Tuxford Primary Academy

Tuxford Primary Academy Science Curriculum Map 2023 – 2024

	Autumn	Spring	Summer
Year 1	**Chemistry:** Materials **Everyday materials** **Physics:** Earth science **Seasons**	**Physics:** Earth science **Earth and space** **Biology:** Plants **Plants**	**Biology:** Animals including humans **Body parts and senses** **Biology:** Animals including humans **Animals**
Year 2	**Chemistry:** Materials **Uses of everyday materials**	**Biology:** Plants **Plants** **Biology:** Animals including humans **Lifecycles**	**Biology:** Living things and their habitats **Living things and their habitats** **Biology:** Animals including humans **Staying healthy**
Year 3 & Year 4	**Physics:** Forces **Forces and magnets** **Chemistry:** States of matter **States of matter**	**Biology:** Animals including humans **Teeth and the digestive system** **Chemistry:** Materials **Rocks**	**Biology:** Plants **Plants** **Biology:** Animals including humans **Nutrition** **Physics:** Energy **Electricity**
Year 5	**Biology:** Animals including humans **Human development** **Biology:** Animals including humans **Circulatory system**	**Physics:** Earth science **Earth and space** **Physics:** Forces **Forces**	**Biology:** Living things and their habitats **Lifecycles and reproduction in plants and animals** **Chemistry:** Materials **Properties and changes of materials**
Year 6	**Biology:** Animals including humans **Evolution and inheritance**	**Biology:** Living things and their habitats **The natural world** **Physics:** Energy **Electricity**	**Physics:** Energy **Light and optics**

Science Curriculum Progression

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Biology: Animals including humans

Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Body Parts and senses To be able to identify the basic parts of the human body: including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth. To know that our eyes allow us to see. To know the basic parts of the eye. To know the functions of the basic parts of the eye. To know that ears allow us to hear. To know that our ears help us tell the direction sound is coming from. To know that sound is made up of vibrations. To know the 5 senses. To know that our tongue allows us to taste. To be able to describe a range of different flavours. To know why our sense of taste is important. To know that our skin helps us to feel. To know that our fingertips are sensitive to touch. To know that our sense of touch can identify different textures. To know that our nose allows us to smell. To know that we can smell many different flavours. To know that our sense of smell helps to keep us safe. **Animals** To be able to name a variety of common animals. To be able to identify the 5 groups of animals: amphibian, reptile, bird, fish, mammal	**Lifecycles** To know the basic needs of animals, including humans, for survival (water, food and air). To be able to order the stages of a human life cycle. To be able to identify each stage of a human life cycle. To be able to describe each stage of the human life cycle. To know that animals, including humans, have offspring which grow into adults. To be able to match offspring with their parents. To be able to identify features inherited from a parent. To know the lifecycle of a chicken. To know the stages of a butterfly's life. To be able to explain the life cycle of a butterfly and the process of metamorphosis. To know the stages of a frog's life cycle. To be able to describe how a frog moves between the stages in its life cycle. **Staying healthy** To know the basic needs of animals, including humans To know what humans need to survive To know the difference between basic human needs and the things humans want. To be able to name the 5 food groups. To be able to sort food into the 5 food groups. To know why the 5 food groups are important for human health. To know the importance of a balanced diet	**Nutrition** To know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat To know that there are 5 key food groups. To know how many portions of food from different food groups we should eat in a day. To know how food from each food group is essential for human growth and health. To know that food labels give information on the ingredients in food. To understand that food labels help us make healthy choices. To know that food labels give in depth information about the different food groups within a product. ***Skeleton and muscles*** *To understand that animals have different types of skeletons.* *To be able to identify which animals have an endoskeleton, exoskeleton and a hydrostatic skeleton.* *To be able to explain how animals' skeletons help them to move and survive.* *To know the functions of the human skeleton: support, protection and movement.* *To be able to identify the main bones in the human body: ulna, tibia, fibular, radius, humerus, spine, rib cage, vertebrate, skull, pelvis* *To be able to match animals to their skeletons.*	**Teeth and the digestive system** To identify the main organs of the human digestive system: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine. To be able to create an accurate diagram of the main organs of the human digestive system. To know the role of the digestive system and the organs within it. To know the functions of the organs in the digestive system. To be able to use a model of the digestive system to explain the journey of food. To know the different types of human teeth. To be able to explain the functions of the different types of human teeth. To know why humans have 2 sets of human teeth. To know how to care for our teeth. ***Food chains*** *To be able to construct and interpret a variety of food chains.* *To be identify the key parts of a food chain: producers, predators and prey* *To be able to create a food chain within a chosen ecosystem.* *To know why it is important to keep food chains balanced.* *To be able to identify threats to living things within their chosen ecosystem.*	**Human development** To be able to describe the changes as humans develop to old age. To know the key stages of a mammal's life cycle. To be able to identify developments during each stage of a life cycle. To know what gestation is. To know reasons behind extreme gestation periods. To know the stages that occur during pregnancy. To know that all children grow. To know some ways that the growth of children is measured. To know that all children go through puberty. To know the changes that take place during puberty. To know the changes experienced by boys and girls. To know some key signs of ageing in humans. To know that humans age differently depending on their lifestyle. To be able to suggest ways to stay healthy in old age. **Circulatory system** To be able to identify and name the main parts of the human circulatory system. To be able to describe the structure and function of the heart. To be able to describe how the blood moves around the heart. To be able to describe the functions of the blood vessels. To know that there is oxygenated and deoxygenated blood.	**Evolution and inheritance** To understand that living things produce offspring of the same kind, but that normally offspring vary and are not identical to their parents. To know how an animal is adapted to its environment and that adaptation may lead to evolution. To know how an animals adaptation helps it to survive in the habitat (*Darwin's finches, giraffe's neck, insulating fur on the artic fox)* To know how a plant is adapted to its environment and that adaptation may lead to evolution. To know how a plant adaptation helps it to survive in the habitat. To understand how fossils provide information about living things that are now extinct. To know about the work of Mary Anning. To be able to compare extinct animals with those that are living and identify adaptation. To know how natural selection causes living things to evolve over time. To know about the work of Charles Darwin. To know why the theory of evolution was not accepted at first. To know how humans have evolved. To be able to compare and contrast Neanderthals and homo sapiens.

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Biology: Animals including humans	**Animals contd.** To be able to describe the key characteristics of the 5 animal groups. To be able to name a variety of common birds and mammals. To be able to name a variety of common amphibians, reptiles and fish. To know that animals eat different things. To be able to group animals based on their diet. To know the difference between herbivores, carnivores and omnivore. To know that some animals are wild and some are kept as pets. To be able to describe the needs of a pet.	**Staying healthy contd.** To be able to give examples of foods that form part of a healthy diet. To know that eating pre-cooked or processed food is not always a healthy choice. To know that exercising regularly is important for our health. To know how exercise impacts our bodies.	***Skeleton and muscles contd.*** *To be able to identify how animals' skeletons have adapted to help them move in their environment.* *To be able to explain the functions of the bones within animal skeletons.* *To know that we have voluntary and involuntary muscles.* *To be able to explain how muscles work.*		**Circulatory system contd.** To be able to describe the composition of the blood. To know of the issues surrounding restricted arteries. To be able to explain the function of cells within the blood. To be able to explain how water and nutrients are transported. To be able to define osmosis and diffusion. To be able to accurately measure pulse. To know how lifestyle choices can affect health. To be able to describe the impact of drugs/alcohol on health. To be able to describe some drugs used to support the circulatory system.	

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Biology: Living things and their habitats

Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
	Living things and their habitats To know that there are things that are living, dead or have never been alive. To be able to identify and classify objects into living, dead or never been alive. To know the 7 characteristics of living things. To be able to identify which animals might live in a range of habitats. To know that most living things live in habitats to which they are suited. To know the difference between a habitat and a microhabitat. To be able to identify and name a variety of plants and animals in their habitats. To know that living things depend on each other for survival. To know that all animals need to eat to survive. What is a food chain? To know what a food chain is. To know what could affect a food chain. To know that food we eat comes from a natural source.		*Living things and their habitats* *To know that living things can be grouped in a variety of ways.* *To be able to use classification keys to help group, identify and name a variety of living things in their local and wider environment.* *To know that environments can change and that this can sometimes pose dangers to living things.* *To understand that ecosystems are affected by changes in the seasons.* *To understand that habitats around the world experience different seasons which changes their ecosystem.* *To understand that it is not just the seasons which cause ecosystems to change.* *To understand human impact on the environment through deforestation.* *To know what measures humans can take to protect the rainforests.* *To know what air pollution is.* *To know what contributes to air pollution.* *To be able to identify the impact air pollution has on the environment and human health.* *To know how water pollution is caused.* *To be able to explain the impact of different kinds of water pollution* *To be able to identify how to prevent water pollution.* *To know why it is important to conserve water.* *To be able to explain how to conserve water and the consequences of water shortages.* *To know of ways that humans can protect the environment.*	**Lifecycles and reproduction in plants and animals** To know what plants need to grow strong and healthy. To know that plants can reproduce sexually and asexually. To know that plants are living things. To know not all mammals have the same life cycle. To know the 3 types of mammal. To know what a life cycle is. To know the life cycle of an amphibian. To know the life cycle of an insect. To be able to compare the process of metamorphosis in amphibians and insects. To know key facts about the structure of an egg. To be able to describe the differences between a mammal and a bird or reptile life cycle. To know the life cycle of birds and reptiles. To be able to describe the importance of documenting living things and highlighting their decline in the world. To know about the work of David Attenborough and Jane Goodall. To know the importance of studying living organisms. To be able to suggest ideas for conservation of living things.	**The natural world** To be able to recall MRS GREN and how living organisms follow these rules. To know that living organisms can be arranged into kingdoms. To be able to give reasons for classifying plants and animals based on specific characteristics. To know about the work of Carl Linnaeus. To know how different organisms can be classified using the Linnaean system. To know that microorganisms are microscopic and cannot be seen with the naked eye. To know how micro-organisms are both helpful and harmful. To know the differences between fungi and other organisms. To know that fungi are a separate kingdom to plants.

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Biology: Plants	**Plants** To be able to identify and name a variety of common wild and garden plants. To be able to explain how to plant a seed To be able to say what is the same and what is different between 2 flowering plants. To know the parts of a plant. (leaves, flowers (blossom), petals, fruit, roots, bulb, seed, branches, stem) To know the parts of a tree. (leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches) To be able to group plants according to their features. To know that deciduous trees change throughout the year. To know how a deciduous tree changes through the year. To know that an evergreen tree stays green throughout the year. To be able to make comparisons between a deciduous tree and an evergreen tree. To know that plants are a source of food. To know that plants grow over time.	**Plants** To know the difference between a bulb and a seed. To know that plants need space, water, sunlight and a suitable temperature to grow. To know the life cycle of a plant. To be able to identify and sort plants according to their habitats. To be able to explain how plants adapt to suit their environment.	**Plants** To know 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. To be able to identify the parts of a plant: roots, stem/trunk, leaves and flowers. To be able to describe the functions of the parts of a flowering plant. To know how water is transported within plants. To be able to identify the reproductive parts in a flower. To be able to explain the functions of the reproductive parts in a flower. To know how flowering plants reproduce. To know that seed dispersal is a way in which some plants reproduce, including pollination, seed formation and seed dispersal.			

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Chemistry: States of matter				**States of matter** To know the 3 states of matter: solid, liquid, gas. To be able to describe the properties of the 3 states of matter. To be able to classify substances based on their state of matter. To know how particles behave in each state of matter. To be able to explain how substances change state. To know the temperature at which water changes state. To know what a 'melting point' means. To know what freezing and boiling point means. What is evaporation? To be able to define evaporation. To be able to define condensation. To know the stages of the water cycle. To know the importance of evaporation and condensation within the water cycle. To be able to describe the water cycle in detail.		

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Chemistry: Materials	**Everyday materials** To know that a material is To be able to identify a variety of everyday materials, (including wood, plastic, glass, metal, water, and rock / move on to explore brick, paper, fabrics, elastic, foil) To be able to describe everyday materials To know that all objects are made from materials To be able to identify what material an object is made from To know that different objects can be made from the same material To be able to describe the simple properties of everyday materials (hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent) To be able to explain why materials are chosen for particular objects To know that some materials are natural and some are manmade To be able to identify natural and manmade materials To know that natural and manmade materials are used for different purposes To know that some objects float and some objects sink To be able to predict and identify if an object will float or sink To know that some materials soak up water To know that some materials are absorbent and some are not absorbent To know that non-absorbent materials are used in objects that need to be waterproof	**Uses of everyday materials** To know what a material is. To know the properties of a variety of everyday materials. To be able to explain why some materials are suitable for specific uses. To know that some materials are stronger than others. To be able to compare the strength of different materials. To know that materials differ in strength and can be strengthened by changing their structure. To know that the shapes of objects can be changed by stretching. To be able to compare how the shapes of objects change when they are stretched. To be able to compare how some objects change after stretching while other objects return to their original form. To know that shapes of objects can be changed by twisting, bending, squashing or stretching. To be able to compare how the shapes of objects change when they are twisted, bent, squashed or stretched.	**Rocks** To know that igneous rocks come from beneath the Earth's surface. To know how igneous rocks are formed on Earth's surface. To be able to explain the difference between intrusive and extrusive igneous rock. To know the three types of rock that are formed on Earth. To be able to identify the properties of rocks by carrying out tests. To be able to explain the difference between igneous, sedimentary and metamorphic rocks. To be able to identify the different types of weathering. To be able to explain the effects weathering has on rocks. To know that water can cause rocks to erode. To be able to explain how water causes rocks to erode. To know what a fossil is. To know how a fossil is created. To know that soils are made from rocks and organic matter. To be able to name some different types of soil. To be able to describe the properties of different soils.		**Properties and changes of materials** To know that some materials will dissolve in liquid to form a solution. To be able to describe how to recover a substance from a solution. To know that there are three states of matter: solids, liquids and gases. To know how mixtures might be separated, including through filtering, sieving and evaporating. To know that evaporating, filtering, sieving, melting and dissolving are changes of state that are reversible changes. To be able to describe how the method used to reverse a physical change works. To be able to recognise that melting and dissolving are different processes. To be able to name some irreversible changes. To know why particular changes are irreversible and what new products have been made. To know that rusting is an irreversible change. To know why rusting is a problem and how to prevent it. To know the 3 factors a fire needs to burn. To know what the fire triangle is. To be able to describe and explain different methods for extinguishing a fire. To know that burning is an irreversible change. To be able to apply knowledge of the fire triangle to alternative extinguishing methods. How do chemists create new materials? E.g. Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.	

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
Physics: Earth science	**Seasons** To know that there are 4 seasons. To be able to name the 4 seasons. To know that autumn is a season. To know the different weather that happens in autumn. To know that the days get shorter in autumn. To know that winter is a season. To know the different weather that happens in winter. To know that the days are short in winter. To know that spring is a season. To know the different weather that happens in spring. To be able to make comparisons between the different seasons. To know the different weather that happens in summer. To know that summer is a season. To know the different weather that happens in summer.				**Earth and space** To know the key characteristics of a planet To know the order of the planets from the Sun. To know that the sun is a star at the centre of our solar system. To know that our solar system has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). To be able to describe the Sun, Earth, moon and other celestial bodies as spheres. To know the differences between a heliocentric and geocentric model of the solar system To know that attitudes and knowledge about the solar system has changed over time. To know the geocentric model of the solar system gave way to the heliocentric model. To know about the work of the scientists Ptolemy, Alhazen and Copernicus. To know how Earth moves in space. To know how the Sun transitions across the sky. To know how night and day happen. To know that time can be different in various parts of the world To know how time can be recorded using a 'solar clock'. To be able to describe how the Earth and Moon move relative to the Sun. To be able to describe the movement of the Moon relative to the Earth. To be able to explain that the Moon orbits the Earth, not the Sun.	

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
P Physics: Forces			**Forces and magnets** To be able to identify different types of forces. To be able to identify different types of forces and describe the effect they have on an object. To be able to identify different types of forces and explain how they impact the movement of an object. To be able to compare how things move on different surfaces. To know why some surfaces slow objects down. To know how friction can be increased or decreased. attract and repel? To know that magnets have two poles. To be able to predict whether 2 magnets will attract or repel each other, depending on which poles are facing. To be able to name some different types of magnet. To know some everyday uses for magnets. To know how magnetic materials behave To be able to identify a range of materials which are magnetic. To know that magnetic forces can act at a distance. To know how magnetic forces act at a distance. To know what a compass is. To know the four main compass points. To be able to explain how a compass works.		**Forces** To know about the life and work of Isaac Newton. To know about the life and work of Galileo Galilei. To know the influence gravity has on the universe. To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. To investigate the relationship between mass and gravity. To know how air resistance acts on objects. To know how water resistance acts on objects. To be able to describe the forces acting on an object floating in water. To be able to identify the similarities and differences between air and water resistance. To know how friction acts on objects. To be able to accurately use a Newton meter to measure a force. To be able to describe ways of changing the size of a frictional force. To be able to explain how gears, levers and pulleys work.	

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hysics: Energy	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
			Light *To be able to identify light sources.* *To know the difference between natural and artificial sources of light.* *To be able to explain why certain objects are sources of light and why others are not.* *To know that sunlight can damage our skin and our eyes.* *To be able to explain the effectiveness of suncream as protection against the sunlight* *To know that some objects are a light source and some are reflectors.* *To know which materials are good reflectors.* *To be able to explain why some materials are better reflectors than others.* *To know that shadows are formed when the light from a light source is blocked by an opaque object.* *To understand that shadows change throughout the day* *To be able to explain how and why shadows change throughout the day* *To know that we need light in order to see things and that dark is the absence of light.* *To know that the size and shape of a shadow can change.* *To know how to change the size and shape of a shadow.* *To be able to explain why the size and shape of a shadow can change*	***Sound*** *To know that sound is created by vibrations.* *To be able to explain how sound is created and how it travels from an object to the ear.* *To know how sound is created, travels and is interpreted by the brain.* *To know that sounds can travel through air, liquids and solids.* *To be able to explain how sound waves travel through air, liquids and solids.* *To be able to compare how sound waves travel through air, liquids and solids.* *To know that some materials absorb sound and some materials reflect sound.* *To know that materials that absorb sound are sound insulators.* *To know why some materials absorb sound.* *To know that the volume of sound is measured in decibels.* *To know that the volume of a sound is dependent on how much energy or power the sound source is given.* *To know that the volume of sound increases so too does the amplitude, or height, of the sound waves.* *To know that pitch is how low or high a sound is.* *To know that pitch is caused by the speed of the sound source's vibrations.* *To know how a sound wave is different for a high pitch and a low pitch.* *To know that sound fades as it travels.* *To know why sound fades as it travels.* *To be able to explain the relationship between distance and volume.*		**Electricity** To know the parts of an electric circuit *(lamp, buzzer, cells, switches, bulb, motor)* To know there are recognised symbols to represent a simple circuit diagram. To know that batteries are a store of energy. (*The energy pushes electricity around the circuit, When the battery's energy is gone it stops pushing.)* To know that Voltage measures the 'push' of energy around the circuit. To know how the brightness of a bulb is affected by the voltage / number of cells in the circuit. To be able to explain how to fix issues in a circuit. To know which materials are electrical conductors and insulators. **Light and optics** To know that light travels in straight lines. To know that light is reflected off surfaces so that we can see it. To know how to create a shadow. To know that shadows change length depending on how far away they are from a light source. To know what refraction is. To know what reflection is. To know what happens when light is refracted. To understand how our eyes respond to light. To know the names and role of parts of the eye – cornea, iris, lens, retina, pupil, optic nerve To know the meaning of the terms far sighted and near sighted.

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	Year 1	Year 2	Year 3 & Year 4		Year 5	Year 6
				Electricity To be able to Identify common appliances that run on electricity. To understand the dangers of using electrical appliances. To know how to keep safe when using electrical appliances. To be able to identify electrical components: cells, wires, bulbs, switches and buzzers. To be able to create a simple electrical circuit. To be able to explain how a simple electrical circuit works. To be able to predict if a simple electrical circuit will work. To know the difference between a complete and an incomplete circuit. To know the difference between an insulator and a conductor. To be able to recognise some common conductors and insulators. To know how a switch works. To be able to explain how an electrical switch works. To be able to apply knowledge of how a switch works to create a switch.		

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Classifying	**Ask scientific questions:** Be able to ask a Yes/No questions to aid sorting **Plan an enquiry:** Identify the headings for the two groups (it is …., it is not ….) **Observe closely:** Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc. **Present results:** Sort objects and living things into two group using a basic Venn diagram or simple table **Interpret results:** Talk about the number of objects in each group i.e. which has more or less.	**Ask scientific questions:** Be able to ask a Yes/No questions to aid sorting **Plan an enquiry:** Identify the headings for the two groups (it is …., it is not ….) **Observe closely:** Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc. **Present results:** Sort objects and living things into two group using a basic Venn diagram or simple table **Interpret results:** Talk about the number of objects in each group i.e. which has more or less.	**Ask scientific questions:** Be able to ask a range of yes/no questions to aid sorting **Plan an enquiry:** Be able to put appropriate headings onto intersecting Venn and Carroll diagrams **Observe closely:** Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams **Present results:** Sort objects and living things into groups using intersecting Venn and Carroll diagrams **Interpret results:** Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs **Draw conclusions:** Draw simple conclusions when appropriate for patterns e.g. a flying insect with no legs might always crash land **Evaluate an enquiry:** Suggest improvement e.g. a wider range of objects – only looked a British trees. Suggest new questions arising from the investigation.	**Ask scientific questions:** Be able to ask a range of yes/no questions to aid sorting **Plan an enquiry:** Be able to put appropriate headings onto intersecting Venn and Carroll diagrams **Observe closely:** Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams **Present results:** Sort objects and living things into groups using intersecting Venn and Carroll diagrams **Interpret results:** Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs **Draw conclusions:** Draw simple conclusions when appropriate for patterns e.g. a flying insect with no legs might always crash land **Evaluate an enquiry:** Suggest improvement e.g. a wider range of objects – only looked a British trees. Suggest new questions arising from the investigation.	**Ask scientific questions:** Be able to ask a range of yes/no questions to aid sorting and decide which ways of sorting will give useful information **Plan an enquiry:** Identify specific clear questions that will help to sort without ambiguity **Observe closely:** Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry **Present results:** Create branching databases (tree diagrams) and keys to enable others to name livings things and objects **Interpret results:** Be able to talk about the features that objects and living things share and do not share based on the information in the key etc **Draw conclusions:** Be able to use data to show that livings things and materials that are grouped together have more things in common than with things in other groups **Evaluate an enquiry:** Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for	**Ask scientific questions:** Be able to ask a range of yes/no questions to aid sorting and decide which ways of sorting will give useful information **Plan an enquiry:** Identify specific clear questions that will help to sort without ambiguity **Observe closely:** Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry **Present results:** Create branching databases (tree diagrams) and keys to enable others to name livings things and objects **Interpret results:** Be able to talk about the features that objects and living things share and do not share based on the information in the key etc **Draw conclusions:** Be able to use data to show that livings things and materials that are grouped together have more things in common than with things in other groups **Evaluate an enquiry:** Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for

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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Observing over time	**Ask scientific questions:** Ask a question about what might happen in the future based on an observation **Plan an enquiry:** Choose equipment to use, decide what to do and what to observe or measure in order to answer the question **Observe closely:** Make observations linked to answering the question **Take measurements:** When appropriate, measure using standard units where all the numbers are marked on the scale **Gather / record results:** Record data in simple prepared tables, pictorially or by taking photographs **Present results:** Present what they learnt verbally or using pictures **Interpret results:** Answer their question in simple sentences using their observations or measurements	**Ask scientific questions:** Ask a question about what might happen in the future based on an observation **Plan an enquiry:** Choose equipment to use, decide what to do and what to observe or measure in order to answer the question **Observe closely:** Make observations linked to answering the question **Take measurements:** When appropriate, measure using standard units where all the numbers are marked on the scale **Gather / record results:** Record data in simple prepared tables, pictorially or by taking photographs **Present results:** Present what they learnt verbally or using pictures **Interpret results:** Answer their question in simple sentences using their observations or measurements	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to measure or observe. Decide how often to take a measurement **Observe closely:** Make a range of relevant observations **Take measurements:** Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time **Gather / record results:** Prepare own tables to record data **Present results:** Present data in time graphs **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to measure or observe. Decide how often to take a measurement **Observe closely:** Make a range of relevant observations **Take measurements:** Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time **Gather / record results:** Prepare own tables to record data **Present results:** Present data in time graphs **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data **Present results:** Choose an appropriate form of presentation including line graphs **Interpret results:** Be able to answer their questions, describing the change over time **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data **Present results:** Choose an appropriate form of presentation including line graphs **Interpret results:** Be able to answer their questions, describing the change over time **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results

Science Curriculum Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Pattern seeking	**Ask scientific questions:** Ask a question that is looking for a pattern based on observations **Gather / record results:** Record data in simple, prepared tables and tally charts **Present results:** Present what they learnt verbally	**Ask scientific questions:** Ask a question that is looking for a pattern based on observations **Gather / record results:** Record data in simple, prepared tables and tally charts **Present results:** Present	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to measure or observe **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units where not all the numbers are marked on the scale. **Gather / record results:** Prepare own tables to record data **Present results:** Use ICT package to present data as a scattergram **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to measure or observe **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units where not all the numbers are marked on the scale. **Gather / record results:** Prepare own tables to record data **Present results:** Use ICT package to present data as a scattergram **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data **Present results:** Choose an appropriate form of presentation including scatter graphs **Interpret results:** Be able to answer their questions identifying patterns **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data **Present results:** Choose an appropriate form of presentation including scatter graphs **Interpret results:** Be able to answer their questions identifying patterns **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results

Science Curriculum Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Comparative / Fair testing	**Ask scientific questions:** Identify the question to investigate from a scenario or choose a question from a range provided **Plan an enquiry:** Choose equipment to use, decide what to do and what to observe or measure in order to answer the question **Observe closely:** Make observations linked to answering the question **Take measurements:** When appropriate, measure using standard units where all the numbers are marked on the scale **Gather / record results:** Record data in simple prepared tables, pictorially or by taking photographs **Present results:** Present what they learnt verbally, using pictures or block diagrams **Interpret results:** Answer their question in simple sentences using their observations or measurements	**Ask scientific questions:** Identify the question to investigate from a scenario or choose a question from a range provided **Plan an enquiry:** Choose equipment to use, decide what to do and what to observe or measure in order to answer the question **Observe closely:** Make observations linked to answering the question **Take measurements:** When appropriate, measure using standard units where all the numbers are marked on the scale **Gather / record results:** Record data in simple prepared tables, pictorially or by taking photographs **Present results:** Present what they learnt verbally, using pictures or block diagrams **Interpret results:** Answer their question in simple sentences using their observations or measurements	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to change and what to measure or observe **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units where not all the numbers are marked on the scale, take repeat readings where necessary **Gather / record results:** Prepare own tables to record data **Present results:** Present data in bar charts **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Decide what to change and what to measure or observe **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units where not all the numbers are marked on the scale, take repeat readings where necessary **Gather / record results:** Prepare own tables to record data **Present results:** Present data in bar charts **Interpret results:** Refer directly to their evidence when answering their question **Draw conclusions:** Where appropriate provide oral or written explanations for their findings **Make a prediction:** Use results from an investigation to make a prediction about a further result **Evaluate an enquiry:** Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data, including columns for taking repeat readings **Present results:** Choose an appropriate form of presentation including line graphs **Interpret results:** Be able to answer their question, describing causal relationships **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results	**Ask scientific questions:** Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results **Plan an enquiry:** Recognise and control variables where necessary. **Observe closely:** Make observations linked to answering the question **Take measurements:** Measure using standard units using equipment that has scales involving decimals **Gather / record results:** Prepare own tables to record data, including columns for taking repeat readings **Present results:** Choose an appropriate form of presentation including line graphs **Interpret results:** Be able to answer their question, describing causal relationships **Draw conclusions:** Provide oral or written explanations for their findings **Make a prediction:** Use test results to make predictions for further investigations **Evaluate an enquiry:** Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results

Science Curriculum Progression

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Researching	**Ask scientific questions:** Ask one or two simple questions linked to a topic **Present results:** Present what they have learnt verbally or using pictures **Interpret results:** Be able to answer their questions using simple sentences	**Ask scientific questions:** Ask one or two simple questions linked to a topic **Present results:** Present what they have learnt verbally or using pictures **Interpret results:** Be able to answer their questions using simple sentences	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Choose a source from a range provided **Present results:** Present what they learnt verbally or using labelled diagrams **Interpret results:** Be able to answer their questions using simple scientific language **Evaluate an enquiry:** Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions linked to a topic **Plan an enquiry:** Choose a source from a range provided **Present results:** Present what they learnt verbally or using labelled diagrams **Interpret results:** Be able to answer their questions using simple scientific language **Evaluate an enquiry:** Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.	**Ask scientific questions:** Ask a range of questions recognising that some can be answered through research and others may not **Plan an enquiry:** Choose suitable sources to use **Present results:** Present what they learnt in a range of ways e.g. different graphic organisers **Interpret results:** Be able to answer their questions using scientific evidence gained from a range of sources **Evaluate an enquiry:** Be able to talk about their degree of trust in the sources they used	**Ask scientific questions:** Ask a range of questions recognising that some can be answered through research and others may not **Plan an enquiry:** Choose suitable sources to use **Present results:** Present what they learnt in a range of ways e.g. different graphic organisers **Interpret results:** Be able to answer their questions using scientific evidence gained from a range of sources **Evaluate an enquiry:** Be able to talk about their degree of trust in the sources they used

Science Long Term Plan 2023-2024

	Autumn	Spring	Summer
Year 1	**Chemistry:** Materials **Everyday materials** What is a material? **What type of material is this...?** (including wood, plastic, glass, metal, water, and rock / move on to explore brick, paper, fabrics, elastic, foil) How would you describe this material? What material is this object made from? **What are the properties of this material?** (hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent) **Why might this material have been chosen to make this object?** **What are natural materials?** **What are manmade materials?** Is this material natural or manmade? Will this object float or sink? **What are absorbent materials? What are non-absorbent materials?** ***Classifying:** Classify objects made from the same material (e.g. lots of things made from plastic). -Classify one object made from different materials (e.g. cups made of different materials). ***Comparative / Fair testing:** Test objects made of different materials to see how effective they are e.g. umbrellas/hats/coats for waterproofness, cloths/nappies for absorbency, picnic plates for stiffness. -Answer questions such as: 'What is the best material for an umbrella? ... for lining a dog basket? ... for curtains?	**Physics:** Earth science **Earth and space** To know about the moon: phases of the moon (full, half, crescent, new) To know that the sun is a source of energy, light, heat To know about the eight planets To know about stars and constellations: the Plough To know about Earth and its place in the solar system To understand that Earth moves around the Sun; the sun does not move To understand the Earth revolves (spins); one revolution takes one day (24 hours), To understand why the sun rises and sets and how it happens at different times round the world - (Sunrise and sunset, When it is day where you are, it is night for people on the opposite side of the Earth) **Biology:** Plants **Plants** What is this variety of plant? **How do you plant a seed?** What is the same and different between these 2 flowering plants? **What are the names of the different parts of this plant?** **What are the names of the parts of a tree?** How could we group these plants according to their features? **What is a deciduous tree? How does a deciduous tree change through the year?** **What is an evergreen tree?** How are plants a source of food? ***Classifying:** Allow children to classify leaves, flowers, and seeds, choosing their own criteria. Observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants. ***Observing over time:** Observe a tree through the year. -Observe the growth of flowers and vegetables that they have planted. ***Pattern seeking:** Based on observations, encourage children to identify patterns e.g. after comparing the size of leaves on different plants, children may suggest "bigger plants have bigger leaves." ***Researching:** Use secondary sources to name plants (including trees) based on observations of leaves, seeds, flowers, buds, and bark (Leafsnap UK on Apple App Store, SEEK INaturalist on google play and Apple App Store, textbooks, Woodland Trust resources).	**Biology:** Animals including humans **Body parts and senses** **What is the name of this body part? Where is our ...?** (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, skeleton.) What do our eyes do? What are the names of the different parts of the eye? (eye, Pupil, eyelash, eyelid) What does this part of the eye do? What do our ears do? **What is sound made up of?** **What are the 5 senses?** Which sense does our tongue have? Why is our sense of taste important? What sense does our skin have? What sense does our nose have? How does our sense of smell help to keep us safe? ***Pattern seeking:** Generate questions for investigation such as: Do people with longer arms have longer legs? Can more people identify prawn cocktail crisps than cheese and onion? ***Comparative / Fair testing:** Can I taste the difference between different flavoured crisps/skittles/smarties? **Biology:** Animals including humans **Animals** What is the name of this animal? **What are the 5 different groups of animals?** What type of animal is this? **How do we know this is a - amphibian, reptile, bird, fish, mammal?** What does this animal eat? **What is a herbivore / carnivore / omnivore?** What would a pet need? ***Classifying:** Classify animals they have seen/have first-hand experience of, choosing their own criteria to do so. -Classify animals based on physical structure. -Classify animals they have first-hand experience of based on what they eat. ***Observing over time:** Observe animals in the local environment throughout the year. ***Pattern seeking:** Generate questions for investigation such as: Do all animals with ..... have .....?

Science Long Term Plan 2023-2024

	Autumn	Spring	Summer
Year 1	**Physics:** Earth science **Seasons** **How many seasons are there?** **What are the 4 seasons?** **What is the weather like in autumn?** What happens to the days in autumn? **What is the weather like in winter?** **What are the days like in winter?** **What is the weather like in spring?** **What is the weather like in summer?** ***Observing over time:** Take weather measurements and make observations over time. -Record/Photograph what children are wearing (jumper, coat, hats, scarves, etc.) -Make observations of daylight hours e.g. a diary of when it gets dark / activities undertaken in the different seasons. ***Pattern seeking:** At the end of the year, look for patterns in evidence e.g. Does it rain more in spring? Do we have more sunny days in the summer? Which was the coldest month?		
	Working Scientifically Vocabulary: Investigation, aim, method, results, conclusion, measure, observe, record, accurate, data, predict, scientist, prepare, describe, identify, classify, group, question, record		
	Materials: Vocabulary Material, wood, metal, fabric, plastic, object, brick, glass, elastic, property, opaque, stiff, dull, transparent, rubber, polyester, factory, manmade, natural, submerge, float, predict, buoyant, sink, umbrella, waterproof, sponge, absorbent, soak **Seasons: Vocabulary** season, summer, spring, autumn, harvest, autumn, hibernate, protect, winter, weather, sleet, temperature, frost, chick, grow, spring, changes, compare, heatwave, warm, sun protection, rainfall	**Plants: Vocabulary** plant, tree, seed, oak, flower, blossom, root, leaf, petal, stem, weed, daisy, dandelion, wild, buttercup, evergreen, deciduous, seasons, bush, branch, vegetable, farm, tractor, supermarket, fruit, observe, adult plant, seedling, young plant, growth, bulb, branches, trunk, daffodil	**Body parts and senses: Vocabulary** body, joint, skeleton, limb, head, eye, pupil, eyelash, eyelid, Sight, brain, vibration, ear, deafness, sound, sign language, sweet, flavour, mouth, taste, tongue, touch, brain, skin, fingertips, organ, odour, smell, nose, nose hair, nostrils **Animals: Vocabulary** amphibian, reptile, bird, fish, mammal, hatchling, feather, backbone, characteristic, warm-blooded, reptile, scale, amphibian, gill, cold-blooded, carnivore, omnivore, predator, canine, herbivore, natural, wild, shelter, pet, veterinary, climate, similarities, differences, unsuitable, compare

Science Long Term Plan 2023-2024

	Autumn	Spring	Summer
Year 2	**Chemistry:** Materials **Uses of everyday materials** **What is a material?** **What are the properties of this material?** Why is this material suitable for this use? Which is the strongest / weakest material? How can we change the shape of this object? **Will this object return to its original form?** **What happens if we heat this material?** ***Classifying:*** Based on the children's own criteria, classify materials e.g. samples of wood, metal, plastic, etc. ***Comparative / Fair Testing:*** Test materials for different uses e.g. Which material can you use to make an aeroplane? Which fabric would you use for curtains? ***Researching:*** Find out about people who have developed useful new materials, - Charles Macintosh /John McAdam.	**Biology:** Plants **Plants** **What is the difference between a bulb and a seed?** **What do plants need to grow?** **What is the lifecycle of a plant?** What is this plant? Where might this plant's habitat be? How have plants adapted to suit their environment? ***Classifying:*** Based on the children's own criteria: -classify seeds / bulbs -plants found in the local area ***Observing over time:*** Plant seeds and bulbs and observe how they grow into mature plants. ***Pattern seeking:*** Generate questions for investigation such as: Do big seeds germinate more quickly? Does it matter which way round you plant a bulb or seed? ***Researching***: Look at packets to decide how to plant and care for seeds e.g. How much water do they need? Do they need shade/full sun? *Note: seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.* **Biology:** Animals including humans **Lifecycles** **What are the basic needs that all animals and humans need to survive?** **What is the lifecycle of a human?** **What do we mean by offspring?** Which offspring comes from which parent? What features has the offspring inherited from their parents? What is the lifecycle of a chicken? What are the stages in a butterfly life cycle? **What is metamorphosis?** What are the stages in a frog's lifecycle? ***Classifying:*** Based on the children's own criteria, classify animals. ***Observing over time:*** Observe a life cycle (e.g. caterpillars, chicks, farm animals). ***Researching:*** Research adult animals and their young e.g. googling pictures and names of animal babies – swan and cygnet.	**Biology:** Living things and their habitats **Living things and their habitats** Is this living, dead or has never been alive? **What is a habitat?** **What is a microhabitat?** **Which animals might live in this habitat?** What is the name of this plant / animal? (To be able to identify and name a variety of plants and animals in their habitats.) **What is a food chain?** Which foods come from a natural source? ***Classifying:*** Find things that are living / dead / have never been alive. -Classify things found in the environment (choosing their own criteria to do so), leading to living, dead and never been alive. -Classify minibeasts found in the environment based on physical structure. ***Observing over time:*** Explore animals in micro-habitats throughout the year (under a rock, under a log, in a pond, in a bush, in the long grass). -Explore plants in micro-habitats throughout the year (e.g. woodland area, ponds, meadows). ***Pattern seeking:*** Generate questions for investigation such as: Are there more daisies in the meadow or on the field? Where do you see more ivy? Where do you see more butterflies? ***Researching:*** Use secondary sources to name plants and animals seen in the local environment that they may not currently be able to name (Leafsnap UK APP, SEEK INaturalist APP, textbooks, Woodland Trust resources). -Research what animals they have first-hand experience of eat.

Science Long Term Plan 2023-2024

	Autumn	Spring	Summer
			Biology: Animals including humans **Staying healthy** What do humans need to survive? What is the difference between basic human needs and things humans want? **What are the 5 food groups?** Which food group does this food belong to? **Why is having a balanced diet important?** Which foods are part of a healthy diet? **Why is exercising regularly important for our health?** **How does exercise impact our body?** **Why is maintaining good hygiene important?** What would be a good hygiene routine? ***Observing over time:** Observe how their body changes during/after exercise.
	Working Scientifically Vocabulary: Investigation, aim, method, results, conclusion, measure, observe, record, accurate, data, predict, scientist, prepare, describe, identify, classify, group, question, record, compare, contrast		
	Uses of everyday materials: Vocabulary brick, material, suitable, property, object, bridge, structure, obstacle, triangle, construction, elastic, hinder, floppy, stretchy, limit, bend, waterproof, protective, fluorescent, safety, mackintosh, twist, stretch, force, squash, bound, highway, road	**Plants: Vocabulary** bulb, seed, growth, plant, pollination, germination, life cycle, reproduction, seedling, carbon dioxide, photosynthesis, glucose, oxygen, energy, crop thrive, healthy, insulate, manure, forest, desert, survive, adapt, condition **Lifecycles: Vocabulary** Grow, survive, adult, independent, life cycle, helpless, toddler, womb, develop, foetus, inherit, differences, offspring, resemble, gene, reproduction, chick, hatchling, transformation, chrysalis, caterpillar, metamorphosis, larva, frog, amphibian, froglet, frogspawn, tadpole	**Living things and their habitats: Vocabulary** Excrete, nutrition, reproduce, respire, senses, fungi, microhabitat, habitat, survive, shelter, colony, condition, insect, antennae, suitable, omnivore, herbivore, producer, Consumer, carnivore, nutrient, food chain, rot, refrigerated lorry, forklift truck, automated, frozen food, canned **Staying healthy: Vocabulary** Essential, oxygen, nutrition, survival, shelter, vital, healthy, survive, grow, non-essential, carbohydrate, calcium, dairy, protein, vitamins, fresh food, pre-cooked food, processed, food, nutrients, balanced diet, strength, exercise, coordination, flexibility, balance, bacteria, prevent, germs Virus, hygiene

Science Long Term Plan 2023-2024

	Autumn	Spring	Summer
Year 3 & Year 4	**Physics:** Forces **Forces and magnets** What forces are acting on this object? How does this force impact the movement of this object? Why do some surfaces slow objects down? **What is friction?** **How can friction be increased or decreased?** **What do we mean when we say magnets attract and repel?** Will these magnets attract or repel each other? What types of magnets do you know of? How can magnets be used? Which materials are magnetic? How do magnetic forces act at a distance? **What is a compass? How does it work?** **What are the four compass points?** ***Classifying:** Based on the children's own criteria: -sort materials (leading towards metal/non-metal and magnetic/not magnetic) -sort toys (leading to what makes them move e.g. push/pull). ***Comparative / Fair testing:** Test how objects move on different surfaces e.g. cars, spinning tops, wind-up/clockwork toys. -Test the strength of different magnets. ***Researching:** Find out how magnets are used in everyday life. ***Observing:** how magnetic forces act at a distance -observe how magnets attract or repel each other and attract some materials and not others **Chemistry:** States of matter **States of matter** **What are the 3 states of matter?** **What are the properties of the 3 states of matter?** Is this a solid, liquid or gas? **How do particles behave in each state of matter?** How can substances change state? At what temperature does water change state? What do we mean by 'melting point'? What do we mean by 'freezing point' and 'boiling point'? What is evaporation? What is condensation? What are the stages of the water cycle? **Why is evaporation and condensation important to the water cycle?** **What happens within the water cycle?** ***Classifying:** Based on the children's own criteria:	**Biology:** Animals including humans **Teeth and the digestive system** **What are main organs of the human digestive system?** **What is the role of the digestive system?** **What do each of the organs in the digestive system do?** What happens to our food after we put it into our mouths? **What are the different types of human teeth?** **What do the different human teeth do?** Why do humans have two sets of teeth? How should we care for our teeth? ***Comparative/ Fair testing:** What effect do different liquids have on teeth? ***Classifying:** Compare and contrast different types of teeth (linking to simple functions). -Classify jaw bones/teeth to aid with making food chains e.g. recognise what eats plants and what eats animals by looking at their teeth. ***Researching:** Research the different parts of the digestive system. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.) Find out what damages teeth and how to look after them. **Chemistry:** Materials **Rocks** Where does igneous rock come from? What is the difference between intrusive and extrusive igneous rock? What are the three types of rock that are formed on Earth? **What are the properties of these rocks?** **What is the difference between igneous, sedimentary and metamorphic rocks?** What different types of weathering are there? **What effects can weathering have on rocks?** How does water cause rocks to erode? **What is a fossil?** **How is a fossil created?** What is soil made from? What different types of soil are there? What are the properties of these different types of soil? ***Classifying:** Based on the children's own criteria, classify rocks. -look at different soils and discuss how they are similar/different. -compare and group together different kinds of rocks on the basis of their appearance and simple physical properties - whether they have grains or crystals, and whether they have fossils in them.	**Biology:** Plants **Plants** **What do plants need to live and grow?** **What are the key parts of a plant?** **What is the function of each of these parts?** **How is water transported within a plant?** What are the reproductive parts in a flower? What are the functions of the reproductive parts in a flower? How do flowers reproduce? **What is seed dispersal?** ***Classifying:** Classify flowers based on the children's own criteria. (This does not meet the curriculum objectives for this topic, but it is a good opening activity to assess prior knowledge.) ***Observing over time:** Observe white carnations (freshly cut) in coloured water. -Gather seeds and photographic evidence of blossoms/flowers and berries on a particular trail throughout the year. ***Pattern seeking:** Investigate what happens to plants when conditions are changed e.g. more/less light/water, change in temperature, nutrients (Baby Bio vs other brands). ***Researching:** Research the functions of the parts of flowering plants. / Research different methods of seed dispersal. / Research different methods of pollination. *Note: pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.* **Biology:** Animals including humans **Nutrition** Where do animals and human get their nutrition from? **What are the 5 key food groups?** How many portions of food from different food groups should we eat in a day? **How is food from each food group essential for human growth and health?** What do food labels tell us? How do food labels help us to make healthy choices? ***Classifying:** Based on the children's own criteria: -classify food items (leading to sorting by nutrients) ***Pattern seeking:** Children generate questions for investigation such as: -Do 'healthy' drinks have less sugar? -Does brown bread have more fibre?

	-classify solids (including grains, crystals, powders: physical properties) -classify liquids ***Observing over time:** Watch ice melt (ice hands). -Watch hand prints dry e.g. water hand prints on coloured paper towel. ***Comparative/ Fair testing:** What affects the melting rate of chocolate (size of pieces, temperature of water, type of chocolate)? -What affects the rate an 'ice pole' melts? -What affects the rate of evaporation? ***Researching:** Research the melting point of metals. -Research the water cycle. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)	***Observing over time:** Observe how soil separates into different layers in water ***Comparative / Fair testing:** Test the hardness of different rocks / Test what happens when rocks are put in water / Test how quickly water runs through different types of soil. ***Researching:** Research how fossils are formed.	***Researching:** Look at food packaging to identify the amount of nutrients in different food items. / Research which types of food contain which nutrients. ***Application:** Design meals based on what they find out. **Physics:** Energy **Electricity** Which common appliances use electricity? **What are some of the dangers of using electrical appliances?** **How can we use them safely?** **What are the main components of an electrical circuit?** How does a simple electrical circuit work? Will this circuit work? What makes you think that? **What is an electrical insulator? What is an electrical conductor?** **Which common items are conductors / insulators?** How does a switch work? ***Classifying**: Based on the children's own criteria, classify household appliances and/or toys (leading to electrical/not electrical, batteries/mains). -Test materials to classify into insulators and conductors. ***Pattern seeking:** Observe patterns, for example, that bulbs get brighter if more cells are added -that metals tend to be conductors of electricity ***Application:** Use their circuits to create simple devices. *Note: pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage.* *Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6.*
	Forces and magnets: Vocabulary Friction, air resistance, non-contact forces Force, contact force, motion, texture, resistance, tilt, surface, repel, magnet, horseshoe magnet, attract, bar magnet, iron, magnetic field, steel, magnetism, magnetic, non-magnetic materials, attract, magnetism, recycle, non-contact forces, magnetic north, magnetic needle, compass, direction, orienteering **States of matter: Vocabulary** Gas, matter, liquid, volume, solid, particle, arranged, bond Heated, cooled, particle, melting, melting point, temperature, thermometer, reverse, sublimation, deposition Freezing, boiling, condensation, water vapour, process Absorb, evaporation, water cycle, precipitation, transpiration, surface run off , groundwater	**Teeth and the digestive system: Vocabulary** small intestine, digestive system, stomach, large intestine, oesophagus, liver, peristalsis, gall bladder, absorb, saliva jaw, gum, molars, canines, incisors, plaque, enamel, tooth decay, cavity, fluoride **Rocks: Vocabulary** extrusive igneous rock, igneous rocks, intrusive igneous rock, magma, crystals, sandstone, marble, metamorphic rock, limestone, sedimentary rock, chemical weathering, weathering, physical weathering, acid rain, biological weathering, texture, erosion, receding, appearance, submerged, sediment, amber, embedded, fossil, extinct fragments, decompose, clay soil, sandy soil, chalky soil	**Plants: Vocabulary** Potassium, fertiliser, nutrients, nursery, stunted, chlorophyll, photosynthesis, UV light, xylem, stomata, transpiration, phloem, absorb, anther, stigma, filament, reproduction, style, pollen, nectar, pollination, pollinator, seed dispersal, vulnerable, anchor, germination, sapling, formation **Nutrition: Vocabulary** carbohydrate, vitamin, mineral, nutrition, protein, energy, nutrition label, portion, diet, balanced, diary, fats **Electricity: Vocabulary** Electricity, mains electricity, appliance, socket, batteries, series circuit, voltage, cell, circuit, component, power, current, bulb, wire, battery, conductor, insulator, metal Copper, rubber, control, current, complete circuit, incomplete circuit, switch

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Year 5	**Biology:** Animals including humans **Human development** **What changes happen as humans develop to old age?** What are the key stages of a mammal's life cycle? What happens during each stage of a life cycle? What is gestation? Why do some mammals have extreme gestation periods? **What are the key stages of pregnancy?** How is children's growth measured? **What changes take place during puberty?** What are the key signs of ageing in humans? Why do humans age differently? How can I stay healthy in old age? ***Researching:** Develop questions to ask an expert e.g. a health visitor, doctor or nurse. ***Pattern seeking:** Do larger mammals have longer gestation periods? Research the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows. ***Data analysis:** Accurately create and plot points on a line graph. **Biology:** Animals including humans **Circulatory system** What are the main parts of the human circulatory system? **What are the names of the main parts of the heart?** **What does the heart do?** How does the blood move around the heart? What do blood vessels do? What is blood composed of? Why is there oxygenated blood and deoxygenated blood? **What do the cells in my blood do?** What can happen if my arteries becoming restricted? **How are water and nutrients transported around my body?** What is osmosis and diffusion? How do I measure my pulse? **How can my lifestyle choices affect my health?** How can drugs and alcohol impact my health? Which drugs can support my circulatory system? How? ***Observing over time:** Observe pulse rates before, during and after exercise. ***Pattern seeking:** Children generate questions for investigation such as: Do older people have lower pulse rates? / Do boys have higher pulse rates?	**Physics:** Earth science **Earth and space** What are the key characteristics of a planet? **What is the order of the planets from the sun?** What shape is the sun, earth and moon? What are the differences between a heliocentric and geocentric model of the solar system? How have ideas about the solar system developed over time? Who were Ptolemy, Alhazen, Copernicus? Why was their work important to our understanding of the solar system? How does the Earth move in space? How does the sun transition across the sky? **How does night and day happen?** **Why is it different times in different parts of the world?** How can time be recorded with a 'solar clock'? **How does the Earth move relative to the sun?** **How does the moon move relative to the Earth?** ***Observing over time:** Measure shadows throughout the day. ***Researching:** Generate questions to research about the Earth and space. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.) -Research the time of day at different places on the Earth through internet links and direct communication. -Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks. **Physics:** Forces **Forces** Who was Isaac Newton? Why is his work important? Who was Galileo Galilei? Why is his work important in understanding gravity? **Why is gravity important?** What is the relationship between mass and gravity? **How does air resistance act on objects?** **How does water resistance act on objects?** What forces are acting on an object floating in water? What are the similarities and differences between air and water resistance? **How does friction act on an object?** How do we use a Newton meter to measure force? How can we change the size of a frictional force? **How do levers / gears / pulleys work?**	**Biology:** Living things and their habitats **Lifecycles and reproduction in plants and animals** **What do plants need to grow strong and healthy?** **How do plants reproduce?** How do we know that plants are living things? What is a life cycle? What are the three types of mammal? How do their life cycles differ? What is the life cycle of an amphibian? What is the life cycle of an insect? **What is the same and different about the process of metamorphosis in amphibians and insects?** What is the structure of an egg? What are the differences between a mammal and a bird or reptile life cycle? What is the life cycle of a bird / reptile? Why is it important to document living things and their decline in the world? What is important about the work of David Attenborough and Jane Goodall? Why is it important that we study living organisms? How can we support the conservation of living things? ***Classifying:** Classify animals according to their life cycle. ***Observing over time:** Grow from cuttings and observe whether they grow roots/stem/ leaf/flower. -Observe strawberry/spider plants through the year. -Observe changes in an animal over a period of time (for example, by hatching and rearing chicks) ***Pattern seeking:** Do larger animals live longer? Do smaller animals lay more eggs? ***Researching:** Generate questions to research the life cycle of a chosen animal: mammal, amphibian, insect, bird e.g. dragon fly, cuckoo, salmon, worm, owl. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.) -Research how gardeners asexually reproduce plants. **Chemistry:** Materials **Properties and changes of materials** What happens to some materials when they are added to liquids? **How can we recover a substance from a solution?** **What are the 3 states of matter? What are their properties?** How can we separate mixtures?

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	***Comparative / Fair testing:** Complete different activities to compare the impact on their own heart rate. ***Researching:** Generate questions to research about the human circulatory system. (Children present what they've learned in different ways: create a model, write a song, write a story, create a PPT, etc.)	***Comparative / Fair testing:** Compare friction, e.g. trainers or a weighted match box pulled with force meters, balloon rockets, CD hovercraft, balloon cars. -Compare water resistance, e.g. boats in a gutter of water, plasticine in a cylinder of liquid (easier with more viscous liquid, e.g. bubble bath) -Compare air resistance, e.g. spinners, parachutes, sailing boats, straw rockets -Compare levers, pulleys and gears ***Researching:** Research Heath Robinson and Rube Goldberg machines. (This could be cross-curricular with D&T and English biography writing.)	**How can we reverse a physical change?** How does this method to reverse a physical change work? **What is the difference between melting and dissolving?** **What are some irreversible changes?** Why is this change irreversible? What new products have been made? What type of change is rusting? Why is it a problem? How can we prevent it? What does a fire need to burn? What is the fire triangle? How can we extinguish fires? How do chemists create new materials? E.g. Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. ***Classifying:** classify materials themselves e.g. samples of wood, metal, plastic, etc. on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets -after observing what happens when solids are added to liquids, classify materials based on the outcomes. ***Comparative / Fair testing:** e.g. Which material would be good for a tent? Which material would be good to make a tea bag from? Which materials keep things warm/cold? -Test solids for solubility / Compare rates of solubility. ***Observing over time:** Observe rusting with uncoated nails in different liquids. (This can be achieved by removing coating with sandpaper.
	Working scientifically: Vocabulary scientific enquiry, variables, comparative test, fair test, controlled variable, identify, classify, describe, observe, interpret, data, causal relationship, secondary resources, accuracy, precision, opinion, fact, plan, repeat, graphs, illustrations, predictions, degree of trust, patterns, systematic, quantitative measurement, conclusion, explanation, evidence, validity, keys, tables, scatter graphs		
	Human development: Vocabulary adolescent, reproduce, dependent, puberty, foetus gestation, pregnant, breeding, duration, embryo, trimester midwife, umbilical cord, womb, growth spurt, childhood motor skills, milk teeth, adolescence, bloodstream, hormone, growth, appetite, cataract, memory, neurodegenerative, keratin, lifestyle **Circulatory system: Vocabulary** circulatory system, atrium, ventricle, valves, vessel artery, vein, capillary, microscope, stimulant, depressant hallucinogen, painkiller, drug, blood, plasma, platelet white blood cell, diet, exercise, heart rate, BPM - beats per minute, pulse, red blood cell, absorb, diffusion, osmosis, concentration, nutrient	**Earth and space: Vocabulary** orbit, terrestrial planet, Solar System, spherical, gas giant planets, geocentric, heliocentric, dwarf planet astronomy, axis, poles, season, hemisphere, sundial, time zone, gnomon, dial, shadow, moon, waxing waning, eclipse, phase, rocky planet, gas planet **Forces: Vocabulary** Weight, mass, astronomy, gravity, parachute, air resistance opposing, streamlined, water resistance, upthrust, buoyant sink, Newton meter, resistance, lubricant, Newton, friction load, pulley, lever, pivot, fulcrum, gear, mesh, mechanism, rack and pinion, bevel gear	**Lifecycles and reproduction in plants and animals: Vocabulary** reproduction, asexual reproduction, fertilisation, tuber Genes, placental mammal, monotreme mammal Marsupial, mammary glands, pouch, amphibian, pupa Metamorphosis, larva, caterpillar, egg, fledgling, egg tooth Hatch, embryo, primatologist, endangered, documentary natural sciences, naturalist, life cycle, reproduction, warm-blooded, living organism, vertebrate **Properties and changes of materials: Vocabulary** pure substance, solute, solvent, solution, evaporate, reversible, mixture, physical change, melting, irreversible chemical change, compare, effervescence, product corrosion, rusting, combustion, fuel, oxygen, extinguish, smother, carbon dioxide, acid, reaction, bicarbonate of soda

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	Autumn	Spring	Summer

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	Autumn	Spring	Summer
Year 6	**Biology:** Animals including humans **Evolution and inheritance** **What is adaptation?** How are species / plants adapted to their environment? How does this help it to survive? **What is evolution?** How do fossils provide information about extinct things? Who was Mary Anning? Why is her work important? **What is natural selection? How does natural selection effect evolution?** Who was Charles Darwin? Why is his work important? **How have humans evolved?** Why was the theory of evolution not accepted at first? **What are the similarities and differences between Neanderthals and homo sapiens?** ***Classifying:** To show variation in a species: -Classify a species of animal e.g. cats, dogs -Classify a species of plant e.g. daffodils, tulips, lilies. ***Pattern seeking:** Which beak is best for the job? Use different pieces of equipment, e.g. chopsticks, toothpicks, cutlery, to look for patterns linking the suitability of bird beaks for the available food e.g. rice, grapes, raisins. ***Researching:** Which characteristics make this species suitable for their habitat? Research different types of a species and their characteristics making them suitable for different habitats e.g. penguins.	**Biology:** Living things and their habitats **The natural world** **What is MRS GREN? How do living organisms follow these rules?** **What are the kingdoms that living organisms can be organised into?** **Why is it useful to classify plants and animals?** Who was Carl Linnaeus? Why is his work important? How can different organisms be classified using the Linnaean system? **What are microorganisms?** **How can micro-organisms be helpful and harmful?** What is the difference between fungi and other organisms? ***Classifying:** Classify animals according to Carl Linnaeus' system. -Classify plants into flowering, mosses, ferns and conifers, based on specific characteristics. -Create a branching database/dichotomous key to classify a set of living things. ***Research:** What are the characteristics of...? -Research the characteristics of flowering plants, mosses, ferns and conifers. -Research the difference between bacteria, virus and fungi to give reasons why these are not plants or animals. -Research how micro-organisms can be helpful or harmful. -Research unusual animals e.g. axolotl, platypus, kangaroos etc. **Physics:** Energy **Electricity** **What are the main parts of an electric circuit?** **What do these symbols represent in a simple circuit diagram?** **What is voltage?** What can affect the brightness of a bulb? How can I fix this circuit? **Which materials are electrical conductors / insulators?** ***Comparative and fair testing:** How does changing the components in a circuit effect it? *-Investigate the effect of adding more bulbs, cells, buzzers, motors to a circuit.* ***Application:** Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.*	**Physics:** Energy **Light and optics** **How does light travel?** **How are shadows created?** How does the length of a shadow change? **What is reflection?** **What is refraction?** What happens when light is refracted? How do eyes respond to light? **What are the names of the main part of the eye? What do these parts do?** What does it mean to be far sighted / near sighted? ***Comparative and fair testing:** How are shadows formed? What affects their size, direction and shape? -Investigate the shape of shadows and link this to light travelling in straight lines. ***Application:** Design and make a periscope and using the idea that light appears to travel in straight lines to explain how it works.* *They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur).*

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Year 6	**Working scientifically: Vocabulary** scientific enquiry, variables, comparative test, fair test, controlled variable, identify, classify, describe, observe, interpret, data, causal relationship, secondary resources, accuracy, precision, opinion, fact, plan, repeat, graphs, illustrations, predictions, degree of trust, patterns, systematic, quantitative measurement, conclusion, explanation, evidence, validity, keys, tables, scatter graphs		
	Evolution and inheritance: Vocabulary offspring, inherit, characteristic, variation, environmental, adaptation, habitat, nutrition, epiphytes, predator, pollinate, fossil, palaeontologist, Jurassic Coast, ichthyosaurus, evolve, theory, natural selection, extinct, ancestor, primate, home sapiens, neanderthal	**The natural world: vocabulary** classification, micro-organism, fungus, fungi, protist, bacteria, kingdom, conifer, fern, unicellular, multicellular, domain, species, virus, protozoa, microscopic, mycelium, ecosystem, Linnaeus, vascular plant, nonvascular plant, spores, moss **Electricity: vocabulary** circuit, battery, cell, resistor, variable resistor, dimmer switch, output, conductor, insulator, symbol, voltage, current, LED, sensor	**Light and optics: vocabulary** light source, reflected, refracted, cornea, iris, lens, retina, pupil, optic nerve, opaque, transparent translucent, optical, disperse, spectrum, absorption