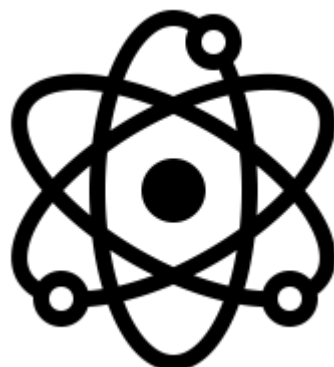




Science Learning Journey



Curriculum Design:

Cumulative:

At William Davis our science curriculum is organised to ensure a progression in developing both knowledge and working scientifically skills. This journey begins in the EYFS, where knowledge, opportunities and experiences have been carefully designed to ensure firm foundations are in place before the children move into KS1. Each year children have the opportunity to revisit and build upon their prior learning, working towards cumulative end goals for each year group.

Coherence:

Our science curriculum is centred around our 'Big Ideas'- as reflected in the strands of Science: Biology, Physics and Chemistry. The concepts are built upon throughout the learning modules, deepening children's understanding of each concept as they continue on their learning journey.

Connections:

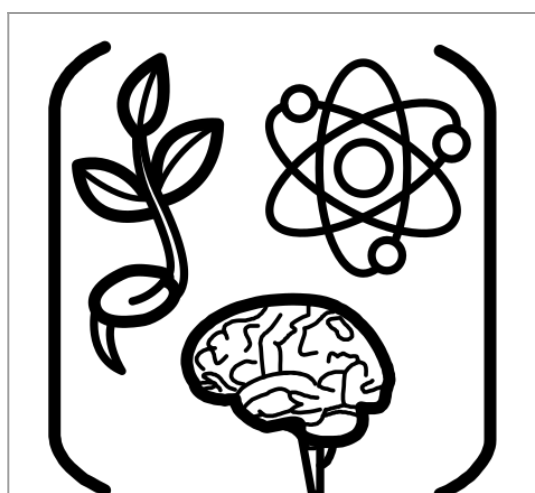
Where appropriate our science studies are linked to learning in other subjects, so that connections can be made and understanding deepened. This might be links with texts studied in the reading curriculum, opportunities to use their scientific knowledge within the writing curriculum, or links to other subjects such as DT. For example Year 2 use their knowledge of keeping healthy in science to deepen their learning in Food and Nutrition in DT, when they consider the question, 'what does healthy mean? Year 4 use their science knowledge to support their science learning in electrical systems and then use this as the context for their writing of persuasive adverts. Year 6 use their knowledge of the circulatory system to write explanatory texts.

Context:

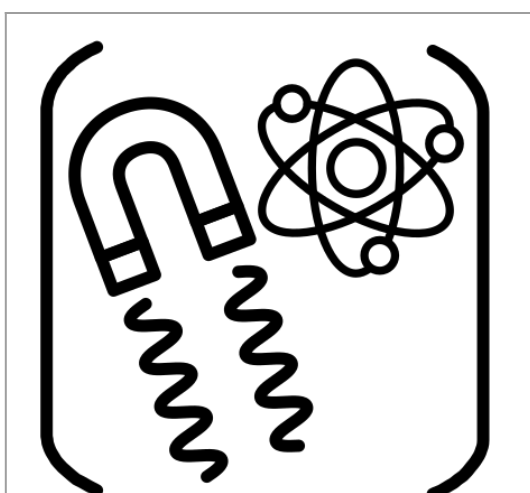
We have made deliberate choices within our science curriculum linked to our locality and our school community. Tower Hamlets has one of the highest rates of childhood obesity and many of our children eat a high proportion of processed fast food. Our Animals including humans units explore the importance of healthy eating and a balanced diets. In year 6, children explore the function of the heart and why it's vital to look after it.

In our living things unit we ensure we look for living things in our local area. For example, in Year 2 we think about some of the microhabitats in our area and what may live there.

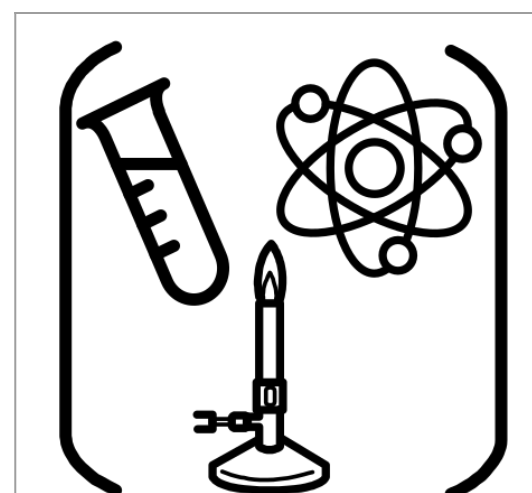
Big Ideas



Biology



Physics



Chemistry

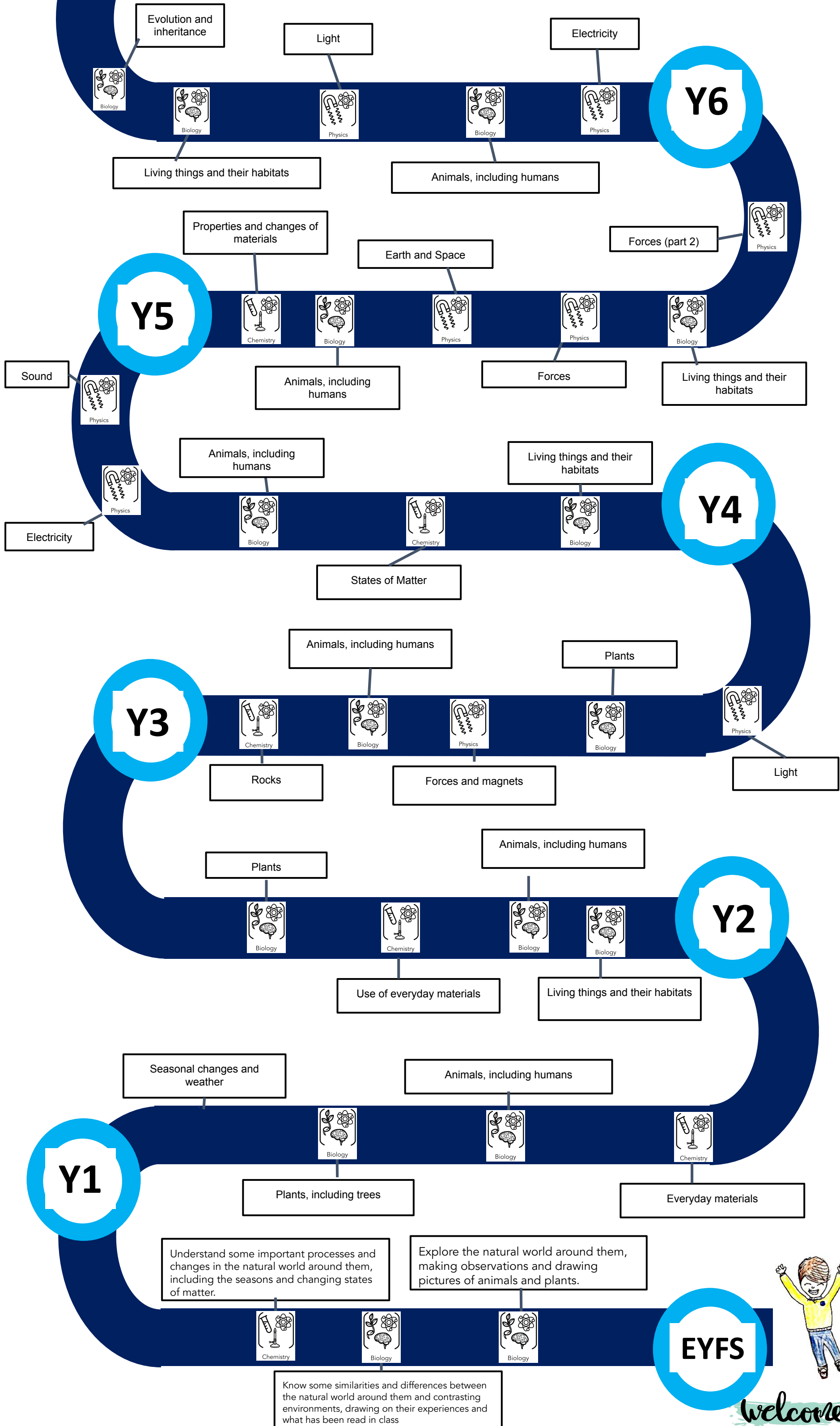
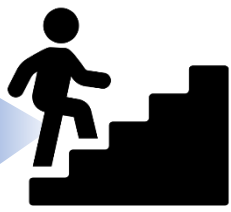
Ideas of science

- 1 All material in the Universe is made of very small particles.
- 2 Objects can affect other objects at a distance.
- 3 Changing the movement of an object requires a net force to be acting on it.
- 4 The total amount of energy in the Universe is always the same but energy can be transformed when things change or are made to happen.
- 5 The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth's surface and its climate.
- 6 The solar system is a very small part of one of millions of galaxies in the Universe.
- 7 Organisms are organised on a cellular basis.
- 8 Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.
- 9 Genetic information is passed down from one generation of organisms to another.
- 10 The diversity of organisms, living and extinct, is the result of evolution.

Ideas about science

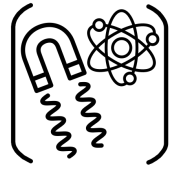
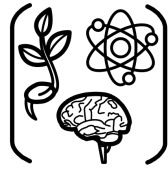
- 11 Science assumes that for every effect there is one or more causes.
- 12 Scientific explanations, theories and models are those that best fit the facts known at a particular time.
- 13 The knowledge produced by science is used in some technologies to create products to serve human ends.
- 14 Applications of science often have ethical, social, economic and political implications.

Science Learning Journey



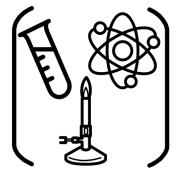
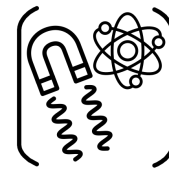
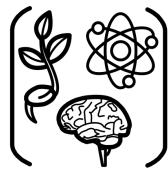
welcome

Cumulative End Goals



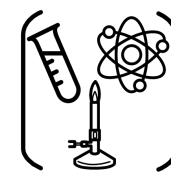
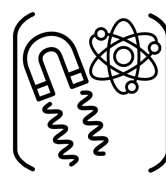
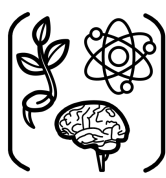
Year 1

	BIOLOGY	PHYSICS	CHEMISTRY
	<p>Pupils develop an understanding of the concept of BIOLOGY through:</p>	<p>Pupils develop an understanding of the concept of PHYSICS through:</p>	<p>Pupils develop an understanding of the concept of CHEMISTRY through:</p>
Seasonal changes and daily weather <i>Physics</i>	<ul style="list-style-type: none"> knowing and explaining what an animal is and what a plant is knowing and explaining how seasons influence plants and animals knowing and identifying the common features of fish, amphibians, reptiles, birds and mammals 	<ul style="list-style-type: none"> knowing and explaining the order of seasons knowing and explaining the changes within each season including months of the year knowing different patterns of weather and explaining, for example, how rain can occur in all seasons 	<ul style="list-style-type: none"> knowing the properties of everyday materials, such as wood, plastic, glass, metal, water, and rock knowing and explaining the difference between an object and the material from which it is made, such as metal and a spoon
Animals, including humans <i>Biology</i>	<ul style="list-style-type: none"> knowing, explaining and grouping animals by the types of food they eat knowing and explaining the places (habitats) that fish, amphibians, reptiles, birds and mammals live knowing and locating the main body parts of a human 	<ul style="list-style-type: none"> knowing that the earth rotates and explaining how day and night occurs 	<ul style="list-style-type: none"> knowing and explaining the properties of materials, such as hard / soft, stretchy, / stiff, rough / smooth, bendy / rigid, waterproof / not waterproof, absorbent / not absorbent, opaque / translucent / transparent knowing, explaining and grouping a range of everyday materials depending on their properties
Everyday materials <i>Chemistry</i>	<ul style="list-style-type: none"> knowing the five senses and explaining how they help compare different textures, sounds and smells knowing and identifying the basic structure of plants and trees, such as roots, bulbs, stem, leaf, flower, fruits, trunk, branch and crown 		
Plants <i>Biology</i>	<ul style="list-style-type: none"> knowing and identifying the common names of wild and garden plants knowing and identifying explaining different trees in the locality, such as oak or Scots Pine... knowing and explaining the difference between evergreen and deciduous trees, including the influence of seasons 		



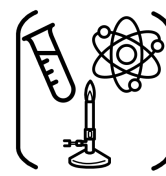
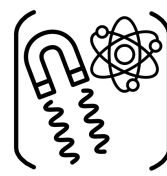
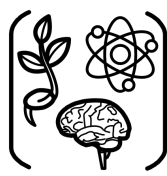
Year 2

	BIOLOGY	PHYSICS	CHEMISTRY
	<p>Pupils develop an understanding of the concept of BIOLOGY through:</p>	<p>Pupils develop an understanding of the concept of PHYSICS through:</p>	<p>Pupils develop an understanding of the concept of CHEMISTRY through:</p>
Living things and their habitats <i>Biology</i>	<ul style="list-style-type: none"> knowing and explaining the common characteristic of living things, such as MRS GREN knowing and explaining the difference between things that are living, dead and things that have never been alive knowing and explaining what a habitat is and why plants and animals that live there are best suited to it 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> knowing and explaining what properties everyday materials have knowing, comparing and explaining the properties and suitability of everyday materials for particular uses, such as glass in windows or bricks for building – identifying what is suitable or unsuitable
Animals, including humans <i>Biology</i>	<ul style="list-style-type: none"> knowing and identifying a variety of plants and animals in micro-habitats and habitats knowing and explaining what an animal is and how they get their food from other plants and animals knowing and explaining what a simple food chain is, including the direction of energy 		<ul style="list-style-type: none"> knowing and explaining how the shape of everyday materials can be changed, for example by squashing, bending, twisting and stretching
Uses of everyday materials <i>Chemistry</i>	<ul style="list-style-type: none"> knowing and explaining that animals, including humans, have offspring which grow into adults knowing and explaining simple life cycles of animals, including humans knowing and explaining that animals need water, food and air to survive knowing and explaining that to be healthy, humans need to exercise, eat the right amounts of different types of food and keep clean 		<ul style="list-style-type: none"> explaining how significant scientists have made useful things from knowing about the properties of materials, such as Charles Macintosh
Plants <i>Biology</i>	<ul style="list-style-type: none"> knowing and explaining what conditions are needed for seeds to germinate and mature into plants knowing and explaining how bulbs grow knowing and explaining the conditions that plants need to thrive, grow, mature, and reproduce 		



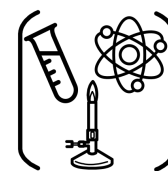
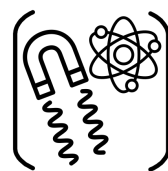
Year 3

	BIOLOGY	PHYSICS	CHEMISTRY
	<p>Pupils develop an understanding of the concept of BIOLOGY through:</p> <ul style="list-style-type: none"> knowing and explaining that animals, including humans, need the right types and amounts of nutrition knowing and explaining that animals only get nutrition from the food they eat – they cannot make their own food like plants knowing, identifying and explaining the purpose and function of the human skeleton, such as supporting the body, protecting the lungs and helping joints move knowing, identifying and explaining the purpose and function of the muscles, such as skeletal, cardiac or smooth muscles knowing and explaining the difference between vertebrates and invertebrates knowing and identifying the structure of the different parts of flowering plants knowing and explaining the function of the parts of flowering plants knowing and explaining what plants need to live and grow, such as air, light, water, nutrients from soil and space to grow knowing how water is transported within plants and explaining the process of transpiration knowing and explaining the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<p>Pupils develop an understanding of the concept of PHYSICS through:</p> <ul style="list-style-type: none"> knowing how objects move on different surfaces using friction and resistance to explain why knowing and explaining the difference between contact and non-contact forces knowing and explaining how magnets attract and repel each other knowing and explaining how magnets attract some materials and not others using what they know about the properties of materials from KS1 to group everyday materials that are attracted to a magnet knowing and identifying magnetic materials knowing and explaining that a magnet has two poles, and predicting whether they will attract or repel each other knowing and explaining that light is needed to see things knowing and explaining that dark is the absence of light knowing and explaining that light is reflected from surfaces and enters our eyes knowing that the light of the sun can be dangerous and how to protect their eyes knowing and explaining that shadows are formed when light from a source is blocked by an opaque object knowing and explaining how shadows change size 	<p>Pupils develop an understanding of the concept of CHEMISTRY through:</p> <ul style="list-style-type: none"> knowing and explaining that rocks can be grouped together on the basis of their appearance and properties knowing and explaining how rocks are formed knowing and explaining what a rock is and what is not a rock knowing and explaining different types of rock, such as igneous, sedimentary and metamorphic rock knowing and explaining how fossils of animals and plants are formed knowing and explaining the different types of fossils, including body and trace fossil knowing and explaining what soil is made from knowing and explaining the different types of material that make up soil, including rocks and organic matter
Rocks <i>Chemistry</i>			
Animals, including humans <i>Biology</i>			
Forces and magnets <i>Physics</i>			
Plants <i>Biology</i>			
Light <i>Physics</i>			



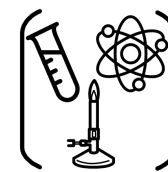
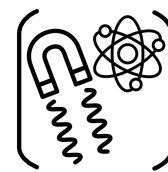
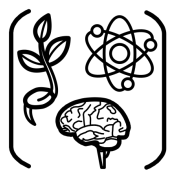
Year 4

	BIOLOGY	PHYSICS	CHEMISTRY
	<p>Pupils develop an understanding of the concept of BIOLOGY through:</p> <ul style="list-style-type: none"> knowing and explaining that living things can be grouped in a variety of ways, such as vertebrate or invertebrate and flowering and non-flowering plants knowing, using and explaining the classification of vertebrates, such as fish, amphibians, reptiles, birds and mammals knowing, using and explaining the classification of invertebrates, such as snails and slugs, worms, spiders and insects knowing and use classification keys to group, identify and name a variety of living things in their local environment knowing and explaining the impact on living things if their habitat changes knowing and identifying the parts of the human digestive system, such as the mouth, tongue, teeth, oesophagus, stomach, small and large intestine knowing and explaining the functions of the parts of the human digestive system, such as the mouth, tongue, teeth, oesophagus, stomach, small and large intestine knowing and explaining the different teeth that carnivores and herbivores have and why this is important for their diet knowing, constructing and explaining food chains knowing and identifying producers, predators and prey in a food chain 	<p>Pupils develop an understanding of the concept of PHYSICS through:</p> <ul style="list-style-type: none"> knowing and explaining that household appliances run on electricity from mains or batteries knowing, identifying and explaining what a simple single loop circuit is (also know as a simple series electrical circuit) knowing, identifying and explaining the component of a single loop circuit, such as cells, wires, bulbs, switches and buzzers knowing and explaining 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 knowing and explaining that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a single loop circuit knowing and identifying that some common conductors and insulators as well as associating metals with being good conductors. knowing and explaining that current is the flow of electricity through a circuit knowing and explaining how sounds are made through vibrations and travel as waves knowing and explaining how sounds travel through a medium, such as a solid (wood), a liquid (water) or gas (air) knowing and explaining how sounds travel through a medium to the ear as vibrations knowing and explaining that sound is the transfer of energy knowing and explaining what pitch means – frequency of the sound wave knowing and explaining what loudness means – the size of the sound wave knowing, identifying and explaining patterns between the pitch of a sound and the features of the object that produced it, such as the length of an elastic band knowing, identifying and explaining patterns between the volume of a sound and the strength of the vibrations that produced it, such as the bang of a drum knowing and explaining that sounds get fainter as the distance from the sound source increases 	<p>Pupils develop an understanding of the concept of CHEMISTRY through:</p> <ul style="list-style-type: none"> knowing and explaining what matter and state means being introduced to simple models that explain what particles are knowing and explaining the difference between solids, liquids and gases, such as solids hold their shape, liquids form a pool not a pile and gases escape from an unsealed container observing and knowing that some materials change state when they are heated or cooled, such as water evaporating or butter melting knowing and using Celsius as a measure of temperature knowing and explaining the part played by evaporation and condensation in the water cycle observing, knowing and explaining how the rate of evaporation is associated with temperature
Living things and their habitats <i>Biology</i>			
States of matter <i>Chemistry</i>			
Animals, including humans <i>Biology</i>			
Electricity <i>Physics</i>			
Sound <i>Physics</i>			



Year 5

	BIOLOGY	PHYSICS	CHEMISTRY
	Pupils develop an understanding of the concept of BIOLOGY through:	Pupils develop an understanding of the concept of PHYSICS through:	Pupils develop an understanding of the concept of CHEMISTRY through:
Properties and changes of materials <i>Chemistry</i>	<ul style="list-style-type: none"> knowing, describing and explaining the changes humans go through to old age knowing and using a timeline to show stages of growth and development of humans, including puberty knowing, comparing and explaining the difference in gestation periods of humans to other animals, such as an elephant or butterfly <hr/> <ul style="list-style-type: none"> knowing, identifying and explaining the differences in the life cycles of a mammal (dog), an amphibian (frog), an insect (ladybird) and a bird (chicken) knowing and explaining the life process of reproduction in some plants and animals knowing and explaining about a significant scientist, such as Maria Merion who David Attenborough described as one of the most important contributors to entomology 	<ul style="list-style-type: none"> knowing and explaining that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object knowing, identifying and explaining the effects of air resistance, water resistance and friction, that act between moving surfaces, such as a parachute or a brake on a bike knowing and explaining how significant scientists, such as Isaac Newton or Galileo Galilei helped develop the theory of gravitation knowing, experiencing and explaining how the effect of friction on movement slows or stops moving objects knowing and explaining that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect known as a force multiplier knowing and experiencing how levers, pulleys and gears multiply a smaller force to achieve a greater effect, such as removing a nail using a claw hammer, making simple pulleys and gears on a bike <hr/> <ul style="list-style-type: none"> knowing and identifying the eight planets in our solar system - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune knowing and identifying Pluto as a dwarf planet knowing, identifying and explaining the movement of the Earth and other planets, relative to the Sun in the solar system knowing and explaining the movement of the Moon relative to the Earth knowing and explaining that a moon is a celestial body that orbits a planet, such as the Moon around Earth or the four large moons of Jupiter - Io, Europa, Ganymede and Callisto first seen by Galileo Galilei knowing and explaining that the Sun, Earth and Moon are approximately spherical bodies knowing about Earth's rotation to explain day and night and the apparent movement of the sun across the sky 	<ul style="list-style-type: none"> knowing, identifying and grouping the properties of everyday materials, such as hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets knowing and explaining how some materials dissolve in liquid to form a solution knowing and describing how to recover a substance from a solution knowing and using their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating knowing and explaining, by giving reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic knowing and explaining how dissolving, mixing and changes of state are reversible changes knowing and explaining that some changes result in the formation of new materials that are not usually reversible, such as burning
Animals, including humans <i>Biology</i>			
Forces <i>Physics</i>			
Earth in Space <i>Physics</i>			
Living things and their habitats <i>Biology</i>			



Year 6







	BIOLOGY	PHYSICS	CHEMISTRY
	Pupils develop an understanding of the concept of BIOLOGY through:	Pupils develop an understanding of the concept of PHYSICS through:	Pupils develop an understanding of the concept of CHEMISTRY through:
Electricity <i>Physics</i>	<ul style="list-style-type: none"> knowing, identifying and explaining the main parts of the human circulatory system and describe the functions of the heart, aorta, pulmonary vein, left atrium, right atrium, left ventricle, right ventricle, arteries, veins and capillaries, oxygenated and deoxygenated knowing, identifying and explaining the components and function of blood, such as plasma, red blood cells, white blood cells, platelets, nutrients and oxygen knowing and explaining the impact of diet, exercise, drugs and lifestyle on the way their bodies function knowing, describing and explaining the ways in which nutrients and water are transported within animals, including humans knowing and explaining how significant scientists helped us understand more about the circulatory system, such as Galen or William Harvey <hr/> <ul style="list-style-type: none"> knowing and explaining how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals knowing and identifying the five major kingdoms of living things, including plant, animal, fungi, algae, slime and mould, and bacteria knowing and explaining how significant scientists, such as Aristotle or Carl Linnaeus, helped us understand more about classification knowing, using and explaining taxonomy knowing and explaining reasons for classifying plants and animals based on specific characteristics, such as vertebrates or invertebrates knowing and using classification systems and keys to identify some animals and plants in the immediate environment knowing how to classify animals and plants they are unfamiliar with using a classification system <hr/> <ul style="list-style-type: none"> knowing and explaining that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago, such as body fossils, mould fossils, cast fossils and trace fossils knowing and explaining that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents knowing, identifying and explaining how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution knowing and explaining about significant scientists who have helped us understand the theory of evolution, such as Alfred Wallace and Charles Darwin 	<ul style="list-style-type: none"> knowing and explaining how a single loop circuit (series circuit) works knowing and explaining how the brightness of a lamp or the volume of a buzzer is affected by the number and voltage of cells used in a circuit knowing, using and explaining the reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches knowing and using recognised symbols when representing a simple circuit in a diagram knowing and explaining how to be safe when working with electricity <hr/> <ul style="list-style-type: none"> knowing and explaining that light appears to travel in straight lines knowing that light travels in straight lines to explain how objects are seen because they give out or reflect light into the eye knowing and explaining that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes knowing that light travels in straight lines to explain why shadows have the same shape as the objects that cast them 	
Animals including humans <i>Biology</i>			
Animals including humans (water transport) <i>Biology</i>			
Light <i>Physics</i>			
Living things and their habitats <i>Biology</i>			
Evolution and inheritance <i>Biology</i>			

Thinking and working Scientifically









Pupils construct understanding by applying substantive knowledge to questioning and planning, observing, performing a range of tests, accurately measuring, comparing through identifying and classifying, using observations and gathering data to help answer questions, explaining and reporting, predicting, concluding, improving, and seeking patterns. We call it 'Working Scientifically.'

Teachers plan to model and teach how to think like a scientist, developing the following areas of working scientifically over time:








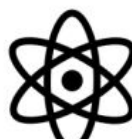
Key Stage 1

					
Asking simple questions and recognising that they can be answered in different ways	Observing closely, using simple equipment	Performing simple tests	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Gathering and recording data to help in answering questions

Lower Key Stage 2

							
Ask relevant questions	Set up simple, practical enquiries and comparative and fair tests	Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers	Gather, record, classify and present data in a variety of ways to help in answering questions	Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests	Identify differences, similarities or changes related to simple, scientific ideas and processes

Upper Key Stage 2

							
Plan enquiries, including recognising and controlling variables where necessary	Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work	Take measurements, using a range of scientific equipment, with increasing accuracy and precision	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models	Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions	Present findings in written form, displays and other presentations	Use test results to make predictions to set up further comparative and fair tests	Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments

Early Foundations

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Plants	<ul style="list-style-type: none"> Talk about some of the things they have observed such as plants / trees. Notice features of plants. Know that plants grow. Know that plants often grow in the ground or in pots. 	<ul style="list-style-type: none"> Know that fruit and vegetables are plants. Know that some vegetables grow underground and they look different above and below the ground. Understand the key features of the life cycle of a plant. Develop an understanding of growth, decay and changes over time, e.g. observing an apple / banana rotting / school compost heap, wet pile of leaves. Show care and concern for living things and the environment, e.g. keep plants alive by watering them. 	<ul style="list-style-type: none"> Name some common plants / vegetation, e.g. grass, tree, bush, daisy, dandelion (and other plants and tree names local to their environment, e.g. reeds / lily pads in a school pond). Examine change over time, for example, life cycle of different plants / fruit / vegetables, growing plants from seeds, plants which go to seed (collect seeds). Talk about simple plant parts and what happens to them. Use language, e.g. leaves, roots, stem, petal. Talk about simple similarities and differences in plants.
Essential vocabulary	plant, tree, grass, leaves, twig / stick, ground, grow	seeds, rot, change, fruit, vegetable, die underground	leaves, roots, stem, petal, familiar plant names, life cycle

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Animals including humans	<ul style="list-style-type: none"> Talk about some of the things they have observed such as people and animals. Name facial features on humans and know what they have on their bodies, e.g. arms, legs, body, feet, toes, hands, fingers. Know how they are similar and different to their friends, e.g. eye colour / hair colour. Name some more familiar animals, e.g. farm and domestic animals. Name human and animal excretions, e.g. poo, wee, sick. 	<ul style="list-style-type: none"> Show care and concern for living things and the environment. Name obvious body parts on humans and animals. Understand the key features of the life cycle of an animal. Name some differences between animals, e.g. fur / colour / markings. Name more excretions, e.g. snot, tears, blood. 	<ul style="list-style-type: none"> Talk about some similarities and differences in animals including humans. Name all basic parts of the human body that they can see and the brain and heart. Observe different animals and their body parts and talk about why they have them, e.g. beak, wings, legs. Name some habitats, e.g. homes of birds (garden, forest, wood and water). Begin to talk about what their body needs, e.g. food, water exercise and sleep.
Essential vocabulary	eyes, ears, nose, mouth, hair, arms, hands, fingers, legs, feet, toes, same, different, (some animal names), poo, wee, sick	shoulders, elbow, neck back, stomach, knees, ankles, tail, fur, whiskers, markings, grow, baby, child, adult, snot, tears, blood, differences	similarities, brain, heart, bones, bottom, hips, collar bone, wrist, beak, wings, feathers, gills,

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Everyday materials	<ul style="list-style-type: none"> Talk about some of the things they have observed such as natural and found objects. Explore natural materials, indoors and outside. Manipulate and play with different materials, e.g. dough, shaving foam, sand. 	<ul style="list-style-type: none"> Explore different materials freely, to develop their ideas about how to use them and what to make. Talk about the differences between materials and changes they notice. Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and / or different properties. 	<ul style="list-style-type: none"> Know about similarities and differences in materials. Sort materials using criteria such as soft, hard, flexible, plastic, wood, metal. Develop their own ideas through experimentation with a diverse range of materials. (EAD Link) Increasingly choose more appropriate materials for the job, e.g. cotton reels / lids for wheels, wool for hair. (EAD Link) Look at how materials change, e.g. when cooking.
Essential vocabulary	wood (twigs / sticks), leaves, soil, dough,	change, senses, explore, mixture, pinecones, conkers, bark, moss	sort, materials, flexible, experiment, change

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Seasonal Change	<ul style="list-style-type: none"> Observe the weather through first hand experiences. Name simple weather types, e.g. rain, snow, sun, wind. Know the difference between hot and cold, wet and dry. 	<ul style="list-style-type: none"> Know the difference between day and night, dark and light. Name more weather types, e.g. storm, thunder, lightning, rainbow, cloudy. Know that we wear different clothes for different weather. 	<ul style="list-style-type: none"> Know the names of the seasons and what the weather is / can be like in each. Talk about the changes that each seasons brings in relation to their environment: the clothes they wear, the weather and the plants. Describe how trees and plants change in different seasons. Know that some animals store food for the winter. Know that some animals hibernate in the winter.
Essential vocabulary	rain, snow, sun, wind, wet, dry, hot, cold	weather, day, night, light, dark, storm, thunder, lightning, rainbow, cloudy	autumn, winter, spring, summer, season, hibernate

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Environmental change	<ul style="list-style-type: none"> Play with small world reconstructions, building on first-hand experiences of the natural world e.g. visiting farms, walking by a river or lake, visiting the seaside. Begin to understand that places are different and have different things in them. 	<ul style="list-style-type: none"> Begin to understand the effect their behaviour can have on the environment. Begin to understand the need to respect and care for the natural environment and all living things. 	<ul style="list-style-type: none"> Talk about the features of their own immediate environment and how environments might vary from one another. Know some ways in which humans are harming the world and how to help.
Essential vocabulary	garden, farm, seaside, park, river, lake	forest, concrete, tidy, ruin, care, places, wildlife	harm, humans, nature, island, pollution

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Forces and how things work	<ul style="list-style-type: none"> Repeat actions that have an effect, e.g. splashing in water, handprints in sand, building and knocking over towers. 	<ul style="list-style-type: none"> Explore how things work, e.g. wind-up toys, pulleys, sets of cogs with pegs and boards. Explore and talk about different forces they can feel. 	<ul style="list-style-type: none"> Know how to use a variety of different tools and equipment and how they work. Know the effect of simple push and pull forces.
Essential vocabulary	splash, print, mark, build, knock down	cogs, gears, join,, work, turn	push, pull, action, tools, together, apart, connect, electricity, battery

What will pupils know and be able to do?	2 – 3 years	3 – 4 years	4 – 5 years
Working scientifically	<ul style="list-style-type: none"> Use all of their senses to explore the natural world and materials. Begin to ask simple <i>why</i> questions about what they see, hear, smell and hear. Talk about what they see happening, e.g. xxx got wet. Recognise similarities and differences. 	<ul style="list-style-type: none"> Comment and ask questions about aspects of their familiar world such as the place where they live or the natural world. Make observations and talk about what they see, using a wide vocabulary. Ask simple <i>why</i>, <i>when</i>, <i>what</i> questions. Show interested in <i>why</i> things happen. Describe similarities and differences. Begin to group and sort. 	<ul style="list-style-type: none"> Question <i>why</i> things happen, having their own ideas. Carry out observations on changes, e.g. growing plants, floating and sinking, ice melting, magnets, sponges in water. Look closely at similarities, differences, patterns and change. Make observations and explain observations. Explore the natural world around them. Make predictions about what might happen. Make decisions about what to do. Describe what they see, hear and feel whilst outside
Essential vocabulary	look, see, same, different, why	group, sort, objects, compare, why, when, what,	try, test, ideas, explore, find, out, how

Early Foundations

Area of Learning and Development: Understanding of the World:				NATIONAL CURRICULUM
EDUCATIONAL PROGRAMME EYFS Framework	LANGUAGE children will encounter	OPPORTUNITIES + EXPERIENCES specific teaching	OPPORTUNITIES + EXPERIENCES continuous provision	Builds knowledge and understanding so pupils access Y1 SCIENCE
<p>Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension</p>				<p>Animals, including humans</p> <p>Plants</p> <p>Living things and their habitats</p> <p>Seasonal changes</p> <p>Everyday materials</p> <p>Uses of everyday materials</p>
<p>Early Learning Goals: The natural world</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants;</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>Plants:</p> <p>plant, tree, grass, leaves, twig / stick, ground, grow seeds, rot, change, fruit, vegetable, die, underground leaves, roots, stem, petal, familiar plant names, life cycle.</p> <p>Animals, including humans:</p> <p>eyes, ears, nose, mouth, hair, arms, hands, fingers, legs, feet, toes, same, different, (some animal names), poo, wee, sick shoulders, elbow, neck back, stomach, knees, ankles, tail, fur, whiskers, markings, grow, baby, child, adult, snot, tears, blood, differences similarities, brain, heart, bones, bottom, hips. collar bone, wrist, beak, wings, feathers, gills.</p> <p>Seasonal change:</p> <p>rain, snow, sun, wind, wet, dry, hot, cold weather, day, night, light, dark, storm, thunder, lightning, rainbow, cloudy autumn, winter, spring, summer, season, hibernate</p> <p>Everyday materials:</p> <p>wood (twigs / sticks), leaves, soil, dough, change, senses, explore, mixture, pinecones, conkers, bark, moss sort, materials, flexible, experiment, change</p> <p>Environmental change:</p> <p>garden, farm, seaside, park, river, lake forest, concrete, tidy, ruin, care, places, wildlife harm , humans, nature, island, pollution</p> <p>Forces:</p> <p>splash, print, mark, build, knock down cogs, gears, join,, work, turn push, pull, action, tools, together, apart, connect, electricity, battery</p>	<p>Plants:</p> <ul style="list-style-type: none"> Planting bulbs and seeds Observing growth Talk about what plants need to survive. <p>Animals including humans:</p> <ul style="list-style-type: none"> Children bring in pictures from home to show how they've changed. Observing the life cycle of chicks. Tasting, smelling, feeling (texture) different items <p>Seasonal change:</p> <ul style="list-style-type: none"> Observing changes in the park. Collecting autumn treasures. Transient art. Observing how day and night change. Noticing how the weather changes. <p>Everyday materials</p> <ul style="list-style-type: none"> Observing what happens when water changes state, e.g. ice melting. Feeling and sorting different materials e.g. soft, hard, rough etc. <p>Environmental change:</p> <ul style="list-style-type: none"> Recycling daily. Keeping classroom and shared areas clean. <p>Forces:</p> <ul style="list-style-type: none"> Through continuous provision 	<p>Plants:</p> <ul style="list-style-type: none"> Classrooms: there are plant which children are encourage to look after and are used in the continuous provision -small world play Outside children look after the garden -we plant carrots, beans, potato, tomato, mint ect <p>Animals and human</p> <ul style="list-style-type: none"> Photos of their families are on display in the home corner. Birthday display reminding of their age. Small word play Children identity and sort different animals farm, wild, sea creatures -observe the life cycle of the chicks Playdough- we add different fragrance (leomon, orange..) and different herbs and spices to add/change the smell and texture. <p>Seasonal change</p> <ul style="list-style-type: none"> We use natural materials -such as conkers and pine cones, remind children where we got them from. <u>maths</u> -conkers are used for counting and making patterns <u>construction</u> - conkers are used to roll down different height ramps <u>Small word</u> - natural materials are you to set scene. Weather - talk about the weather at the start of everyday. <p>Everyday material</p> <ul style="list-style-type: none"> Ice play- freeze a toy/ object in a bowl of balloon- children experiment on different ways to get the toy/object. Children are exposed to different materials throughout the EY environment <p>Environment change:</p> <ul style="list-style-type: none"> Children are encouraged to use recycle material to do DT projects Class rules- tidy up- putting thing back where they belong. <p>Forces:</p> <ul style="list-style-type: none"> Climbing frame Construction toys 	

Assessment in Science

Assessment in science is both formative and at the point of learning as well as summative to feed forward to the next point of contact pupils will have. Recording of assessment is multi-faceted. We support whole class feedback and marking principles. The following are used to assess pupils' knowledge and skills as well as their understanding and use of relevant vocabulary.

- *Whole class marking* and feedback.
- Formative outcomes from *cumulative quizzing*
- Summative outcomes from cumulative quizzing.
- *Structured explanative tasks* such as vocabulary connections.
- *Structured assessment tasks* such as 'Show what you know'.
- *Cumulative end goals* for each of the strands of science. These specify what pupils should know and be able to explain at the end of each year group.

At the end of each academic year, this all feeds into a final overall assessment judgement for science, which is reported to parents. This judgement reflects how secure the pupil's knowledge and understanding in the learning taught that year has been.

How do we measure the impact of our Science curriculum?

We evaluate the impact of our Science curriculum in the following ways:

- Pupil Book Study: Small groups of pupils from each class are asked to talk about what they remember about their learning in Science. These sessions are led by the Science Leader and provide an extremely useful insight into the impact of the curriculum on pupil's learning.
- Lesson visits. The Science leader visits a sample of lessons over the year to evaluate the quality of teaching and learning.
- Book looks: The subject leader looks at samples of Science books. Often this is done in conjunction with the Pupil Book Study.
- Supported planning and teaching: The leader works alongside the class teacher to support the planning and teaching, providing quality assurance.
- This all feeds into a termly subject leader evaluation.

How do we adapt our history curriculum to include all learners?

It is our expectation that all pupils participate fully in science lessons. We use adapted tasks to support some pupils in accessing the same learning question as their peers. A small number of pupils may be working towards adapted end points for science or may be working at a pre-subject specific stage of development. Details of the provision for these pupils can be found in their individual learning plan.