Science Curriculum Map

Science	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
Year 3	Light & Shadow	Movement & Nutrition	Forces & Magnets	Rocks & Soil	Plant Reproduction	Does hand span affect grip strength?	
Year 4	States of Matter	Sounds & Vibrations	Digestion & Food	Classification & Changing Habitats	Electricity & Circuits	How does the flow of liquids compare?	
Year 5	Earth & Space	Unbalanced Forces	Mixtures & Separation	Materials – Properties & Changes	Life Cycles & Reproduction	Human Timeline	Does the size of an asteroid affect its impact strength?
Year 6	Light & Reflection	Circuits, Batteries & Switches	Classifying Big & Small	Evolution & Inheritance	Circulation & Health	Are some sunglasses safer than others?	

Science Progression of Scientific Knowledge, Understand and Skills

Animals Inc. Humans	Y3: Movement and Nutrition	Y4: Digestion and Food	Y 5: Human Timeline	Y6: Circulation and Food Health
Animal Growth			To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, and elderly). To describe changes that occur during puberty (in boys and girls). To know that gestation periods vary across mammals.	
Animal Structure & Function	To know that animals can be grouped based on the presence of a skeleton. To know that the skeleton in humans and some animals is used for movement, protection and support. To know that the muscular system in humans and some animals works with the skeleton for movement. To know the main bones in the body.	To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.		To know the main parts of the human circulatory system (heart, blood vessels and blood). To know that the heart pumps blood around the body. To know that the blood vessels transport blood around the body. To know that the blood transports vital substances around the body, including oxygen and nutrients. To understand the relationships between different organ systems.
Health & Nutrition	To know that animals, including humans, need the right types and amount of nutrition. To understand that humans cannot make their own food and therefore eat to get the nutrition needed. To know the main nutrient groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions. To know that a balanced diet should include all nutrient groups. To describe the diets of different animals.	To know that teeth can be damaged, including the effect of sugary and acidic food. To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. To describe the teeth of carnivores and herbivores and understand why they are different. To know that predators hunt for their food and prey are the animals being hunted. To know that producers make their own food. To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.		To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions. To know that the heart rate is the number of beats per minute. To know that exercise increases heart rate.

Plants	3: Plant Reproduction			
Plant structure and function	To understand the functions of the basic parts of a plant and the relationship between structure and function. To know that water is transported within a plant from the root, the leaves			
Plant growth and needs	To know that plants need water, light, air, nutrients and a suitable temperature for growth and health. To understand that the needs for growth and health vary from plant to plant.			
Plant life cycle	To know the life cycle of a plant from seed to mature plant. To know that flowers are the reproductive organ of a plant. To know that the process of pollination is the transfer of pollen to the female (part of the) flower. To know that the process of seed formation is the growth of a seed after pollination. To know some different methods of seed dispersal and the benefits of Each.			

Living things & their habitats	Year 3	Year 4: Classification and changing habitats	Year 5: Life cycles and reproduction	Year 6: Classifying big and small – Evolution and inheritance
Characteristics of living things		To know that living things can be grouped in different ways. To know that a classification key can be used to group and identify plants and animals. To know that vertebrates are animals which have a backbone and nvertebrates are animals which do not have a backbone.		To know that 'organism' is a term used to refer to an individual living thing. To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye. To know the characteristics of the different groups of vertebrates and commonly found invertebrates.

		To know that plants can be grouped into flowering or non-flowering varieties. To know that flowering plants include grasses and non -flowering plants includes ferns and mosses. To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish. To know that invertebrate groups include snails, slugs, worms, spiders and insects.		
Variation and inheritance			To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again. To know that all living things must reproduce for the species to survive. To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent. To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).	To know that living things have changed over time. To know that fossils provide us with information about living things that inhabited the Earth millions of years ago. To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents. To know that over time, variation in offspring can affect animals' chances of survival in particular environments.
Habitats and Interdependence		To know that habitats can change throughout the year and this can be dangerous for living things. To know that humans can have both a positive and negative impact on the environment.		To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.

Materials	Year 3: Rocks and Soil	Year 4: States of Matter	Year 5: Mixtures and separation, properties and changes	Year 6

Identifying and naming	To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.) To know that rocks may contain grains, crystals, or fossils. To know that grains and crystals appear differently and can be used to classify rocks. To know that soils are made from rocks and dead matter	To know that all substances around us can exist as solids, liquids and gases.		
Properties and use	To understand the relationship between the properties of rocks and their uses.	To know that a property of a solid is that it keeps its shape unless a force is applied to it. To know that a property of a liquid can flow freely and take on the shape of a container. To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.	To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.	
Change	To know that fossils can form from the remains of living things. To know that rocks can change over time (e.g. erosion, weathering).	To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating). To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing). To know that water can exist as a solid, a liquid or a gas. To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius. To know that water flows around the world in a continuous process called the water cycle. To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour. To know that in the water cycle, condensation is the process of water vapour cooling to form water	To know that some substances will dissolve in a liquid to form a solution. To know the factors that affect the time taken to dissolve, including temperature and stirring. To understand that dissolving, mixing and changes of state are reversible changes. To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes. To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)	

		droplets in clouds, which can result in precipitation. To know that the rate of evaporation increases as temperature rises.		

Energy – Light & Sound	Year 3: Light & Shadow	Year 4: Sound & Vibrations	Year 5	Year 6: Light & Reflection
Sources	To know that light travels from a source (e.g. the Sun, light bulbs and torches). To know that light is needed to see things and that dark is the absence of light. To know that light from the Sun can be dangerous and how to protect their eyes.	To understand that sound is a result of vibrations.		To know that light travels in a straight line from a light source. To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye
Transfer	To know that all materials reflect light. To know that shadows are formed when the light from a light source is blocked by an opaque object.	To know that vibrations from sounds travel through mediums to the ear. To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds. To know that different materials provide different amounts of insulation against sound		To know that shiny surfaces reflect light uniformly. To know that when light is reflected off a surface, its direction changes. To know that mirrors and periscopes work using reflection of light on smooth surfaces. To understand why shadows have the same shape as the objects that cast them as a result of light travelling in straight lines. To understand relationships between light sources, objects and shadows
Factors affecting energy	To know that shadows change as a result of different factors: - Changing the position of the light source. - Changing the distances between the light source, object and surface. To know that shadows change position and length throughout the day as the Sun changes position in the sky	To know a variety of ways to change the pitch or volume of a sound. To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds. To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds. To know that sounds get fainter as the distance from the sound source		To understand how and why the distance between the object and the screen affects the size of the shadow. To understand how the angle of a reflected ray is affected by the angle of the incoming ray on a smooth surface.

		increases		

Energy - Electricity	Year 3	Year 4: Electricity & Circuits	Year 5	Year 6: Circuits, Batteries & Switches
Sources		To know that all electrical appliances need a power source, including batteries or mains electricity. To know that an electrical circuit needs a complete path for the electrical charge to flow through. To know the main components in a simple series circuit. To know the precautions for working safely with electricity		To know a wider variety of components in a series circuit (including buzzer and motor). To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.
Transfer		To know that some materials allow electrical charge to pass through them quickly and these are known as electrical conductors (e.g. metals). To know that some materials do not allow electrical charge to pass through them easily and these are known as electrical insulators (e.g wood and plastic). To know that metals are used for cables and wires because they are good conductors of electricity. To know that plastic is used to cover cables and wires because it is a good insulator		
Factors Affecting Energy		To understand that an open switch breaks a series circuit so the components will be off. To understand that a closed switch completes a series circuit so the components will be on. To understand the relationship between bulb brightness and the number of bulbs in a circuit.		To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).

Forces, Earth & Space	Year 3	Year 4: Forces & Magnets	Year 5: Earth & Space	**Year 5: Unbalanced Forces**
Key Facts		To know some examples of contact and non-contact forces. To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism). To know the North and South poles of a magnet. To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. To know some different examples of magnets, including bar, horseshoe, button and ring, To know some uses of magnets	To know that the Sun is a star at the centre of our solar system. To know that the Sun, Earth and Moon are approximately spherical bodies. To know the names, order and relative positions of the planets and other main celestial bodies. To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets	To know that gravity is a non-contact force that pulls objects together. To know that air resistance and water resistance are both types of friction.
Forces in Motion		To know that friction is a contact force that acts between two surfaces to slow an object down. To know that magnetism is a non-contact force that affects objects containing magnetic metal. To understand that the opposite poles of a magnet attract one another and like poles repel one another.	To know that the Earth and other planets orbit around the Sun. To know that the tilt of the Earth and its orbit around the Sun causes the seasons. To know that the Moon orbits around the Earth. To understand how the Earth's rotation causes day and night and the apparent movement of the Sun across the sky	To know that unsupported objects fall towards the Earth because of gravity. To know that friction, air resistance and water resistance act in the opposite direction to a moving object. To know that when forces are imbalanced, the speed, shape or direction of an object changes. To know that when forces are balanced the speed, shape or direction of an object stays the same. To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
Factors Affecting Forces		To know that rougher surfaces have more friction between them than smoother surfaces . To understand that the strength of different magnets may vary.		To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement To know that the larger the surface area of an object the greater the air or water resistance it creates.

Working Scientifically	Year 3	Year 4	Year 5	Year 6
Posing Questions	Beginning to raise further questions during the enquiry process. Considering what makes a testable question. Beginning to recognise that there are different types of enquiry and that they are suitable for different questions. Beginning to make suggestions about how different questions could be answered.		Raising questions throughout the enquiry process. Identifying testable questions. Selecting the most appropriate enquiry method to answer questions and give justification.	
Planning	Beginning to select from options which variables will be changed, measured and controlled. Beginning to suggest what observations to make and how long to make them for. Planning a simple method, verbally and in writing. Beginning to write a simple method in numbered steps. Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.		Suggesting which variables will be changed, measured and controlled. Making and explaining decisions about what observations to make and how long to make them for. Writing a method including detail about how to ensure control variables are kept the same. Writing a method that considers reliability by planning repeated readings. Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.	
Predicting	Making predictions about what they think will happen by: ● Using scientific knowledge and/or personal experience to explain their prediction (because…) ● Beginning to consider cause and effect when making predictions, where appropriate. ● Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)		Making increasingly scientific predictions by: ● Using previous scientific knowledge and evidence to inform their predictions. ● Using scientific language to describe a potential outcome or explain why they think something will happen. ● Making links between topics to evidence a predictio	
Observing (Qualitative Data)	Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.		Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.	
Measuring (Quantitive Data)	Using standard units to measure and compare. Using measuring equipment with increasing accuracy. Reading scales with unmarked intervals between numbers.		Using standard units to measure and compare with increasing precision (decimals). Reading a wider variety of scales with unmarked intervals between numbers.	
Researching	Gathering specific information from a variety of sources.		Gathering answers to open-ended questions from a variety of sources.	
Recording (Diagrams)	Beginning to draw more scientific diagrams by: ● Using some standard symbols. ● Drawing in 2D to produce simple line diagrams. ● Labelling with more scientific vocabulary		Drawing scientific diagrams by: ● Using a wider range of standard symbols. ● Drawing with increasing accuracy. ● Labelling with a broader range of scientific vocabulary. ● Annotating diagrams to explain concepts and convey opinions.	
Recording (Tables)	Using a prepared table to record results including more detailed observations.		Using tables with columns that allow for repeat readings. Suggesting headings to tables, including units.	

	Using tables with more than two columns. Identifying and adding headings to tables . Beginning to design simple results tables	Designing results tables with increasing independence with consideration of variables where applicable. Calculating the mean average.
Grouping & Classifying	Grouping based on visible characteristics and measurable properties. Populating a pre-prepared branching and number key. Choosing appropriate questions for classification keys.	Grouping in a broader range of contexts. Organising the layout of number and branching keys. Formulating appropriate questions for classification keys
Graphing	Representing data using bar charts. Drawing bars with greater accuracy. Reading the value of bars with greater accuracy.	Representing data by using line graphs and scatter graphs. Plotting points with greater accuracy. Reading the value of plotted points with greater accuracy.
Analysing & Drawing Conclusions	Writing a conclusion to summarise findings using simple scientific vocabulary. Beginning to suggest how one variable may have affected another. Beginning to quote results as evidence of relationships. Identifying data that does not fit a pattern (anomalous data). Recognising when results or observations do not match their predictions. Beginning to use identified patterns to predict new values or trends.	Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. Suggesting with increasing independence how one variable may have affected another. Quoting relevant data as evidence of relationships. Identifying anomalies in repeat data and excluding results where appropriate. Comparing individual, class and/or model data to the prediction and recognising when they do not match. Using identified patterns to predict new values or trends.
Evaluating	Beginning to identify steps in the method that need changing and suggest improvements. Beginning to identify which variables were difficult to control and suggesting how to better control them. Commenting on the degree of trust by reflecting on: ● Results that do not fit a pattern (anomalies). ● The quality of results (accurate measurements and maintaining control variables). Beginning to identify new questions that would further the enquir	Identifying steps in the method that need changing and suggesting improvements. Identifying which variables were difficult to control and suggesting how to control them better. Commenting on the degree of trust by also reflecting on: ● Accuracy (human error with equipment). ● Reliability (repeating results). ● Sources of information (e.g. websites, books). Posing new questions in response to the data that would extend the enquiry. Deciding what data to collect to further test direct relationships

Additional Knowledge & Skills

Year 3	Year 4	Year 5	Year 6
To know about famous scientists throughout history. To know about a range of jobs and careers that use scientific knowledge and methods. To know about the work of modern-day scientists. To know about science in the news and recent discoveries. To know there are spiritual, moral, social and cultural links with Science.			
To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. To know how scientific knowledge has changed over time, leading to the current understanding of Science. To know about current scientific research and what it aims to achieve in the future. To know that collaboration and peer reviewing is essential for effective scientific progress.			
		To know how scientific evidence is used to support or refute ideas or arguments. To know that mistakes can lead to new discoveries.	

Progression of Vocabulary

Vocabulary	Year 3	Year 4	Year 5	Year 6
Working Scientifically	observe, predict, compare, classify, measure, investigate, fair test, results, evidence, conclusion	variable, data, pattern, relationship, accurate, thermometer, enquiry, classify, identify	control variable, reliability, repeat readings, justify, method, dependent variable, independent variable	precision, anomalous results, evaluate, validity, systematic, scientific evidence, argument, accuracy
Animals Including Humans	skeleton, muscles, joints, nutrition, carbohydrates, protein, fats, vitamins, minerals, balanced diet	digestive system, oesophagus, stomach, intestine, incisor, canine, molar, food chain, predator, prey	gestation, puberty, adolescence, reproduction, embryo, foetus, development	circulatory system, heart, blood vessels, arteries, veins, capillaries, nutrients, oxygen, pulse, heart rate
Plants	roots, stem, nutrients, water transport, pollination, seed dispersal, reproduction	flowering plant, non-flowering plant	life cycle, reproduction, fertilisation, germination	adaptation, evolution, inheritance (linked through wider biology)
Living Things and Their Habitats	habitat, organism, environment, food chain	vertebrate, invertebrate, classification, classification key, species	reproduction, sexual reproduction, asexual reproduction, life cycle	microorganism, bacteria, fungi, virus, evolution, adaptation, inheritance
Rocks and Soils / Materials	rock, soil, fossil, sedimentary, igneous, metamorphic, erosion, weathering	solid, liquid, gas, evaporation, condensation, freezing, melting, water cycle	soluble, insoluble, solution, dissolve, filtration, evaporation, reversible change, irreversible change	properties, conductivity, insulation, transparency (applied across science contexts)
Forces and Magnets	force, friction, magnet, magnetic field, attract, repel, poles	—	gravity, air resistance, water resistance, mechanism, pulley, lever, gear	applied through scientific investigations
Light	light source, reflection, shadow, opaque, translucent, transparent	—	—	reflection, refraction, periscope, spectrum, ray, line of sight
Sound	—	vibration, pitch, volume, sound wave, insulation, medium, eardrum	—	—
Electricity	—	circuit, conductor, insulator, electrical appliance, battery, switch, series circuit	—	voltage, current, resistance, circuit diagram, component, symbol
Earth and Space	—	—	solar system, orbit, rotation, axis, planet, moon, star, hemisphere	apply and revisit through scientific enquiry and environmental science
Evolution and Inheritance	—	—	—	evolution, inheritance, adaptation, variation, offspring, fossil, natural selection, characteristics

The development of SMSC and the promotion of British Values in the Science Curriculum

Spiritual	Moral

Providing opportunities to search for meaning and purpose in natural and physical phenomena and to wonder what is special about life, an awe at the scale of living things from the smallest micro-organism to the largest tree and the interdependence of all living things and materials on Earth. Reflection and the emotional drive to know more and to wonder about the world and aesthetically appreciate its wonders including, for example the enormity of space and the beauty of national objects or phenomenon, plants, animals, crystals, rainbows and the Earth from space etc. Promoting teaching styles which: value pupils' questions and give them space for their own thoughts, ideas and concerns; enable pupils to make connections between aspects of their learning; encourage pupils to relate their learning to a wider frame of reference – for example, asking why? how? And where as well as what? Showing respect for the different opinions expressed by others, for example regarding creation. Science and spiritual ideas can cause conflict but in a modern society it is important to understand why these conflicts arise so our children can respect the views of others. It is also seen that science can stand alongside spiritual beliefs. This is looked at from a neutral stand point within science lessons.	Encouraging pupils to take responsibility for their actions; for example, in respect of property, care of the environment and developing codes of behaviour. Encouraging pupils to become increasingly curious, to develop open mindedness to suggestions of others and to make judgements on evidence not prejudice. Encouraging children to use their understanding of the world in a positive manner. Begin to understand that moral dilemmas are often involved in scientific developments. When considering the environment, the use of further natural resources and its effect on future generations is an important moral consideration. Children are also encouraged to ask themselves, What are the consequences of our actions on the world around us? What are the consequences of my actions on myself and others?
Social Encouraging pupils to work co-operatively and develop team working skills in practical work and to share the results to improve reliability. Developing team working skills and taking responsibility in that team. Pupils taking responsibility for their own and others' safety. Consideration of the benefits and drawbacks of scientific and technological developments and the social responsibilities. Children are encouraged to consider their impact on the world around them and start to look at what we can do to help the next generation have a habitable planet. They need to develop their empathy and tolerance towards different viewpoints.	**Cultural** Encouraging thinking of scientific discoveries as part of our culture as great as music and films with credit given to scientific discoveries made by people of all backgrounds and other cultures, not just British or American. Science is a contemporary activity with developments being made all over the modern world by both men and women in many different cultures (now and in the past). Children are encouraged to investigate and discuss the historical impact of scientists from around the world linked to famous discoveries.
British Values Children develop the ability to take a full and active part in practical lessons while keeping to the rules to keep ourselves and others safe. They take turns to use equipment and have their say. Children are encouraged to understand the consequences of their actions and to confidently share their opinions and ideas while respecting the opinions of others. They learn to work as a team, supporting and advising each other. They make their own choices when planning an investigation and recognise that others may have different points of view. They recognise that some of the most important scientific discoveries have come from other parts of the world. They respect the views and opinions of others (and freedom of others to hold different beliefs) for example in issues such as creation, genetically modified crops or the impact of pollution. They look at scientific discoveries which have come from other cultures and how religious beliefs often compete with scientific understanding. They learn to be respectful of these beliefs and to appreciate and understand them	