



Progression Documents

Science

Curriculum Overview:

Learning for life



We are **CONFIDENT COMMUNICATORS** who listen and share our ideas confidently.
 We are **RESILIENT RESEARCHERS** who don't give up and learn from our mistakes.
 We are **ASPIRATIONAL AMBASSADORS** who strive to be the best we can be.
 We are **COLLABORATIVE CITIZENS** who work together and respect others.

Intent	Implementation	Impact
<p>As a school we provide Science for all registered pupils, including those in reception classes.</p> <p>Early years Foundation Stage: In EYFS the framework is organised across 7 areas of learning rather than subject areas. As part of this document we have planned how the skills taught across EYFS feed into our science curriculum and which statements from the 2020 Development Matters are prerequisite skills.</p> <p>KS1 and KS2: Taking the National Curriculum as its starting point, our curriculum is carefully sequenced so that powerful knowledge builds term by term and year by year. We make meaningful connections within subjects and between subjects.</p> <p>At Spalding St Pauls Primary School we use the United Learning Curriculum as a base to form our teaching as it is designed to take account of statutory requirements and curriculum research. The core content – the 'what' – of the curriculum is stable, but as a school we will bring it to life in our own local context, and teachers will adapt lessons – the 'how' – to meet the needs of our own classes, school and community.</p> <p>Our curriculum - which includes the taught subject timetable as well as spiritual, moral, social and cultural development, our co-curricular provision and the ethos and 'hidden curriculum' of the school – is intended to spark curiosity and to nourish both the head and the heart.</p> <p>Our Curriculum for Science provides all children, regardless of their background, with:</p> <p><u>Substantive knowledge:</u></p> <ul style="list-style-type: none"> Ensuring pupils master core content through the development of key concepts and timely revisiting of key knowledge Sequencing the curriculum and selecting knowledge to allow for gradual development of vertical concepts – the 'big ideas' in science – to provide firm foundations for KS3 and KS4 Preventing common misconceptions that are often formed at an early age and prove problematic at the later stages of pupils' science education Purposefully teaching appropriate knowledge that goes beyond the KS1 and KS2 national curriculum, to aid current and future understanding, and to smooth the transition to KS3 Encouraging pupils to apply and make connections between the disciplines of science, the wider curriculum and the wider world <p><u>Disciplinary knowledge:</u></p> <ul style="list-style-type: none"> Sequencing Working Scientifically elements so that they are explicitly taught and practised alongside the substantive knowledge, and regularly reviewed and built upon across the years and key stages Making deliberate and explicit links to other curriculum areas – particularly geography and mathematics – to ensure there is a consistent approach to teaching content, and that pupils are always first taught content in the most relevant subject. For example, pupils are taught how to construct bar charts or calculate the mean in mathematics before they are applied in science Planning practical tasks that have a clear purpose: to demonstrate or prove substantive concepts, or to allow pupils to deliberately practice working scientifically skills in a relevant context <p><u>Curiosity and excitement about science:</u></p> <ul style="list-style-type: none"> Selecting examples and applications of science that inspires pupils' curiosity about the world and natural phenomena Ensuring that all pupils can see themselves reflected in the science curriculum, by highlighting present-day role models and the contributions of scientists from a wide range of backgrounds; and considering social and cultural values around scientific ideas 	<p>The Early years Foundation Stage (EYFS) follows the 'Development Matters' in the EYFS guidance. In EYFS Science is taught as part of 'Understanding of the World' and will be seen as part of the continuous and adult lead provision across the classroom, not as a discrete subject.</p> <p>In KS1 and KS2, Science is taught as a discreet subject every week to allow time to embed skills in the subject.</p> <p><u>The Teaching Sequence</u> Within each Subject Our Curriculum has been very carefully sequenced to ensure coverage and appropriate progression through substantive and disciplinary knowledge.</p> <p>Within the Unit</p> <ol style="list-style-type: none"> KNOWLEDGE ORGANISER: A knowledge organizer is provided to show coverage of each unit of work, outlining key fact to be covered over the unit of work and key vocabulary. Each unit clearly sets out the knowledge that should be taught and reviewed in the sequence of lessons. Each unit is planned to cover six lessons PRE-UNIT ASSESSMENT: Each unit of work begins with a pre-learning quiz. <p>Within the Lesson</p> <ol style="list-style-type: none"> SUBJECT OVERVIEW: At the start of a lesson children are reminded about the subject being taught and what this covers (e.g. Science: Is the study of the natural world through observation and experimentation. It teaches us to use evidence, along with active thinking, to explain what is happening in the natural world. There are 3 types of scientific study: Biology - This teaches us about living organisms; Chemistry - This teaches us about properties and behaviour of matter; Physics - This teaches us about matter, motion and energy. As a scientist, Astronomer, biologist, botanist, chemist, ecologist, naturalist, physician, zoologist we will know ...) FLASHBACK: Each lesson begins with a flashback to recap prior knowledge of the unit, previous units or previous years learning. VOCABULARY: Subject specific key vocabulary is then taught which will be covered in the lesson. See word aware books for more information. MAIN TEACHING: ('I do', 'We do', and 'You do'). During the main teaching, content broken down into small steps of 'I do', 'We do', and 'You do' to allow for modelling, guided practice and independent practice. RECAP: At the end of the lesson children will have an opportunity to recap on the knowledge they have been taught throughout the session. <p>End of the Unit</p> <ol style="list-style-type: none"> ASSESSMENT: At the end of a unit of work children will carry out a post-learning quiz to see how much knowledge they have maintained and so teachers can pick up any misconceptions and fill gaps where needed. This assessment will inform end of unit summative assessments. 	<p>Assessing impact is assessing how well pupils have learned the required knowledge from the implemented curriculum.</p> <p>It is not about lots of tests, or meticulously comparing pupils' outcomes at the start and end of each unit.</p> <p>If pupils can keep up with a well-sequenced curriculum that has progression built in, they are making progress!</p> <p>The Curriculum has this progression built in, and teachers and subject leads monitor how well pupils are keeping up with it.</p> <p>This can be done through: Formative assessment in lessons There are opportunities for formative assessment in the lesson slides, and teachers continually adapt their lesson delivery to address misconceptions and ensure that pupils are keeping up with the content.</p> <p>Low-stakes summative assessment A post-learning quiz is provided for every unit. These questions usually take the form of multiple-choice questions, and aim to assess whether pupils have learned the core knowledge for that unit. These should also be used formatively, and teachers will plan to fill gaps and address misconceptions before moving on.</p> <p>Books and pupil-conferencing Talking to pupils about their books allows school to assess how much of the curriculum content is secure. These conversations are used most effectively to determine whether pupils have a good understanding of the vertical concepts, and if they can link recently taught content to learning from previous units. (They should not be used to assess whether pupils can recall information, as low-stakes quizzes can gather this information more efficiently).</p>

Breadth of study

Breadth of Study EYFS:

Three and Four Year-Olds	Communication and Language		<ul style="list-style-type: none"> Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development		<ul style="list-style-type: none"> Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World		<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Begin to make sense of their own life-story and family's history. Explore how things work. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.
Reception	Communication and Language		<ul style="list-style-type: none"> Learn new vocabulary. Ask questions to find out more and to check what has been said to them. Articulate their ideas and thoughts in well-formed sentences. Describe events in some detail. Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. Use new vocabulary in different contexts.
	Personal, Social and Emotional Development		<ul style="list-style-type: none"> Know and talk about the different factors that support their overall health and wellbeing: <ul style="list-style-type: none"> regular physical activity healthy eating toothbrushing sensible amounts of 'screen time' having a good sleep routine being a safe pedestrian
	Understanding the World		<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them.
ELG	Communication and Language	Listening, Attention and Understanding	<ul style="list-style-type: none"> Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	<ul style="list-style-type: none"> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy choices.
	Understanding the World	The Natural World	<ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Breadth of study Key Stage 1:

Pupils should be taught about:

BOIOLOGY		CHEMISTRY	PHYSICS
<p>Plants</p> <ul style="list-style-type: none"> Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal. <p>Evolution and inheritance</p> <ul style="list-style-type: none"> Look at resemblance in offspring. Look at changes in animals over time. Look at adaptation to environments. Look at difference in offspring. Look at adaptations and evolution. Look at changes to the human skeleton over time. 	<p>Animals and humans</p> <ul style="list-style-type: none"> Look at nutrition, transportation of water and nutrients in the body and the muscle skeleton system of humans and animals. Look at the digestive system in humans. Look at teeth. Look at the human circulatory system. <p>All living things</p> <ul style="list-style-type: none"> Identify and name plants and animals. Look at classification keys. Look at the life cycle of animals and plants. Look at the classification of plants, animals and micro-organisms. Look at reproduction in plants and animals and human growth and changes. Look at the effect if diet, exercise and drugs 	<p>Materials</p> <ul style="list-style-type: none"> Identify, name, describe, classify and compare properties and changes. Look at the practical uses of everyday materials. 	<p>Forces</p> <ul style="list-style-type: none"> Describe basic movements. <p>Earth and Space</p> <ul style="list-style-type: none"> Observe seasonal changes.

Breadth of study Key Stage 2:

Pupils should be taught about:




BOIOLOGY	CHEMISTRY	PHYSICS
<p>Plants</p> <ul style="list-style-type: none"> Look at the function of parts of flowering plants, requirements of growth, water transportation in plants, life cycles and seed dispersal. <p>Evolution and inheritance</p> <ul style="list-style-type: none"> Look at resemblance in offspring. Look at changes in animals over time. Look at adaptation to environments. Look at difference in offspring. Look at adaptations and evolution. Look at changes to the human skeleton over time. Look at the life cycle of animals and plants. Look at the classification of plants, animals and micro-organisms. Look at reproduction in plants and animals and human growth and changes. Look at the effect if diet, exercise and drugs. <p>Animals and humans</p> <ul style="list-style-type: none"> Look at nutrition, transportation of water and nutrients in the body and the muscle skeleton system of humans and animals. Look at the digestive system in humans. Look at teeth. Look at the human circulatory system. <p>All living things</p> <ul style="list-style-type: none"> Identify and name plants and animals. Look at classification keys. 	<p>Rocks and Fossils</p> <ul style="list-style-type: none"> Compare and group rocks and describe the formation of fossils. <p>States of matter</p> <ul style="list-style-type: none"> Look at solids, liquids and gases, change of state, evaporation, condensation and the water cycle. <p>Materials</p> <ul style="list-style-type: none"> Examine the properties of materials using various tests Look at solubility and recovering dissolved substances Separate mixtures. <p>Examine changes to materials that create new materials that are usually not reversible.</p>	<p>Light</p> <ul style="list-style-type: none"> Look at sources, seeing, reflections and shadows. Explain how light appears to travel in straight lines and how this affects seeing and shadows. <p>Sound</p> <ul style="list-style-type: none"> Look at sources, vibration, volume and pitch. <p>Electricity</p> <ul style="list-style-type: none"> Look at appliances, circuits, lamps, switches, insulators and conductors. <p>Forces and Magnets</p> <ul style="list-style-type: none"> Look at contact and distant forces, attraction and repulsion, comparing and grouping materials. Look at poles, attraction and repulsion. Look at the effect of gravity and drag forces. Look at transference of forces in gears pulleys, levers and springs. <p>Earth and Space</p> <ul style="list-style-type: none"> Look at movement of the Earth and the Moon. Explain day and night

Vertical Concepts

These ideas below set out key concepts that, when understood together, allow pupils to understand the world around them.

The ideas are expressed in the form of narrative descriptions that builds the understanding of key ideas from primary to secondary education. They cannot be understood in single units or lessons; we need to build concepts by attending to them in small steps within the curriculum.

The ideas are **ideas of science**, and span the disciplines of chemistry, biology and physics.

1	2	3	4	5	6	7	8	9	10	11
Chemistry 	Physics 					Biology 				
All material in the universe is made of very small particles.	Objects can affect each other at a distance.	Changing the movement of an object requires a net force to be acting on it.	The total amount of energy in the Universe is always the same, but energy can be transformed when things change or are made to happen.	The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth's surface and its climate.	Our solar system is a very small part of one of millions of galaxies in our universe.	Organisms are organised on a cellular basis.	Organisms require a supply of energy and materials for which they are often dependent or in competition with other organisms.	Genetic information is passed down from one generation of organisms to another	Diversity of organisms, living and extinct, is the result of evolution.	11: Organisms are healthy when physically, mentally and socially well and free from disease.




Disciplinary Knowledge




The below tables outlines where disciplinary knowledge – the working scientifically elements – is first taught and deliberately practised in KS1 or KS2.


The curriculum has been sequenced so that the content is also reviewed in subsequent units (and may also be reviewed in other subject areas like geography and history), but to keep the table readable, we have only set out where it is first taught. The Mathematics Programmes of Study have been considered so that pupils never need to apply mathematical skills (e.g. calculating mean, rounding to an appropriate degree, constructing graphs) until they have first been taught in mathematics lessons.

Scientific Attitudes & Planning (A&P)	Measuring & Observing (M&O)	Recording & Presenting (R&P)	Analysing & Evaluating (A&E)
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Vertical Concepts

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
 Chemistry	1	<ul style="list-style-type: none"> Objects have a purpose and are made of different materials 	<ul style="list-style-type: none"> All the 'stuff' encountered in everyday life, including air, water and different kinds of solid substances, is called matter. Different materials are recognisable by their properties. Materials have different properties, which make them suitable for specific purposes. Matter can exist in three different states: as solids, liquids and gases. The amount and type of substance does not change when the matter changes state. 		<ul style="list-style-type: none"> If a material could be divided into smaller and smaller pieces, it would be found to be made of particles, which smaller than can be seen even with a microscope. These particles are not in a material; they are the material. The particles of a substance are arranged differently when it is solid, liquid or gas. Properties of materials can be physical (such as hardness) or chemical (such as toxicity). 	<ul style="list-style-type: none"> A pure substance is one that contains only one type of particle. A mixture is created when two or more substances are mixed. The two types of particle are mixed together, but the particles themselves stay the same. 	<ul style="list-style-type: none"> A chemical change is where a new substance – that is made of a different type of particle – is formed.
	2			<ul style="list-style-type: none"> Objects can affect other objects even when they are not in contact with them. Light reaches our eyes, even though the light source may be far away. The non-contact force of magnetism mean magnets can attract or repel other magnets and attract objects made of magnetic materials 	<ul style="list-style-type: none"> Sound comes from objects that vibrate and can be detected at a distance from the source, because the air or other material around is made to vibrate. Sounds are heard when the vibrations in the air reach our ears. 	<ul style="list-style-type: none"> The non-contact force of gravity pulls objects towards the centre of the Earth. 	
 Physics	3		<ul style="list-style-type: none"> We can move or change the shape of objects by pushing and pulling: by squashing, bending, twisting or stretching the materials. 	<ul style="list-style-type: none"> Forces act in pairs. Forces acting against each other are opposing. If opposing forces equal, they are balanced, and the object's motion will stay the same; this includes staying stationary. If opposing forces are unequal, they are unbalanced will change an object's speed, direction or shape. Friction is a force that will slow an object down. Friction is an example of a contact force. 		<ul style="list-style-type: none"> There is gravitational force between all objects, but it is only felt when one or more of the objects has a very large mass. The greater the mass, the greater the gravitational force. Objects on Earth are pulled to the centre of the Earth because the Earth's mass and therefore gravitational force is much larger than that of the objects. The downward force of gravity on an object on the Moon is less than that on Earth because the Moon has less mass on Earth 	
	4		<ul style="list-style-type: none"> All living things need food to give them energy. All food chains start with a producer (a living thing that makes its own food). The arrows in a food chain show where energy is being transferred from and to. 		<ul style="list-style-type: none"> The arrows in a food web show where energy is being transferred from and to. A cell in a complete circuit can make a bulb light or buzzer sound. This will not happen without a cell. 	<ul style="list-style-type: none"> Many processes and phenomena are explained in terms of energy exchanges. Energy cannot be created or destroyed. When energy is transferred from one object to others, the total amount of energy in the universe remains the same; the amount that one object loses is the same as the other objects gain. Two examples of energy stores are thermal stores and chemical stores of energy. Energy resources – but not energy – can be depleted. 	<ul style="list-style-type: none"> Energy resources can be renewable (such as wind, solar, geothermal and hydrological) or non-renewable (such as fossil fuels). All organisms respire.
 Physics							

 Physics	5 A	<ul style="list-style-type: none"> • Geography: We live on the Earth. • Geography: Physical features occur in nature and include river, forest, soil and hill. • Geography: Coastal areas are areas of land that are near the sea. Features in coastal areas include beach, cliff, sea and ocean. • Science: Some plants grow in soil. 	<ul style="list-style-type: none"> • Geography: Features of hot deserts include rocks, sand dunes and oases. Features of cold deserts include mountains and ice sheets. • Geography: Rivers travel from highland areas to lowland areas. Physical features around rivers include valleys, mountains, hills and vegetation. • 	<ul style="list-style-type: none"> • Science: Rocks are formed when placed under pressure. • Science: Much of the solid surface of the Earth is covered in soil, which is a mixture of pieces of rock of various sizes and the remains of organisms. Some soil also contains air, water and some nutrients. • Science: There are three main kinds of rock, igneous, sedimentary and metamorphic, with different composition and properties. • Geography: There are several mountain ranges in the UK. • Geography: The Earth has four layers. Its upper layer of tectonic plates move. • Geography: Shield and composite volcanoes can form at plate boundaries, which produce lava, pyroclastic flows and lahars. • Geography: Soil is rich with nutrients around volcanoes. 	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Geography: Examples of natural resources include wood, food, water and fossil fuels. Fossil fuels are materials made from fossils over millions of years, like coal and oil. Humans use these to run cars and electrical items. • Geography: Natural resources are unevenly distributed across the world and can be renewable or non-renewable (finite). • Geography: The upper course of a river is in high, mountains ground and the river is narrow and fast flowing. The lower course of a river is in low, flat ground and the river is wide and slow flowing. The middle course is between the two. • Geography: Rivers erode, transport and deposit to form waterfalls, meanders and floodplains. • 	<ul style="list-style-type: none"> • Geography: Use of fossil fuels to create plastics, and the effects this can have on the Earth. •
 Physics	5 B	<ul style="list-style-type: none"> • Science: The weather can change rapidly. The four different seasons have different weather patterns. 	<ul style="list-style-type: none"> • Geography: The weather is short-term. Climate is long-term summary of the weather conditions. • Geography: Precipitation is the fall of water as rain, sleet, snow or hail. • Geography: Deserts are places where there is very little precipitation. • Science: There is air all around us on Earth. Air has oxygen in it. • Science: Global warming describes the increase in average temperatures on Earth. 	<ul style="list-style-type: none"> • Science: Air has carbon dioxide in it. 	<ul style="list-style-type: none"> • Science: The water cycle involves evaporation of water from oceans and condensation of water, which falls as precipitation. • Geography: The layer of air around the Earth is called the atmosphere. • Geography: Atmospheric circulation causes some areas on Earth to have higher levels of precipitation than others. • Geography: Tropical rainforests are places where there is lots of precipitation. • 	<ul style="list-style-type: none"> • Science: Air is a mixture of lots of different gases, including oxygen and carbon dioxide. • Geography: The amount of water on Earth is constant. Most is saltwater stored in oceans, and most freshwater is stored as ice or underground. • Geography: Water cycle: Evaporation from the air and transpiration from trees means that water vapour rises in the air. It condenses to form clouds and precipitation occurs when the clouds get heavy. Surface runoff is the flow of water overground; throughflow is the flow of water underground. • Geography: Climate zones share long-term weather patterns. There are six main climate zones: polar, temperate, arid, tropical, Mediterranean and mountains. • Geography: Biomes are areas of the world that, because of similar climates, have similar landscapes, flora and fauna. The major biomes of the world are tundra, tropical rainforests, coral reefs, temperate forests and hot deserts. • Science: There is less and less air further away from the Earth's surface. • Geography: The natural greenhouse effect, the enhanced greenhouse effect, global warming and resulting climate change. • Geography: The increase in frequency of extreme weather events like heatwaves and drought as a result of climate change. 	<ul style="list-style-type: none"> • Geography: Mitigation and adaptation are ways that humans can reduce and live with the effects of climate change. •
 Physics	6	<ul style="list-style-type: none"> • Daytime is when the Earth is facing the Sun; nighttime is when the Earth is facing away from the Sun. 		<ul style="list-style-type: none"> • The Sun emits light, some of which reaches Earth. The Moon reflects light from the Sun. 		<ul style="list-style-type: none"> • Our Sun is one of many stars that make up the Universe. • The distances between us and the bodies in solar system is huge, and even bigger in the Universe. 	

 Biology	7	<ul style="list-style-type: none"> Plants are organised with roots, stem, leaves and flowers. 		<ul style="list-style-type: none"> Humans are organised with organs like hearts and lungs, which do particular jobs. The skeleton and muscles allow the body to move. 		<ul style="list-style-type: none"> A cell is the smallest building block of living things. All organisms are made of cells. There are lots of different types of cell (e.g. sex cells), which each have different purposes. 	<ul style="list-style-type: none"> Micro-organisms are organisms that are so small that we cannot see them with our eyes alone. Respiration takes places in cells.
 Biology	8	<ul style="list-style-type: none"> Living things, including humans, react to their surroundings with their senses. 	<ul style="list-style-type: none"> All living things need food, oxygen, water and certain temperature conditions. Most plants make their own food. Animals' food comes from eating plants (herbivores) or by eating animals (carnivores), which have eaten plants or other animals. These relationships can be represented in a food chain. Plants and animals are often dependent on each other. Organisms are adapted to their environment. If conditions in a habitat change, organisms may not be able to survive. Organisms move, reproduce, are sensitive to their surroundings, grow, need oxygen, get rid of their waste, and need nutrition (MRS GOWN). 	<ul style="list-style-type: none"> Plants make their own food using sunlight, carbon dioxide and water. 	<ul style="list-style-type: none"> The feeding relationships between organisms can be represented as food chains and food webs. They show where the energy is being transferred from and to. 	<ul style="list-style-type: none"> Energy is transferred to the Earth by light. When making their own food, plants transfer some of this energy to their chemical store. As other organisms eat these producers, some energy in this chemical energy store is transferred. 	<ul style="list-style-type: none"> Living things move, reproduce, are sensitive to their surroundings, grow, respire, excrete, and need nutrition (MRS GREN).
 Biology	9		<ul style="list-style-type: none"> Plants and animals reproduce (have offspring). A species is a group of living things of the same type. 	<ul style="list-style-type: none"> When there are no living individuals of a species to reproduce, the species is extinct. When a plant reproduces, it goes through stages of pollination, fertilisation and seed dispersal. The seed will then germinate and grow into a plant 	<ul style="list-style-type: none"> A species is a group of one type of organism. Individuals in this group can breed with each other to produce offspring that can go on to reproduce. 	<ul style="list-style-type: none"> An organism's genome is the information that controls how that individual organism will develop. In sexual reproduction, two parents contribute to the formation of offspring. They each pass down half their genome through specialised cells called sex cells. The two halves are combined during fertilisation. While it inherits genetic information from both parents, the offspring's genome is distinct, which means the offspring is not identical to a parent. Asexual reproduction involves only one parent. In this process, the offspring's genome is an exact copy of the parent's genome. The offspring is identical to the parent. 	
 Biology	10	<ul style="list-style-type: none"> There are lots of types of animal, and some types can be grouped as amphibians, birds, fish, mammals and reptiles. 	<ul style="list-style-type: none"> Biodiversity describes all the different living things in an area. Living things are adapted to their environments. If the environment changes, the organisms may no longer be adapted and may struggle to survive. 	<ul style="list-style-type: none"> We know about extinct and dead species from fossils. These are the preserved remains (or traces) of organisms that lived many years ago. To help scientists make sense of the diversity of organisms, they are classified into different groups. Each group has similar features. 	<ul style="list-style-type: none"> A species is a group of one type of organism. Individuals in this group can breed with each other to produce offspring that can go on to reproduce. 	<ul style="list-style-type: none"> Although organisms of the same species are very similar, there is variation within them. 	<ul style="list-style-type: none"> Variation exists within species, caused by genetic and environmental factors. Living things are found in certain environments because they have the features that enable them to survive there. This adaptation to their environment has come about because of the small differences that occur during reproduction, resulting in some individuals being better suited to the environment than others. In the competition for materials and food, those that are better adapted will survive and are more likely to pass on their adapted feature to their offspring. Fossils are evidence of evolution.



<ul style="list-style-type: none">Humans have five senses. Some people have impairments, like visual and hearing impairments.	<ul style="list-style-type: none">Humans need to exercise, practise good hygiene and eat a healthy and balanced diet to stay healthy. Their diet should be high in fruits and vegetables and low in fats, sugar and salt.	<ul style="list-style-type: none">A balanced diet includes the right proportions of the main food groups of carbohydrates (starch and sugars), proteins, fats, fibre, vitamins and minerals.Animals, including humans, may get diseases (like scurvy) if they are deficient in vitamins and minerals.	<ul style="list-style-type: none">Bacteria are tiny living things. Some are useful for humans, and some can cause diseases. Bacteria can cause tooth decay.Humans with hearing loss may use closed captions, hearing aids and/or sign language.Some substances are toxic; this means they can be poisonous. Humans and other organisms need to avoid these to stay healthy.	<ul style="list-style-type: none">Healthy development includes cognitive, physical, social and emotional development. Most of this happens during infancy and childhood. Ageing happens naturally, and can be sped up by environmental factors like smoking.Some adults are unable to become pregnant. IVF and other treatments can be used.	<ul style="list-style-type: none">Visual impairments include long and short sightedness, colour vision deficiency, and blindness. Some of these can be corrected, and some people with visual impairments will use Braille, magnifying devices, canes and/or guide dogs.Being healthy means we are in a state of physical, mental and social well being and are free from disease. Some drugs can help us and some can harm us (particularly in the wrong quantities).
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Disciplinary Knowledge

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Scientific Attitudes & Planning	<ul style="list-style-type: none"> Scientists look for patterns in the world around them. Scientists group objects or living things based on their properties. Scientists conduct secondary research to learn from what other scientists have already learned 	<ul style="list-style-type: none"> It is important that we keep as much as we can the same, apart from the one thing we measure and the one thing we change. Make a prediction based on substantive knowledge. There are four main stages of enquiry (A&P, M&O, R&P, A&E). Scientists identify potential hazards in their experiments and plan ways to reduce them. 	<ul style="list-style-type: none"> Select most appropriate equipment to measure (the variables) that will give you the best chance of an accurate result. A dependent variable is what you measure; an independent variable is what you change; controlled variables are things that stay the same. Scientists identify factors in an investigation that should be controlled, and try to find ways to control them. Write an appropriate method. Science is studied as three disciplines: biology (study of organisms), chemistry (study of materials) and physics (study of energy). 	<ul style="list-style-type: none"> Set a hypothesis to test. Draw diagram of the investigation. Scientists use models to help explain their ideas. 	<ul style="list-style-type: none"> Science is studied as three disciplines: biology (study of organisms), chemistry (study of properties of matter and how it interacts with energy) and physics (study of energy). Scientists look for patterns in data to try to identify correlations. 	
Measuring & Observing (M&O)	<ul style="list-style-type: none"> Gather information from text/books/ images. 	<ul style="list-style-type: none"> Make systematic observations of an object. 	<ul style="list-style-type: none"> Gather information from the internet. Anomalous results should be discarded and rerecorded. Data is repeatable if the same person repeats the investigation and gets the same results; data is reproducible if the investigation is repeated by a different person and the results are the same. Taking multiple readings allows you to see if your data is repeatable, and helps identify outliers. 	<ul style="list-style-type: none"> Gather information using a data logger (e.g. sound meter app; heart rate app). 	<ul style="list-style-type: none"> Measure force using a Newtonmeter. 	<ul style="list-style-type: none"> Taking multiple readings allows you to see if your data is repeatable, helps identify outliers and allows a mean to be calculated.
Recording & Presenting (R&P)	<ul style="list-style-type: none"> Record numerical or descriptive observations in a table. Draw a diagram, a simple scientific drawing that explains or informs. Use a table to classify items based on properties. Use a Carroll diagram to classify items based on properties. Use a Venn diagram to classify items into two or three sets based on properties. 	<ul style="list-style-type: none"> Use a pair of axes to classify items based on the extent it displays two properties. 	<ul style="list-style-type: none"> Design a table to collect data with the appropriate number of rows and columns and correct headings. 	<ul style="list-style-type: none"> Use a classification key to identify an object. Draw a dichotomous classification key to help others identify an object. Drawings can be labelled and annotated Present information orally using a prop or demonstration. Present information in a written format. Draw labelled and annotated diagrams. 	<ul style="list-style-type: none"> Scatter graphs can help you decide if there is a relationship between two variables. (Geography: Interpret and construct climate graph). Line graphs can be used when data is continuous; bar charts can be used when data is discrete. 	<ul style="list-style-type: none"> Decide which graph is most appropriate for the enquiry.
Analysing & Evaluating (A&E)	<ul style="list-style-type: none"> Make simple statements about the results of an enquiry. 	<ul style="list-style-type: none"> Ask further questions that could be explored to extend findings. 	<ul style="list-style-type: none"> Draw conclusions (e.g. 'the greater the... , the greater the...'). Use scientific understanding to explain their findings. Suggest ways to improve practical procedures to obtain more accurate measurements. Use findings of investigation to make further predictions. 	<ul style="list-style-type: none"> Identify scientific evidence that has been used to support or refute ideas. 	<ul style="list-style-type: none"> Make judgements on the accuracy of the data Some people may agree or disagree with the use of some scientific discoveries. Science is never 'complete' and scientists are always working to make models more accurate or to discover new explanations. 	<ul style="list-style-type: none"> Calculating the mean can be used as a method of analysing data.



Overview Document

SCIENCE OVERVIEW

	Autumn 1		Spring 1		Summer 1	
Year 1	 BIOLOGY Plants Identifying and naming common plants and describing basic structures	 BIOLOGY / PHYSICS Seasonal changes Observing changes across four seasons and describing associated weather	 CHEMISTRY Everyday materials Distinguishing objects from their material, and describing simple properties	Consolidation and review	 BIOLOGY Animals Naming reptiles, fish, amphibians, birds and mammals; carnivores, herbivores, omnivores	 BIOLOGY Humans Human body parts and senses
Year 2	 BIOLOGY Plant growth Plants grow from seeds, and require water, light and a suitable temperature	 BIOLOGY Needs of animals Animals need water, food and air to survive and to have offspring	 CHEMISTRY Uses of materials Comparisons of an object's material with its use; impact of bending, twisting on solid objects	 BIOLOGY Living things & habitats Introduction to habitats, micro-habitats, and simple food chains	 CHEMISTRY Solids, liquids and gases How the same substances can exist as solids, liquids and gases	Consolidation and review
Year 3	 CHEMISTRY Rocks Comparisons of types of rocks and how fossils are formed	 PHYSICS Light Relationship between light and how we see; the formation of shadows	 BIOLOGY Organisms The role of muscles and skeletons; the importance of nutrients	 BIOLOGY Plants Features of flowering plants and what they need to survive	 PHYSICS Forces & motion Introducing pushes and pulls; opposing forces, and balanced forces	 PHYSICS Magnetism Contact and non-contact forces, including friction and magnetism
Year 4	 BIOLOGY Classifying organisms Introduction to classifying animals and their environment	 BIOLOGY Food & digestion The human digestive system and food relationships in ecosystems	 CHEMISTRY Particle model and states of matter States of matter in relation to particle arrangement	 PHYSICS Sounds Relationship between strength of vibrations and volume of sound	 PHYSICS Electricity Simple series circuits	 CHEMISTRY Properties of materials Considering physical and chemical properties
Year 5	 CHEMISTRY Separating mixtures Identifying and separating mixtures; reversible and non-reversible changes	 BIO / CHEM / PHYSICS Energy Introducing the concept of energy stores and energy transfers; relate this to prior knowledge	 BIOLOGY Life cycles Life cycles of a mammal, amphibian, insect, bird, and some reproduction processes	 BIOLOGY Human development Human development to old age	 PHYSICS Forces Gravity, air and water resistance and friction; introduction to pulleys	 PHYSICS Earth and space Movements of planets and the Moon, and relationship to day and night
Year 6	 PHYSICS Electricity Investigating variations in series and parallel circuits, and how electricity is generated	 BIOLOGY Evolution Fossils; introduction to the idea that adaptation may lead to evolution	 PHYSICS Light How light travels and is reflected, and how this allows us to see	 BIOLOGY Further classification Further classification of organisms based on characteristics	 BIOLOGY Functions of the human body Human circulatory system; transport of nutrients within the body	 CHEMISTRY Physical and chemical changes Identifying physical and chemical changes