasts; life cycles (frog/butterfly)

How are animals and humans the same/different?

Groups of animals

Fish

Fish live in water and have gills, fins and scales on their bodies.

Birds

Birds have feathers, beaks and wings. Most birds can fly.

Mammals

Mammals have fur or hair. They drink milk from their mother when they are young.

Amphibians

Amphibians are born in water but ten develop lungs and live on land.

Reptiles

Reptiles are cold-blooded animals with scales that live on land.

Nutrition

Carnivores

Carnivores only eat others animals (meat).

Herbivores

Herbivores just eat plants.

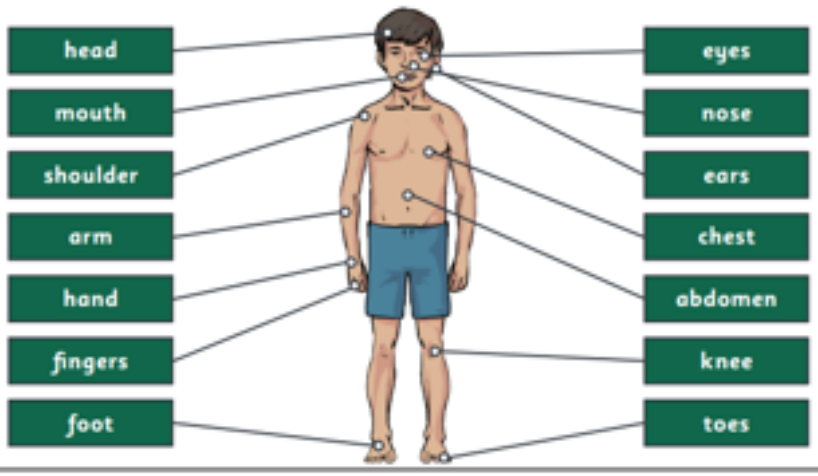
Omnivores

Omnivores eat both plants and other animals.

Senses

1) We can see (sight) with our eyes.
2) We can hear with our ears.
3) We can touch with our hands.
4) We can smell with our noses.
5) We can taste with our tongue.

Body parts



Working Scientifically

- Observation of body parts.
- Classification of animals.

Year 1 – What changes as we move from season to season? (Spring – Seasonal Change)

St Clare's Unit Plan:

I can explain what spring is and what happens to the weather in spring
I can explain what happens to animals during spring
I can identify the types of clothes we wear during spring
I can observe changes across the four seasons
I can explain what happens in spring

Learning enhancements:

- Outdoor learning

Links to prior learning:

- EYFS – arctic animals, habitats and babies
- Year 1 – autumn
- Year 1 - winter

What changes as we move from season to season?

Spring

Spring is usually in the months **March, April** and **May.** In spring the days start to get **longer** and a bit **warmer.** New plants **grow** and the trees grow their leaves back.

plant

spring

Seasons

Autumn Winter Spring Summer

Each year we experience these **four seasons.**

The seasons are caused because the **Earth is spinning on a tilt.**

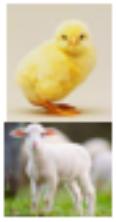
Weather

Sun rain wind snow thunder and lightening

Animals

Many **animals** have babies such as **birds, cows, sheep** and **ducks.**

new life



Working Scientifically

- Comparing and grouping
- Observing
- Gather record and classify data

Clothes

Year 1 – What materials to we use in everyday life? (Everyday Materials)

St Clare's Unit Plan:

I can identify a variety of everyday materials
I can describe the physical properties of a variety of everyday materials
I can distinguish between an object and the material from which it is made
I can compare and group together a variety of everyday materials on the basis of their simple physical properties
I can investigate the properties of different materials
I can explain what materials we use in our everyday lives

Learning enhancements:

-

Links to prior learning:

- EYFS – materials; using loose parts to make pictures; exploring the world around them; floating and sinking

What materials to we use in everyday life?

Materials

Wood

We use wood to make things like tables, chairs, furniture and some toys.

Metal

We use metal to make things like cars, spoons, tins and musical instruments.

Glass

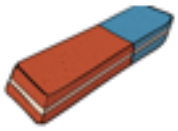
We use glass to make things like windows, glasses and mirrors.

Plastic

We use plastic to make things like toys, Lego, games consoles and food packaging.

Rubber

We use rubber to make things like car tyres, bouncy balls, balloons and wellington boots.



Physical Properties

Wood = stiff, dull and not bendy

Metal= hard, shiny, smooth, stiff and opaque

Glass = transparent and waterproof

Plastic = Smooth, hard or bendy

Rubber = bendy and stretchy

Grouping Materials

Rock

We use rock to make things like roof tiles and jewellery.

Fabric

We use soft fabric to make things like clothes, bedding and carpets.

Paper

We use paper to make things like books and wrapping

Brick

We use brick to make things like houses and outdoor pizza ovens.

Suitability

It is important to use the right materials for certain objects so that these objects can be used properly.

Working Scientifically

- Identifying and classifying
- Performing simple tests

Year 1 – What changes as we move from season to season? (Summer – Seasonal Change)

St Clare's Unit Plan:

I can explain what summer is and what happens to the weather in summer
I can explain what happens to plants and animals during the summer
I can identify the clothes worn in summer
I can observe change across the seasons
I can explain what changes as we move from spring to summer

Learning enhancements:

-

Links to prior learning:

- Year 1 – Seasonal change: Autumn and Spring

What changes as we move from season to season?

Summer

Summer is usually in the months **June, July** and **August.**

In summer the days are at their **longest** and the weather is the **warmest.**

The **trees** are **full of leaves.**

summer

Seasons

Autumn Winter Spring Summer

Each year we experience these **four seasons.**

The seasons are caused because the **Earth is spinning on a tilt.**

Weather

Sun rain wind snow thunder and lightening

Animals

At this time of year **insect** life is at its most abundant. It is a great time to get to know **moths, dragonflies, crickets, grasshoppers, beetles** and all our other amazing minibeasts! Summer is also a great time to get to the **seashore** to investigate rockpools and to see what wild treasures the tide has washed up.

Working Scientifically

- Comparing and grouping
- Observing
- Gather record and classify data

Clothes

Year 2 – What do plants need to grow and how do they reproduce? (Plants)

St Clare's Unit Plan:

I can observe and describe how seeds grow into mature plants
I can describe the life cycle of a plant
I can identify what plants need to stay healthy
I can explain what can affect a plant's health
I can understand how plants are suited to their habitats
I can explain what plants need to grow and how they reproduce

Learning enhancements:

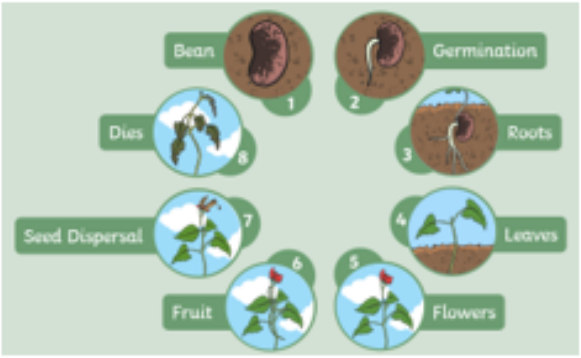
- Chn grow plants in different conditions

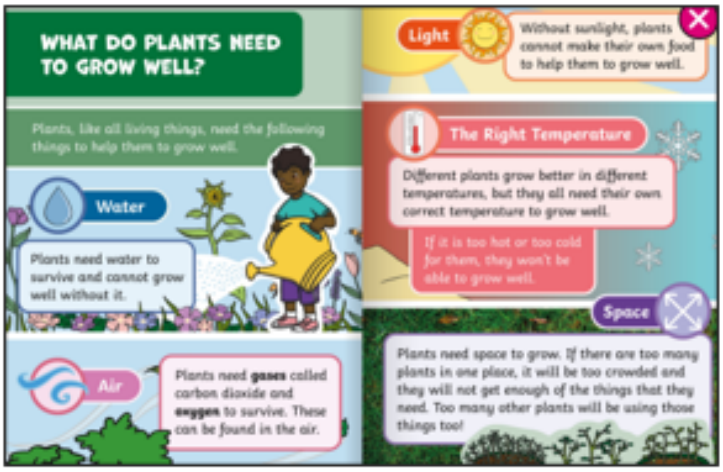
Links to prior learning:

- EYFS – drawing pictures of plants; growing cress; exploring the natural world
- Year 1 – plants – parts of a plant; name common/wild garden plants

What do plants need to grow and how do they reproduce?

Life cycle of a plant





Reproduction

- Plants produce seeds to create new plants.
- Some plants produce fruit with the seeds inside, so animals eat them and spread them.
- Others have seeds that are light and can be spread by the wind.
- Some have prickly or sticky seeds that attach to animals.

Different needs

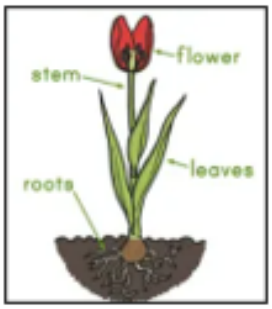
Different plants have different needs
For example, the cactus is a desert plant and does not need much water, however, plants that live in the Rainforest, love lots of water, like the Bird of Paradise plant.

Germination

Germination occurs when the seed first begins to grow. A shoot, roots and eventually, leaves will grow from it, creating the plant.

Habitats

Plants survive in different habitats around the world. Some prefer hot, dry climates whilst others can survive in very cold and snowy places. Some plants even grow underwater in ponds, lakes and under the sea.



Year 2 – What are different materials used for and why? (Everyday Materials)

St Clare's Unit Plan:

I can identify uses of different everyday materials
I can identify and group the uses of everyday materials
I can compare the suitability of different everyday materials
I can explain how the shape of objects made from some materials can be changed
I can explain who John McAdam was
I can explain what different materials are used for and why

Learning enhancements:

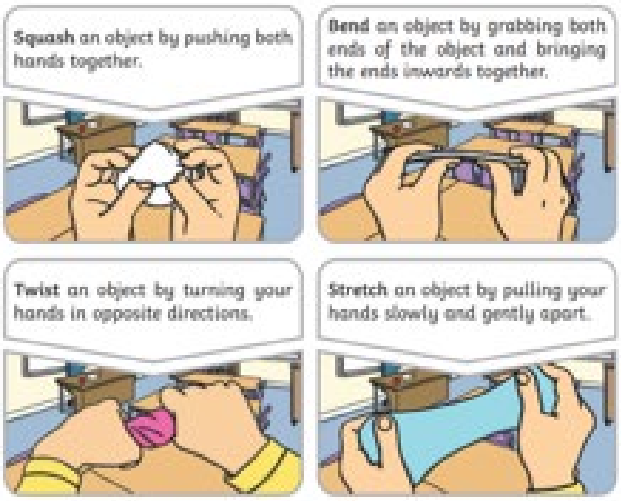
-

Links to prior learning:

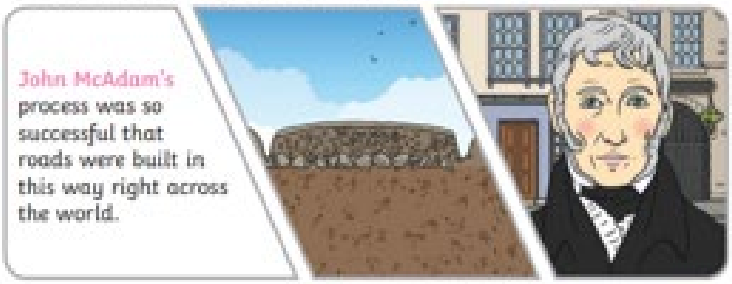
- Year 1 – Everyday materials
- Year 1 – Great Fire of London

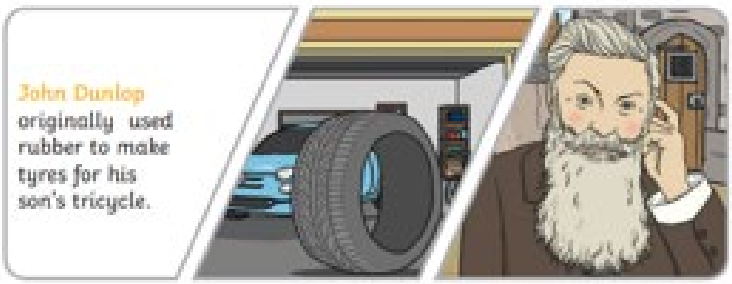
What are different materials used for and why?

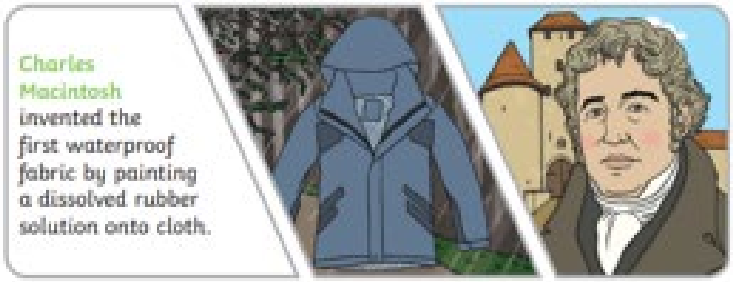
Properties of Materials



People who developed new materials:







Working Scientifically

- Observing
- Recording data
- Analysing data
- Researching scientists

Year 2 – What do animals, including humans, need to survive and how do they reproduce? (Animals, incl Humans)

St Clare's Unit Plan:

I can match, sort and group young animals and their adults
I can find out how animals change as they grow into adults
I can explain the stages of the human life cycle
I can research and explain what animals, including humans, need to survive
I can explain the importance of exercise and healthy living
I can explain what animals, including humans, need to survive and how they reproduce

Learning enhancements:

- Chn observe frogspawn in the school pond
- Opportunity to observe butterfly life cycle

Links to prior learning:

- EYFS – animals and farm visit
- Year 1 – animals, including humans
- Year 1 – D & T – cookery day

What do animals, including humans, need to survive and how do they reproduce?

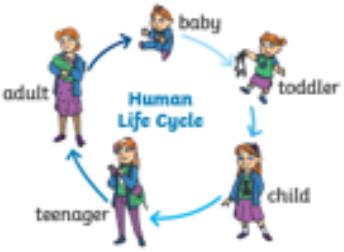
Some animals give birth to **live young**.

Some animals lay eggs which the **young** hatch from.

Both of these types of **young** then **develop** into **adults**.

Some **offspring** look like their **adult** when they are born.

Some **offspring** do not look like their **adult** when they are born.



To stay alive, all animals have three basic needs for survival:

To grow into a healthy adult, we must eat the right types of food in the right amount and **exercise**.

Water, lower fat milk and sugar-free drinks.

Eatwell Guide

Eat less often and in small amounts.

oil and spreads
Choose unsaturated oils and use in small amounts.

Being active and **exercising** keeps our bodies and minds healthy.

To stop germs from spreading, it is important to be **hygienic**.

Working Scientifically

- Children can sort and classify objects (animals) into simple groups. They use scientific language to talk about their findings. They start, with support, to notice patterns and relationships between the groups.
- Children can use simple secondary sources to find answers to a question.
- Children can ask simple scientific questions and use scientific language to answer them.
- Children use simple secondary sources to find answers and talk about their findings to an audience.
- Children can carry out simple practical tests and use their observations and ideas to suggest answers to questions.
- Children can carry out simple practical tests, make careful observations and draw simple conclusions.

Year 2 – What is a habitat and what do you find in one? (All Living Things and their Habitats)

St Clare's Unit Plan:

I can compare the differences between things that are living, dead and have never been alive
I can map a habitat and identify what is in it
I can describe a habitat and identify animals that live in it
I can explain how an animal is suited to its habitat
I can explain what a food chain is
I can explain what a habitat is and what you find in one

Learning enhancements:

- Playground safari

Links to prior learning:

- EYFS – minibeasts
- Year 1 – animals, including humans
- Year 2 – animals, including humans

What is a habitat and what do you find in one?

living

dead

never living

Food Chains

Food chains. The arrows mean 'is eaten by'.

Habitats

Examples of habitats:

Working Scientifically

- Sort objects into categories
- Ask questions about different habitats.
- Gather and record information

Micro Habitats

Year 3 – How do forces make objects move? (Forces)

St Clare's Unit Plan:

I can compare how different things move
I can plan and carry out a fair test to compare how an object move on different surfaces
I can explore how magnetic forces act at a distance
I can compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet
I can predict whether two magnets will attract or repel each other and which magnet will be the strongest
I can explain how force makes objects move

Learning enhancements:

-

Links to prior learning:

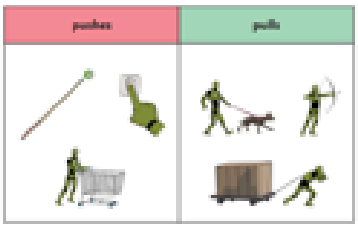
- Year 1 – everyday materials
- Year 2 – everyday materials

How do forces make objects move?

Forces

- A force is a push or pull that acts upon an object. We can't see forces, but they are an important part of our everyday lives.
- When we push or pull objects we can move the object, change the shape of the object or make the object change direction.

Examples of **pushes** and **pulls**



Friction

- Different surfaces can affect the motion of an object.
- Friction is a force that holds back the movement of an object

Examples of **magnetic objects**

Magnets

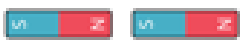
South **magnetic pole**

North **magnetic pole**

Magnets are usually made from **iron**. They can **attract** and **repel** other objects with their **magnetic forces**. Magnetic forces act at a distance meaning that a magnet does not need to be in contact with another object for the magnetic forces to act.

Magnetic Poles

- The different parts of a magnet are called the poles.
- There is a north pole and a south pole.
- Like poles repel, opposite poles attract.
- The north pole of the magnet should always point the same way, north, even if the compass moves



Scientific Enquiry

- Setting up a fair test
- Make systematic and careful observations
- Gather, record and present data
- Record findings using simple scientific language, drawings, labelled diagrams and tables

Year 3 – What does our body do for us and how do we keep it healthy? (Animals, including Humans)

St Clare's Unit Plan:

I can identify that humans have bones for support, protection, and movement.
I can identify that humans have muscles for support, protection, and movement.
I can identify that some other animals have bones for support, protection and movement.
I can set up a simple practical enquiry. I can communicate my results.
I understand that animals, including humans, need the right type of nutrition.
I can describe what our body does for us and how we can keep it healthy

Learning enhancements:

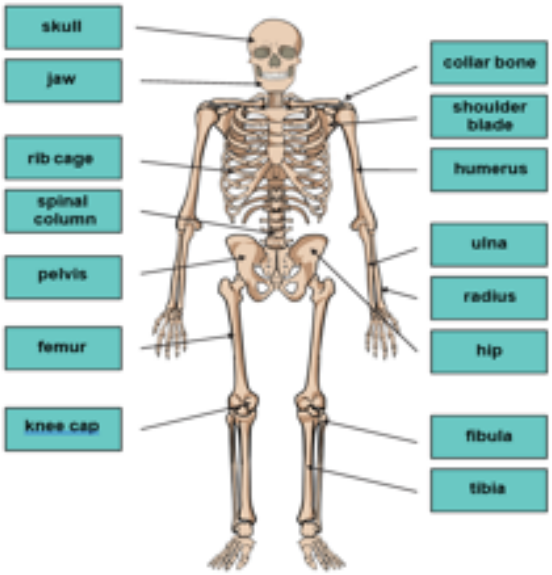
-

Links to prior learning:

- Year 1 – Animals, including humans
- Year 2 – Animals, including humans

What does our body do for us and how do we keep it healthy?

Bones



Vertebrates vs Invertebrates

Vertebrates are animals that have a spine or backbone as part of their skeleton.

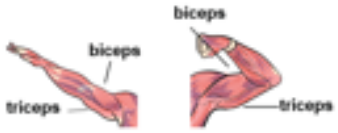
Invertebrates are animal that do not have a backbone.

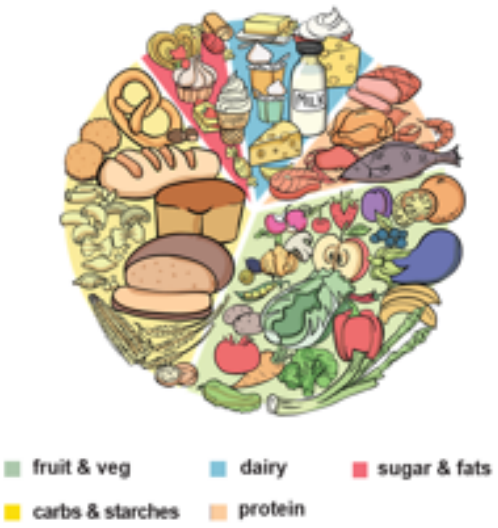
Scientific Enquiry

- Identifying and classifying
- Ask questions and plan enquiry

Muscles

To straighten our arm, our biceps relax and our triceps contract.
To bend our arm, our biceps contract and our triceps relax.
When we stretch our muscles, they become longer and thinner.
When we contract our muscles, they become shorter





Nutrition

Humans need to eat a healthy balanced diet.

Nutrition is when we eat food to give us energy. Adults and children need lots of energy to help them keep moving and keep their bodies healthy!

Children also need food to help them grow.

Year 3 – How can we classify rocks? (Rocks)

St Clare's Unit Plan:

I can compare and group together different kinds of rocks
I can compare and group together different kinds of rocks
I can explain how rocks are formed
I can explain how fossils are formed
I recognise that soils are made from rocks and organic matter
I can describe how we can classify rocks

Learning enhancements:

- Chn have real fossils and rocks to examine

Links to prior learning:

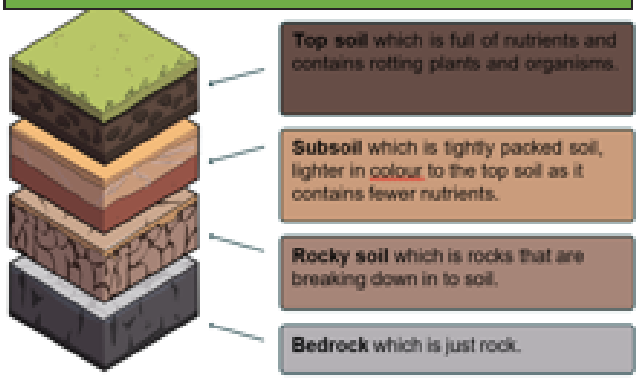
-

How can we classify rocks?

Rocks

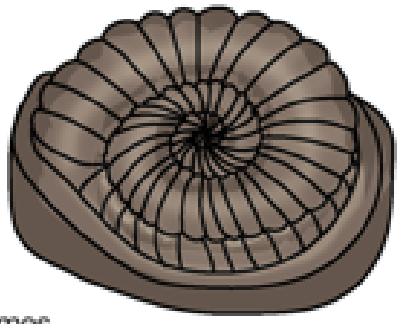
If you dig down anywhere on Earth you will find rock. Rocks can be hard, soft, permeable or impermeable, depending on what type of rock it is. Slate, marble, chalk and granite are all different types of rock and all have different uses.

Soils



Fossils

A fossil is the preserved remains or traces of a dead organism. The process by which a fossil is formed is called fossilisation.



Types of Rocks

Igneous rock - When a volcano is about to erupt, magma comes to the surface. As it flows down the volcano and across the land, it cools and turns back into a solid. This forms rock.

Sedimentary rock - When a river reaches the sea, pieces of broken rock settle at the bottom of the sea to form a layer of sediment. Over millions of years, more and more layers of sediment settle on top and squash it down until it turns into rock.

Metamorphic rock - Metamorphic rock is formed from other rocks that are changed because of heat or pressure.

Scientific Enquiry

- Identifying and classifying
- Interpret and report
- Observing over time

Year 3 – How does light travel and how are shadows formed? (Light)

St Clare's Unit Plan:

I can recognise that there needs to be light in order to see things and that darkness is the absence of light.
I can notice that light is reflected from surfaces.
I can recognise that light from the Sun can be dangerous and that there are ways to protect your eyes and skin from the Sun.
I can recognise that shadows are formed when light from a light source is blocked by an opaque object.
I can find patterns in the way that the length of shadows change.
I can explain how light travels and how shadows are formed

Learning enhancements:

-

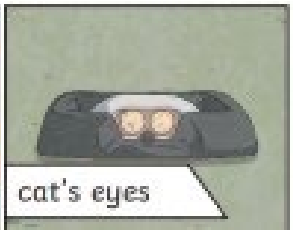
Links to prior learning:

- Year 1 – Seasonal Change

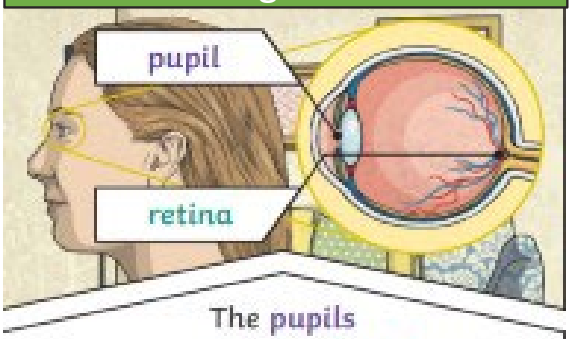
How does light travel and how are shadows formed?

What is light?

We need **light** to be able to see things. **Light** travels in a straight line. When **light** hits an object, it is **reflected** (bounces off). If the **reflected light** hits our eyes, we can see the object. Some surfaces and materials **reflect light** well. Other materials do not **reflect light** well. **Reflective** surfaces and materials can be very useful...



Why is light from the Sun can be dangerous



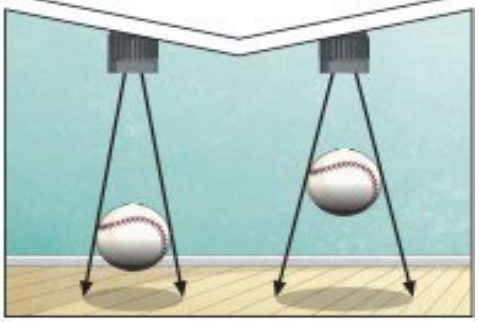
The **pupils** control the amount of **light** entering the eyes. If too much **light** enters, then it can damage the **retina**. To help protect the eyes, you can wear a hat with a wide brim and sunglasses with a UV rating.

How is light reflected from surfaces?

Mirrors **reflect light** very well, so they create a clear image. An image in a mirror appears to be reversed. For example, if you look in a mirror and raise your right hand, the mirror image appears to raise its left hand.

How are shadows made?

A **shadow** is caused when **light** is blocked by an **opaque** object. A **shadow** is larger when an object is closer to the **light** source. This is because it blocks more of the **light**.



How does the length of shadows change?

When the **light** source is directly above the object, the **shadow** will be directly underneath.

When a **light** source is to one side of an object, the **shadow** will appear on the opposite side. The **shadow** will also be longer.

Scientific Enquiry

- looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Year 3 – What is the life cycle of a flowering plant and what do they need to stay healthy? (Plants)

St Clare's Unit Plan:

I can name parts of flowering plants and explain their function
I can set up a fair test to find out what plants need to grow well
I can record observations and present results of a fair test
I can investigate the way in which water is transported within plants
I can explain the life cycle of flowering plants
I can explain the life cycle of a flowering plant and what they need to stay healthy

Learning enhancements:

- Dissecting plants
- Planting seeds/bulbs

Links to prior learning:

- Year 1 – plants – parts of a plant
- Year 2 – plants – what a plant needs to grow

What is the life cycle of a flowering plant and what do they need to stay healthy?

What do plants need to grow and live?

- water
- nutrients from the soil
- light
- air
- room to grow

What is the function of the roots?

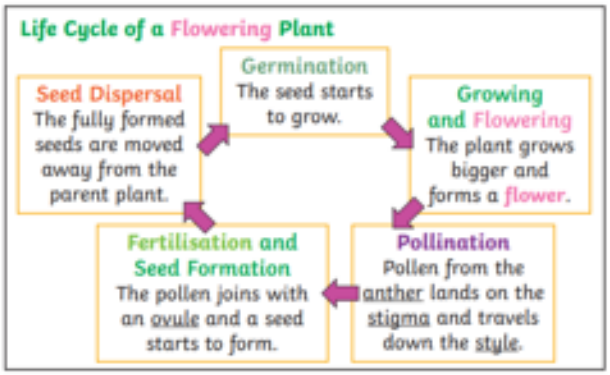
The roots have **different jobs**:

They take up **water** and **nutrients** from the soil.

They keep the plant **steady**.

They keep the plant **upright**.

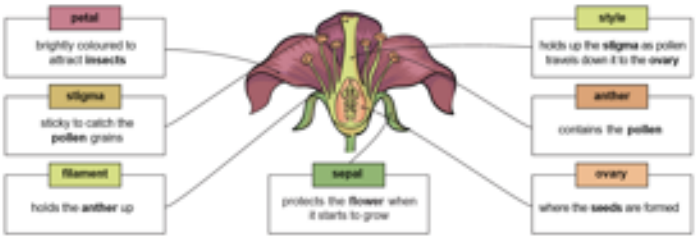
They "**anchor**" the plant.



How is water transported in a plant?

The job of the **stem** is to transport **water** and **nutrients** from the soil to the leaves, flowers or fruit through tiny, thin tubes called the **xylem**.

What are the different parts of a flower ?



Scientific Enquiry

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries.

Year 4 – Can materials change state? (States of Matter)

St Clare's Unit Plan:

I can identify solids, liquids and gases
I can make careful observations and communicate my results
I can take accurate measurements using thermometers
I can observe that some materials change state when they are heated or cooled
I can investigate how water evaporates
I can explain whether materials can change state

Learning enhancements:

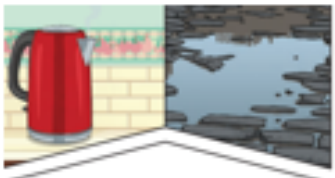
-

Links to prior learning:

- Year 1 – everyday materials
- Year 1 – Great Fire of London and materials

Can materials change state?

Evaporation and Condensation



Evaporation occurs when water turns into water vapour. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle evaporating in the warm air.

Condensation is when water vapour is cooled down and turns into water. You can see this when droplets of water form on a window. The water vapour in the air cools when it touches the cold surface.

Thermometers

1) Place the thermometer in the liquid.

2) Wait for the coloured centre to stop moving.

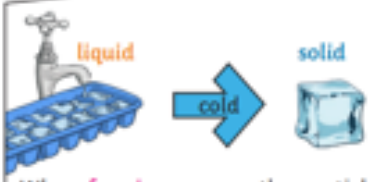
3) Read the scale precisely to find the temperature. Ask an adult for help if you are struggling.

Remember: We usually measure temperature in degrees Celsius which can be shortened to °C.

Changing State

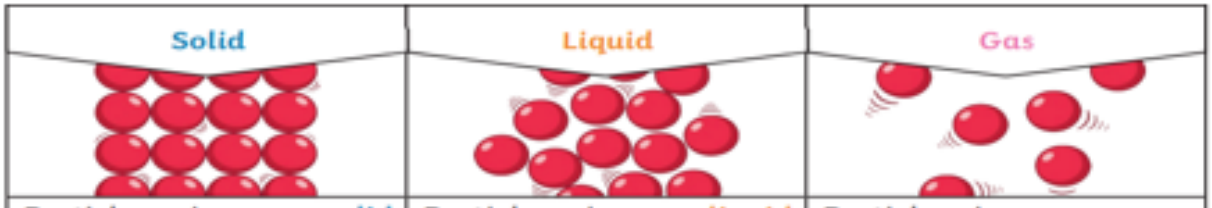
When water and other liquids reach a certain temperature, they change state into a solid or a gas. The temperatures that these changes happen at are called the boiling, melting or freezing point.

If a solid is heated to its melting point, it melts and changes to a liquid. This is because the particles start to move faster and faster until they are able to move over and around each other.



When freezing occurs, the particles in the liquid begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a solid structure.

Solids, Liquids and Gases



Solid	Liquid	Gas
Particles in a solid are close together and cannot move. They can only vibrate.	Particles in a liquid are close together but can move around each other easily.	Particles in a gas are spread out and can move around very quickly in all directions.

Working Scientifically

- Use results to draw simple conclusions,
- Make predictions
- Make observations
- Use straightforward scientific evidence to answer questions or to support their findings.

Do all liquids behave the same?

Think about **honey** and **water.** Both are liquids but do they behave the same?

Year 4 – How can we classify living things and how can their environments change?

(All Living Things and their Habitats)

St Clare's Unit Plan:

I can describe life processes using scientific vocabulary
I can recognise that living things can be grouped in a variety of ways
I can explore and name a variety of living things in my local environment
I can explore and use classification keys to help group, identify and name a variety of living things in my local environment.
I can recognise that environments can change and that this can sometimes pose dangers to living things.
I can explain how we classify living things and how their environments can change.

Learning enhancements:

- Playground safari – RSPB Habitats
- Trip to the University of Leicester Botanical Gardens – habitats activity

Links to prior learning:

- Year 1 – Seasons
- Year 1 – Animals, including humans
- Year 2 – Living things and their habitats

How can we classify living things and how can their environments change?

Characteristics

Animals can be grouped in lots of different ways based upon their characteristics.

We can also group animals based on the types of food they eat.

Omnivore Carnivore Herbivore

Plants

Plants can be sorted into many different groups. For example: flowering plants and non-flowering plants

Life Processes

To stay alive and healthy, all living things need certain conditions that let them carry out the seven life processes:

Movement
Respiration
Sensitivity
Growth
Reproduction
Excretion
Nutrition

Classification

Classification keys usually have statements or questions that describe some of the features or characteristics. You have to answer either yes or no. Your answer will then take you to another question or statement OR the type of living thing.

Working Scientifically

- Comparing and grouping animals and plants
- Gather record and classify data

Changes to environments and habitats

Changes to an environment can be natural or caused by humans. Changes to an environment can have positive as well as negative effects.

Natural: earthquakes, storms, floods, droughts, wildfires and the seasons.

Man-made: deforestation, pollution, urbanisation, the introduction of new animal or plant species to an environment and creating new nature reserves

Year 4 – What is sound? (Sound)

St Clare's Unit Plan:

I can identify how sounds are made, associating some of them with something vibrating
I can recognise that vibrations from sounds travel through a medium to the ear
I can recognise that vibrations from sounds travel to the ear
I can investigate if the size of the pinnae affects the volume of the sound and report my findings
I can find patterns between the pitch of a sound and the features of the object that produced it I can find patterns between the volume of a sound and the strength of the vibrations that produced it
I can explain what sound is

Learning enhancements:

- De Montfort Hall music trip

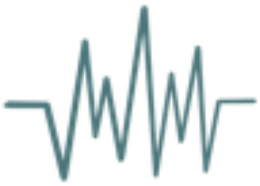
Links to prior learning:

- EYFS – music: pitch
- Year 1 – Senses
- Year 1 – 3 music curriculum

What is sound?

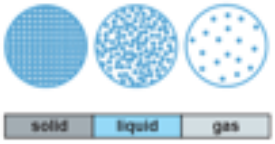
Sound

Sounds are made when objects **vibrate**. The **vibration** makes the air around vibrate, and the air vibrations enter your **ear**. You hear the vibrations as **sounds.** You cannot always see the vibrations, but if something is making a sound, a part of it is vibrating. The vibrations travel in all directions and **they don't travel in straight lines.**



Vibrations

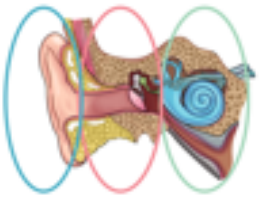
The vibrations caused by the sound can travel through the air (gas) but can also travel through liquids and solids.



The vibrations travel in all different directions so people all around will be able to hear the sound. Vibrations don't travel in straight lines! They travel in waves. These are called **sound waves.**

The Ear

The ear is divided into three parts. The **inner ear**, the **middle ear** and the **outer ear**.



Pinna or ear flaps
Ear canal
Ear drum
Cochlea

Pitch

Sounds can be **high** or **low**. We call this the **pitch**. A high sound has a **high pitch** and a low sound has a **low pitch**. The pitch of a sound is due to how many times the object vibrates each second. The higher the number of vibrations the higher the pitch.

Working Scientifically

- To set up simple practical enquiries.
- Report on findings.
- Use results to draw conclusions
- Make careful observations

Volume

Sounds can also be **loud** or **quiet**. We call this the **volume** or loudness of the sound. Sound is measured in **decibels**.

Year 4 – What happens when animals eat and do they eat the same types of food?

(Animals, including Humans)

St Clare's Unit Plan:

I can name the basic parts of the digestive system and describe their functions
I can identify the different teeth and describe their functions
I can plan and carry out an investigation
I can communicate the results of an investigation
I can construct and interpret a variety of food chains
I can explain what happens when animals eat and which types of food each eats

Learning enhancements:

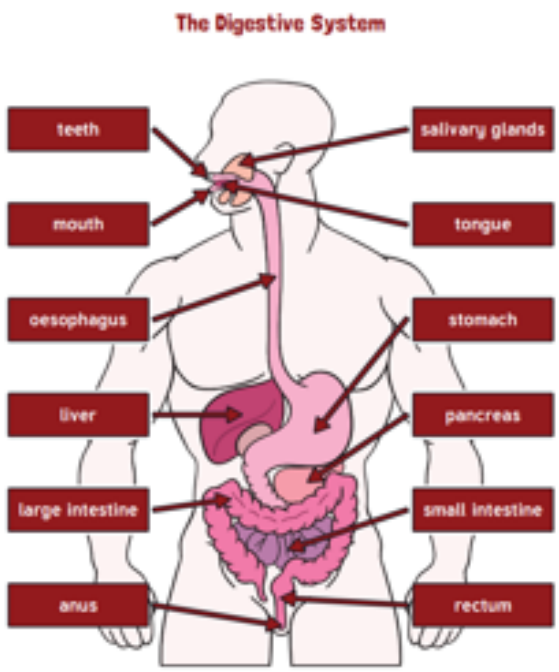
-

Links to prior learning:

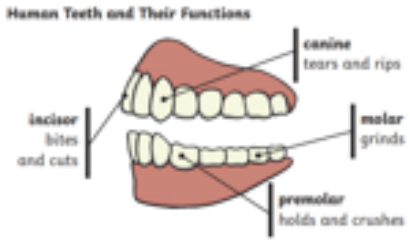
- EYFS - dinosaurs
- Year 1 – Animals, including humans: parts of the body
- Year 3 – Animals, including humans: nutrition

What happens when animals eat and do they eat the same types of food?

The Digestive System



Human Teeth



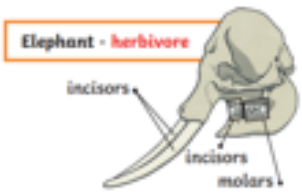
Looking after Teeth

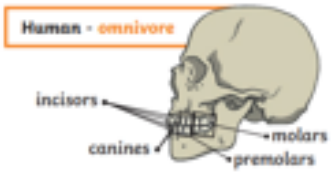
To help prevent tooth decay:

- limit sugary food and drink;
- brush teeth at least twice daily using a fluoride toothpaste;
- visit your dentist regularly

Animals Teeth

The teeth of animals are designed to eat different foods depending on the diet of the animal.

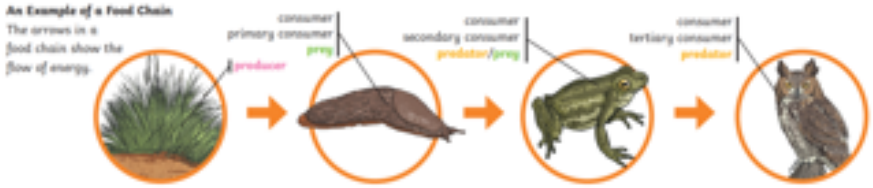




Working Scientifically

- Use results to draw simple conclusions, make predictions
- Ask questions.
- Use straightforward scientific evidence to answer questions
- or to support their findings.

Food Chains



Year 4 – What is electricity and how is it used? (Electricity)

St Clare's Unit Plan:

I can identify common appliances that use electricity
I can construct a simple circuit and name parts of the circuit
I can identify if a bulb will light up in a circuit
I can recognise common conductors and insulators
I can investigate different switches
I can explain what electricity is and how it is used

Learning enhancements:

-

Links to prior learning:

- Year 1 – everyday materials

What is electricity and how is it used?

Electrical Appliances

Lots of appliances around our house use electricity to work.



Most big appliances in our house have to be plugged in. These are powered by mains power. Some smaller appliances can be powered by batteries. Some appliances have batteries that need to be charged by mains power.

Mains Power

Battery electricity: batteries store chemicals which produce an electric current. Battery powered appliances are portable which means you can use it anywhere without it having to be plugged into a plug socket.




Working Scientifically

- Observing - identifying and classifying.
- Gathering and recording results.
- Drawing conclusions.
- Making predictions.

Mains Power

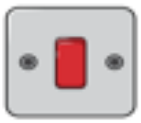
Mains power is produced mainly in a gas, coal or nuclear power station. The electricity then travels from the power stations to our houses through overhead wires and pylons.

A simple Circuit

Electricity can only flow around a complete circuit that has no gaps. There must be wires connected to both the positive and negative end of the power supply/battery.

Switches

Switches can be used to open or close a circuit. When off, a switch 'breaks' the circuit to stop the flow of electricity. When on, a switch 'completes' the circuit and allows the electricity to flow.


paddle switch


push button switch


pull switch

Insulator and Conductors

- A conductor of electricity is a material that will allow electricity to flow through it. Metals are good conductors. Materials that are electrical insulators do not allow electricity to flow through them. Wood, plastic and glass are good insulators.

Year 5 – How do plants and animals develop? (All Living Things and their Habitats)

St Clare's Unit Plan:

I can discuss the 7 life processes
I can explain how animals reproduce
I understand reproduction in plants
I can describe the life cycle of a plant
I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
I can explain how plants and animals develop

Learning enhancements:

-

Links to prior learning:

- Year 1 – plants: parts of a plant
- Year 1 – seasonal change

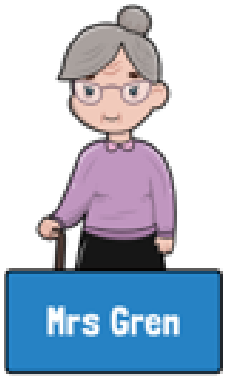
How do plants and animals develop?

The 7 life processes

There are 7 things that all living things do. These are called life processes.
'MRS GREN' will help you remember!

Movement
Respiration
Sensitivity

Growth
Reproduction
Excretion
Nutrition

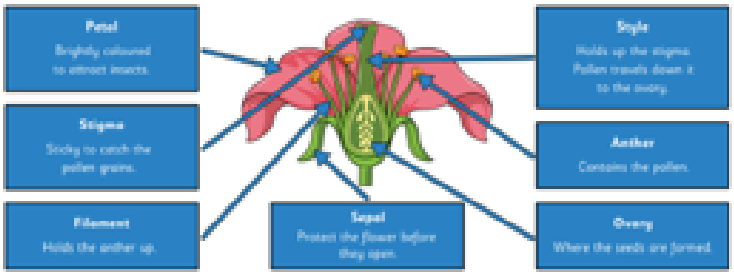


Reproduction in animals

- We can sort animals into five groups: Mammals, reptiles, amphibians, birds and fish
- Sexual reproduction is the process in which two living things create offspring. A male sex cell, called a sperm, fertilises the female sex cell, called an egg.
- When mammals have offspring, an embryo grows inside the mother's womb. When a mammal carries a their young, they are pregnant.
- Different animals have different gestation periods.
- Birds and reptiles lay eggs.
- Fish and most amphibians also lay eggs but in water.

Reproduction in plants

- A plant's main job is to create new seeds to grow new plants. There are lots of different parts of the flower.
- Plants can create offspring through either sexual or asexual reproduction. Asexual means producing plants that are genetically identical to the parent plant because no mixing of male and female gametes takes place.
- Pollination is when pollen from the anther is transferred to the stigma. This can happen by wind or by a pollinator such as a bee or a butterfly. Once the pollen is transferred to the stigma, it travels down the style to the ovary where the seed grows.
- Seeds are then dispersed and will grow in different places.

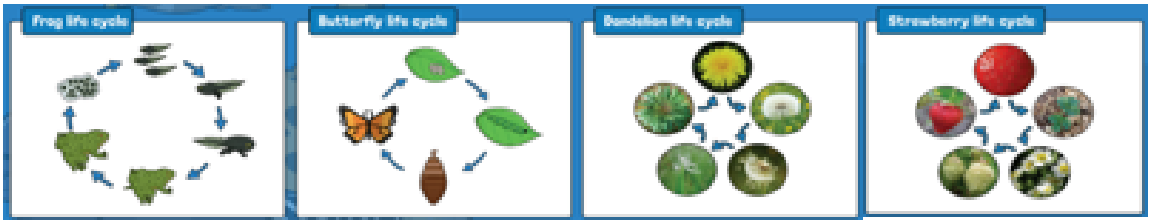


Working Scientifically

- Report and present findings from enquiries, in oral and written forms such as displays and other presentations, using appropriate scientific language.

Life Cycles

- All plants and animals have a life cycle, but they are different depending on the type of animal or plant.
- During life cycles, metamorphosis occurs which is a biological process by which an animal physically develops and changes through cell growth and differentiation.



Year 5 – How do we change as we grow older? (Animals, including Humans)

St Clare's Unit Plan:

I can describe the human life cycle
I can research how a foetus develops in the womb
I can describe what happens at the baby, toddler and child stages of life
I can describe what happens when I become a teenager
I can describe what happens when I become a senior
I can explain how we change as we grow older

Learning enhancements:

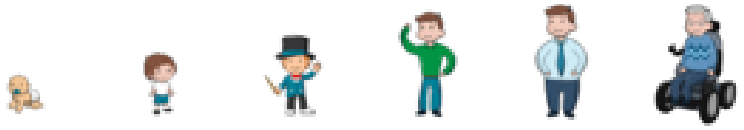
-

Links to prior learning:

- Year 1 – Animals, including humans: senses
- Year 2 – Life cycles of animals and humans

How do we change as we grow older?

Human life cycle



Baby Toddler Child Teenager Adult Senior

Baby, toddler and child life

- Babies cannot talk so they cry to communicate. Babies rely on adults to do things for them like feeding them and carrying them.
- Toddlers experience a lot of 'firsts' – first steps, first time standing up alone, first teeth, first solid food and first words.
- Children are still growing and learning new skills.

Puberty

- Puberty is the development and growth process of a child's body maturing into an adult's body
- Many natural and normal changes happen to the body during puberty
- Sweat occurs more often. When sweat mixes with bacteria on your skin, it can smell or cause bad odour (BO). It is important to wash regularly
- Spots may on the face, neck, back or chest. Some people develop lots of spots and some hardly any. It is completely normal.
- Hair grows in new places such as under the armpits. Boys also grow facial hair like beards and moustaches.
- Puberty causes both physical and emotional changes to the human body due to hormones. It is important to talk about these emotions and changes with someone you trust.

Inside the womb

- The womb is a special organ that only women have.
- To create a baby, fertilisation must occur
- A male sex cell (sperm) and a female sex cell (egg) must combine to create a baby
- An unborn child is called an embryo in the early stages of pregnancy. It is referred to as a foetus after approximately 11 weeks.
- A human baby's gestation period is 40 weeks (9 months).

Senior life

- People over 60 years old are classed as senior citizens
- As a person gets older, the cells in the body become weaker
- It is harder to fight off illnesses
- Bones and muscles become weaker resulting in difficulty staying fit and active.
- A senior's teeth may become weak resulting in them having false teeth

Working Scientifically

- To take measurements using a range of equipment
- To research, interpret and report the life cycle of a human

Year 5 – Are all changes irreversible? (Properties and Changes in Materials)

St Clare's Unit Plan:

I can compare materials according to their properties
I can investigate thermal conductors and insulators
I can investigate which electrical conductors make a bulb shine brightest
I can investigate materials which will dissolve
I can use different processes to separate mixtures of materials
I can identify and explain irreversible chemical changes

Learning enhancements:

-

Links to prior learning:

- Year 1 – Everyday materials
- Year 4 - Electricity

Are all changes irreversible?

Key Knowledge

Different materials are used for particular jobs based on their properties: electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency.

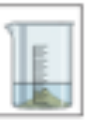
Reversible Changes

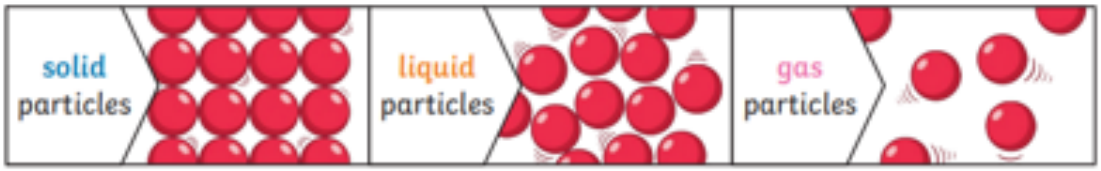
Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by:

Sieving	Filtering	Evaporating
		
Smaller materials are able to fall through the holes in the sieve, separating them from larger particles.	The solid particles will get caught in the filter paper but the liquid will be able to get through.	The liquid changes into a gas, leaving the solid particles behind.

Dissolving
A solution is made when solid particles are mixed with liquid particles. Materials that will dissolve are known as soluble. Materials that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.

Sugar is a soluble material. 

Sand is an insoluble material. 



Key Vocabulary

materials	The substance that something is made out of, e.g. wood, plastic, metal.
solids	One of the three states of matter. Solid particles are very close together, meaning solids, such as wood and glass, hold their shape.
liquids	This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk.
gases	One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around. A gas fills its container, taking both the shape and the volume of the container. Examples of gases are oxygen and helium.
melting	The process of heating a solid until it changes into a liquid.
freezing	When a liquid cools and turns into a solid.
evaporating	When a liquid turns into a gas or vapour.
condensing	When a gas, such as water vapour, cools and turns into a liquid.

Irreversible Changes

Irreversible changes often result in a new product being made from the old materials (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.

Year 5 – How do different celestial bodies move and how does this affect us here on Earth?

(Earth and Space)

St Clare's Unit Plan:

I can explain what makes up the Solar System
I can describe the size and movement of the Earth, sun and moon
I can explain the size of the planets and how far apart they are
I can explain why we have day and night
I can explain the phases of the moon
I can explain how different celestial bodies move and how that affects us here on Earth

Learning enhancements:

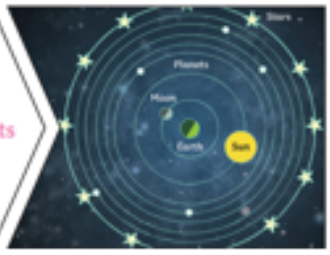
- Making a model of the solar system

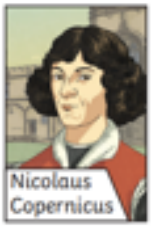
Links to prior learning:

- Year 1 – science – seasonal change
- Year 2 – history - Neil Armstrong

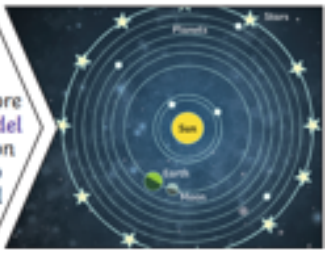
How do different celestial bodies move and how does this affect us here on Earth?

Geocentric model
Years ago people believed that planets moved around the Earth.

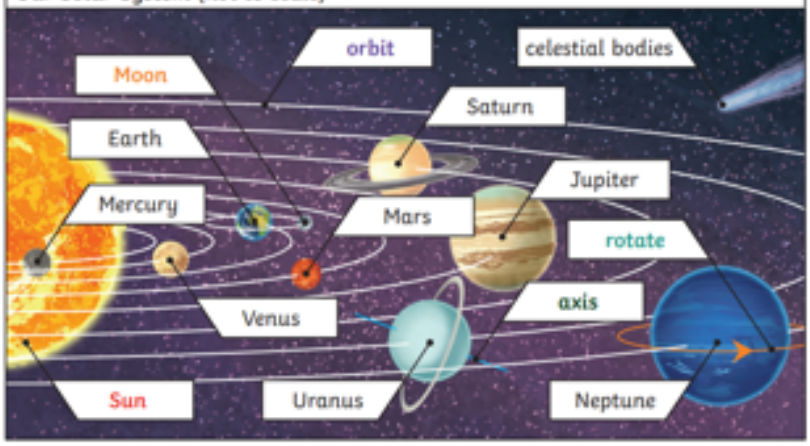



Nicolaus Copernicus

The work and ideas of many astronomers (such as Copernicus and Kepler) combined over many years before the idea of the heliocentric model was developed. Galileo's work on gravity allowed astronomers to understand how planets stayed in orbit.



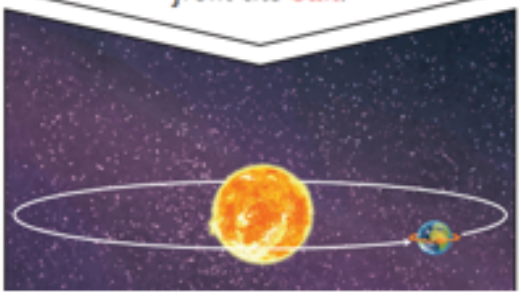
Our Solar System (not to scale)



Key Knowledge

It appears to us that the Sun moves across the sky during the day but the Sun does not move at all. It seems to us that the Sun moves because of the movements of Earth.

Earth rotates (spins) on its **axis**. It does a full rotation once in every 24 hours. At the same time that Earth is rotating, it is also orbiting (revolving) around the Sun. It takes a little more than 365 days to orbit the Sun. Daytime occurs when the side of Earth is facing towards the Sun. Night occurs when the side of Earth is facing away from the Sun.



Phases of the Moon

Scientific Enquiry

Identifying scientific evidence that has been used to support or refute ideas or arguments

The Moon orbits Earth in an oval-shaped path while spinning on its **axis**. At various times in a month, the Moon appears to be different shapes. This is because as the Moon rotates round Earth, the Sun lights up different parts of it.

Year 5 – What are different forces and what do they do? (Forces)

St Clare's Unit Plan:

I can identify forces acting on objects
I can explain what gravity is and who discovered it
I can investigate the effects of air resistance
I can investigate the effects of water resistance
I can investigate the effects of friction
I can explain what different forces there are and what they do

Learning enhancements:

-

Links to prior learning:

- Year 3 - Forces

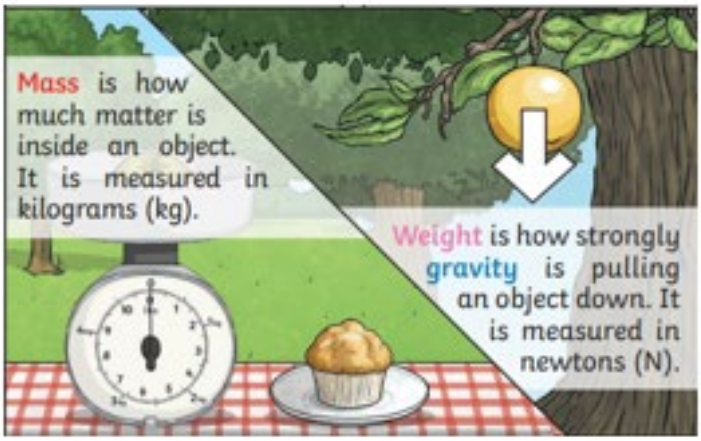
What are different forces and what do they do?

Key Knowledge

Forces

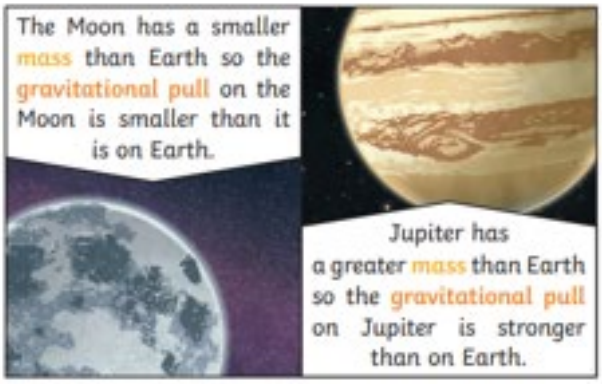
Forces can make an object...

- start to move.
- stop moving.
- change direction.
- move faster.
- change its shape.
- move more slowly.



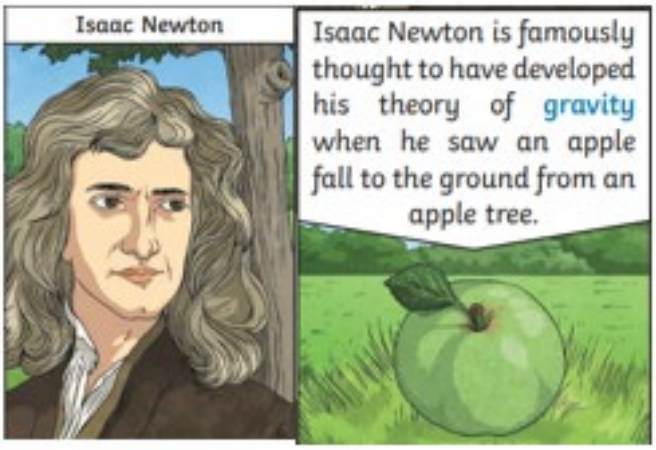
Mass is how much matter is inside an object. It is measured in kilograms (kg).

Weight is how strongly **gravity** is pulling an object down. It is measured in newtons (N).



The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.

Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.



Isaac Newton

Isaac Newton is famously thought to have developed his theory of **gravity** when he saw an apple fall to the ground from an apple tree.

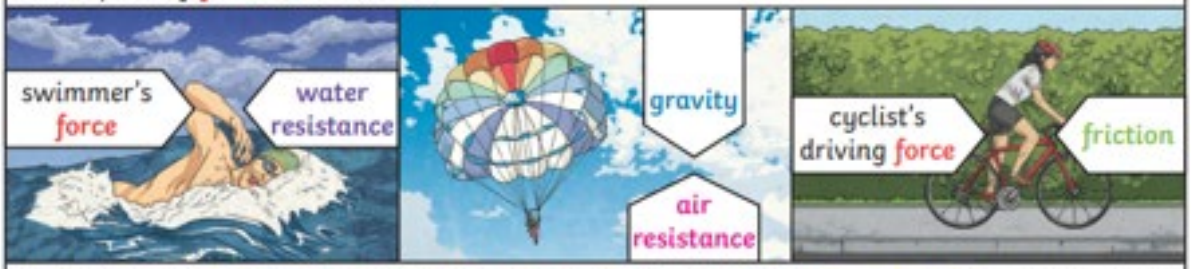
It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

This shark is **streamlined**.

It does not create much **water resistance** so it can move through the water quickly.

Key Knowledge

Examples of **forces** in action:



Water resistance and **air resistance** are forms of **friction**. **Friction** is sometimes helpful and sometimes unhelpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. **Friction** on a bike chain can make the bike harder to pedal so it is unhelpful.

Year 6 – What are 'living things' and how do we tell them apart?

(All Living Things and their Habitats)

St Clare's Unit Plan:

I can explain how living things are classified into broad groups according to common observable characteristics
I can describe and use the Linnaean classification system
I can interpret and create classification keys and understand how they help to identify plants and animals
I can name types of microorganism and know their uses
I can set up an experiment to observe how microorganisms grow in different conditions
I can explain what living things are and how we tell them apart

Learning enhancements:

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Links to prior learning:

- EYFS – classifying living/non-living things
- Year 1 – plants: name different types of plants
- Year 1 – Animals, including humans
- Year 1 – seasonal change

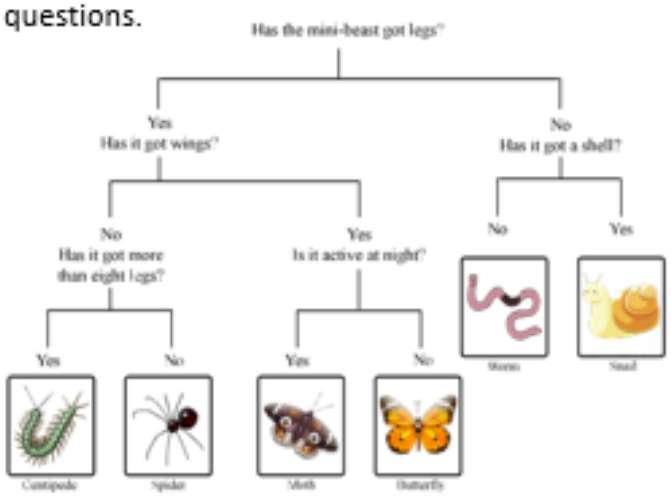
What are 'living things' and how do we tell them apart?

Grouping Organisms

Organisms can be grouped based on their characteristics. The five main groups for classifying animals are; mammals, amphibians, reptiles, birds and fish.
Organisms can also be groped into vertebrates and invertebrates.

Classification Keys

Classification keys are used to help us identify different living things by answering yes/no questions.



Linnaean Classification System

Charles Linnaean was a pioneer in scientific classification. He designed the first comprehensive classification system that is still used today.

Remember from Year 5

Living things are identified using MRS GREN

Movement
Respiration
Sensitivity

Growth
Reproduction
Excretion
Nutrition

Microorganisms

Micro-organisms, more commonly known as 'germs', 'bugs' or 'microbes', are tiny living things too small to be seen with the naked eye. They are found almost everywhere on Earth. They can be 'useful' or harmful'.
The three main types of microorganism are bacteria, viruses and fungi.

Working Scientifically

In this topic we will:

- Use observation skills.
- Research and record information.
- Record results.
- Set up an investigation.
- Find patterns and groups.
- Identify characteristics.

Year 6 – Have living things always been the same? (Evolution and Inheritance)

St Clare's Unit Plan:

I can recognise that living things produce offspring of the same kind and explain how it leads to variation in species with inherited and non-inherited characteristics
I can recognise and explain ways in which plants and animals have adapted to suit their environment
I can use the case study of the Peppered Moth to explain natural selection
I can research significant people involved in the study of evolution and discuss their theories
I can relate physical and behavioural characteristics to survival or extinction: Darwin's Finches
I can demonstrate my learning on evolution and inheritance.

Learning enhancements:

- PSTT beaks experiment

Links to prior learning:

- Year 1 – seasonal change
- Year 1 – Animals, including humans (senses)
- Year 4 - All living things and their habitats

Have living things always been the same?

Inheritance and Variation

Offspring
Animals and plants produce offspring that are similar but not identical to them. Offspring often look like their parents because features are passed on.

Variation
In the same way that there is variation between parents and their offspring, you can see variation within any species, even plants.

Adaptive Traits
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
Eye colour is an example of an inherited trait, but so are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

Natural Selection

- Natural selection is the term invented by Darwin to describe how species change to survive.
- Animals that are best suited to their environment survive to pass on their genetic traits,
- Organisms that have weaker traits are eliminated from the eco-system.
- The best adapted animals survive and reproduce leading to evolution over millions of years.

Remember from Year 4

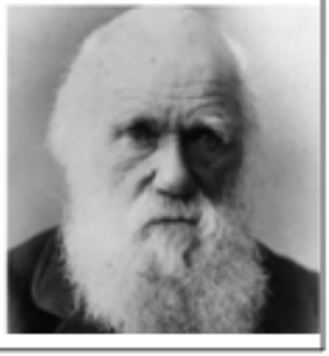
- Fossils are the preserved remains of ancient animals and plants. They let scientists know how living things looked and acted millions of years ago and how they have evolved over time.
- Mary Anning was an English palaeontologist who became famous for her important discoveries of Jurassic marine fossils in Lyme Regis.

Evolution

- Evolution is the gradual process by which organisms develop from earlier forms over many generations,
- Difference within a species can be caused by inheritance and mutations.
- Adaptation is when organisms have changed – evolved- to survive in new and changing environments.
- We can use the Peppered Moth Case study to demonstrate adaptation and evolution.
- Evolutions can be bad- like to dodos who evolved not to fly!

Charles Darwin

Charles Darwin was an English born evolutionary biologist who was best known for his contributions to the science of evolution. He first published his theory in 1859 in his book 'On the Origin of Species.' His most famous work was a study of finches on the Galapagos Islands.



Working Scientifically

- I can observe patterns and changes over time.
- I can plan an investigation to test a theory.
- I can record information clearly.

Year 6 – How do you make a bulb brighter or a buzzer louder? (Electricity)

St Clare's Unit Plan:

I can use scientific symbols when drawing a simple circuit diagram
I can associate the brightness of a lamp with the number and voltage of cells used in the circuit.
I can investigate variations in how components change the circuit.
I can name and explain renewable and non-renewable sources of electricity.
I can explain how to use electrical equipment safely.
I can explain why a piece of string would not make a bulb brighter and suggest other ways to achieve this.

Learning enhancements:

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Links to prior learning:

- Year 4 – electricity
- Year 4 – Geography: renewable and non-renewable sources

How do you make a bulb brighter or a buzzer louder?

Scientific Symbols

When scientists draw electrical circuits, they use scientific symbols to show the different components.

Making Electricity

Electricity is made using a **generator**. Large generators are found in Power Stations and we make them turn in different ways.

Non-Renewable Power is made in power stations that burn oil, coal or gas to create steam which turns the generator. These are fossil fuels: they are naturally occurring but can take millions of years to come back meaning they are non-renewable (we can run out!). Burning these fossil fuels also damages the environment as they produce harmful gasses.

Renewable Power uses energy sources like the sun, wind and sea to turn generators and create electricity. We can use these sources over and over again and should not run out. They do not produce any harmful gasses.

Circuits

A circuit is when electricity flows from a **battery** to power different **components**. If there is a **complete circuit** a battery can push **electrons** all around the circuit. This is an **electric current**. We measure the amount of electricity travelling around a circuit in **volts**.

Using Electricity

Lots of **appliances** around our homes use electricity. These can get power from batteries or from the **mains supply** by plugging into the wall. Electricity often has to travel a long way from the **power plant** to your house: sometimes hundreds of miles! It travels this distance through large electrical wires that stretch up and down the country. **Pylons** help keep the dangerous cables off the ground and away from us.

Working Scientifically

- Identify and classify appliances that use electricity.
- Use electrical equipment to build simple circuits.
- Investigate variables in circuits, observing and recording changes and arriving at an overall conclusion.
- Work safely with electrical equipment.

Remember from Year 4

Insulators do not let electricity flow through them eg fabric and wood.
Conductors DO let electricity flow through them eg metals.
Switches are used to break and connect circuits allowing us to control when the electricity reaches the component.

Electrical Safety

Electricity coming from a mains plug socket is usually 230 volts!
Electricity can be very dangerous if used incorrectly. Always ask an adult before touching electrical sockets.
Never have water near electrical circuits or appliances.
Never overload the components with too many volts of electricity.
Never touch live electrical wires eg in sockets or power sub-stations.

Year 6 – How do we see in the dark and around corners? (Light)

St Clare's Unit Plan:

I can recognise that light appears to travel in straight lines
I can 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
I can explain how the eye works
I can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
I can explain how light is refracted and link this to different colours
I can explain how we can see in the dark and around corners

Learning enhancements:

-

Links to prior learning:

- Year 1 – seasonal change
- Year 3 - light

How do we see in the dark and around corners?

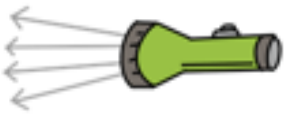
Light Sources

A **light source** makes light. The **Sun** and other **stars**, **fires**, **torches** and **lamps** all make their own light, so they are examples of sources of light.



Travelling Light

Light travels very fast in **straight lines** called **light rays**. Even though light travels in straight lines, it travels in **different directions**.



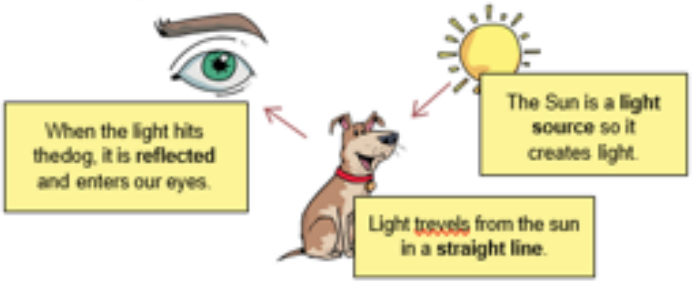
Light rays from a torch travel in different directions but **always in straight lines**.

Reflective Light

We can see things because light is **reflected**. Some materials reflect light better than others.

Light travels in straight lines. When light from an object is reflected by a surface, it changes direction.

Smooth, **shiny surfaces** such as mirrors and polished metals **reflect light well**. **Dull** and **dark surfaces** such as dark fabrics do **not reflect light well**.

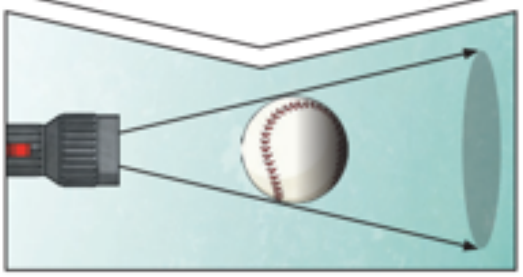


When light hits an object, it is **reflected** (bounces off) and enters our eyes. This is how we see the object.

We need **light sources** to be able to see; otherwise, there is no light to reflect o surfaces and into our eyes. This is why we cannot see in the dark.

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.



Refraction

The spoon in this water 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**.

Working Scientifically

- I can investigate materials using the fair testing method.
- I can measure results accurately.
- I can use my results to form scientific conclusion.

Year 6 – How can we power our bodies? (Animals, including Humans)

St Clare's Unit Plan:

I can identify and name the main parts of the human circulatory system
I can identify and name the main parts of the heart
I can investigate which activity increases my heart rate the most
I can describe how water and nutrients are transported in humans
I can identify how humans can live a healthy lifestyle
I can explain how we power our bodies

Learning enhancements:

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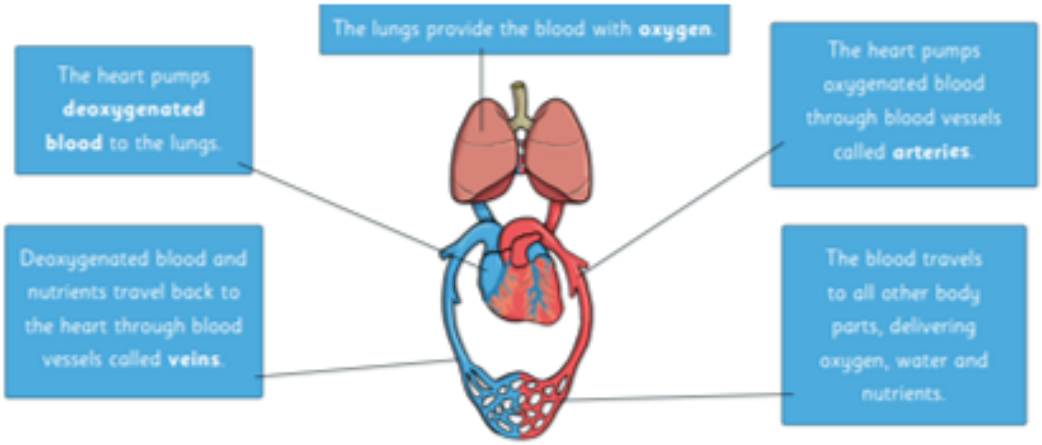
Links to prior learning:

- Year 1 – Animals, including humans
- Year 3 – Animals, including humans

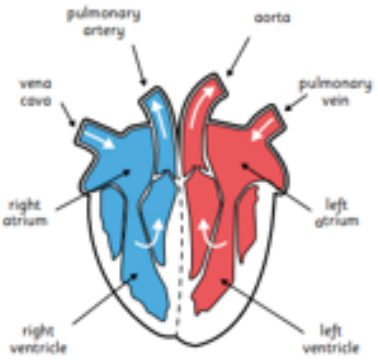
How can we power our bodies?

The Human Circulatory System

The body's circulatory system is responsible for transporting nutrients, water and oxygen to the billions of cells all around your body. It also carries away waste, such as carbon dioxide.



The Human Heart



Working Scientifically

- I can plan my own investigation to answer a scientific question.
- I can measure results with accuracy.

Absorbing Water and Nutrients

We absorb water and nutrients through the food we eat. The small intestine is lined with villi. Villi have veins and arteries running through them. The blood in the arteries delivers oxygen to the intestine. Nutrients are absorbed into the blood, which are then taken away to other parts of the body. Water is also absorbed in this way. The blood carries the water and nutrients to the parts of the body that need it.

Health Heroes and Villains

- You can keep your body healthy by eating a balanced diet, ensuring you have good hygiene and exercising regularly.
- You should avoid eating lots of unhealthy food, smoking, drinking alcohol and becoming inactive

Did you know?

- The heart pumps more than 2.5 billion times over an average lifetime.
- If you were to lay out all of the blood vessels in one adult, end-to-end, they would stretch about 60,000 miles. It's only 9500 miles from London to Australia!
- We have to exercise our heart to keep it strong. Doctors advise at least 30 minutes of activity a day.