Porter Croft Science Curriculum

PORTER CROFT
Church of England Primary Academy

Long and Medium term plan

	Identify and diversity		Sustainable development		Globalisation and interdependence	
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Year 1	Everyday materials	Seasonal changes (Autumn and Winter)	Animals, including humans		Seasonal changes (Spring and Summer)	Plants
Year 2	Animals, including humans	Uses of everyday materials	Living things and their habitats		Plants	
Year 3	Animals, including humans	Rocks	Forces and magnets		Light	Plants
Year 4	Living things and their habitats	Animals, including humans	States of matter		Sound	Electricity
Year 5	Properties and changes of materials		Forces	Living things and their habitats	Earth and space	Animals, including humans
Year 6	Evolution and inheritance	Animals, including humans	Living things and their habitats	Light	Electricity	

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Year one

Working scientifically

- Ask simple questions and recognise that they can be answered in different ways
- Observe closely, using simple equipment
- Perform simple tests
- Identify and classify
- Use their observations and ideas to suggest answers to questions
- Gather and record data to help answer questions
- Notice patterns and relationships
- Use simple secondary sources to find answers
- Use simple, scientific language

Medium Term Plan: Y1 Plants (Biology)				
Key Learning **I know that...**	...growing locally, there will be a vast array of plants which all have specific names.	...plants have common parts, but they vary between the different types of plants.	...these (plants) can be identified by looking at the key characteristics of the plant.	...some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.
Vocabulary	names of trees in the local area, names of garden and wild flowering plants in the local area	leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud		deciduous, evergreen

Skills **So I can…**	… name trees and other plants that I see regularly.	… point to and name the parts of a plant, recognising that they are not always the same, e.g. leaves and stems may not be green	…. describe some of the key features of these plants (including trees), e.g. the shape of the leaves, the colour of the flower / blossom.	… point out trees which lost their leaves and those that kept them the whole year.
Common Misconceptions	Trees are not plants. Plants are flowering plants grown in pots with coloured petals and leaves and a stem.	All leaves are green. All stems are green.	A trunk is not a stem. Blossom is not a flower.	
Enquiry Type	Identifying and Classifying			Observing over time
Working Scientifically **I can…**	… make close observations of leaves, seeds, flowers etc. … use simple charts to identify plants.	… classify leaves, seeds, flowers etc. using a range of characteristics	… compare two leaves, seeds, flowers etc. … sort and group parts of plants (e.g. leaves, seeds, flowers) using similarities and differences.	… make observations of how plants change over a period of time (using photographs). … collect information on features that change during the year.
By the end of this topic children should be able to: • **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)**				

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Medium Term Plan: Y1 Animals Including Humans (Biology)						
Key Learning **I know that…**	…humans have key parts in common.	…humans have key parts in common, but these vary from person to person.	…humans find out about the world using their five senses: sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.	…animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them.		…animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.
Vocabulary	head, nose, body, eyes, ears, mouth, teeth, leg, **shoulders**, arms, **elbows**, fingers, **wrists**, **hips**, knees, feet, toes, **ankles**	**measure, compare**, small, smaller, smallest, big, bigger, biggest, tall, taller, tallest, long, longer, longest	**senses, touch, see, smell, taste, hear,** fingers (**skin**), eyes, nose, ears, tongue	Names of animals experienced first-hand from each vertebrate group, **fish, amphibian, reptile, mammal, bird**	tail**,** wing**, claw, fin, scales,** feathers**, fur, beak, paws, hooves**	**eats other animals, eats plants, eats other animals and plants,** carnivore, herbivore, omnivore
Skills **So I can…**	… label parts of the body on pictures and diagrams.	… compare parts of my own body. … compare two people.	… explore objects using different senses.	… name a range of animals which includes animals from each of the vertebrate groups.	… describe the key features of these named animals and label them on a picture / diagram.	… describe what a range of animals eat.

Common Misconceptions	Humans are not animals.		We only feel things with our fingers and hands.	Only four-legged mammals, such as pets, are animals. Amphibians and reptiles are the same.	Amphibians and reptiles are the same.	Carnivores eat meat, but not other animals.
Enquiry Type	Identifying and Classifying	Pattern Seeking	Comparative and Fair Testing	Identifying and Classifying		
Working Scientifically **I can…**	… make first-hand close observations of parts of the body, e.g. hands, eyes. … classify people according to their features.	… take (non-standard) measurements of parts of my body. … look for patterns between people, e.g. Do people with big hands have big feet?	… investigate human senses, e.g. Which part of my body is good for feeling, which is not? Which smells can I match? … talk about findings from investigations using appropriate vocabulary, e.g. "My fingers are much better at feeling than my toes"	… make first-hand, close observations of animals from each of the groups. … identify animals by matching them to named images. … classify animals using a range of features.	… classify animals according to what they eat. … compare two animals from the same or different groups.	… sort animals into groups according to what they eat.
By the end of this topic children should be able to:						

• **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 and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)** • **Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense**		
Medium Term Plan: Y1 Everyday Materials (Chemistry)		
Key Learning **I know that…**	…all objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons	…materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.
Vocabulary	object, material, **wood, plastic, glass, metal, water, rock, brick, paper, fabric**, elastic, foil, card/cardboard, rubber, wool, clay	**hard, soft, stretchy, stiff, bendy, floppy**, waterproof, absorbent, **breaks/tears, rough, smooth, shiny, dull, see-through, not see-through**
Skills **So I can…**	… label a picture or diagram of an object made from different materials.	… describe the properties of different materials.
Common Misconceptions	Only fabrics are materials. Only building materials are materials.	‘Solid’ is another word for hard.

	Only writing materials are materials. The word 'rock' describes an object rather than a material.				
Enquiry Type	Identifying and Classifying		Comparative and Fair Testing		
Working Scientifically **I can...**	... classify objects made of one material in different ways, e.g. a group of objects made of metal. ... classify one type of object made from a range of materials, e.g. a collection of spoons made of different materials.	... sort objects and materials using a range of properties.	... choose an appropriate method for testing whether an object is waterproof. ... use my test evidence to answer the question, "Which items are waterproof?"	... choose an appropriate method for testing whether an object is absorbent. ... use my test evidence to answer the question, "Which cloth is the most absorbent?"	... choose an appropriate method for testing whether an object is see-through or not see-through. ... use my test evidence to answer the question, "Which materials are see-through/not see-through?"
By the end of this topic children should be able to: • **Distinguish between an object and the material in which it is made** • **Identify and name a variety of different everyday materials, including wood, plastic, glass, metal, water and rock**					

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• **Describe the simple physical properties of everyday materials** • **Compare and group together a variety of everyday materials on the basis of their simple, physical properties**						
Medium Term Plan: Y1 Seasonal Changes (Physics)						
Key Learning **I know that…**	…there are four seasons which occur across the year.	…the weather changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer.	…in the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again.	…the change in weather causes many other changes, including the numbers of minibeasts found outside.	…the change in weather causes many other changes, including seed and plant growth.	…the change in weather causes many other changes, including the type of clothes worn by people.
Vocabulary	seasons, autumn, winter, spring, summer, January, February, march, April, may, June, July, august, September, October, November, December	sunny, rainy, windy, snowy, frosty, hail, sleet, cloudy, stormy, thunder, lightning, hot, dry, cold	sunrise, sunset, day length	minibeasts, names of minibeasts in the local environment	seed and plant growth	Type of clothes worn by people during different seasons – hat, scarf, gloves, sun hat, sunglasses, shorts, t-shirt, cardigan etc.

Skills **So I can…**	… name the four seasons and identify when in the year they occur.	… describe the weather in different seasons over a year.	… describe days being longer (in time) in the summer and shorter in the winter.	… describe how the number of minibeasts found outside changes throughout the year.	… describe how seeds and plants grow at different times of year.	… describe how the types of clothing people wear changes throughout the year.
Common Misconceptions	There are only flowers in spring and summer. It always snows in winter. It is always sunny in the summer. It rains most in the winter.					
Enquiry Type		Observing over time				
Working Scientifically **I can…**		… collect information about the weather regularly throughout the year. … present this information in tables and charts to compare	… gather data about day length regularly throughout the year and present this to compare the seasons.	… collect information regularly throughout the year, of features that change with the seasons, e.g. animals … present this information in	… collect information regularly throughout the year, of features that change with the seasons, e.g. plants … present this information in	… collect information regularly throughout the year, of features that change with the seasons, e.g. humans. … present this information in

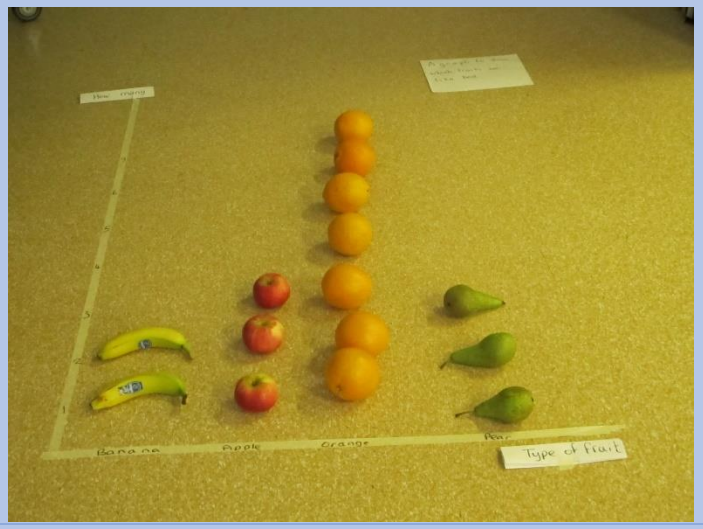
		weather across the seasons.		different ways to compare seasons.	different ways to compare seasons.	different ways to compare seasons.

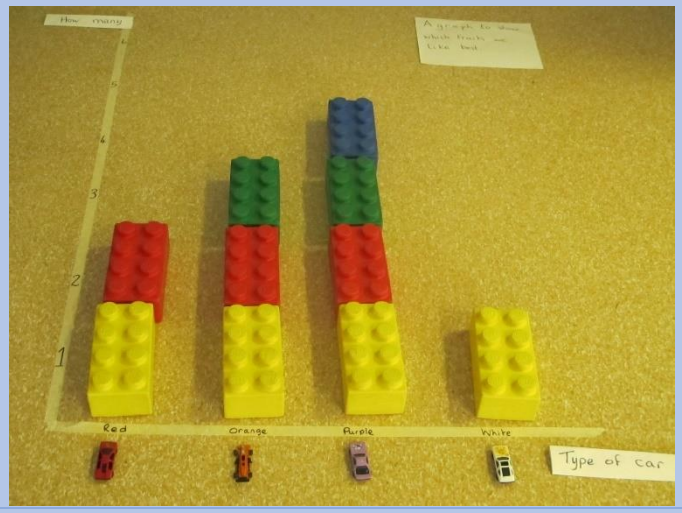
By the end of this topic children should be able to:

- **Observe changes across the four seasons**
- **Observe and describe whether associated with the seasons and how day length varies**

Recording data and results in year one:

Begin to introduce ways to record practically and as a whole class using; pictograms, tally charts, block diagrams and simple tables.





Year one trip opportunities:

- Local walks- the cemetery, botanical gardens, Endlcliffe park

- The Deep
- Yorkshire Wildlife Park
- A garden centre

Year two

Working scientifically

- Ask simple questions and recognise that they can be answered in different ways
- Observe closely, using simple equipment
- Perform simple tests
- Identify and classify
- Use their observations and ideas to suggest answers to questions
- Gather and record data to help answer questions
- Notice patterns and relationships
- Use simple secondary sources to find answers
- Use simple, scientific language

Medium Term Plan: Y2 Living Things and Their Habitats (Biology)

Key Learning **I know that...**	...all objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers. An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive.	...animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food, and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water.	...within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry.	...the plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.

			These conditions affect which plants and animals live there.	
Vocabulary	living, dead, never been alive, plants, seeds, animals, leaves, twigs, shells, fur, hair, feathers, wood, rock, metal, plastic	suited, suitable, basic needs, shelter, move, feed, names of local habitats, e.g. pond, woodland etc., names of micro-habitats, e.g. under logs, in bushes etc., light, dark, damp, dry, leaf litter		food chain, habitat, depend, food, shelter, is eaten by, plant
Skills **So I can…**	… find a range of items outside that are living, dead and never lived.	… name a range of animals and plants that live in a habitat and micro-habitats that I have studied. … talk about how the features of these animals and plants make them suitable to the habitat. … talk about what the animals eat in a habitat and how the plants provide shelter for them.		… construct a food chain that starts with a plant and has the arrows pointing in the correct direction.

Common Misconceptions	Plants and seeds are not alive as they cannot be seen to move. Fire is living.	An animal's habitat is like its 'home'.	Arrows in a food chain mean 'eats'.
Enquiry Type	Identifying and Classifying	Observing over time	Research
Working Scientifically **I can...**	... explore the outside environment regularly to find objects that are living, dead and have never lived. ... classify objects found in the local environment and sort them into living, dead and never lived.	... observe animals and plants carefully, drawing and labelling diagrams. ... explain using key features why an animal or plant is suited to a habitat and micro-habitat, e.g. the caterpillar cannot live under the soil like a worm because it needs fresh leaves to eat.	... create simple food chains for a familiar local habitat from first-hand observation and research. ... create simple food chains from information given, e.g. in picture books (Gruffalo etc.) ... use a food chain to explain

				what animals eat.
By the end of this topic children should be able to: • 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 and identify and name different sources of food				
Medium Term Plan: Y2 Plants (Biology)				
Key Learning I know that...	...plants may grow from either seeds or bulbs. These germinate and grow into seedlings which continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc.	...seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates.	...some plants are better suited to growing in full sun and some grow better in partial or full shade.	...plants need different amounts of water and space to grow well and stay healthy.
Vocabulary	leaf, flower, blossom, petal, fruit, berry, root,	seasons, germinate, growth, seed, bulb, seedling, mature plant	shade, sun, light, warm, cool, water, grow, healthy	

	seed, trunk, branch, stem, bark, stalk, bud,		
Skills So I can…	… describe how plants that I have grown from seeds and bulbs have developed over time.		… identify plants that grew well in different conditions.
Common Misconceptions	Plants are not alive as that cannot be seen to move. Seeds are not alive. All plants start out as seeds.	Seeds and bulbs need sunlight to germinate.	
Enquiry Type	Identifying and Classifying	Research Observing over time	Observing over time Comparative and fair Testing.
Working Scientifically I can…	… make close observations of seeds and bulbs. … spot similarities and differences between bulbs and seeds. … classify seeds and bulbs.	… research and plan when and how to plant a range of seeds and bulbs. … make close observations and measurements of my plants growing from seeds and bulbs.	… nurture seeds and bulbs into mature plants, identifying the different requirements of different plants. … look after the plants as they grow – weeding, thinning, watering etc. … make comparisons between plants as they grow

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By the end of this topic children should be able to:

- Observe and describe how seeds and bulbs grow into mature plants
- Find out and describe how plants need water, light and suitable temperature to grow and stay healthy

Medium Term Plan: Y2 Animals, Including Humans (Biology)						
Key Learning I know that...	...animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or	...in other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their	...all animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive.	...to grow into healthy adults, humans, also need the right amounts and types of food.	...to grow into healthy adults, humans also need exercise.	...good hygiene is also important in preventing infections and illnesses.

	kittens, that grow into adults.	parents e.g. tadpoles.				
Vocabulary	Offspring, reproduction, growth, child, young, old, stages e.g. chick/hen, baby/child/adult, caterpillar/butterfly, tadpole/frog		food, nutrition, water, breathing, air (oxygen)	meat, fish, vegetables, bread, rice, pasta etc.	exercise, heartbeat, breathing	hygiene, germs, disease
Skills So I can…	… describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages		… state the basic needs of animals, including humans, for survival (water, air, food).	… name foods in each section of the Eatwell Guide. … state the importance for humans of eating the right	… state the importance for humans of exercise, by creating an exercise routine.	… state the importance for humans of good hygiene.

			amounts of different types of food.		
Common Misconceptions	An animal's habitat is like its 'home'. All animals that live in the sea are fish.	Respiration is breathing. Breathing is respiration.			
Enquiry Type	Research Observing over time	Research	Identifying and Classifying	Comparative and Fair Testing	Pattern Seeking
Working Scientifically I can...	... observe animals growing over a period of time, e.g. chicks, caterpillars, tadpoles, a baby. ... ask people questions and use secondary sources to find out about the life cycles of some animals.	... explain how development and health might be affected by differing conditions and needs being met/not met.	... classify food in a range of ways, including using the Eatwell Guide.	... explore the effect of exercise on my body.	... investigate washing hands, using glitter gel.

	… describe, including using diagrams, the life cycle of some animals, including humans, and their growth to adults. … measure / observe how animals, including humans, grow. … ask questions of a parent about how they look after their baby. … ask pet owners questions about how they look after their pet. … show what I know about looking after a baby / animal.				

By the end of this topic children should be able to:

- Notice that animals, including humans have offspring which grow into animals
- Find out about and describe the basic needs of animals, including humans for survival (water, food, air)
- Describe the importance of exercise for humans, eating the right amounts of different types of foods and hygiene

Medium Term Plan: Y2 Uses of Everyday Materials (Chemistry)

Key Learning I know that...	...all objects are made of one or more materials that are chosen specifically because they have suitable properties for the task.	...when choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials.	...objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. This can be a property of the material or depend on how the material has been processed e.g. thickness.
Vocabulary	wood, metal, plastic, glass, brick, rock, paper, card/cardboard hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-	Properties of materials – opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, stretchy	shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

	through, not see-through			
Skills So I can...	... label a picture or a diagram of an object made from different materials. ... recognise that a material may come in different forms which have different properties (e.g. plastic – spoon, straw, bag, Lego brick; metal – cutlery, foil).	... name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use.	For a given object: .. identify what properties a suitable material needs to have.	Whilst changing the shape of an object: ... describe the action used.
		... use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot.		
Common Misconceptions	Only fabrics are materials. Only building materials are materials.			

	Only writing materials are materials. The word 'rock' describes an object rather than a material. 'Solid' is another word for hard.		
Enquiry Type	Identifying and Classifying	Comparative and Fair Testing	
Working Scientifically I can...	... classify materials and sort them using a range of properties.	...test materials to find which is the best for a rain hat / which is the best for Elastigirl's costume? ... begin to use my test evidence to select appropriate materials for a purpose ... explain using the key properties why a material is suitable or not suitable for a purpose. ... make suggestions for alternative materials for a purpose that are both suitable and unsuitable.	

By the end of this topic children should be able to:

- 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 and stretching

Recording data and results in year two:

Children should be able to construct and interpret simple pictograms, tally charts block diagrams and simple tables.

Year two trip opportunities:

- Local walks- the cemetery, botanical gardens, Endlcliffe park
- A farm
- Yorkshire Wildlife Park
- A garden centre
- Butterfly house and wildlife centre
- RSPB Fairburn INGS

Year 3

Working scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them
- Set up simple, practical enquiries, comparative and fair tests

- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment (including thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help answer questions
- Record findings, using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identify differences, similarities or changes related to simple, scientific ideas and processes
- Use straightforward scientific evidence to answer questions or to support their findings
- Make their own decisions about the most appropriate scientific enquiry they might use to answer questions

Medium Term Plan: Y3 Plants (Biology)					
Key Learning I know that...	...many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food.	...the stem transports water and nutrients/minerals around the plant	...some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers	...seeds are dispersed in different ways.	...different plants require different conditions for germination and growth.

			(pollination). This forms seeds, sometimes contained in berries or fruits. *which are then dispersed in different ways.*		
Vocabulary	roots, absorb, water, nutrients, soil, anchor, stem, (trunk), leaves, sunlight, flowers, (blossom), photosynthesis	stem, transports, water, nutrients, minerals	pollen, insect pollination, wind pollination	seed dispersal, wind dispersal, animal dispersal, water dispersal	conditions, darkness, cold, deprived of air, sandy soil, clay soil, compost, peat, fertiliser, space
Skills So I can…	… explain the function of the parts of a flowering plant.		… describe the life cycle of flowering plants, including pollination and seed formation.	… describe the life cycle of flowering plants, including seed dispersal.	… describe the life cycle of flowering plants, including germination.
Common Misconceptions	Plants eat food. Food comes from the soil via the roots.	Water is sucked up the stem.	Flowers are merely decorative		

	Plants only need sunlight to keep them warm. Roots suck in water.		rather than a vital part of the life cycle in reproduction.		
Enquiry Type	. Research	Observing over time		Observing over time Research Identifying and Classifying	Comparative and Fair Testing
Working Scientifically I can...	... draw and label a diagram of a flowering plant to show its parts and their function. ... spot flowers, seeds, berries and fruits outside throughout the year. ... observe what happens to plants over time when the leaves or roots are removed	... explain observations made during investigations. ... observe the effect of putting cut white carnations or celery in coloured water.	... observe flowers carefully to identify the pollen. ... observe flowers being visited by pollinators e.g. bees and butterflies in the summer. ... draw and label a diagram of a flowering plant	... research different types of seed dispersal. ... observe seeds being blown from the trees e.g. sycamore seeds. ... look at features of seeds to decide on their method of dispersal. ... draw and label a diagram of a flowering plant to	... investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.

			to show the method of pollination.	show the method of seed dispersal. ... classify seeds in a range of ways, including by how they are dispersed.	

By the end of this topic children should be able to

- Identify and describe the functions of different parts of flowering plants
- Explore the requirements of plants for life and growth and how they vary from plant to plant
- Investigate the way in which water is transported within plants
- Explore the part in which flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Medium Term Plan: Y3 Animals, Including Humans (Biology)			
Key Learning I know that...	...animals (including humans), unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients.	...humans, and some other animals, have skeletons which help them move and provide protection and support.	...humans, and some other animals, have muscles which help them move.
Vocabulary	nutrition, nutrients, carbohydrates, energy, sugars, quick burst of energy, energy slump, protein, muscle growth/repair, vitamins,	skeleton, bones, joints, hinge joint, ball and socket joint, support,	joints, hinge joint, ball and socket joint, muscles, biceps, triceps, pairs, move

	minerals, defend from coughs and colds, fibre, healthy gut, fat, water				protect, move, skull, ribs, spine, vertebrate, invertebrate			
Skills So I can…	… name the nutrients found in food (Eatwell Guide). … state that to be healthy we need to eat the right types of food to give us the correct amounts of these nutrients (linked to the Eatwell Guide).				… name some bones that make up my skeleton, giving examples that support, help us move or provide protection.			… describe how muscles and joints help me move.
Common Misconceptions	Certain whole food groups like fats are 'bad' for you. Certain specific foods, like cheese are also 'bad' for you. Diet and fruit drinks are 'good' for you.				Snakes are similar to worms, so they must also be invertebrates. Invertebrates have no form of skeleton.			
Enquiry Type	Research / Identifying and Classifying	Research			Research	Pattern Seeking	Identifying and Classifying	Pattern Seeking
Working Scientifically I can…	… use food labels to explore nutritional content of a range of food items. … classify food in a range of ways, e.g. those that are high or low in particular nutrients.	… use food labels to gather evidence to answer enquiry questions about nutrients in	… plan a daily diet to contain a good balance of nutrients. … talk about the nutrient content of	… explore the nutrients contained in fast food. … use secondary sources to	… use secondary sources to research the parts and functions	… investigate patterns, asking questions such as: Can people with	… compare, contrast and classify skeletons of different animals.	… investigate patterns, asking questions such as: Do people who exercise more have stronger muscles? … use my data to look for patterns (or lack of them) when answering our enquiry question.

		food, e.g. how much fat do different types of pizza contain? How much sugar is in soft drinks?	my daily plan.	find out the types of food that contain the different nutrients.	of the skeleton.	longer legs run faster? Can people with bigger hands catch a ball better? … use my data to look for patterns (or lack of them) when answering our enquiry question.	… give similarities, e.g. they all have joints to help the animal move, and differences between skeletons.	

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By the end of this topic children should be able to:

- Identify that animals, including humans, need the right types and amounts 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

Medium Term Plan: Y3 Rocks (Chemistry)

Diverse scientists to study:
Mary Anning- discovered the first fossil-

Key Learning I know that...	...rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders).	...some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by	...soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.

			minerals from the water.		
Vocabulary	rock, stone, pebble, boulder, grain, crystals, layers, texture, marble, chalk, granite, sandstone, slate	hard, soft, absorb water	fossil, fossilisation, preserved remains, decompose, sediment, compact, dissolved, minerals, rock replica	soil, peat, compost	sandy / chalky / clay soil
Skills So I can…	… name some rocks and give physical features of each. … name some types of rock and give physical features of each.	… devise tests to explore the properties of rocks and use data to rank the rocks.	… explain how a fossil is formed.	… explain that soils are made from rocks and also contain living / dead matter.	

Common Misconceptions	Rocks are all hard in nature. Rock-like, man-made substances such as concretes or brick, are rocks. Materials which have been polished or shaped for use, such as granite worktop, are not rocks as they are no longer 'natural'			Certain found artefacts, like old bits of pottery or coins, are fossils. A fossil is an actual piece of the extinct animal or plant.	Soil and compost are the same thing.	
Enquiry Type	Identifying and Classifying	Observing over time	Comparative and Fair Testing	Research	Identifying and Classifying	Comparative and Fair Testing
Working Scientifically I can...	... observe rocks closely, classifying them in different ways using appropriate vocabulary (appearance).	... observe how rocks change/have changed over time (e.g. gravestones, old buildings).	... devise tests to explore the properties of rocks (hardness, absorption) and use data to rank the rocks.	... research using secondary sources how fossils are formed. ... present in different ways my understanding of how fossils are formed.	... observe soils closely. ... identify plant / animal matter and rocks in samples of soil. ... classify soils in a range of ways, based on their appearance.	... devise a test to explore the water retention of soils. ... observe how soil can be separated through sedimentation.

			… link rocks changing over time with their properties, e.g. soft rocks get worn away more easily.	… research the work of Mary Anning.		

By the end of this topic children should be able to:

- 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

Medium Term Plan: Y3 Light (Physics)					
Key Learning I know that…	…we see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in	…objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective.	…the light from the sun can damage our eyes and therefore we should not look directly at the sun and	…shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light.	…the size of the shadow depends on the position of the source, object and surface.

	complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light.		can protect our eyes by wearing sunglasses or sunhats in bright light.		
Vocabulary	light, light source, dark, absence of light sun, light, bulbs, candles, moon and names of other light sources and non-light sources	shiny, matt, surface, reflect, mirror	sunlight, dangerous	transparent, translucent, opaque, block colour	shadow, position, source, object, surface
Skills So I can…	… describe how we see objects in light and can describe dark as	… describe how reflective objects are easier to see in less light, when other	… state that it is dangerous to view the sun directly and state	… define transparent, translucent and opaque.	… describe how shadows are formed.

	the absence of light. … identify natural and man-made light sources and group them.	objects are easier to see in more light.	precautions used to view the sun, for example in eclipses.		
Common Misconceptions	We can still see even when there is an absence of any light. Our eyes 'get used' to the dark. The moon and reflective surfaces are light sources. A transparent object is a light source.			A transparent object is a light source.	Shadows contain details of the object, such as facial features on their own shadow. Shadows result from objects giving off darkness.

Enquiry Type	Identifying and Classifying	Pattern Seeking	Research Observing over time Pattern Seeking	Identifying and Classifying	Comparative and Fair Testing
Working Scientifically I can...	... clearly explain, giving examples, that objects are not visible in complete darkness.	... explore how different objects are more or less visible in different levels of lighting. ... explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. ... Describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change.	...research how to stay safe in the sun and present my findings (wrap, splat, hat). ...make UV bead bracelets and investigate, e.g. Do you need to wear sun cream on cloudy days? Where is the safest place to	... explore shadows which are connected to and disconnected from the object, e.g. shadows of clouds and children in the playground. ... investigate and identify whether all shadows are a block colour and classify which objects create darker/lighter shadows.	... describe and demonstrate how shadows are formed by blocking light. ... explore how shadows vary as the distance between a light source and an object or surface is changed. ... describe, demonstrate and make predictions about patterns in how shadows vary.

			play on a sunny day?		

By the End of this topic children should be able to:

- 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 size of shadows change

Medium Term Plan: Y3 Forces and Magnets (physics)

Key Learning I know that...	...a force is a push or a pull.	...when an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.	...a magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic.	...the strongest parts of a magnet are the poles.	...magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.	...for some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.

Vocabulary	force, push, pull	surface, texture, movement	magnetic, not magnetic, magnetic force, attract, repel, magnetic material, metal, iron, steel,	magnet, strength, magnetic force, bar magnet, ring magnet, button magnet, horseshoe magnet, contact force, non-contact force, poles, north pole, south pole	attract, repel	
Skills So I can…	… give examples of forces in everyday life.	… give examples of objects moving differently on different surfaces.	… identify magnetic and non-magnetic objects and materials.	… name a range of types of magnets and identify which	… draw diagrams using arrows to show the attraction and repulsion between the poles of magnets.	… create a magnetic game which involves contact and/or non-contact force.

				magnet is the strongest.		
Common Misconceptions			All metals are magnetic.	The bigger the magnet, the stronger it is.		
Enquiry Type	Identifying and Classifying	Comparative and Fair Testing	Identifying and Classifying	Comparative and Fair Testing	Identifying and Classifying	
Working Scientifically I can...	...identify push and pull forces in everyday life.	... carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. ... use my results to describe how objects	... explore what materials are attracted to a magnet. ... classify materials according to whether they are magnetic.	... devise an investigation to test the strength of magnets. ... use test data to rank magnets.	... explore the way that magnets behave in relation to each other. Through my exploration, ... show how like poles repel and unlike poles attract. ... use a marked magnet to find the unmarked poles on other types of magnets and name the unmarked poles.	... explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.

		move on different surfaces. ... use my results to make predictions for further tests.	... use classification evidence to identify that some metals, but not all, are magnetic.			

By the end of this topic children should be able to:

- Compare how things move on different surfaces
- Notice that some forces need contact between two 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 two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing

Recording Data and results in year three

Interpret and present data using bar charts, pictograms and tables.

Year three trip opportunities:

- Magna
- Local walks- the cemetery, botanical gardens, Endlcliffe park
- Wonderdome (visit to school)
- National Science and Media museum
- Workshop- https://www.planmyschooltrip.co.uk/1325/Forces-&-Magnets.php

Year 4

Working scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them
- Set up simple, practical enquiries, comparative and fair tests
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment (including thermometers and data loggers)
- Gather, record, classify and present data in a variety of ways to help answer questions
- Record findings, using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identify differences, similarities or changes related to simple, scientific ideas and processes

- Use straightforward scientific evidence to answer questions or to support their findings
- Make their own decisions about the most appropriate scientific enquiry they might use to answer questions

Medium Term Plan: Y4 Living Things and Their Habitats (Biology)					
Key Learning I know that...	... living things can be grouped (classified) in different ways according to their features.	... classification keys can be used to identify and name living things.	... living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc.	... humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering).	... these environments also change with the seasons; different living things can be found in a habitat at different times of the year.
Vocabulary	living things, animals, plants, humans, classification	classification keys	environment, habitat	impact, positive, negative	migrate, hibernate
Skills So I can...	... name living things living in a range of habitats, giving the key features that	... use classification keys to name unknown living things.	... can give examples of how an environment may change naturally.	... can give examples of how an environment may change due to human impact.	

	helped them to identify them.				
Common Misconceptions	animals are only land-living creatures		Animals and plants can adapt to their habitats however they change. All changes to habitats are negative.		
Enquiry Type	Identifying and Classifying		Research		Observing over time
Working Scientifically I can...	... compare and contrast the living things observed. ... classify living things found in different habitats based on their features.	... create a simple identification key based on observable features.	... use secondary sources to find out about how environments may naturally change. ... can present my learning about changes to the environment in different ways e.g. campaign video, persuasive letter	... use fieldwork to explore human impact on the local environment e.g. litter, tree planting. ... use secondary sources to find out about human impact, both positive and negative, on environments.	... observe plants and animals in different habitats throughout the year. ... keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)

By the end of this topic children should be able to:

- 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

Medium Term Plan: Y4 Animals, Including Humans (Biology)

Key Learning I know that...	... food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.			... humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).	... living things can be classified as producers, predators and prey according to their place in the food chain.
Vocabulary	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach	stomach, small intestine, nutrients,	large intestine, rectum, anus,	teeth, incisor, canine, molar, premolars,	herbivore, carnivore, omnivore, producer, predator, prey, food chain
Skills So I can...	... sequence the main parts of the digestive system ... draw the main parts of the digestive system onto a human outline			... point to the three different types of teeth in their mouth and talk	... name producers, predators and prey within a habitat. ... construct food chains.

	… can describe what happens in each part of the digestive system	about their shape and what they are used for.	
Common Misconceptions	Your stomach is where your belly button is. When you have a meal, your food goes down one tube and your drink down another. Food is digested only in the stomach. The food you eat becomes “poo” and the drink becomes “wee”.		There is always plenty of food for wild animals. The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain. Arrows in a food chains mean ‘eats’.
Enquiry Type	Research		
Working Scientifically I can…	… research the function of the parts of the digestive system. … create a model of the digestive system using household objects. … can use diagrams or a model to describe the journey of food through the body explaining what happens in each part.	… explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing) … can explain the role of the different types of teeth. …. can record the teeth in their mouth (make a dental record).	… can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores … can create food chains based on research Use food chains to identify producers, predators and prey within a habitat. … use secondary sources to identify animals in a habitat and find out what they eat. … classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.

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By the end of this topic children should be able to:

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their special functions
- Construct and interpret a variety of food chains identifying producers, predators and prey

Medium Term Plan: Y4 States of Matter (Chemistry)			
Key Learning I know that...	... a solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid.	... melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling.	... water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.
Vocabulary	solid, liquid, gas, state change	melting, freezing, melting point, boiling point, evaporation, temperature	water cycle, evaporation, condensation, precipitation, collection

Skills So I can…	… can create a concept map, including arrows linking the key vocabulary. … can name properties of solids, liquids and gases.	… can give everyday examples of melting and freezing. … can give everyday examples of evaporation and condensation.		… can describe the water cycle.
Common Misconceptions	'Solid' is another word for hard or opaque. Solids are hard and cannot break or change shape easily and are often in one piece. Substances made of very small particles like sugar or sand cannot be solids. Particles in liquids are further apart than in solids and they take up more space. When air is pumped into balloons, they become lighter.	Water in different forms – steam, water, ice – are all different substances. All liquids boil at the same temperature as water (100 degrees) Melting, as a change of state, is the same as dissolving. Steam is visible water vapour (only the condensing water droplets can be seen) Clouds are made of water vapour or steam. The substance on windows etc. is condensation rather than water.		The changing states of water (illustrated by the water cycle) are irreversible. Evaporating or boiling water makes it vanish. Evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material.
Enquiry Type	Identifying and Classifying	Observing over time	Comparative and Fair Testing	Research
Working Scientifically I can…	… observe closely and classify a range of solids and liquids. … explore making gases visible e.g. squeezing sponges under water to see	… observe a range of materials melting e.g. ice, chocolate, butter.	… use a thermometer to measure temperatures e.g. icy water (melting), tap	… use secondary sources to find out about the water cycle. … present my learning about the water cycle in a range of ways e.g.

	bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. ... classify materials according to whether they are solids, liquids and gases and give reasons to justify why something is a solid, liquid or gas.	... investigate the melting point of different materials e.g. ice, margarine, butter and chocolate, by measuring temperatures using a thermometer. ... give examples of things that melt/freeze and how their melting points vary. ... investigate how to melt ice more quickly and use our data to explain what affects how quickly a solid melts. ... explore freezing different liquids e.g. tomato ketchup, oil, shampoo.	water, hot water, boiling water (demonstration). ... observe water evaporating and condensing e.g. on cups of icy water and hot water. ... explain why there is condensation inside the cup with hot water and on the outside of the cup with icy water. ... set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. ... from our data, I can explain how to speed up or slow down evaporation.	diagrams, explanation text, story of a water droplet.

By the end of this topic children should be able to:

- 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 • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature			
Medium Term Plan: Y4 Sound (Physics)			
Key Learning I know that…	… a sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound	… the loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively.	… pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.
Vocabulary	sound, source, vibrate, vibration, travel	volume, faint, loud, insulation	pitch (high, low)
Skills So I can…	… name sound sources and state that sounds are produced by the vibration of the object. … state that sounds travel through different mediums such as air, water, metal.	… give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder. … give examples to demonstrate that sounds get fainter as the distance from the sound source increases.	… give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it.

Common Misconceptions	Sound is only heard by the listener. Sound only travels in one direction from the source. Sound can't travel through solids and liquids.	High sounds are loud and low sounds are quiet. Pitch and volume are frequently confused, as both can be described as high or low.		
Enquiry Type	Identifying and Classifying	Comparative and Fair Testing	Pattern Seeking	Pattern Seeking
Working Scientifically I can…	… classify sound sources. … explore making sounds with a range of objects, such as musical instruments and other household objects. … explore how string telephones or ear gongs work. … can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear.	… explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium. … measure sounds over different distances. … measure sounds through different insulation materials. … demonstrate how to increase or decrease the volume using musical instruments or other objects. … use data to identify patterns in volume.		… explore altering the pitch of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. … demonstrate how to increase or decrease the pitch using musical instruments or other objects. … use data to identify patterns in pitch.

By the end of the topic children should be able to:

- 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 produce 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

Medium Term Plan: Y4 Electricity (Physics)			
Diverse scientists to study: **Lonnie Johnsons- study in electricity**			
Key Learning I know that…	…many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries.	… an electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off.	… metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.
Vocabulary	Electricity, electrical appliance/device, mains, plug	electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, symbol **N.B.** Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.	conductor, insulator, metal, non-metal

Skills So I can…	… name household appliances and devices which run on mains electricity and battery-operated electricity.	… name the components in a circuit. … make electric circuits. … control a circuit using a switch.	… name some metals that are conductors. … name materials that are insulators.	
Common Misconceptions	Electricity flows to bulbs, not through them. Electricity flows out of both ends of a battery. Electricity works by simply coming out of one end of a battery into the component.			
Enquiry Type	Identifying and Classifying		Comparative and Fair Testing	Identifying and Classifying
Working Scientifically I can…	… classify household devices and appliances which run on mains and battery-operated electricity.	… construct a range of circuits and communicate structures of circuits using drawings which show how the components are connected. … explore how to connect a range of different switches and investigate how they function in different ways, by incorporating a switch into a circuit to turn it on and off. … choose switches to add to circuits to solve particular problems, such as a pressure	… explore which materials can be used instead of wires to make a circuit and classify the materials that were suitable/not suitable for wires. … apply my knowledge of conductors and insulators to design and make different types of switch, by connecting a range of different switches and identifying the parts that are insulators and conductors. … use classification evidence to identify that metals are good conductors and non-metals are insulators and give reasons for the choice of materials for making different parts of a switch.	

		switch for a burglar alarm, describing how the switch works. ... make circuits that can be controlled as part of a DT project, by adding a circuit with a switch to a DT project and demonstrating how it works. **N.B.** Children should be given one component at a time to add to circuits.	

By the end of the topic children should be able to:

- Identify common appliances that run on electricity
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulb, switches and 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 and closes a circuit and a 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.

Recording Data and results in year four

Interpret and present discrete continuous data using appropriate graphical methods, including bar charts and time graphs

Year four trip opportunities:

- Magna
- Local walks- the cemetery, botanical gardens, Endlcliffe park
- Wonderdome (visit to school)
- RSPB Fairburn INGS
- National Science and Media museum
-

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Year 5

Working scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate
- Record data and results of increasing complexity using scientific diagrams and label, classification keys, tables, scatter graphs, bar and line graphs
- Use test results to make predictions to set up further comparative and fair tests
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and presentations
- Identify scientific evidence that has been used to support or refute ideas or arguments
- *Make their own decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them*
- *Explain how to use equipment accurately*
- *Recognise when secondary sources would be most useful to research their ideas and begin to separate opinion and fact*
- *Communicate and justify their scientific ideas and talk about how scientific ideas have developed over time*

Medium Term Plan: Y5 Living Things and Their Habitats (Biology)

Key Learning I know that...	... as part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young	... plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.

	undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.			
Vocabulary	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis		asexual, plantlets, runners, bulbs, cuttings	
Skills So I can...	... can draw the life cycle of a range of animals identifying similarities and differences between the life cycles.		... can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways.	
Common Misconceptions	Only birds lay eggs.		All plants start out as seeds. All plants have flowers. Plants that grow from bulbs do not have seeds.	
Enquiry Type	Research	Pattern Seeking	Observing over time	Research
Working Scientifically I can...	... use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals and present my understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game. ... compare two or more animal life cycles they have studied. ... compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. ... identify patterns in life cycles by look for patterns between the size of an animal and its expected life span.		... grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. ... take cuttings from a range of plants e.g. African violet, mint. ... plant bulbs and then harvest to see how they multiply. ... use secondary sources to find out about pollination and explain how a range of plants reproduce asexually.	

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By the end of this topic children should be able to: • 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		
Medium Term Plan: Y5 Animals, Including Humans (Biology)		
Key Learning I know that…	… when babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills.	At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. (*This needs to be taught alongside PSHE.*)
Vocabulary		puberty, voice box (larynx), sweat glands, oilier skin, armpit hair, pubic hair, taller, facial hair, chest hair, arm and leg hair, scrotum, testes, penis grows, muscular, breasts grow, periods start (menstruate / menstruation)
Skills So I can…	… explain how a baby changes physically as it grows, and also what it is able to do.	… explain the changes that takes place in boys and girls during puberty.
Common Misconceptions	A baby grows in a mother's tummy. A baby is "made".	
Enquiry Type	Research	
Working Scientifically I can…	… explain how a baby changes physically as it grown, and also what it is able to do first (first 12 months). Could use the Development Matters 2022 guidance	This unit is likely to be taught through direct instruction due to its sensitive nature, although children can carry out a research enquiry by asking

	document to research 0-12 months development and display findings in different ways (poster / leaflet / informative timeline / presentation etc.)			an expert e.g. school nurse to provide answers to questions that have been filtered by the teacher. … present information about the changes occurring during puberty as an information leaflet for other Y5 children or as answers to 'problem page' questions
By the end of this topic children should be able to • Describe the changes as humans develop to old age				
Medium Term Plan: Y5 Properties and Changes of Materials (Chemistry)				
Key Learning I know that…	… materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets.	… some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.	… mixtures can be separated by filtering, sieving and evaporation.	… some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.
Vocabulary	thermal/electrical insulator/conductor, change of state, hardness, transparency, attraction to magnets	mixture, dissolve, solution, soluble, insoluble	filter, sieve, evaporation	reversible/non-reversible change, burning, rusting, new material

Skills So I can…	… use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings.	… explain what dissolving means, giving examples.	… name equipment used for filtering and sieving. … use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving.	… describe some simple reversible and non-reversible changes to materials, giving examples.	
Common Misconceptions	Thermal insulators keep cold in or out. Thermal insulators warm things up.	Solids dissolved in liquids have vanished and so you cannot get them back.	*There are lots of misconceptions which exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.*		
Enquiry Type	Comparative and Fair Testing				Research
Working Scientifically I can…	… investigate the properties of different materials in order to recommend materials for particular functions	… explore adding a range of solids to water and other liquids e.g. cooking	… separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and	… explore a range of non-reversible changes e.g. rusting,	… research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth

	depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. ... create a chart or table grouping/comparing everyday materials by different properties	oil, as appropriate and group solids based on my observations when mixing them with water. ... investigate rates of dissolving by carrying out comparative and fair test.	equipment for each mixture and give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water. ... explain the results from my investigations.	adding fizzy tablets to water, burning. ... carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?	Benerito (wrinkle free cotton).

By the end of this topic children should be able to

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity 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 thorough 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 plastics
- 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 type of change is not usually reversible (include burning and action of bicarbonate of soda)

Medium Term Plan: Y5 Earth and Space (Physics)

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Diverse scientists to study: Mae C Jemison- astronaut			
Key Learning I know that...	... the Sun is a star. It is at the centre of our solar system. There are 8 planets (*can choose to name them, but not essential*). These travel around the Sun in fixed orbits. The Sun, Earth and Moon are approximately spherical.	... Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky.	... the Moon orbits the Earth. It takes about 28 days to complete its orbit.
Vocabulary	Earth, Sun, Moon, planets, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), approximately spherical, (heliocentric, geocentric), solar system, rotates, star, orbit, fixed orbit, axis		
Skills So I can...	... describe how scientific thinking about the Earth and our solar system has changed over time.	... show using diagrams the rotation of the Earth and how this causes day and night.	... show, using diagrams, the movement of the Earth and Moon and explain the movement of the Earth and Moon.
Common Misconceptions	The Earth is flat. The Sun is a planet. The Sun rotates around the Earth. The Sun moves across the sky during the day. The Sun rises in the morning and sets in the evening.		The Moon appears only at night. Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.
Enquiry Type	Research	Observing over time	Research

Working Scientifically I can...	... consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel and describe the arguments and evidence used by scientists in the past.	... use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and use the model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth. ... demonstrate and explain verbally why day and night occur. ... research time zones and explain verbally, using a model, why we have time zones.	... make first-hand observations of how shadows caused by the Sun change through the day and explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model. ... make a sundial and explain how a sundial works.	... use secondary sources to help create a model e.g. role play or using balls to show the movement of the Moon around the Earth.

By the end of this topic children should be able to

- 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, Moon and Earth as approximate spherical bodies.

• Use the idea of the suns rotation to explain day and night and the apparent movement of the sun across the sky			
Medium Term Plan: Y5 Forces (Physics)			
Key Learning I know that...	... a force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.	... air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object.	... a mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.
Vocabulary	force, gravity, Earth, distance	air resistance, water resistance, friction, contact force, surface(s)	mechanisms, simple machines, levers, pulleys, gears, distance, movement, greater, smaller
Skills So I can...	... demonstrate the effect of gravity acting on an unsupported object.	... give examples of friction, water resistance and air resistance. ... give examples of when it is beneficial to have high or low friction, water resistance and air resistance.	... demonstrate how pulleys, levers and gears work.
Common Misconceptions	The heavier the object the faster it falls, because it has more gravity acting on it.	Smooth surfaces have no friction. Objects always travel better on smooth surfaces	

	Forces always act in pairs which are equal and opposite.	A moving object has a force which is pushing it forwards and it stops when the pushing force wears out. A non-moving object has no forces acting on it. Heavy objects sink and light objects float.	
Enquiry Type	Research	Comparative and Fair Testing	Research
Working Scientifically I can...	... create a timer that uses gravity to move a ball. ... research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	... investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. ... investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. ... investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats.	... explore how levers, pulleys and gears work and make a product that involves a lever, pulley or gear. ... demonstrate clearly the effects of using levers, pulleys and gears.

		… explain the results of our investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface the particles in the water, air or on the surface slow it down.	

By the end of this topic children should be able to

- 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 small force to have a greater effect.

Recording Data and results in year five

- Record data and results of increasing complexity using scientific diagrams and label, classification keys, tables, scatter graphs, bar and line graphs
- Solve comparison, sum and difference problems using information presented in a line graph.
- Complete, read and interpret information in tables, including times tables.

Year five trip opportunities:

- Magna

- Local walks- the cemetery, botanical gardens, Endlcliffe park
- Wonderdome (visit to school)
-

Year 6

Working scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate
- Record data and results of increasing complexity using scientific diagrams and label, classification keys, tables, scatter graphs, bar and line graphs
- Use test results to make predictions to set up further comparative and fair tests
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and presentations
- Identify scientific evidence that has been used to support or refute ideas or arguments
- *Make their own decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them*
- *Explain how to use equipment accurately*
- *Recognise when secondary sources would be most useful to research their ideas and begin to separate opinion and fact*

Communicate and justify their scientific ideas and talk about how scientific ideas have developed over time

Medium Term Plan: Y6 Living Things and Their Habitats (Biology)			
Key Learning I know that...	... living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot.	... animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.	... plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.

Vocabulary	classification, micro-organisms, bacteria, yeast, toadstools, mushrooms, Carl Linnaeus		vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms		flowering, non-flowering
Skills So I can…	… explain why the formal classification system devised by Carl Linnaeus, is important.		… give examples of animals in the five vertebrate groups and some of the invertebrate groups. … give the key characteristics of the five vertebrate groups and some invertebrate groups. … compare the characteristics of animals in different groups.		… give examples of flowering and non-flowering plants
Common Misconceptions	All micro-organisms are harmful. Mushrooms are plants.				
Enquiry Type	Research	Identifying and Classifying		Research	Identifying and Classifying
Working Scientifically I can…	… use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important.	… use first-hand observation to identify characteristics shared by the animals in a group and give a number of characteristics that explain why an animal belongs to a particular group.	… create classification keys for animals and classify animals, presenting in a range of ways e.g. Venn diagrams, Carroll diagrams and keys.	… use secondary sources to research the characteristics of animals that belong to a group and create an imaginary animal which has features from one or more groups.	… use classification materials to identify unknown plants. … create classification keys for plants and classify plants, presenting in a range of ways e.g. Venn

		… use classification materials to identify unknown animals.			diagrams, Carroll diagrams and keys

By the end of this topic children should be able to

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

Medium Term Plan: Y6 Animals, Including Humans (Biology)		
Key Learning I know that…	… the heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.	… diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. (*This content is also included in PSHE.*)
Vocabulary	heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system,	diet, exercise, drugs, lifestyle

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Skills So I can…	… draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do.			… produce a piece of writing that demonstrates the key knowledge e.g. explanation text, informative poster.
Common Misconceptions	Your heart is on the left side of your chest. The heart makes blood. The blood travels in one loop from the heart to the lungs and around the body. When we exercise, our heart beats faster to work the muscles more. Some blood in our bodies is blue and some blood is red.			We just eat food for energy. All fat is bad for you. All dairy is good for you. Protein is good for you, so you can eat as much as you want. Foods only contain fat if you can see it. All drugs are bad for you.
Enquiry Type	Comparative and Fair Testing	Pattern Seeking	Observing over time	Research
Working Scientifically I can…	… create a role play model for the circulatory system and use it to explain the main parts of the circulatory system and their role. … carry out a range of pulse rate investigations: ▪ fair test – effect of different activities on my pulse rate ▪ pattern seeking – exploring which groups of people may have higher or lower resting pulse rates ▪ observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) ▪ pattern seeking – exploring recovery rate for different groups of people.			… research the negative effects of drugs (e.g. tobacco). … research the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources. … explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body. … present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body.

	… use subject knowledge about the heart whilst writing conclusions for investigations.	

By the end of this topic children should be able to

- 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

Medium Term Plan: Y6 Evolution and Inheritance (Biology)			
Key Learning I know that…	All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.	Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.	Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.

Vocabulary	offspring, sexual reproduction, vary, characteristics	suited, adapted, environment, inherited, species, evolution	fossils
Skills So I can…	… demonstrate how offspring have features which are inherited from the parents	… give examples of how plants and animals are suited to an environment. … give examples of how an animal or plant has evolved over time e.g. peppered moth. … explain the process of evolution.	… give examples of living things that lived millions of years ago and the fossil evidence we have to support this. … give examples of fossil evidence that can be used to support the theory of evolution.
Common Misconceptions	Offspring mostly resemble their parents of the same sex, so that sons look like fathers. All characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited.	Adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life.	Cavemen and dinosaurs were alive at the same time.

Enquiry Type	Identifying and Classifying	Identifying and Classifying	Research	Research
Working Scientifically I can…	… identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs.	… identify characteristics that will make a plant or animal suited or not suited to a particular habitat and design a new plant or animal to live in a particular habitat. … use models to demonstrate evolution e.g. 'Battle of the Beaks' bird beak activity and link the patterns seen in the model to real examples. … use secondary sources to find out about how the population of peppered moths changed during the industrial revolution and explain why the dominant colour of the peppered moth changed over a very short period of time.		… make observations of fossils to identify living things that lived on Earth millions of years ago. … compare the ideas of Charles Darwin and Alfred Wallace on evolution.
By the end of this topic children should be able to • 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 environments in different ways and that adaption may lead to evolution				
Medium Term Plan: Y6 Light (Physics)				

Key Learning I know that...	Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen.	Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.
Vocabulary	As for Year 3 - Light, plus straight lines, light rays, reflection, shadow, periscope,	
Skills So I can...	... describe, with diagrams or models as appropriate, how light travels in straight lines either from sources or reflected from other objects into our eyes.	... describe, with diagrams or models as appropriate, how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape.
Common Misconceptions	We see objects because light travels from our eyes to the object.	
Enquiry Type		Comparative and Fair Testing
Working Scientifically I can...	... explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card and explain how evidence from enquiries shows that light travels in straight lines. ... predict and explain, with diagrams or models as appropriate, how the path of light rays can be directed by	... explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets to predict and explain, with diagrams or models as appropriate, how the shape of shadows can be varied.

	reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope.	

By the end of this topic children should be able to

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

Medium Term Plan: Y6 Electricity (Physics)

Diverse scientists to study:
Sir Charles Kao-

Key Learning I know that...	... adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.	... recognised circuit symbols can be draw in simple circuit diagrams.
Vocabulary	circuit, complete circuit, cell, battery, bulb, buzzer, motor, switch, voltage **N.B.** Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.	circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch,
Skills So I can...	... make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages.	... draw circuit diagrams of a range of simple series circuits using recognised symbols.

Common Misconceptions	Larger-sized batteries make bulbs brighter. A complete circuit uses up electricity. Components in a circuit that are closer to the battery get more electricity.	
Enquiry Type	Comparative and Fair Tests	
Working Scientifically I can…	… incorporate a switch into a circuit to turn it on and off. … devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test, predict results and answer questions by drawing on evidence gathered. … explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightness's or make a motor go faster or slower. and change cells and components in a circuit to achieve a specific effect. … make circuits that can be controlled as part of a DT project by making circuits to solve particular problems, such as a quiet and a loud burglar alarm.	… communicate structures of circuits using circuit diagrams with recognised symbols

By the end of this topic children should be able to

- Associate the brightness of a lamp all 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

Recording Data and results in year six

- Record data and results of increasing complexity using scientific diagrams and label, classification keys, tables, scatter graphs, bar and line graphs.

- Interpret and construct pie charts and line graphs and use these to solve problems.
- Calculate and interpret the mean as an average, knowing what it is appropriate to do so.
- By year six children should be able to choose which method of recording data is the most appropriate.

Year six trip opportunities:

- Magna
- Local walks- the cemetery, botanical gardens, Endlcliffe park
- Wonderdome (visit to school)
- RSPB Fairburn INGS