



Science Curriculum

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Science Intent Statement

Whole-school definition of science

Science is a way to understand our world by carefully thinking about it and testing our guesses with observations and experiments.

The intent of the Science curriculum at St Vincent's VC Academy is to provide a strong understanding of the scientific world around them. We teach specific skills and knowledge to help children to think scientifically, an understanding of scientific processes and the understanding of the uses and implications of Science today and for the future.

It is also the intent of the Science Curriculum to ensure that:

- scientific enquiry skills are embedded in each unit that the children study.
- repetition is built into the long term curriculum so knowledge and skills are revisited and built on, supporting with the long-term memory.
- the children are encouraged to develop and use a range of skills including observations, planning and investigations.
- specialist vocabulary is taught and built up during each unit.
- the children are taught to ask scientific questions and also learn how to explore possible answers to these types of questions.

Our curriculum plan has been designed and built with clear schemes of work for each year group and each subject. The plan allows for spiral learning avoiding unnecessary repetition but recapping what has gone before and moving learning on. Rosenshine's Principles underpin the teaching and learning practices within planning, lesson design and delivery. Sequences of learning are also carefully planned for so that there is a natural flow between units of learning.

In addition, the school aims to develop the children's use and understanding of scientific vocabulary associated with this subject. This is so that the children can articulate the knowledge and think scientifically.

Biology



Chemistry



Physics



Earth Science





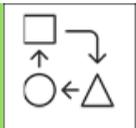
Big Ideas

Physics: The universe follows unbreakable rules that are all about forces, matter and energy. Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe. Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

Chemistry All matter (stuff) in the universe is made up of tiny building blocks. The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter. Matter can change if the arrangement of these building blocks changes.

Biology Living things are special collections of matter that make copies of themselves, use energy and grow. Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago. The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Earth science The Earth is one of eight planets that orbit the sun. The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate. The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)



Content, Sequencing and Retrieval

- Science units are separated into Biology, Chemistry, Physics and Earth Science for each year, according to the National Curriculum.
 - Subject specific vocabulary is selected and taught within lesson sequences.
- The Long-Term Plan ensures that pre-requisite knowledge and skills are considered and linked to new learning.
- Opportunities to revisit and retrieve prior learning are woven into sequencing and teaching and learning practice.



Engagement / Enrichment

- Participation in national days/ weeks such as National Science Week to support deeper understanding of scientific knowledge through experiential learning opportunities
 - SHOWCASE: pupils are given the opportunities to showcase their learning at the end of every topic.



Support, Challenge and Progress for All

Units of work are carefully sequenced, so prior knowledge and concepts are returned to and built upon from previous year groups and units. Knowledge Mats are used to pre-load learners before lessons to support vocabulary and key concepts. Our Curriculum follows a tight progression of skills and knowledge. Children take part in regular mini quizzes and retrieval activities to strengthen their memory. Every lesson has opportunities for children to discuss and practice their learning linking back to their knowledge mat. Remembering and building on skills, information and knowledge is celebrated and giving opportunities for this is a key part of St Vincent's teaching and learning opportunities. Every child has access to the National Curriculum. Some children have specific support and guidance taken from their EHCP and SEN support plan. Scaffolding, diverse questioning and opportunities for shared thinking are key tools in supporting pupils to make progress at all levels.



Science Long Term Plan

Topics

Biology - Animals including humans, Plants, Living things and their habitats, Evolution and inheritance

Chemistry – Everyday materials, rocks, states of matter, properties of materials

Physics – Forces and magnets, light, Earth and space, sounds, electricity **Earth Science**: Seasons, Rocks and Fossils

Year Group	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	Biology All About Me Senses	Chemistry Materials Changes	Physics Light and Dark	Physics Forces Growth	Biology Growth Life Cycles	Biology Plants Animals / Habitats
Year One	Biology: Animals including Humans 1	Biology: Animals including Humans 2	Chemistry: Everyday Materials 1	Chemistry: Everyday Materials 2	Earth Science: Seasonal Changes	Biology: Plants
Year Two	Chemistry: Uses of Everyday Materials 1	Chemistry: Uses of Everyday Materials 2	Biology: Living Things and their habitats1	Biology: Living Things and their habitats 2	Biology: Plants	Biology: Animals Including Humans
Year Three	Physics: Light 1	Physics: Light 2	Chemistry and Earth Science: Rocks and Fossils	Physics: Forces and Magnets	Biology: Plants	Biology: Animals Including Humans
Year Four	Biology: Animals Including Humans	Physics: Sound	Physics: Electricity	Chemistry: States of Matter 1	Chemistry: States of Matter 2	Biology: Living things and their habitats
Year Five	Earth Science and Physics: Earth and Space	Physics: Forces	Chemistry: Properties of Materials 1	Chemistry: Properties of Materials 2	Chemistry: Properties of Materials 3	Biology: Living things and their habitats
Year Six	Physics: Light	Physics: Electricity	Biology: Living things and their habitats	Biology: Evolution and Inheritance	Biology: Animals Including Humans 1	Biology: Animals Including Humans 2

Progression of Knowledge and Skills from EYFS to Y6

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	<p>Understanding the World 3-4 year olds</p> <ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Talk about what they see, using a wide vocabulary. Explore how things work. <p>Reception:</p> <ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside <p>ELG: The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants;</p>	<ul style="list-style-type: none"> Know that science is a way to understand our world by carefully thinking about it and testing our guesses with observations and experiments Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into 	<ul style="list-style-type: none"> Know that science is a way to understand our world by carefully thinking about it and testing our guesses with observations and experiments Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into 	<ul style="list-style-type: none"> Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to 	<ul style="list-style-type: none"> Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to 	<ul style="list-style-type: none"> Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth) Know how to identify conditions that were imperfectly controlled and can explain how these might affect results Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of 	<ul style="list-style-type: none"> Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth) Know how to identify conditions that were imperfectly controlled and can explain how these might affect results Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of

		<p>groups based on their observable properties</p> <p>Know that we can write down numbers and words or draw pictures to record what we find</p>	<p>groups based on their observable properties</p> <p>Know that we can write down numbers and words or draw pictures to record what we find</p>	<p>draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key</p> <p>how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table</p> <ul style="list-style-type: none"> • Know - with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a 	<p>draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key</p> <p>how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table</p> <ul style="list-style-type: none"> • Know - with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a 	<p>each device</p> <ul style="list-style-type: none"> • Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement • Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion • Know how to present brief oral findings from an enquiry, speaking clearly and with confidence 	<p>each device</p> <ul style="list-style-type: none"> • Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement • Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion • Know how to present brief oral findings from an enquiry, speaking clearly and with confidence
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				<p>conclusion</p> <ul style="list-style-type: none"> • Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry • Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true • Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as 	<p>conclusion</p> <ul style="list-style-type: none"> • Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry • Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true • Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can 	<p>and using notes where necessary</p> <ul style="list-style-type: none"> • Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection) 	<p>and using notes where necessary</p> <ul style="list-style-type: none"> • Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection)
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possible can improve an enquiry

- Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant - does this work with other plants / different types of light / etc)
- Know that they can draw conclusions from the findings of other scientists
- Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not

improve an enquiry

- Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant - does this work with other plants / different types of light / etc)
- Know that they can draw conclusions from the findings of other scientists
- Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry

				yet been tested, but that can be tested through a scientific enquiry			
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	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Physics	<p>Understanding the World 3-4 year olds</p> <ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore how things work. Explore and talk about different forces they can feel. <p>Reception:</p> <ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside Understand the effect of changing seasons on the natural world around them 			<ul style="list-style-type: none"> Know that light is a form of energy Know that we need light to see things and that darkness is the absence of light Know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes Know that light travels in straight lines know that light is reflected when it travels from a light source and then 'bounces' off an 	<ul style="list-style-type: none"> Know that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move Know that sound travels through a medium (e.g. particles in the air) and thus sound does not travel through a vacuum which has no particles in it at all Know the correlation between pitch and the object producing a sound Know the correlation between the volume of a 	<ul style="list-style-type: none"> Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together Know that unsupported objects are pulled towards the Earth by the force of gravity Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, 	<ul style="list-style-type: none"> Know that light travels in straight lines 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 Know how our eyes work

	<p>ELG: The Natural World</p> <ul style="list-style-type: none"> Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 			<p>object</p> <ul style="list-style-type: none"> Know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes Know that the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun Know the dangers of looking at the sun Know that sunglasses can protect eyes from sunlight but looking at the Sun directly – even with sunglasses – can damage the eyes Know that opaque objects block light creating shadows and that light passes easily through transparent 	<p>sound and the strength of the vibrations that produced it</p> <ul style="list-style-type: none"> Know that sound gets fainter as the distance from the sound sources increases Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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 associate this 	<p>the more gas particles it bumps into and the more air resistance it experiences</p> <ul style="list-style-type: none"> Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles Identify and know the effect of friction Know that gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger force over a small distance 	<ul style="list-style-type: none"> Know how to draw simple circuit diagrams Know the recognized symbols for a battery, bulb, motor, buzzer and wire Know that the brightness of a bulb is associated with the voltage Know how to predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit Compare and give reasons for variations in how components function, including the brightness of
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				<p>objects</p> <ul style="list-style-type: none">• Know that opacity/transparency and reflectiveness are properties of a material• Know that as objects move towards a light source, the size of the shadow increases• Know how to show the changing of shadow size by drawing a diagram with straight lines representing light• Know that a force can be thought of as a push or a pull• Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves	<p>with whether or not a lamp lights in a simple series circuit</p> <ul style="list-style-type: none">• recognise some common conductors and insulators, and• associate metals with being good conductors	<p>at the other end</p>	<p>bulbs, the loudness of buzzers and the on/off position of switches</p>
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				<ul style="list-style-type: none">• Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force• Know that magnets have two poles called north and south• Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other• Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic			
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	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Chemistry	<p>Understanding the World 3-4 year olds</p> <ul style="list-style-type: none"> Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice <p>Reception:</p> <ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside <p>ELG: The Natural World</p> <ul style="list-style-type: none"> Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> Science is a way to understand our world by carefully thinking about it and testing our guesses with observations and experiments (retrieval) Know that an object is made from/of a material and knowsome examples of materials in the realworld Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material <p>Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock</p>	<ul style="list-style-type: none"> Know that objects are made from materials such as wood, plastic, glass, metal, water, rock Know that materials have properties such as being hard, soft, strong, weak, absorbent, heavy, light, solid, runny, smooth and rough; these descriptions denote the properties of a material Know that materials can have useful properties for a given job (including being waterproof, strong, hard, soft, flexible, rigid, light or heavy.) Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock 	<ul style="list-style-type: none"> Know that there are three kinds of rocks: igneous, sedimentary and metamorphic Know that some crystals are extremely rare and valuable Know how fossils are formed Know that soil is made from tiny particles of rock broken down by the action of weather (weathering) 	<ul style="list-style-type: none"> Know that materials can be grouped according to whether they are solids, liquids or gases and their differences Know that materials can change state when temperature changes Know that when solid turns into liquids, this is called melting and that the reverse process is called freezing (see diagram below) Know that when liquid turns into gases, this is called evaporation and that the reverse process is called condensation (see diagram below) Know that when a solid turns into a gas without 	<ul style="list-style-type: none"> Retrieval to consolidate Year 4 States of Matter compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating 	<ul style="list-style-type: none">

			<p>is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy,</p> <ul style="list-style-type: none"> • Know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller (pre-load for Year 3 forces) • Know that applying forces to objects can change their shape, by squeezing, stretching, bending and twisting • Know that Isambard Kingdom Brunel was a famous scientist who used materials to build impressive and important things; know 		<p>passing through the liquid state, this is called sublimation (see diagram below)</p> <ul style="list-style-type: none"> • Know that the melting point of water is 0o C and that the boiling point of water is 100o C • Know that water flows around our world in a continuous process called the water cycle (see diagram below) • Know that, along with evaporation, water on the Earth's surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants • Know that rain condenses in clouds and falls to earth as rain, snow or hail in a 	<ul style="list-style-type: none"> • demonstrate that dissolving, mixing and changes of state are reversible changes • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, 	
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			<p>that he was an engineer</p> <p>Know that Brunel lived in the Victorian era and that he designed steamships, railways, bridges, tunnels and dockyards</p>		<p>process called precipitation</p>	<p>including changes associated with burning and the action of acid on bicarbonate of soda</p>	
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	<p>EYFS</p>	<p>Year 1</p>	<p>Year 2</p>	<p>Year 3</p>	<p>Year 4</p>	<p>Year 5</p>	<p>Year 6</p>
<p>Biology</p>	<p>PSED</p> <p>3-4 year olds</p> <p>Be increasingly independent in meeting their own care needs, e.g., brushing teeth, using the toilet, washing and drying their hands thoroughly. Make healthy choices about food, drink, activity and toothbrushing</p> <p>Reception:</p> <ul style="list-style-type: none"> • Manage their own needs. (Personal hygiene) • Know and talk about the different factors that support their overall health and 	<ul style="list-style-type: none"> • Know that a trout is an example of a fish; a frog is an example of an amphibian; a lizard is an example of a reptile; a robin is an example of a bird; a rabbit and a human are examples of a mammal and explore further examples of each animal type • Know that herbivorous animals eat plants; carnivorous animals eat other animals; omnivorous animals eat both animals and plants 	<ul style="list-style-type: none"> • Know that living things move, grow, consume nutrients and reproduce; that dead things use to do these things, but no longer do; and that things that never lived have never done these things. • Know that light is a form of energy • Know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals • Know that the arrows on a food chain show the direction that 	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the lifecycle of flowering plants, 	<ul style="list-style-type: none"> • Know the basic parts of the digestive systems including: Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion • Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body • Know that the process of digestion begins with food being chewed in the 	<ul style="list-style-type: none"> • Know about the lifecycle of a human being Know what the terms puberty, gestation and reproduction mean • Know the life cycle of different living things, e.g. mammal, amphibian, insect and bird • Know about the process of reproduction in plants • Know about the process of reproduction in animals 	<ul style="list-style-type: none"> • Be able to classify living things into broad groups according to observable characteristics and based on similarities and differences • Give reasons for classifying plants and animals based on specific characteristics • Give reasons for classifying plants and animals based on specific characteristics • Know about vertebrate and invertebrate animals • Know who Carl Linnaeus is • Know that Jane

	<p>wellbeing:</p> <p>ELG: Managing Self</p> <ul style="list-style-type: none"> • Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices <p>Understanding the World 3-4 year olds</p> <ul style="list-style-type: none"> • Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. <p>Reception:</p> <ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside <p>ELG: The Natural</p>	<p>(know different animals from eat category)</p> <ul style="list-style-type: none"> • Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone • Know that reptiles are different to other animals in that they breathe air and have scaly skin • Know that birds are different to other animals in that they have feathers and wings (and name some common birds) • Know that mammals are different to other animals in that they have fur/hair and they feed milk to their young • Know that feet, legs, arms, hands, torso, 	<p>the energy travels</p> <ul style="list-style-type: none"> • Know that polar bears are an example of an animal adapted to its environment - thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice • Know that woodlice live under logs - an example of a microhabitat - as they need somewhere dark and damp so that they do not dry out • Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth) • Know that plants that are deprived of light, food or air will not grow and will die. • Know that plants and animals produce 	<p>including pollination, seed formation and seed dispersal</p> <ul style="list-style-type: none"> • Know the names of the body parts associated with skeleton and muscles. • Know that the body parts have special functions • Know what joints are and how they work • Compare the diet of different groups of animals, including humans 	<p>mouth by the teeth and saliva added</p> <ul style="list-style-type: none"> • Teeth • Know that a human has three types of teeth - incisors, canines and molars - and that these each perform different functions • Know that incisors slice food, canines tear food (especially meat) and that molars grind food • Food chains start with a plants which is called a producer • Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator • Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour 		<p>Goodall is an anthropologist, most famous for her study of chimpanzees, of which she is considered the world's foremost expert</p> <ul style="list-style-type: none"> • Know that Goodall discovered that chimpanzees are much more intelligent than they had ever been thought to be • Know that Goodall is also a conservationist and environmentalist, which means she does important work to help protect the planet, in particular animal habitats • See National Geographical Association resources • Know that living things have changed over time. • Know the part fossils play in helping us understand more about living things that inhabited our Earth millions of
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	<p>World Explore the natural world around them, making observations and drawing pictures of animals and plants;</p> <ul style="list-style-type: none"> • 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>head, skin, ears, eyes, nose, mouth and tongue are parts of the body and identify them</p> <ul style="list-style-type: none"> • Know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch • Know a rose bush, a sunflower and a dandelion by sight (visit queens gardens to see plants) • Know an oak tree, a birch tree and a horse chestnut tree by sight • Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn • Know that a flowering plants consist of roots, stem, petal, leaves and flowers, and that a tree's stem is called a trunk 	<p>offspring that grow into adults.</p> <ul style="list-style-type: none"> • Know that animals, including humans, need food, water and air to survive • Know the basic food groups: fruit and vegetables, protein, dairy, fat and sugary foods • Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth. • Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables (see diagram below) • Know that fats and sugary foods should be eaten rarely and in 		<p>(e.g. herbivores, carnivores and omnivores) Know that a classification key uses questions to sort and identify different living things (see diagram below)</p> <ul style="list-style-type: none"> • Know that a classification key uses questions to sort and identify different living things (see diagram below) • Know how to use a classification key to identify living things • Know that the environment can be changed for Good • Know that some changes to the environment can be a danger to living things. 		<p>years ago</p> <ul style="list-style-type: none"> • Know that living things produce off-spring of the same kind • Know that off-spring vary and are not normally identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Know the names of key bones in the body, including the rib cage, cranium, mandible, sternum, vertebrae, femur, tibia, fibula, patella, humerus, radius and ulna; know how to label these on a diagram of the human body • Know that an adult human body has 206 bones, the longest of which is the femur • Know that the heart and lungs are
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			<p>small amounts</p> <ul style="list-style-type: none"> • Know that people need to exercise often to help their body stay strong and fit • Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy 				<p>organs protected by the ribcage and understand this as a part of the skeleton</p> <ul style="list-style-type: none"> • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and lifestyle on health • Know the ways in which nutrients and water are transported in animals, including humans • Know who William Harvey was
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	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth Science	<p>Understanding the World</p> <p>Reception:</p> <ul style="list-style-type: none"> • Understand the effect of changing seasons on the natural world 	<ul style="list-style-type: none"> • Know that the four seasons are spring, summer, autumn and winter and know the order of the cycle 				<ul style="list-style-type: none"> • Know about and explain the movement of the earth and other planets relative to the sun • Know the sun, earth and 	

	<p>around them</p> <p>ELG: The Natural World</p> <ul style="list-style-type: none"> • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> • Know that weather changes through the year, getting hotter in • the summer and colder in the winter Know that days are longer in the summer and shorter in winter and know that in different parts of the world their seasons are at different times to us. • Know that the Earth orbits the Sun with one orbit constituting a year of 365/366 days 				<p>moon are spherical bodies</p> <ul style="list-style-type: none"> • Know about and explain the movement of the moon relative to earth • Know the sun, earth and moon are spherical bodies • Know that the Earth spins around an imaginary line through its centre called an axis and that this axis is tilted relative to the Earth's orbit • Know that night and day are the result of the Earth rotating on its axis • Know that Katherine Johnson was a scientist and mathematician from America • She worked for NASA and her calculations and work were critical to the success of the first and subsequent manned space flights • She was one of the first black women to 	
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						attend an integrated university in her state, West Virginia, having been handpicked due to her ability	
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Progression of vocabulary from EYFS to Y6

		EYFS		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		FS1	FS2						
Biology	Animals including Humans	Head Eyes Nose MouthEars Hands FingersFeet Toes Arm Leg animal	HumanAnimalBirds Head Ear Eye Mouth Nose Face hair Leg Knee Arm Elbow Back Toes Hands fingers	amphibiansreptiles mammals herbivore carnivore Omnivore toes fingerstouch hearing taste chest	habitat rainforest desert species pond Indigenousproteins carbohydratesOff- spring fats nutritionhygiene	SkeletonMuscles Joint CartilageTendon Spine	Flowering plants invertebrates insects deforestation pollution Industrial waste oesophaguspancreas organ intestine molars canine	puberty gestation reproductionsembryo obese teenager	atriums cardiovascular capillaries pulse ventricles Blood vessels vertebrates invertebrates species fungi bacteriaalgae Off-spring adaptation evolution inheritance palaeontologist genotype
	Plants	Tree Leaf FlowerStem seed	Tree Trunk Branch LeavesFlowersStem Petals Fruit Roots Bulb seed	deciduous evergreen environmentblossom petals root	trunk stem blossom bulbs woodlandcrown	pollination Seed dispersal Seed formationnutrients stigma Anther			
Chemistry	Materials	MaterialsWood Glass Paper Hard soft	MaterialsWood Plastic Glass Paper Shiny Metal Rock Hard Soft Fabric Smooth ROUGH	PlasticStretchStiff Metal Liquid gas	Stretching Squashing Bending Twisting John Dunlop Charles Macintosh	sedimentary metamorphicigneous fossil crystalssoil			

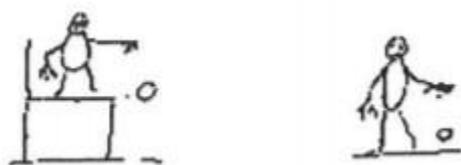
		EYFS		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		FS1	FS2						
	States of matter						evaporation condensation melting solidifying precipitation Degrees - Celsius	solubility dissolve filtering melting separating thermal	
Physics / Earth Science	Forces, Earth and Space	EarthMoonSun star	Earth Moon Planet SpaceSun star					Solar system Planet spherical Crescent moonGibbous moon Eclipse frictiongravity Air resistance Water resistancelevers pulleys	
	Sound, Light, Electricity	Loudquiet	Loud Quiet Volume sound			Reflection shadows opaque refractionconvex concave	pitch volume vibrating frequency vibrating hammer circuit conductor insulator battery cells appliance	Series circuitscells generator turbine fuses socketretina corneairis pupil lens Light wave	
	Seasonal Changes	SummerSpring AutumnWinter SeasonSun Day Dark Light NightMoon	SummerSpring AutumnWinter SeasonSun Day darkLight Night Moon	Autumn Winter Spring Summer temperature Weather symbol					

Progression in aspects of working scientifically for science

Progression in developing tables

Example: Bouncing ball investigations. Changing the height of the drop (independent variable) and measuring the height of bounce (dependent variable).

EYFS



The pupil has observed and recorded what happens when the ball is dropped from different heights.

Y1

Where we rolled it off	How high it bounced

The pupil completes a table constructed by the teacher.

Y2

Where did you drop it	How high it bounced
Top of door	5 boxes
Bookshelf	4 boxes
Bottom of window	2 boxes
Table	2 boxes

The pupil completes a table constructed by the teacher.

Y3

Where did you drop it	How high it bounced
Top of door	5 boxes
Bookshelf	4 boxes
Bottom of window	2 boxes
Table	2 boxes

The pupil constructs and completes the table.

Y4

Height that we dropped it	How high it bounced
1m	0.38m
1.25m	0.59m
1.5m	0.68m
1.75m	0.76m

The pupil constructs the table, chooses the headings and the number of tests to carry out. The teacher suggests the heights from which the ball should be dropped.

Y5

Height that we dropped it	How high it bounced
1m	0.38m
1.25m	0.59m
1.5m	0.68m
1.75m	0.76m

The pupil creates the table independently.

Y6

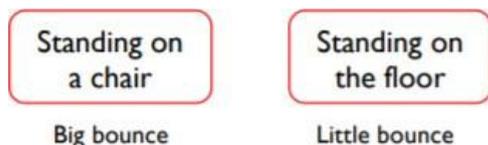
Height of drop	Height of bounce			Average
	1 st go	2 nd go	3 rd go	
1m	0.39	0.40	0.5	0.38m
1.25m	0.58	0.64	0.55	0.59m
1.50m	0.68	0.79	0.80	0.76m
1.75m	0.85	0.80	0.81	0.82m
2.000m	0.82	0.93	0.89	0.88m

The table is designed, constructed and completed independently.

Progression in constructing and using graphs and charts

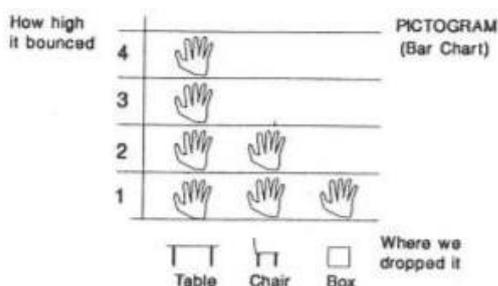
Example: Bouncing ball investigations. Changing the height of the drop (independent variable) and measuring the height of bounce (dependent variable).

EYFS



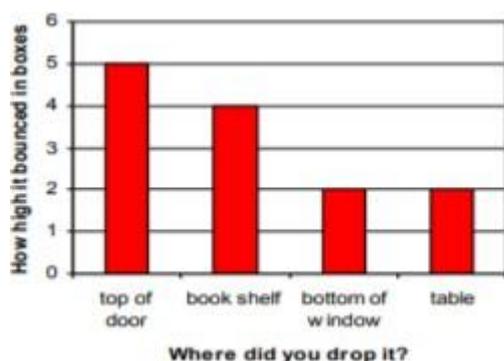
Independent and dependent variable described in words. No graph drawn.

Y1



The height of the bounce has been measured in hands having marked the spot on a wall. The chart is prepared by the teacher.

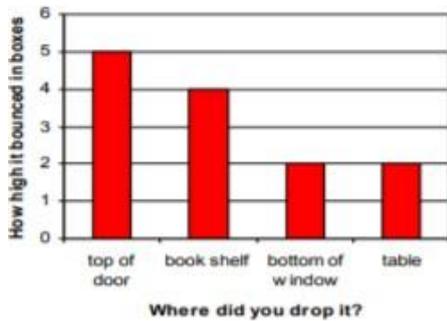
Y2



Bar Chart

The pupil completes the bar chart where the labelling of the axes, with the independent and dependent variable, is prepared by the teacher, along with the numbers on the vertical axis.

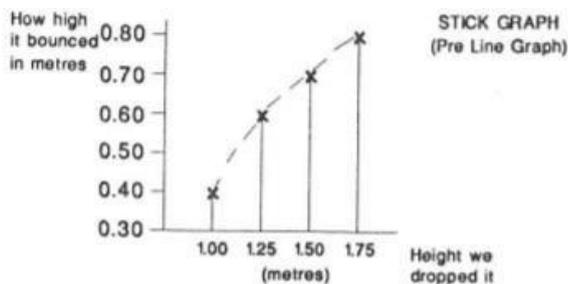
Y3



Bar Chart

The pupil constructs the bar chart.

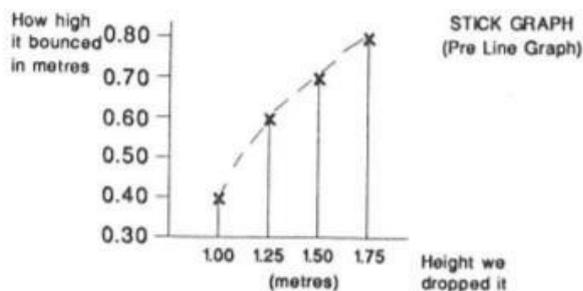
Y4



STICK GRAPH (Pre Line Graph)

The teacher helps to decide on the scales for both axes. The pupil labels the axes and draws the sticks.

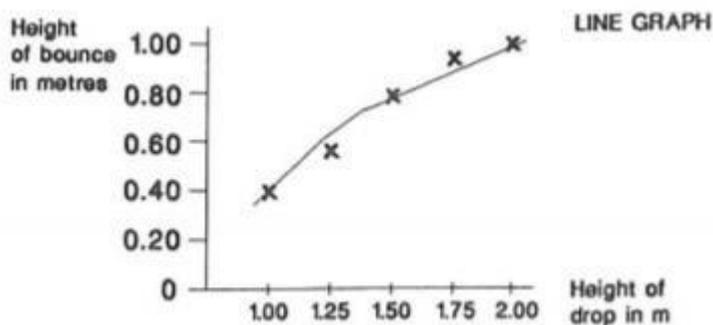
Y5



STICK GRAPH (Pre Line Graph)

The pupil creates the stick graph independently.

Y6



LINE GRAPH

Line graph completed independently, and line of best fit used to help predict the height of bounce for any drop within the range of values.

