Science Curriculum Progression Map

Early Years Foundation Stage

Understanding the World educational programme (taken from the EYFS Statutory Framework):

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

Early Learning Goals that link to Science:

ELG The Natural World:

- 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

In the EYFS, children:

- Explore their own bodies and their senses.
- Learn to name the parts of the body and what we use them for.
- Learn about animals and their homes, including pets, farm animals and wild animals.
- Observe changes such as chicks hatching and caterpillars turning into butterflies, the seasons changing, plants and flowers growing. They are supported to notice and talk about what is happening and why.
- Learn about being healthy, including eating a range of foods and taking part in exercise.
- Develop a sense of curiosity and exploration through a range of resources relating to our topics e.g. magnets, magnifying glasses, colour paddles, things to smell and taste etc, and through the continuous provision areas such as sand, water, small world, construction etc.

Science Curriculum Progression Map

KS1 & KS2 – Autumn 1

	Year 1 **Seasonal Changes**	Year 2 **Uses of Everyday Materials**	Year 3 **Scientific Enquiry**	Year 4 **Animals Including Humans**	Year 5 **Forces**	Year 6 **Electricity**
	Physics – Earth Science	**Chemistry – Materials**	**Combination**	**Biology – Animals including Humans**	**Physics – Forces**	**Physics – Energy**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	There are four seasons called winter, spring, summer and autumn. The seasons happen over different months of the year (December-February, March-May, June-August, September-November). Each season brings different changes. The days get shorter in autumn, trees change colour, weather gets colder and animals hibernate. The days are short in winter. We do not get much sunshine over our part of Earth in winter. This makes the weather cold. Trees lose their leaves in winter to save energy. Hibernation protects animals from the cold. The temperature starts to get warmer in spring because our part of Earth gets more sunlight. Daylight gets longer. Plants grow, flowers bloom and trees grow their leaves again. Animals come out of hibernation. Many animals have babies in the spring because it is warmer – their babies will have time to grow before the weather cools again. It can rain a lot in spring. The temperature is warm in summer. This is because our part of Earth gets lots of sunshine. We have to protect our skin in the sun. Heatwaves can be dangerous for animals and plants as we need water to drink. We usually get the most rainfall in spring and autumn.	Objects are made out of materials. Materials have different properties e.g. strength, stretchiness, transparency, waterproof. Their properties make them suitable for different purposes. Wood comes from trees – it is a natural material. It is hard and a suitable building material. Plastic comes from oil – it is a manmade material. It is strong and waterproof. Glass comes from sand – it is a natural material. It is melted and moulded into any shape. It is fragile and transparent. Metal comes from minerals – it is a natural material. It can be melted. It is strong and shiny. Bricks are made from clay. Paper and cardboard come from trees. Materials can be strengthened by changing their structure. The shape of some materials can be changed by stretching, twisting, bending and squashing. Others return to their original form. Some can be melted. Changing the shape of a material is useful e.g. saving or filling space, recycling. Charles Macintosh invented waterproof clothing. John McAdam invented a road surface.	The word 'solar' is anything related to the sun. Solar panels are used as a source of renewable energy. Substances can be acidic, neutral of alkaline. Litmus paper changes colour depending on how acidic or alkaline a substance is. Baking is a combination of chemistry, biology and physics.	To use food for energy, growth and repair, animals need to break it down into smaller parts that their body can use. This is called digestion. The digestive system is made up of many parts that each have a role e.g. mouth, teeth, saliva, oesophagus, stomach, liver, gall bladder, small intestine, large intestine, rectum, anus. There are four types of teeth: incisors, canines, pre-molars and molars. Each tooth type has a function. Enamel protects the inner, sensitive parts of the teeth. Plaque causes tooth decay. A hole in the tooth is called a cavity. We need to protect our teeth by brushing them with toothpaste containing fluoride and avoiding too many sugary foods. Living things depend on each other within their habitat. Arrows in a food chain show how energy is transferred. A producer makes their own food using sunlight, water and nutrients. A consumer eats other living things to gain their energy. Predators are at the top of the food chain. Changes to ecosystems can impact food webs.	A force is either a push or pull. There are contact and non-contact forces. A force can cause an object to increase speed, decrease speed, change direction or change shape. Gravity is a force that pulls objects towards the centre of the earth. Sir Isaac Newton discovered gravity. Weight is measured in Newtons. Mass is measured in grams and kilograms. Friction occurs when two objects move against each other. Air resistance is a kind of friction that slows down objects moving through the air. Water resistance is a kind of friction that slows down objects moving through water. Upthrust is the force that can keep objects afloat. Changing the shape of an object affects the forces that act upon them. Increasing the surface area of something increases the amount of air resistance acting upon it . Simple machines can allow a smaller force to have a great effect. A lever uses a long pole and a pivot point to increase a force. Pulleys use a rope running over a pulley wheel to increase a force. Gears use cogs with teeth to increase the force.	Symbols are used when drawing circuits. A battery is a collection of cells. Electricity can flow from one place to another - this is called electrical current. We can control the flow of electricity in a circuit. Circuit components need electricity to work. Circuit components turn electrical energy into different energy forms. The number of components in a circuit can affect the output of a circuit. Voltage is the pressure from a battery that pushes electricity around a circuit. The voltage of a battery or the number of batteries can change the brightness/volume of components. Switches control the flow of electricity in a circuit. A switch creates makes a circuit complete or incomplete. Making a gap in a circuit prevents electricity from flowing.

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KS1 & KS2 – Autumn 1

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	Physics – Earth Science	**Chemistry – Materials**	**Combination**	**Biology – Animals including Humans**	**Physics – Forces**	**Physics – Energy**
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Observing and measuring *Observation over time*	Lesson 1 – Observing and measuring *Identifying, grouping & classifying*	Lesson 1 – Asking questions *Comparative / fair testing*	Lesson 1 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 1 – Making predictions *Comparative / fair testing*	Lesson 1 – Recording data *Identifying, grouping & classifying*
	Lesson 2 – Recording data *Pattern seeking*	Lesson 2 – Setting up tests *Comparative / fair testing*	Lesson 2 – Recording data *Observation over time*	Lesson 2 – Recording data *Identifying, grouping & classifying*	Lesson 2 – Setting up tests *Problem-solving*	Lesson 2 – Making predictions *Comparative / fair testing*
	Lesson 3 – Observing and measuring *Pattern seeking*	Lesson 3 – Setting up tests *Comparative / fair testing*	Lesson 3 – Making predictions *Comparative / fair testing*	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Interpreting and communicating results *Comparative / fair testing*	Lesson 3 – Interpreting and communicating results *Problem-solving*
	Lesson 4 – Recording data *Identifying, grouping & classifying*	Lesson 4 – Recording data *Comparative / fair testing*	Lesson 4 – Interpreting and communicating results *Observation over time*	Lesson 4 – Observing and measuring *Comparative / fair testing*	Lesson 4 – Setting up tests *Comparative / fair testing*	Lesson 4 – Evaluating *Pattern seeking*
	Lesson 5 – Recording data *Identifying, grouping & classifying*	Lesson 5 – Interpreting and communicating results *Comparative / fair testing*	Lesson 5 – Setting up tests *Comparative / fair testing*	Lesson 5 – Interpreting and communicating results *Pattern seeking*	Lesson 5 – Evaluating *Problem-solving*	Lesson 5 – Recording data *Problem-solving*
	Lesson 6 – Interpreting and communicating results *Pattern seeking*	Lesson 6 – Evaluating *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Comparative / fair testing*	Lesson 6 – Recording data *Research*	Lesson 6 – Observing and measuring *Problem-solving*	Lesson 6 – Observing and measuring *Comparative / fair testing*

Science Curriculum Progression Map

KS1 & KS2 – Autumn 1

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Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to…* *Be able to…*	**Perform simple tests** – *measuring rainfall over 5 weeks* **Identify and classify** – *sorting and comparing winter scenes with spring scenes* **Use observations and ideas to suggest answers to questions** – *observing changes across the four seasons, drawing a weather wheel to show a typical day you might experience in each season, designing a hibernation den for an animal to explain what they need protection from in winter, presenting a weather forecast including a variety of different weather, drawing and labelling a summer outfit vs a winter outfit* **Gather and record data to help answer a question** – *measuring rainfall over 5 weeks and presenting in a bar graph*	**Perform simple tests** – *bridge-building investigation (mass a material can hold, how structure affects strength – triangles), chocolate road investigation (strengthening a road)* **Use observations and ideas to suggest answers to questions** – *suggesting other objects that can be made from materials, why it is useful to change the shape of materials, ranking materials from most to least waterproof, suggesting why materials can be combined to create products* **Gather and record data to help answer a question** – *investigating which materials are suitable for building a bridge (materials that hold the most mass), measuring the length of the stretch for different materials, exploring which materials can be changed (bending etc.), measuring how much water passes through a material, adding raisins to strengthen a chocolate road (recording in tables)*	**Ask relevant questions and use different types of scientific enquiries to answer them** – *investigating how a solar oven can be made more effective (what measurements can you take? How can you make a comparison? What is your prediction? Why?* **Set up simple practical enquiries, comparative and fair tests** – *recording methods and conclusions for coin-cleaning investigation, changing a recipe for baking a cake by changing one variable at a time* **Make systematic and careful observations and, where appropriate, take accurate measurements using standard units (using a range of equipment including thermometers and data loggers)** – *investigating which substance is the most effective at cleaning coins* **Gather, record, classify and present data in a variety of ways to help in answering questions** – *creating tables with headings and deciding whether to present using bar chart or line graph (solar oven investigation)* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables** – *presenting findings of solar oven investigation in tables and graphs (choose bar or line and explain why)* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** **Identify differences, similarities or changes related to simple scientific ideas and processes** – *evaluating method for investigating which substance is the best for cleaning coins* **Use straightforward scientific evidence to answer questions or to support their findings** – *4 part conclusions: what happened, evidence, scientific explanation, comparing results with prediction*	**Set up simple practical enquiries, comparative and fair tests** – *placing eggs in liquids and brushing an area for different lengths of time to observe changes (tooth brushing and effect of liquids on teeth)* **Make systematic and careful observations and, where appropriate, take accurate measurements using standard units (using a range of equipment including thermometers and data loggers)** – *explaining how food travels through the digestive system (video model)* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables** – *creating a labelled model/diagram of the digestive system, creating colour-coded diagrams using keys to explain the role of each type of tooth, creating food chains within a chosen ecosystem, creating a food web containing 8 organisms from 1 ecosystem* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *explaining the journey food takes through the digestive system* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** – *using results of egg experiment to explain tooth care / decay*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *investigating the best surface to place on the floor to prevent people from slipping* **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** – *using Newton meters, designing an experiment to create the best parachute, recording results of 3 tests and calculating average* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentation** – *designing and creating a pulley system to lift a load, creating a set of three gears that interact with one another* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *investigating whether the mass of a ball affects the force of gravity (Sir Isaac Newton)*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *investigating the effect that voltage has on components within a circuit, investigating how the number of components affects the output, designing and building a circuit to model traffic lights* **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** – *using voltmeters, creating a loop and wire game and playing it, recording repeated attempts and calculating average time* **Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *drawing accurate circuit diagrams* **Use test results to make predictions to set up further comparative and fair tests** **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *explaining how to correct a broken circuit*

Science Curriculum Progression Map

KS1 & KS2 – Autumn 1

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	Physics – Earth Science	**Chemistry – Materials**	**Combination**	**Biology – Animals including Humans**	**Physics – Forces**	**Physics – Energy**
Possible Misconceptions	**It is always hot and sunny in summer. It always snows in winter:** Demonstrate that the summer season can also bring with it rain and thunderstorms, just as we can also have milder winter months. **Flowers only grow in spring:** Highlight the many flowers that also bloom in the winter and the evergreen trees that keep their leaves all year round. **Trees and flowers die in winter:** Teach children that many plants 'rest' over winter, releasing their flowers and leaves to conserve energy so they can withstand the colder months. During the spring and summer months, plants store energy in their roots or bulbs, which allows them to be dormant during the winter – much like hibernating animals. Clouds always lead to rain. Dark clouds always lead to rain. Weather forecasts are 100% accurate.	**Materials can only be used for one purpose:** Investigate how the properties of materials can be changed or altered, enabling them to be used for different purposes. Wood can be used as an example to demonstrate that it can be hard enough to be used as furniture but also manufactured to become paper. The word 'rock' is an object rather than a material. Solid is another word for hard. Solids made of small pieces that can be poured are liquids.	**All variables must be kept the same:** Children may assume that fair testing requires all variables to remain constant. They might not understand the concept of independent and dependent variables, and the importance of manipulating and measuring them to investigate cause-and-effect relationships. **Experiments always yield expected results:** Children may think that experiments always produce the desired or predicted outcome. They will start to realise that unexpected results are common in science and can lead to new discoveries and further investigations.	**The stomach is the only organ involved in digestion:** Some children might believe that the stomach is solely responsible for breaking down food. In this unit, they will become aware of the role played by the small intestine, liver, pancreas, and other digestive organs. **Food chains are always linear:** Some children might think that food chains are always simple, with one organism directly feeding on another in a straight line. The introduction of food webs in this unit will help children understand the complexity of interconnected food webs and the multiple feeding relationships that exist in ecosystems. **Plants are not as important in food chains:** Children may overlook the role of plants in food chains and webs. They might focus more on animal interactions and forget that plants are the primary producers, forming the base of most food chains by converting sunlight into energy through photosynthesis. The stomach is located behind the navel. The digestive system has different 'tubes' for urine and faeces (linking eating solids to making faeces and drinking liquids to making urine).	Heavier objects fall at greater speeds than lighter objects. Forces always act in pairs that are equal. If an object is moving, more force is being applied in the direction it is moving. An object at rest has no forces acting on it. There is no gravity on the moon. Gravity is stronger the further off the ground something is. Smooth surfaces have no friction. Objects always travel better on smooth surfaces. The heavier an object is, the faster it falls because more gravity is acting on it. The best place to put the fulcrum is in the centre of the lever.	Electricity works by coming out of one end of a cell. Electricity comes out of both ends of a cell. A circuit uses up electric current (rather than electric energy). Voltage makes a circuit work by travelling around the wires. Bigger batteries make bulbs brighter. Components in a circuit that are closer to the battery get more electricity.

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KS1 & KS2 – Autumn 1						
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Key Vocabulary	changes, compare, record, results, graph, measuring season, spring, summer, autumn, winter, hibernate, temperature, weather, harvest, protect, sleet, frost, chick, grow, heatwave, warm, sun protection, rainfall	material, property, object, suitable, brick, wood, glass, metal, cardboard, paper, bridge, structure, obstacle, triangle, construction, hinder, stretchy, elastic, floppy, limit, force, twist, bend, stretch, squash, waterproof, protective, fluorescent, safety, mackintosh, bound, road	scientific investigation, prediction, plausible, record, results, graph, data, table, practical, method, evidence, compare, enquiry, conclusion, explanation, variable, control experiment, fair test, measurement, collated, conclusive, scientific knowledge, diagram, equipment solar, renewable energy, acid, alkali, pH scale, baking	small intestine, digestive system, large intestine, oesophagus, stomach, gall bladder, absorb, saliva, liver, peristalsis, jaw, gum, molars, canines, incisors, plaque, enamel, tooth decay, cavity, fluoride, consumer, predator, ecosystem, prey, producer, tundra, threatened, interdependence, hide, food web	weight, mass, astronomy, Sir Isaac Newton, gravity, Galileo Galilei, opposing, air resistance, parachute, streamlined, upthrust, buoyant, water resistance, sink, Newton meter, resistance, lubricant, Newton, friction, load, pulley, lever, pivot, fulcrum, gear, mesh, mechanism, rack and pinion, bevel gear	circuit, circuit diagram, symbol, battery, wires, voltage, voltmeter, brightness, electricity, current, blown, variable resistor, resistor, LED, dimmer switch, fair test, variable, output, systematically, control test, timer-based, sensor, synchronised, signal, traffic light, closed electric circuit, conductor, insulator, indicating

Science Curriculum Progression Map

KS1 & KS2 – Autumn 2

	Year 1 **Animals Including Humans 1 – All About Me**	Year 2 **Living Things and their Habitats 1**	Year 3 **Animals Including Humans**	Year 4 **Living Things and their Habitats 1**	Year 5 **Properties of Materials**	Year 6 **Light**
	Biology – Animals including Humans	**Biology – Living Things and their Habitats**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Physics – Energy**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	The skeleton supports humans' bodies and helps us move. It also protects our organs. Joints are where bones fit together so we can move, like the elbow and the knee. Lungs, the heart, the brain are important organs. Humans have 5 senses – taste, smell, touch, sight and sound. Our sense organs send messages to our brain. Our eyes allow us to see. The pupil is the black spot in the middle of the eye. The iris is the coloured part. Our ears allow us to hear – we hear vibrations. Loud sounds can damage our ears and cause deafness. We use our tongue to taste. Taste buds are found on our tongues. Tastes can be bitter, sweet, salty, sour. We use our skin to touch and see how something feels. We can detect textures, temperatures and pain. Our fingertips are very sensitive. We use our nose to smell. Our nose hairs protect our lungs from insects, dust and pollen. Smelling can keep us safe e.g. rotten food or fire.	All living things move, reproduce, have senses, grow, respire, excrete and need nutrition (MRS GREN). A habitat is a large area where you can find a variety of living things. Within a habitat, you can find a microhabitat. This is where smaller living things can be found. Animals are suited to different conditions. Animals need water, food and air to survive. Plants are producers. Other living things are consumers. Herbivores only eat plants. Carnivores only eat meat. Omnivores eat both. Plants make their own food using sunshine, air, water and nutrients from the soil. Arrows in a food chain mean 'eaten by…' Farms and orchards rear livestock, grow vegetables and fruits. Some are cooked and canned or frozen to keep them fresh for longer.	Animals, including humans, get nutrition from the food they eat. There are five key food groups: carbohydrates, fats and oils, proteins, fruit and vegetables, dairy. Food from each food group is essential for human growth and health. A balanced diet means eating the right amounts of each food group. Animals have different types of skeletons. Vertebrates have endoskeletons, which support and protect their body. Some invertebrates have skeletons on the outside of their body, called exoskeletons. Others don't have any bones at all – they have hydrostatic skeletons. Some bones protect softer and more fragile parts of the human body. Others help us move. Animals' endoskeletons have adapted to help them move within their environment. Muscles are attached to the bones in endoskeletons to help animals move. Animals with endoskeletons have voluntary and involuntary muscles. Involuntary muscles work all of the time.	Habitats provide food, shelter, places to hide and places to reproduce for the organisms that live there. Some habitats have extreme conditions, so the animals and plants that live there have adapted features which suit these conditions. Common habitats in the UK include woodland, farmland, ponds, coasts, grassland and towns. Scientists sort living things using classification. Fish are cold-blooded vertebrates that live in water and have gills. Amphibians are cold-blooded vertebrates that live both in water and on land. Reptiles are cold-blooded vertebrates with scaly skin. Birds are warm-blooded vertebrates with feathers that can fly. Mammals are hairy, warm-blooded vertebrates that breathe air. Insects are invertebrates with six legs and three body parts. Molluscs are invertebrates with a soft body, and some have shells. Arachnids are invertebrates with eight legs and two body parts. Classification keys separate living things into smaller subgroups, using "yes or no" questions. Plants can be categorised as flowering or non-flowering.	Materials can be grouped according to their properties. The properties of materials make them suitable for specific tasks. Some properties are visible. Others can be found by testing. Conductive materials allow heat or electricity to pass through them. Thermal conductors allow heat to be transferred through the material. Thermal insulators do not allow heat to transfer through quickly. Hardness is the ability of a material to resist a compressive force. Dissolving is when something becomes incorporated into a liquid. When it is incorporated into a liquid, it is called a solution. Solutes are materials that can dissolve in liquids. Only soluble materials can dissolve in liquids. Insoluble materials do not change when they are added to a liquid. A solvent is a substance that can dissolve other substances. In a solution, the liquid is the solvent and the chemical which is added to it is the solute. The saturation point is where the solvent cannot dissolve any more of the solute. Pure substances have no other substances mixed into them. In mixtures, the particles are not bonded to each other. They can be separated.	Light enables us to see by entering our eyes through the pupils. Signals are then sent to our brains. Light travels in straight lines. When we draw scientific diagrams, the arrow points towards the eye because light travels into the eye. Some light sources are natural, and some are artificial. The iris helps the pupil to open and close. Inside the retina, light rays become electrical signals which are sent to the brain. Shadows are always the same shape as the object that blocked the light. The size of shadows can change but the outline shape stays the same as the object. Light from the sun is made up of the colours of the rainbow. When light travels through a prism, the glass slows it down and changes its course. Different colours are slowed down different amounts when going through a prism. A periscope uses reflects an image out of sight using light and mirrors.

Science Curriculum Progression Map

KS1 & KS2 – Autumn 2

	Year 1 **Animals Including Humans 1 – All About Me**	Year 2 **Living Things and their Habitats 1**	Year 3 **Animals Including Humans**	Year 4 **Living Things and their Habitats 1**	Year 5 **Properties of Materials**	Year 6 **Light**
	Biology – Animals including Humans	**Biology – Living Things and their Habitats**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Physics – Energy**
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 1 – Making predictions *Comparative / fair testing*	Lesson 1 – Recording data *Identifying, grouping & classifying*
	Lesson 2 – Observing and measuring *Pattern seeking*	Lesson 2 – Observing and measuring *Research*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Observing and measuring *Problem-solving*	Lesson 2 – Setting up tests *Comparative / fair testing*
	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Observing and measuring *Research*	Lesson 3 – Interpreting and communicating results *Research*	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Observing and measuring *Pattern seeking*	Lesson 3 – Evaluating *Problem-solving*
	Lesson 4 – Setting up tests *Research*	Lesson 4 – Recording data *Research*	Lesson 4 – Observing and measuring *Identifying, grouping & classifying*	Lesson 4 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 4 – Setting up tests *Comparative / fair testing*	Lesson 4 – Observing and measuring *Comparative / fair testing*
	Lesson 5 – Observing and measuring *Identifying, grouping & classifying*	Lesson 5 – Recording data *Research*	Lesson 5 – Interpreting and communicating results *Problem-solving*	Lesson 5 – Interpreting and communicating results *Problem-solving*	Lesson 5 – Evaluating *Comparative / fair testing*	Lesson 5 – Interpreting and communicating results *Problem-solving*
	Lesson 6 – Recording data *Pattern seeking*	Lesson 6 – Recording data *Identifying, grouping & classifying*	Lesson 6 – Interpreting and communicating results *Research*	Lesson 6 – Observing and measuring *Research*	Lesson 6 – Evaluating *Problem-solving*	Lesson 6 – Asking questions *Pattern seeking*

Science Curriculum Progression Map

KS1 & KS2 – Autumn 2

	Year 1 **Animals Including Humans 1 – All About Me**	Year 2 **Living Things and their Habitats 1**	Year 3 **Animals Including Humans**	Year 4 **Living Things and their Habitats 1**	Year 5 **Properties of Materials**	Year 6 **Light**
	Biology – Animals including Humans	**Biology – Living Things and their Habitats**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Physics – Energy**
Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to...* *Be able to...*	**Perform simple tests –** *using a range of instruments/objects to create sounds* **Identify and classify –** *naming and labelling important parts of the body, sorting smells children like/dislike* **Use observations and ideas to suggest answers to questions –** *observing how someone's pupil changes when lights are turned off, describing how foods taste* **Gather and record data to help answer a question –** *drawing a still life or, focusing on colours and shapes that can be seen (eyesight), sorting sounds into loud/quiet/pleasant/unpleasant (hearing), comparing textures and completing a comparison table*	**Ask simple questions and recognise that they can be answered in different ways** – *researching different animals' diets, which animals might live in this habitat? What might they eat? Where does my food come from?* **Observe closely, using simple equipment –** *identifying and naming insects and plants found locally* **Identify and classify** – *classification walk (living / dead / never been alive)* **Use observations and ideas to suggest answers to questions –** *looking for and classify things into living, dead and have never been alive, designing and creating own microhabitats, making simple food chains and explaining them* **Gather and record data to help answer a question** – *animals and plants found locally*	**Gather, record, classify and present data in a variety of ways to help in answering questions –** *sorting food according to 5 key food groups* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables** – *creating pictograms of food groups that children eat, assembling a 12-part human skeleton with labels, creating models of the arm and explaining how they move* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *researching and reporting on types of skeletons that animals have* **Identify differences, similarities or changes related to simple scientific ideas and processes** – *matching animals to their endoskeletons* **Use straightforward scientific evidence to answer questions or to support their findings** – *exploring food labels and reporting on healthy choices*	**Gather, record, classify and present data in a variety of ways to help in answering questions** – *identifying and sorting animals according to habitats, explaining why they are suited to their environment, classifying animals in different ways and selecting own methods to sort them (e.g. tables, Venn diagrams), writing classification keys, identifying and sorting flowering and non-flowering plants* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables** – *classifying flowering or non-flowering plants, following a pond-dipping session* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *creating a brochure about a chosen local habitat, explaining the conditions and the species of plants and animals they expect to find there, presenting a "new species" to a peer and classifying it* **Identify differences, similarities or changes related to simple scientific ideas and processes** – *designing own animal, based on an existing species with adaptations (explaining how they are suited to their habitats)*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *predicting and investigating whether materials are electrical conductors, thermal conductors, transparent or magnetic* **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** – *testing the thermal conductivity of different materials (thermometers, degrees Celsius)* **Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *recording whether substances are soluble or insoluble* **Use test results to make predictions to set up further comparative and fair tests** – *planning and carrying out further tests to see what affects the solubility of substances (choosing variables to change)* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *investigating hardness of materials and ranking them to identify which are suitable for use in construction (buildings, furniture, objects)*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *what happens to light when you bend the tube? How does the angle of reflected light change when you change the angle at which you point the torch? Where should you place the parasols so that people have more shade?* **Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *recording the length of shadows and adding data to create line graphs* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *measuring reflectivity of different surfaces and recoding in tables to draw conclusions* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *carrying out a series of mini experiments to explore refraction, colours in light and what happens when looking through filters*

Science Curriculum Progression Map

KS1 & KS2 – Autumn 2

	Year 1 **Animals Including Humans 1 – All About Me**	Year 2 **Living Things and their Habitats 1**	Year 3 **Animals Including Humans**	Year 4 **Living Things and their Habitats 1**	Year 5 **Properties of Materials**	Year 6 **Light**
	Biology – Animals including Humans	**Biology – Living Things and their Habitats**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Physics – Energy**
Possible Misconceptions	**Only our hands can feel the sense of touch:** When we talk about touching, we often refer to the act of touching with our hands or fingertips. However, it is not our hands that feel the sense of touch but our skin. This is why we can feel the sense of touch all over our bodies and why our knees hurt if we fall over! **Our sense organs act alone:** Start building the larger concept of how different parts of our bodies work together. Our eyes, ears, noses, skin and tongues are really just messengers that give information for our brains to decipher. Our brain then tells the rest of our body how to react. Light travels from our eyes. A person is blind without their glasses. People cannot be partially blind or deaf. Sight and sound are the only senses you can lose.	**A habitat is an animal's 'home':** A common misconception is that a habitat is where an animal makes its den or lair. However, the term 'habitat' refers to the much wider area where a living thing can survive. **All animals can survive in the same habitat:** Children might think that all animals are transportable and able to live anywhere in the world. This important unit teaches children that animals have adapted to suit the conditions and temperatures of their environment. Fire is alive because it moves, grows and reproduces. Plants and seeds are not alive as they do not seem to move. Arrows in a food chain mean 'eats' (rather than 'is eaten by'). The death in one part of a food chain has no effect on the rest of the food chain. Wild animals always have food available to them. The living thing at the top of the food chain is a predator of all other living things in the food chain. Animals in soil (e.g. worms, beetles) breathe by coming to the surface.	**All fats are 'bad' or inherently unhealthy:** Children might not understand that all food groups are necessary for a balanced diet and that a small amount of fat is essential for the absorption of vitamins A, D and E. Whilst large amounts of fats pose health risks, small qualities of unsaturated fat provides the energy needed. **Eating fruit and vegetables exclusively gives you all the nutrients needed for a healthy diet:** Children will start to understand that each food group has health benefits and should be eaten as part of a balanced diet. Each food group has a role to play in our bodies' growth, maintenance and repair, as well as our energy levels. **Only the human body has a skeleton:** Children may assume skeletons are unique to humans and overlook the fact that animals also have skeletons. They may not understand the similarities and differences in the skeletal structures of various species. **The skeleton is one single bone:** Children will begin to understand that not all bones are the same and that different bones in the body have distinct shapes, sizes and functions.	**Habitats remain unchanged:** Children may have the misconception that habitats stay the same over time and are not subject to change or human impact. They may not understand that habitats can be altered or destroyed due to natural events or human activities, leading to the displacement or endangerment of species. **All members of a species look and behave the same:** Some children may assume that all members of a particular species look identical and behave in the same way. They may not grasp the natural variations and individual differences that exist within a species due to factors like genetics, environmental influences and adaptation. **Adaptations happen quickly and purposefully:** Children may think that adaptations occur quickly and intentionally in response to an organism's needs. They may not understand that adaptations are gradual, result from genetic variations, and are driven by natural selection over long periods of time.	**All materials can be grouped together based on their properties:** There are some materials that have properties that do not fit neatly into any one category. **When something dissolves, it disappears: When a solute dissolves in a solvent, a solution is created; for example, salt and water -> salty water.** The salt particles are evenly distributed throughout the water but cannot be seen. If you were to evaporate the water, you would be able to see the salt again. **Melting and dissolving are the same:** Melting occurs when a solid changes to a liquid (ice melting to water). Dissolving is when something is mixed with a solvent and the particles of the solute are evenly distributed throughout the solvent. For example, sugar dissolves in water. Melting is a physical change, whereas dissolving is a chemical change. **The solubility of a material is the same in all liquids:** The solubility of a material can vary depending on the liquid that it is dissolved in. For example, salt is more soluble in water than it is in oil. **All metals will respond to magnets in the same way:** Some metals, such copper and gold, are not magnetic, so will not be attracted to a magnet. **All mixtures can be separated using the same methods:** The method that is used to separate a mixture will depend on the properties of the materials in the mixture. For example, a mixture of sand and water can be separated using sieving, while a mixture of oil and water can be separated using decanting. **Irreversible changes are bad:** Cooking and burning fuel for heating are all examples of useful irreversible changes. **A material which is a good conductor only conducts heat:** Typically, metals are good conductors of both electricity and heat.	**Light travels from our eyes to an object, allowing us to see it:** Light travels from a source, bounces off an object and into our eyes, allowing us to see it. **Light travels instantaneously:** Although light travels incredibly fast, it still takes around 8 minutes for light from the Sun to reach Earth. **Because light travels in straight lines, it cannot bend, or change direction:** Light can be refracted when it passes through water, or a prism. **Light is always white:** Light is made up of a spectrum of colours, as demonstrated by a rainbow or when light passes through a prism. These phenomena are explored in lesson 6 of this unit. We can still see when there is an absence of light. Light is only found in bright areas. The moon and reflective surfaces are light sources. We see things because light travels from our eyes to objects. Our eyes 'get used' to the dark. Shadows contain details of the object and not just the outline. Shadows result from objects giving off darkness.

Science Curriculum Progression Map

KS1 & KS2 – Autumn 2						
	Year 1 **Animals Including Humans 1 – All About Me**	Year 2 **Living Things and their Habitats 1**	Year 3 **Animals Including Humans**	Year 4 **Living Things and their Habitats 1**	Year 5 **Properties of Materials**	Year 6 **Light**
	Biology – Animals including Humans	**Biology –** Living Things and their Habitats	**Biology –** Animals including Humans	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Physics – Energy**
Key Vocabulary	body, joint, skeleton, limb, head, brain, eyelash, eye, sight, pupil, sound, ear, sign language, vibration, deafness, tongue, mouth, taste, flavour, sweet, bitter, salty, sour, touch, fingertips, skin, organ, brain, smell, odour, nose, nostril, nose hair	senses, nutrition, reproduce, excrete, respire, habitat, microhabitat, fungi, survive, shelter, antennae, suitable, condition, colony, insect, producer, consumer, herbivore, carnivore, omnivore, food chain, life cycle, nutrient, rot, automated, frozen food, forklift truck, refrigerated lorry, canned	nutrition, carbohydrate, protein, vitamin, mineral, nutrition label, portion, energy, balanced, diet, vertebrate, invertebrate, endoskeleton, exoskeleton, hydrostatic skeleton, humerus, ulna, radius, tibia, fibular, skull, ribcage, spine, muscle, contract, hamstrings, biceps, diaphragm	classification key, sub-group, identify, criteria, classify, characteristics habitat, microhabitat, conditions, adapted, camouflage, coastal, grassland, environment, climate, exposure, vertebrate, invertebrate, species, organism, region, features, colouring, blubber, ecosystem, oxygenised, flowering plant, non-flowering plant, pond dipping	conductive, magnetic, durable, transparent, versatile, thermal, conduction, molecules, degrees Celsius (°C), insulator, hardness, force, iron, steel, stone, dissolve, solute, insoluble, soluble, solvent, solution, substance, saturation, pure substance, mixture, filtering, sieving, evaporation	scientific diagram, real-life problem light, eye, light source, symbol, reflected, mirror, bounce, direction, surface, periscope, angle, mirror, line of sight, utilise, shadow, block, opaque, transparent, translucent, plan, sun shade, rotate, direction, optical, phenomena, disperse, spectrum, refraction

Science Curriculum Progression Map

KS1 & KS2 – Spring 1

	Year 1 **Exploring Everyday Materials 1**	Year 2 **Living Things and their Habitats 2 – Habitats Around the World**	Year 3 **Rocks**	Year 4 **Living Things and their Habitats 2 – Conservation**	Year 5 **Changes of Materials**	Year 6 **Animals Including Humans**
	Chemistry – Materials	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Biology – Living Things and their Habitats**	**Chemistry – Materials**	**Biology – Animals including Humans**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	Materials are used to make the objects around us. All objects are made from materials. Some everyday materials that objects are made from include wood, plastic, glass, fabric and metal. Each material can be used to make many different things, for example plastic can be made into cups, plates, toys, chairs. Properties of materials are things we can measure, see or feel. Materials have different properties that make them useful for different tasks. Some materials will be better suited to certain purposes than others. Some materials are natural and some are manmade.	A habitat must provide everything that a living organism needs to survive. Animals adapted to suit life in different habitats. Some organisms can be found living in lots of different habitats. Others can only be found in one type of habitat. A microhabitat is a small area within a habitat which differs somehow from the surrounding habitat. Organisms can die if they are taken out of their habitat or their habitat changes. Humans affect and change habitats in different ways, for example, cutting down trees or polluting land and water. Organisms that no longer exist are called extinct. Rainforests are hot and moist. Deserts are dry and hot or cold. Ocean habitats vary in temperature. Pollution and overfishing pose risk to ocean habitats. The Arctic is sea surrounded by land in the northern polar region. The Antarctic is land surrounded by sea in the southern polar region. Some animals live in underground habitats and are adapted to living underground.	Rocks have different names and can be sorted into groups according to their properties. There are three main groups of rock called igneous, sedimentary and metamorphic. Igneous rocks come from beneath the Earth's surface. They are formed when volcanos erupt and lava cools. Igneous rocks are different, depending on how slowly or quickly lava cools. Sedimentary rocks are formed by layers of sediment under the sea. Sedimentary rock is soft. Metamorphic rocks started as igneous or sedimentary rocks. They changed under immense heat and pressure. Some rocks have small air spaces in them allowing water to pass through them. If a rock allows water to pass through, it is called permeable rock. If a rock doesn't allow water to pass through, it is called impermeable rock. There are three main types of weathering: chemical, physical and biological weathering. Flowing water causes rocks to erode. Fossils are formed when an organism dies and layers of sediment cover it. Its imprint remains in the rock. Fossils take thousands of years to form. Plants can be fossilised too. Scientists who study fossils are called palaeontologists. Soil is made from rocks and organic matter. Organic matter is made from the decaying remains of living things. There are different types of soil, like chalk, peat, sand, clay, silt and loam.	Habitats and ecosystems are affected by changes in the seasons. Areas that lie on the equator are usually hot and wet all year round. Some parts of Asia have three seasons: summer, monsoon and winter. The monsoon season is wet. Deforestation happens so humans can use wood and also to make space for housing and farming. Deforestation can lead to drought. Deforestation causes the loss of habitats. Recycling and reusing materials and planting trees are ways to help the environment. Air pollution is caused by burning fossil fuels, such as in vehicles, factories or power stations. Greenhouse gases cause climate change, which has caused our planet to get warmer. Climate change has caused extreme weather events and the extinction of many organisms. Water pollution is caused by chemicals, waste products, sewage ad oil spills. Plastic waste is dangerous as it does not decompose. We can conserve water by turning taps off, using water butts and having shorter showers. We can also reuse water. Conservation areas are protected and mean that wildlife can grow and reproduce.	A pure substance has no other substances mixed into it. A solution is a mixture of substances. Evaporation can separate the solute from the solvent. We can heat the solvent to evaporate it. In a mixture, the different substances are not bonded together. This is reversible. Reversible changes are when the substance can be turned back into its original form. Physical changes are reversible because no new substances are made. Melting, freezing and boiling cause reversible changes. Irreversible changes are when substances cannot be changed back into their original form. This is because a new chemical substance has been made. Chemical changes are irreversible. A chemical reaction is when one or more substances are changed into one or more different substances. Fizzing, or effervescence, shows that a gas is being made. Rusting is an irreversible change. It happens when iron reacts with oxygen. Rusting is a type of corrosion. Burning is a chemical change. It is called combustion. Combustion needs oxygen, heat and fuel. Carbon dioxide is a gas that is made in combustion. Photosynthesis is a chemical change.	The heart is at the centre of the circulatory system. It pumps blood around the body. There are four chambers of the heart. The upper chambers are the atria. The lower chambers are the ventricles. The left atrium and left ventricle carry oxygenated blood which is pumped around the body. The right atrium and right ventricle carry deoxygenated blood which is pumped out to the lungs. Arteries and veins are important blood vessels. The vena cava is a vein. It pumps deoxygenated blood from the body into the heart. The heart pumps deoxygenated blood to the lungs via the pulmonary artery. All other arteries carry oxygenated blood away from the heart to cells. Veins carry deoxygenated blood from the cells back into the heart. Veins have valves to control the blood flow. Capillaries are microscopic blood vessels. They connect the arteries and the veins. All cells in our body need oxygen. Drugs and poor health can affect how well the heart works. Blood is made of four parts: plasma, platelets, red blood cells and white blood cells. Most of our blood is plasma. Red blood cells transport oxygen from the lungs and carbon dioxide from the cells. White blood cells are part of the immune system. Platelets mesh together to form a scab. Diffusion allows blood to absorb nutrients. Osmosis allows blood to absorb water. Heart rate increases when you exercise as cells use more oxygen. Drugs, including alcohol, affect the body in different ways. Many recreational drugs are illegal because of how dangerous and harmful they can be to the body.

Science Curriculum Progression Map

KS1 & KS2 – Spring 1

	Year 1 **Exploring Everyday Materials 1**	Year 2 **Living Things and their Habitats 2 – Habitats Around the World**	Year 3 **Rocks**	Year 4 **Living Things and their Habitats 2 – Conservation**	Year 5 **Changes of Materials**	Year 6 **Animals Including Humans**
	Chemistry – Materials	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Animals including Humans
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Observing and measuring *Identifying, grouping & classifying*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Interpreting and communicating results *Research*	Lesson 1 – Interpreting and communicating results *Research*	Lesson 1 – Setting up tests *Observation over time*	Lesson 1 – Recording data *Identifying, grouping & classifying*
	Lesson 2 – Recording data *Identifying, grouping & classifying*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Observing and measuring *Comparative / fair testing*	Lesson 2 – Interpreting and communicating results *Problem-solving*	Lesson 2 – Interpreting and communicating results *Problem-solving*	Lesson 2 – Observing and measuring *Comparative / fair testing*
	Lesson 3 – Observing and measuring *Identifying, grouping & classifying*	Lesson 3 – Interpreting and communicating results *Research*	Lesson 3 – Evaluating *Problem-solving*	Lesson 3 – Observing and measuring *Observation over time*	Lesson 3 – Interpreting and communicating results *Observation over time*	Lesson 3 – Recording data *Identifying, grouping & classifying*
	Lesson 4 – Recording data *Identifying, grouping & classifying*	Lesson 4 – Recording data *Identifying, grouping & classifying*	Lesson 4 – Setting up tests *Comparative / fair testing*	Lesson 4 – Interpreting and communicating results *Observation over time*	Lesson 4 – Setting up tests *Comparative / fair testing*	Lesson 4 – Setting up tests *Comparative / fair testing*
	Lesson 5 – Making predictions *Comparative / fair testing*	Lesson 5 – Recording data *Identifying, grouping & classifying*	Lesson 5 – Observing and measuring *Research*	Lesson 5 – Recording data *Observation over time*	Lesson 5 – Interpreting and communicating results *Problem-solving*	Lesson 5 – Evaluating *Comparative / fair testing*
	Lesson 6 – Setting up tests *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Research*	Lesson 6 – Observing and measuring *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Problem-solving*	Lesson 6 – Recording data *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Identifying, grouping & classifying*

Science Curriculum Progression Map

KS1 & KS2 – Spring 1

	Year 1 **Exploring Everyday Materials 1**	Year 2 **Living Things and their Habitats 2 – Habitats Around the World**	Year 3 **Rocks**	Year 4 **Living Things and their Habitats 2 – Conservation**	Year 5 **Changes of Materials**	Year 6 **Animals Including Humans**
	Chemistry – Materials	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Animals including Humans
Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to…* *Be able to…*	**Perform simple tests –** *test and identify whether the material is hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy, opaque/transparent, investigating floating and sinking – buoyancy, choosing the best material for different objects (an umbrella)* **Identify and classify –** *feely bag investigation, naming a variety of everyday materials (fabric, wood, plastic, metal etc.), grouping everyday materials based on their properties (e.g. natural / manmade)* **Use observations and ideas to suggest answers to questions** – *completing a scavenger hunt to describe objects and the materials they are made from* **Gather and record data to help answer a question –** *completing tables (ticking properties).*	**Ask simple questions, recognising that they can be answered in different ways** – *what can I do to care for the environment? Creating a cross-section of the ocean and labelling ocean animals in the correct location* **Identify and classify –** *matching different animals to their habitats, creating a Venn diagram to identify which animals live in the Arctic / Antarctic / both polar regions* **Use observations and ideas to suggest answers to questions –** *explaining which characteristics make living organisms suitable for life in more than one habitat, planning a campaign to help people understand the issues that rainforests face / how they can help protect the rainforest* **Gather and record data to help answer a question –** *completing a litter audit in the local area and record the impact it is having on inhabitants, using a square grid to measure, compare and count what is found in an area of soil*	**Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *planning and carrying out an in-depth investigation to find out the effect that water has on different rocks (hypotheses, results, conclusions), making fossils, investigating the properties of 4 different soils (peat, clay, sandy soil, silt, loam, chalky soil)* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *explaining the making of igneous rocks and how different types are formed, investigating rocks to rest their durability, permeability and density* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** – *designing an outdoor plaque made from rock (explaining choice of rock and referring to its properties)* **Identify differences, similarities or changes related to simple scientific ideas and processes**	**Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *using a decibel meter and petroleum covered card to explain pollution in three different locations, completing a water audit* **Gather, record, classify and present data in a variety of ways to help in answering questions** – *researching seasons in different parts of the world (how many, typical weather, changes to plant and animal life), suggesting ways of conserving water following a water audit* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *recording results of petroleum covered card and decibel meter investigation into air / noise pollution* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *researching and explaining the environmental effects of natural disasters (water pollution), designing a conservation area (ocean or land) and explaining how wildlife will be protected* **Use straightforward scientific evidence to answer questions or to support their findings** – *creating a persuasive leaflet to stop deforestation (explaining effects on plant and animal life)*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *planning and setting up an investigation into rusting (choosing own question, making prediction, fair testing by deciding on control variables, observations and conclusions)* **Use test results to make predictions to set up further comparative and fair tests** – *predicting how liquids will react with bicarbonate of soda and deciding which combination to test* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *investigating evaporation (writing method and explaining predictions), observing irreversible changes and summarise how a new product has been formed, identifying problems (mixture, solution or change of state that needs reversing) and explaining how you plan to reverse the change* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *summarising combustion reactions and explaining how to control them using the fire triangle (fire extinguishers)*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *designing and conducting own investigation into heart rate, diet and exercise* **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate –** *investigating restriction of blood flow through width of blood vessels (measuring repeated readings of flow of liquid through holes in cups and taking an average)* **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *creating a model of the heart and label showing oxygenated / deoxygenated blood, creating a pie chart showing the percentage of components in blood by volume* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *producing a poster to promote healthy lifestyle (explaining the impact of drugs and alcohol on health)* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *gummy sweet osmosis / diffusion experiment (soaking sweets in 4 different liquids)*

Science Curriculum Progression Map

KS1 & KS2 – Spring 1

	Year 1 **Exploring Everyday Materials 1**	Year 2 **Living Things and their Habitats 2 – Habitats Around the World**	Year 3 **Rocks**	Year 4 **Living Things and their Habitats 2 – Conservation**	Year 5 **Changes of Materials**	Year 6 **Animals Including Humans**
	Chemistry – Materials	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Living Things and their Habitats	**Chemistry – Materials**	**Biology –** Animals including Humans
Possible Misconceptions	**The word 'material' refers only to fabrics:** Children will likely have heard people talk about 'materials' in reference to our clothes or other fabrics, so this is a misconception that needs to be addressed quickly so that the fundamental concepts of this unit are understood. **Objects are only made from one material:** Throughout the unit, children are shown that most objects are made from more than one material. Each material has been carefully chosen to suit the purpose of that object. Materials cannot be changed. The word 'rock' describes an object rather than a material.	**Only fish live in the sea:** Some children might classify all animals that live in the sea as fish. Lions live in the jungle (e.g. from hearing the phrase "the lion is the king of the jungle." All deserts are sandy (polar deserts etc. are not).	**Rocks are static:** Children may perceive rocks as unchanging objects. In this unit, children will learn that rocks can undergo various transformations over time. **Rocks are all the same (hard, dull colours, hard, smooth etc.):** Children may view rocks as being uniform and identical. They will learn that rocks come in different types, compositions, and formations, resulting in their diverse appearances and properties. **Rocks are only found on land:** Children may associate rocks exclusively with terrestrial environments. This unit looks at rocks that are also found in bodies of water, such as oceans, rivers, and lakes, and how they play a significant role in shaping underwater landscapes. **All fossils are dinosaur bones:** Fossils can include the preserved remains of plants, insects, shells, and other ancient organisms. Man-made substances such as concrete and brick are rocks. Rocks have to be big as smaller ones are stones or pebbles. Minerals are precious, shiny stones. A fossil is an actual piece of the animal or plant. Artefacts like pottery or coins are fossils. Soil and compost are the same thing (soil is the top layer on the ground and compost is decomposing organic material).	**Habitats remain unchanged:** Children may have the misconception that habitats stay the same over time and are not subject to change or human impact. They may not understand that habitats can be altered or destroyed due to natural events or human activities, leading to the displacement or endangerment of species. **All members of a species look and behave the same:** Some children may assume that all members of a particular species look identical and behave in the same way. They may not grasp the natural variations and individual differences that exist within a species due to factors like genetics, environmental influences and adaptation. **Adaptations happen quickly and purposefully:** Children may think that adaptations occur quickly and intentionally in response to an organism's needs. They may not understand that adaptations are gradual, result from genetic variations, and are driven by natural selection over long periods of time.	**When something dissolves, it disappears:** e.g. "salty water" - the salt particles are evenly distributed throughout the water but cannot be seen. If you were to evaporate the water, you would be able to see the salt again. **Melting and dissolving are the same:** Melting occurs when a solid changes to a liquid (ice melting to water). Dissolving is when something is mixed with a solvent and the particles of the solute are evenly distributed throughout the solvent. For example, sugar dissolves in water. Melting is a physical change, whereas dissolving is a chemical change. **The solubility of a material is the same in all liquids:** The solubility of a material can vary depending on the liquid that it is dissolved in. For example, salt is more soluble in water than it is in oil. **All metals will respond to magnets in the same way:** Some metals, such copper and gold, are not magnetic, so will not be attracted to a magnet. **All mixtures can be separated using the same methods:** The method that is used to separate a mixture will depend on the properties of the materials in the mixture. For example, a mixture of sand and water can be separated using sieving, while a mixture of oil and water can be separated using decanting. **Irreversible changes are bad:** Cooking and burning fuel for heating are all examples of useful irreversible changes. **A material which is a good conductor only conducts heat:** Typically, metals are good conductors of both electricity and heat. Thermal insulators keep cold in or out or they "warm things up" (they slow down the transfer of heat energy from one place to another). A lit candle simply melts which is reversible.	**The heart makes blood:** Blood is made in the bone marrow; the heart circulates blood around the body. **Blood is red and blue:** Blood is always red, regardless of whether it is oxygenated or deoxygenated. Blood in veins appears blue because of the way light interacts with it. **Food provides us with energy:** Food provides our bodies with several important things our bodies need to function, such as energy, nutrients, minerals and water. **All drugs are bad for you:** Although some drugs have negative effects on the body, medicines are drugs prescribed by doctors to help treat illnesses. The heart lies at the left side of the chest (it is slightly left-of-centre, behind the sternum). Exercise is the only time when the heart beats quicker.

Science Curriculum Progression Map

KS1 & KS2 – Spring 1						
	Year 1 **Exploring Everyday Materials 1**	Year 2 **Living Things and their Habitats 2 – Habitats Around the World**	Year 3 **Rocks**	Year 4 **Living Things and their Habitats 2 – Conservation**	Year 5 **Changes of Materials**	Year 6 **Animals Including Humans**
	Chemistry – Materials 	**Biology –** Living Things and their Habitats 	**Chemistry – Materials** 	**Biology –** Living Things and their Habitats 	**Chemistry – Materials** 	**Biology –** Animals including Humans 
Key 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	environment, microhabitat, mate, organism, habitat, rainforest, moisture, extinct, climate, endangered, pollution, poaching, biodiversity, rainforest, deforestation, plankton, ocean, ecosystem, coral reef, trench, narwhal, tundra, Arctic, caribou, Antarctic, earthworm, desert, lizard, cactus, pond	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	ecosystem, migrate, Southern Hemisphere, monsoon, Northern Hemisphere, recycling, biodiversity, drought, deforestation, rainforest, greenhouse gases, fossil fuels, emissions, pollution, climate change, sewage, chemicals, pesticides, water treatment plant, contaminate, freshwater, pure, conserve, water butt, endangered, conservation areas, protect, marine sanctuaries	pure substance, solute, solvent, evaporate, solution, melting, reversible, mixture, physical change, irreversible, effervescence, compare, chemical change, product, fair test, control variable, corrosion, rusting, variable, combustion, oxygen, fuel, extinguish, smother, carbon dioxide, acid, reaction, predict, bicarbonate of soda	ventricle, atrium, vessel, circulatory system, valves, capillary, microscope, artery, vein, blood, plasma, red blood cell, white blood cell, platelet, concentration, absorb, osmosis, diffusion, nutrient, pulse, diet, beats per minute (BPM), exercise, heart rate, hallucinogen, painkiller, drug, stimulant, depressant

Science Curriculum Progression Map

KS1 & KS2 – Spring 2

	Year 1 **Exploring Everyday Materials 2 – Building**	Year 2 **Animals Including Humans 1 – Growth (Health and Survival)**	Year 3 **Forces and Magnets**	Year 4 **States of Matter**	Year 5 **Animals Including Humans**	Year 6 **Living Things and their Habitats**
	Chemistry – Materials	**Biology – Animals including Humans**	**Physics – Forces**	**Chemistry – States of Matter**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	One object can be made from more than one material. Wood comes from trees. Plastic comes from oil. We choose materials based on their properties. Materials can be rough or hard. Materials can be smooth or soft. Materials can be strong. Waterproof materials do not easily absorb liquid. Absorbent materials soak up liquids. Materials can be transparent. Materials can be opaque. Fabric can come from plants or it can be manmade.	To survive, all animals need oxygen, water, food and shelter. Different animals need different foods to survive. Carnivores need meat, herbivores need plants and omnivores need both. Humans have needs and wants. Clean air, clean water, a balanced diet and sleep are very important. There are five food groups: fruits and vegetables, protein, carbohydrate, dairy and fats and oils. A healthy, balanced diet is needed. How food is prepared can change how many nutrients and energy it contains. Fresh foods have not been changed at all. Exercise keeps our bodies healthy. Good hygiene helps us remain healthy and stop the spread of germs.	A force is a push or a pull. Contact forces are when the objects touch each other. Gravity is a force that makes objects fall to the ground. It is a non-contact force. The effect of a force is to make something move, or change speed, direction or shape. We can change the amount of force we use when we push and pull things. Air resistance is the force of the air particles an object has to push through. Friction is the force between two surfaces. Rough surfaces create greater friction. Smooth surfaces create less friction. Magnetic force is a non-contact push or pull force. When a magnet pushes an object away, we say it repels it. If a magnet pulls an object towards it, we say it attracts it. A lodestone is a naturally occurring rock that has magnetic properties. A magnet has two opposite poles: the north and south pole. A magnetic field is the space around a magnet where the magnetic force can be felt. Magnetic strength can be weakened over time.	Matter is anything that has mass and takes up space. There are three main states of matter: solids, liquids and gases. Solids hold their own shape and have a fixed volume. Liquids take the shape of their container and have a fixed volume. Gases fill the shape and volume of their container. They do not have a fixed shape or volume. Some solids can be poured, like sand and sugar. Each grain keeps the same shape and volume. Particles in solids are held closely together in an organised structure. Particles in liquids move more freely and are randomly arranged. They move faster than particles in solids. Particles in gases are spaced widely apart. They move quickly. When a solid is heated, it can change state to a liquid. This is called melting. The melting point is the temperature at which a solid changes to a liquid. The melting point of water is 0°C. The melting point and freezing point for substances are the same. The freezing point is the temperature at which a liquid changes to a solid. The boiling point is the temperature at which a liquid changes to a gas. The boiling point of water is 100°C. Condensation is when a gas cools and changes state into a liquid. Evaporation is when a liquid is heated and changes state into a gas. The substance does not change when it changes state. Water exists in all these states of matter in nature. Water can change into each state in both directions – we call this the Water Cycle. Water evaporates from all water sources (e.g. puddles, lakes, oceans). When water evaporates, it becomes water vapour. Condensation is when water vapour turns back into liquid. High in the sky, the air is cooler. Condensation turns water vapour into clouds. Precipitation is when water falls from the clouds as rain, snow or hail. There is always water vapour in the air and the temperature changes its appearance.	Key stages of mammal life cycles are foetus, baby, child, adolescence, adult, old age. Gestation is the period of time that an animal is pregnant for. Humans have a gestation period of nine months. Gestation periods for different mammals vary. A foetus grows in the womb. The umbilical cord connects the foetus to the mother. A foetus develops organs, limbs, facial features and bodily functions over time. Humans grow from birth to adulthood. The human body experiences changes as it goes through puberty. Hormones released into the bloodstream cause physical, mental and emotional changes. Physical and mental changes happen to the body from adulthood to old age. All living things follow a life cycle of birth, growth, reproduction and death.	Living things are classified into six main kingdoms. Members of each kingdom share features unique to that group. The six kingdoms are plants, animals, fungi, protista, bacteria and ancient bacteria (prokaryotes). The cells in each of the six kingdoms are different. Plants can be grouped into 4 categories. Mosses, liverworts and ferns make spores to reproduce. Conifers make seeds inside cones. Flowering plants make seeds inside flowers. Fungi includes mushrooms, yeasts, moulds and mildews. They do not photosynthesise but digest organic matter. Protists are unicellular – they have one cell. Bacteria do not have a nucleus in their cells. Carl Linnaeus was a Swedish scientist who developed a system to classify living things. The Linnaean system is a way of classifying living organisms. Taxonomy is a way of grouping organisms. Organisms are divided into kingdoms and then further divided into smaller groups. Organisms are divided into kingdoms, phylum, class, order, family, genus, species. Microorganisms are too small to see without equipment such as a microscope. Microorganisms include bacteria, fungi, viruses and protozoa. Some microorganisms are harmful. Others are helpful. Fungi reproduce asexually through spore dispersal. Cells are tiny building blocks that make up all living things.

Science Curriculum Progression Map

KS1 & KS2 – Spring 2

	Year 1 **Exploring Everyday Materials 2 – Building**	Year 2 **Animals Including Humans 1 – Growth (Health and Survival)**	Year 3 **Forces and Magnets**	Year 4 **States of Matter**	Year 5 **Animals Including Humans**	Year 6 **Living Things and their Habitats**
	Chemistry – Materials	**Biology – Animals including Humans**	**Physics – Forces**	**Chemistry – States of Matter**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Setting up tests *Comparative / fair testing*	Lesson 1 – Observing and measuring *Research*	Lesson 1 – Observing and measuring *Comparative / fair testing*	Lesson 1 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 1 – Recording data *Observation over time*	Lesson 1 – Recording data *Identifying, grouping & classifying*
	Lesson 2 – Setting up tests *Comparative / fair testing*	Lesson 2 – Recording data *Identifying, grouping & classifying*	Lesson 2 – Setting up tests *Comparative / fair testing*	Lesson 2 – Interpreting and communicating results *Pattern seeking*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Interpreting and communicating results *Research*
	Lesson 3 – Observing and measuring *Problem-solving*	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Making predictions *Comparative / fair testing*	Lesson 3 – Setting up tests *Observation over time*	Lesson 3 – Recording data *Pattern seeking*	Lesson 3 – Interpreting and communicating results *Research*
	Lesson 4 – Observing and measuring *Problem-solving*	Lesson 4 – Interpreting and communicating results *Problem-solving*	Lesson 4 – Recording data *Identifying, grouping & classifying*	Lesson 4 – Recording data *Research*	Lesson 4 – Observing and measuring *Comparative / fair testing*	Lesson 4 – Setting up tests *Comparative / fair testing*
	Lesson 5 – Recording data *Identifying, grouping & classifying*	Lesson 5 – Setting up tests *Comparative / fair testing*	Lesson 5 – Setting up tests *Comparative / fair testing*	Lesson 5 – Making predictions *Comparative / fair testing*	Lesson 5 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 5 – Observing and measuring *Observation over time*
	Lesson 6 – Evaluating *Identifying, grouping & classifying*	Lesson 6 – Setting up tests *Comparative / fair testing*	Lesson 6 – Observing and measuring *Problem-solving*	Lesson 6 – Recording data *Problem-solving*	Lesson 6 – Interpreting and communicating results *Problem-solving*	Lesson 6 – Interpreting and communicating results *Problem-solving*

Science Curriculum Progression Map

KS1 & KS2 – Spring 2

	Year 1 **Exploring Everyday Materials 2 – Building**	Year 2 **Animals Including Humans 1 – Growth (Health and Survival)**	Year 3 **Forces and Magnets**	Year 4 **States of Matter**	Year 5 **Animals Including Humans**	Year 6 **Living Things and their Habitats**
	Chemistry – Materials	**Biology – Animals including Humans**	**Physics – Forces**	**Chemistry – States of Matter**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**
Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to...* *Be able to...*	Houses of The Three Little Pigs: **Perform simple tests –** *deciding which material to use to build a simple structure to withstand wind and measuring how much water runs off of materials to choose one for the roof* **Identify and classify –** *classifying materials (fabric) that the pigs might wear to keep warm / cool / dry* **Use observations and ideas to suggest answers to questions –** *suggesting alternative materials to glass that can be used to make the windows, label material choices to make the bed (frame, mattress, sheets and duvet), present ideas for materials used for the house and suggest alternatives*	**Perform simple tests –** *recording the impact of cardio, balance and hand-eye coordination activities on the human body, recording conclusions after a pepper/glitter soap hand washing investigation (what difference did you see when you had the soap on your finger?)* **Identify and classify –** *sort foods into correct groups on a food pyramid* **Use observations and ideas to suggest answers to questions –** *describing what different animals need to survive, explaining whether statements are vital for human survival or are "wants," creating a healthy plate/menu that incorporates all food groups in balanced portions*	**Set up simple practical enquiries, comparative and fair tests** – *setting up magnets and predicting whether they will attract or repel, recording observations in a table* **Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *observing and measuring how objects move on different surfaces, recording distance travelled in tables and bar charts, investigating how powerful different magnets are (measuring distance at which each will attract a paperclip), using compasses to provide directions (everyday uses of magnets)* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *investigating which materials are magnetic and recording in a 2D Carroll diagram (magnetic / made of metal)* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *investigating contact and non-contact forces (using arrows to show direction of forces, naming forces, identifying whether it moved an object or not)*	**Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *using thermometers to record melting points* **Gather, record, classify and present data in a variety of ways to help in answering questions** – *identifying familiar substances as solids, liquids or gases and explaining how each state of matter behaves, creating a water cycle collage* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *investigating boiling and freezing points and representing in a bar chart* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** – *investigating the effect of temperature on evaporation (predicting and recording results)* **Use straightforward scientific evidence to answer questions or to support their findings** – *drawing the appearance of particles in water in three different states (explaining how particles behave)*	**Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** – *measuring hand spans and using the data set in a table to calculate an average hand span* **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *creating life cycle wheels and labelling key stages of human life cycle, using data to plot the predicted length / mass of a foetus on a line graph* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *researching gestation periods of mammals and using information to create a card game, explaining how male / female body parts change during puberty (Venn diagrams), creating a spider diagram describing common changes in old age* **Identify scientific evidence that has been used to support or refute ideas or arguments**	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *investigating conditions that cause mould to grow on bread (identifying independent, dependent and controlled variables)* **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** – *making spore prints to understand spore dispersal* **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *designing own classification key using liquorice allsorts, designing a zoo layout (grouping organisms using the Linnaean system)* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *creating an animal (commenting on habitat, respiration, reproduction, class and order)* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *representing each of the six kingdoms and researching an organism that would belong in each kingdom*

Science Curriculum Progression Map

KS1 & KS2 – Spring 2

	Year 1 **Exploring Everyday Materials 2 – Building**	Year 2 **Animals Including Humans 1 – Growth (Health and Survival)**	Year 3 **Forces and Magnets**	Year 4 **States of Matter**	Year 5 **Animals Including Humans**	Year 6 **Living Things and their Habitats**
	Chemistry – Materials	**Biology – Animals including Humans**	**Physics – Forces**	**Chemistry – States of Matter**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**
Possible Misconceptions	**Materials do not vary/cannot be changed:** children are asked to choose different materials to suit different parts of a house. They will learn that materials have different properties - such as texture, transparency and water resistance - that make them suitable for specific purposes. 'Solid' is another word for hard. Confusing absorbent with waterproof (e.g. paper towel soaking up water).	**Growth is only about getting taller:** Children may think that growth can only be measured by height. However, in this unit, children will learn that as their bones grow, so too do their muscles and strength. **All foods are equally nutritious:** Children will start to understand that foods have a different nutritional value and it is important for our health that we eat the right proportions of each food group. We only eat food for energy (people eat food for enjoyment).	**A force is always visible:** Children may believe that forces are only present when they can see physical contact or movement. They might not understand that forces can act even when objects are not visibly interacting, such as the force of gravity, friction or magnetic forces. **All forces cause motion:** Forces can also cause changes in the shape of objects, such as compressing or stretching them, without necessarily causing movement. Discussing the force of gravity will also demonstrate to children that forces do not always cause motion. Heavier objects fall faster as they have more gravity acting on them. Forces always act in pairs which are equal and opposite. A stationary object has no forces acting on it. A moving object has a force pushing it forwards and it stops when the pushing force runs out. Smooth surfaces have no friction. Objects always travel better on smooth surfaces. The bigger the magnet, the stronger it is. All metals are magnetic.	**Substances can only exist in one state of matter:** Children may think that substances can only exist in one particular state of matter, such as solid, liquid or gas. Substances can change their state depending on factors like temperature and pressure. **All substances change state at the same temperature:** Children might believe that all substances change state at the same temperature. Different substances have different melting points, boiling points and transition temperatures, leading to variations in their state changes. **Water disappears during evaporation:** Children might assume that water completely disappears during the process of evaporation. They will learn that water molecules simply change from a liquid state to a gaseous state, forming water vapour in the air. In this unit, children will learn that this process is also an important part of the water cycle. Confusing steam and water vapour (both are gaseous states of water but water vapour is always present in the air – steam is produced when water is heated). Solid is another word for hard. Solids are hard and cannot break, change shape easily and are usually in one piece. Melting is the same as dissolving. The substance on a colder object is called "condensation" - it is actually water (as a result of condensation).	**All humans develop at the same rate – puberty starts at the same time for everyone:** Although all humans experience changes throughout their lives, these changes can happen at different ages for everyone. **Puberty is only about physical changes:** Puberty is a time of physical, emotional and social changes. **Puberty is the end of my childhood:** Puberty is a transition from childhood to adulthood, but it is not the end of childhood. Only males grow body hair e.g. armpit hair.	**All living things can be easily classified into two groups – plants and animals:** There are 5 kingdoms within biology that living things can be classified into (plants, animals, fungi, protista and bacteria). **The characteristics used to classify living things are always clear-cut and easy to identify:** In reality, there is often overlap between different groups, and some organisms can be classified into more than one group. **Once a living thing is classified, this will not change**: As new information is discovered about a living thing through further study, this may change their classification. **The only purpose of classifying living things is to make them easier to study:** There are other reasons for classifying living things, such as to understand their evolutionary relationships and to help us conserve biodiversity. Mushrooms are plants. All micro-organisms are harmful. Insects are not animals. Humans are not animals. A crab is a vertebrate because it has a hard shell on its back. Snakes are like worms, so they are invertebrates.

Science Curriculum Progression Map

KS1 & KS2 – Spring 2						
	Year 1 **Exploring Everyday Materials 2 – Building**	Year 2 **Animals Including Humans 1 – Growth (Health and Survival)**	Year 3 **Forces and Magnets**	Year 4 **States of Matter**	Year 5 **Animals Including Humans**	Year 6 **Living Things and their Habitats**
	Chemistry – Materials	**Biology – Animals including Humans**	**Physics – Forces**	**Chemistry – States of Matter**	**Biology – Animals including Humans**	**Biology – Living Things and their Habitats**
Key Vocabulary	brick, solid, clay, strong, wind, roof, non-absorbent, waterproof, absorbent, slate, window frame, transparent, opaque, window pane, suitable, fabric, furniture, cotton, mattress, soft, jumper, wool, weather, suitable, waterproof, evaluate, garden, material, tile, properties	essential, oxygen, nutrition, survival, shelter, healthy, non-essential, survive, vital, grow, 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	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 material, recycle, magnetic north, magnetic needle, compass, direction, orienteering	gas, matter, liquid, volume, solid, particle, arranged, bond, heated, cooled, melting, melting point, temperature, thermometer, reverse, sublimation, deposition, freezing, boiling, condensation, water vapour, process, absorb, evaporation, water cycle, precipitation, transpiration, surface run off, groundwater	adolescent, reproduce, dependent, puberty, foetus, gestation, pregnant, breeding, extreme, duration, embryo, trimester, midwife, umbilical cord, womb, growth spurt, childhood, motor skills, milk teeth, constant, adolescence, bloodstream, hormone, growth, appetite, cataract, memory, neurodegenerative, lifestyle, keratin	classify conifer, microorganism, fern, living organism, cell, MRS GREN, unicellular, multicellular, kingdom, species, Carl Linnaeus, domain, Latin, classification, virus, bacteria, fungi, protozoa, plant, microscopic, mycelium, ecosystem, reproduction, habitat, living organism

Science Curriculum Progression Map

KS1 & KS2 – Summer 1

	Year 1 **Plants**	Year 2 **Animals Including Humans 2 – Life Cycles**	Year 3 **Plants**	Year 4 **Sound**	Year 5 **Earth and Space**	Year 6 **Evolution and Inheritance**
	Biology – Plants	**Biology – Animals including Humans**	**Biology – Plants**	**Physics – Energy**	**Physics – Earth Science**	**Biology – Animals including Humans**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	Plants are living things. Trees are plants. Plants are food. Plants can be used to make paper, timber, fabric and medicine. Most plants grow from seeds. Seeds come in different shapes and sizes. Different plants can grow in the same environment. Plants need the right temperature, light and water to grow. If seeds do not get the right conditions, they may not grow into healthy plants. The roots of a plant act as an anchor, fixing the plant into the ground. They also absorb water from the soil. The stem of a plant grows above the ground. The leaves and flowers grow from it. A plant's leaves absorb sunlight and turn it into energy that the plant uses to grow. Plants spread their seeds in order to make new plants. When plants make seeds to make new plants, we call this reproducing. Evergreen trees keep their leaves all year round. Deciduous trees drop their leaves during autumn time and grow fresh leaves in spring. We eat different parts of plants including roots, stem, leaves and sometimes the flowers. Fruits trees and vegetables are varieties of plants. Some plants are dangerous to eat and could make us ill.	There are 5 main stages in the human life cycle: baby, child, adolescent, adult and old age. Humans can do and need different things depending on their stage of life. When animals reproduce, they have offspring. Offspring inherit features from their parents. Not all offspring resemble their parents. The cycle of life begins with birth, then growth, then reproduction and finally death. Some animals give birth to live young. Others lay eggs. Birds, fish, reptiles, insects and amphibians lay eggs. Some insects and amphibians undergo transformation, called metamorphosis. The life cycle of a bird, such as a chicken, is: egg, hatchling, adult chicken. The life cycle of a butterfly is: egg, larva, pupa, butterfly. The life cycle of a frog is: egg, tadpole, froglet, frog.	Plants need carbon dioxide, sunlight, water, nutrients from soil and room to grow. Fertiliser puts extra nutrients in the soil. Flowering plants all have roots, a stem or trunk, leaves and flowers but they do not all look the same. Water moves from the roots of a plant upwards via the stem. Photosynthesis is the process by which plants make their own food. Leaves are very important for photosynthesis. Photosynthesis needs water, carbon dioxide and sunlight. It produces glucose and oxygen. Roots are very important. They absorb water and nutrients and they anchor a plant in the ground. Often, they store food for the plant. Water moves into a plant through the roots, up the stem and out through the leaves. The xylem is a tube that reaches from the roots up through the stem to the top of the plant. Leaves have stomata to take in carbon dioxide and let out oxygen. Stomata also release water. The phloem is a tube that goes from the roots, up the stem to the leaves. It transports nutrients and minerals. Flowers are very important for reproduction. The petals are colourful to attract insects. The anther sits on the filament. It makes pollen. The stigma is on top of the style. It receives pollen. The pollen travels down the style to the ovary. When they meet, they start to form a new seed. Pollinators are animals that move pollen from one plant to another. Insects are very important pollinators. Flowers produce nectar to attract pollinators. Dispersal is when a plant scatters its seeds. Plants disperse their seeds in different ways: wind, animal, water and explosion. A botanist is a scientist who studies plants.	Sound is caused by a back and forth movement called vibration. Sound waves move out from a vibrating object. Sound waves can travel through different types of matter (solid, liquid, gas) in all directions. A receiver, like an ear, "hears" the sound waves. We hear through soundwaves entering the ear, travelling through it (vibrating the eardrum) and the messages sent to the brain. When sound waves bounce off of a medium, it can create an echo. Sound travels faster through liquids than gases. Sound travels faster through solids than liquids. Sound cannot travel in a vacuum where there are no particles. Some materials absorb sound. It is important to insulate sound to protect our ears. The volume of sound is how loud or quiet it is. It relates to the strength of the vibrations. Louder sounds are made by bigger vibrations. Quieter sounds are made by smaller vibrations. Pitch is how high or low a sound is and relates to the speed of vibrations. Faster vibrations make higher-pitched sounds. Slower vibrations make lower-pitched sounds.	The Sun is at the centre of our solar system. Eight planets orbit it. All of the planets are roughly spherical. The terrestrial planets are closest to the Sun: Mercury, Venus, Earth and Mars. Terrestrial planets have solid, rocky surfaces. There are trillions of smaller rocks called asteroids, as well as dwarf planets like Pluto and Ceres. The asteroid belt is between Mars and Jupiter. Beyond the asteroid belt are the gas giant planets: Jupiter, Saturn, Uranus and Neptune. The gas giant planets are made up of mostly gas and rock. Galaxies are groups of stars held together by gravity. Our galaxy is the Milky Way. Earth is held in orbit by the Sun's gravity. Earth spins on its axis. This is called rotation. It takes 24 hours – one day. When a country faces away from the Sun, it is night. When it faces towards the sun, it is day. The Sun does not move. Earth's rotation causes sunrise and sunset. Earth takes 365 days to orbit the Sun – a year. Earth tilts on its axis. This creates the seasons. When a hemisphere is tilted towards the sun, it is summer. When a hemisphere is tilted away from the sun, it is winter. The moon is the Earth's natural satellite. The moon is not a light source. It reflects the sun's light. Depending on the position of the Sun, we see all, part or none of the Moon; these are known as the phases of the Moon. A solar eclipse happens when the Moon passed in front of the Sun during the day.	Inheritance is passing on characteristics from a parent to their offspring. There are differences in characteristics within an individual species, known as variation. Variation can also occur due to environmental factors, like diet. Adaptations help living things survive in their different habitats. Animals and plants that adapt well to an environment have more chance of surviving. Fossils are the remains of organisms. A small percentage of life on earth is preserved as a fossil - most organisms decompose. Fossils provide evidence for evolution. Evolution is the change in inherited traits. Adaptation plays an important part in evolution as species change over time. Charles Darwin spent years observing, comparing and analysing many specimens of plants and animals. Animals and plants that adapt well to an environment have more chance of surviving; this is called natural selection. Humans evolved from a common ancestor: primates. Different stages of human evolution happened over almost 4 million years.

Science Curriculum Progression Map

KS1 & KS2 – Summer 1

	Year 1 **Plants**	Year 2 **Animals Including Humans 2 – Life Cycles**	Year 3 **Plants**	Year 4 **Sound**	Year 5 **Earth and Space**	Year 6 **Evolution and Inheritance**
	Biology – Plants	**Biology – Animals including Humans**	**Biology – Plants**	**Physics – Energy**	**Physics – Earth Science**	**Biology – Animals including Humans**
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Making predictions *Observation over time*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Asking questions *Comparative / fair testing*	Lesson 1 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 1 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 1 – Interpreting and communicating results *Problem-solving*
	Lesson 2 – Observing and measuring *Identifying, grouping & classifying*	Lesson 2 – Recording data *Research*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Observing and measuring *Pattern seeking*	Lesson 2 – Interpreting and communicating results *Research*	Lesson 2 – Interpreting and communicating results *Research*
	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Recording data *Identifying, grouping & classifying*	Lesson 3 – Observing and measuring *Observation over time*	Lesson 3 – Setting up tests *Problem-solving*	Lesson 3 – Observing and measuring *Pattern seeking*	Lesson 3 – Asking questions *Research*
	Lesson 4 – Observing and measuring *Research*	Lesson 4 – Observing and measuring *Pattern seeking*	Lesson 4 – Recording data *Research*	Lesson 4 – Recording data *Pattern seeking*	Lesson 4 – Making predictions *Observation over time*	Lesson 4 – Observing and measuring *Problem-solving*
	Lesson 5 – Making predictions *Identifying, grouping & classifying*	Lesson 5 – Recording data *Research*	Lesson 5 – Interpreting and communicating results *Research*	Lesson 5 – Evaluating *Pattern seeking*	Lesson 5 – Recording data *Pattern seeking*	Lesson 5 – Interpreting and communicating results *Problem-solving*
	Lesson 6 – Interpreting and communicating results *Observation over time*	Lesson 6 – Recording data *Research*	Lesson 6 – Interpreting and communicating results *Pattern seeking*	Lesson 6 – Setting up tests *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Problem-solving*	Lesson 6 – Interpreting and communicating results *Problem-solving*

Science Curriculum Progression Map

KS1 & KS2 – Summer 1

	Year 1 **Plants**	Year 2 **Animals Including Humans 2 – Life Cycles**	Year 3 **Plants**	Year 4 **Sound**	Year 5 **Earth and Space**	Year 6 **Evolution and Inheritance**
	Biology – Plants	**Biology – Animals including Humans**	**Biology – Plants**	**Physics – Energy**	**Physics – Earth Science**	**Biology – Animals including Humans**
Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to…* *Be able to…*	**Ask simple questions and recognise that they can be answered in different ways –** *how do you plant a seed? What will happen to my seed? Why is my seed different from...?* **Observe closely, using simple equipment –** *observing real flowers and recreating/drawing them with labels, drawing (including colour) to show how a deciduous tree changes throughout the seasons* **Identify and classify –** *naming the parts of a plant, including trees, classifying and sorting plants by colours / leaves that are similar and leaves that are different / by size / whether it has flowers or not* **Use observations and ideas to suggest answers to questions –** *exploring a range of seeds and matching them to the correct fruit or vegetable* **Gather and record data to help in answering questions –** *taking photographs to evidence how the seeds grew, ordering and labelling the stages of growth*	**Ask simple questions and recognise that they can be answered in different ways –** *what can humans do now that they couldn't before/can't do yet? What have I inherited from my parents? What else has a life cycle like this one?* **Identify and classify –** *sequencing and labelling pictures showing the stages of a human life cycle, explaining each stage of the human life cycle* **Use observations and ideas to suggest answers to questions –** *matching offspring to their parents and identifying a feature they have inherited, creating and reporting models of a butterfly's life cycle* **Gather and record data to help in answering questions –** *creating a bar chart to show the growth of a chick in its first week (with a title and labelled axes), predicting the growth of a chick in the following week, creating a storyboard to explain each stage of a frog's life cycle*	**Ask relevant questions and using different types of scientific enquiries to answer them** – *what factors affect plant growth?* **Set up simple practical enquiries, comparative and fair tests** – *planning own investigation into factors and plant growth (asking own question, hypotheses, method, fair test)* **Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *making an observational drawing of a flowering plant, labelling and explaining the function of each in photosynthesis, cutting celery and making observational drawings of xylem and phloem* **Gather, record, classify and present data in a variety of ways to help in answering questions** – *own investigation into factors that affect plant growth and health* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *own investigation into factors that affect plant growth and health* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *drawing a flowering plant, building a model flower and explaining what each part is for in reproduction, reporting on the many ways plants reproduce* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** – *write up results of experiment, providing a diagram and a conclusion that explains what plants need to thrive*	**Set up simple practical enquiries, comparative and fair tests** – *creating own ear defenders and recording results of how well different materials insulate sound* **Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *using decibel meters to record sound when a weight is dropped from different heights* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *recording results of weight on drum investigation in a line graph, recording volume as distance increases and recording in a line graph* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *labelling the parts of the ear and creating a presentation to explain how sound is created, travels and is received* **Identify differences, similarities or changes related to simple scientific ideas and processes** – *exploring how sound travels in solids, liquids and gases (sugar and speaker, hanging from ears, rocks underwater, balloon chatting), creating a musical instrument*	**Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** **Use test results to make predictions to set up further comparative and fair tests** – *designing and making a sundial (predicting where the shadow will fall and correcting in a different colour)* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *drawing planets of the solar system in order from the sun and explaining key features, making models of Earth and using a torch to record which parts are illuminated and when, creating a pinwheel to show the phases of the moon, designing a planet and explaining key features (relative to size, distance from the sun, surface type, number of moons etc.)* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *heliocentric (Copernicus and Galileo) / geocentric models of the solar system, Pluto not being classified as a planet, Copernicus' theory that planets travelled in a perfect circle (rather than in the elliptical orbit we know today)*	**Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *explaining characteristics that offspring have inherited from parents and any variations (identifying which are inherited and which could be caused by environmental factors), researching animals and plants and explaining how they have adapted to survive in their habitat* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *comparing extinct animals with livings ones and explaining how they have adapted to survive in the modern world (Mary Anning), creating a scientific report to explain Charles Darwin's observations and theories, creating a storyboard to explain human evolution*

Science Curriculum Progression Map

KS1 & KS2 – Summer 1

	Year 1 **Plants**	Year 2 **Animals Including Humans 2 – Life Cycles**	Year 3 **Plants**	Year 4 **Sound**	Year 5 **Earth and Space**	Year 6 **Evolution and Inheritance**
	Biology – Plants	**Biology – Animals including Humans**	**Biology – Plants**	**Physics – Energy**	**Physics – Earth Science**	**Biology – Animals including Humans**
Possible Misconceptions	**Plants are not alive:** As plants do not move, a children may think they are not alive. However, plants grow, breathe, reproduce and respond to environmental changes. **Trees are not plants – a trunk is not a stem – all stems are green:** Children learn that trees have roots, leaves, flowers and a trunk that acts just like a stem. **All leaves are green:** Children look at a variety of different species of plants. This concept is also addressed in the Y1 Seasonal Changes unit. Plants are only flowering plants with colourful petals.	**All animals reproduce in the same way:** A common misconception is that all animals reproduce like mammals. In this unit, children will explore the life cycle of the frog, chicken and butterfly to dispel this myth. **All offspring look like their parents:** This is true in many cases, but it is not a universal fact. This unit will look at the transformations of animals such as the swan and the slivered leaf monkey.	**Plants obtain food from the soil:** Children may think that plants directly "eat" or obtain food from the soil. In this unit, they will learn about the concept of photosynthesis, where plants use sunlight, water and carbon dioxide to produce their own food. **All seeds are dispersed by wind:** Children may think that wind is the sole method of seed dispersal. They will begin to learn that there are various other mechanisms for seed dispersal, such as by animals, water, or self-dispersal mechanisms. Flowers are decorative rather than a vital part of reproduction. Plants only need light to keep them warm.	**Sound travels instantaneously:** Children may think that sound travels instantaneously from the source to the listener. This unit is their introduction to the concept that sound waves propagate through a medium, such as air or water, at a finite speed and take time to reach the ears. **Sound needs air to travel:** Children might believe that sound can only travel through the air and cannot propagate in other mediums. Investigations will demonstrate that sound can travel through various materials, including solids (such as walls or floors) and liquids (such as water). Sound travels only to the listener. Sound only travels in one direction from the source. High sounds are loud and low sounds are quiet.	**Seasons are caused by the changing distance between the Earth and Sun (the two are closer in the summer and further apart in the winter):** The UK has four seasons because of the tilt of the Earth's axis. The Sun and Earth remain the same distance apart. **The Sun moves up and down:** The Earth rotates on its axis and revolves around the Sun, which is at the centre of our Solar System. **The phases of the moon are caused by shadows cast on its surface by the Earth or the Sun:** As the moon orbits the Earth, different parts of the moon are illuminated by the sun. This is why we see different phases of the moon. The Earth is the centre of our Solar System. Everything in our Solar System is the same size e.g. Earth is a similar size to the moon, stars are the same size. The Earth is stationary. The Moon is stationary. The universe has stopped expanding. Mass and weight are the same. The Sun is a planet. Pluto is a planet. The only planets that exist are in our solar system. The Milky Way is the only galaxy.	**Evolution is a process of gradual change:** It can also happen in rapid bursts, such as the evolution of antibiotic resistance in bacteria. **Evolution is always progressive:** In some cases, evolution can lead to organisms becoming simpler or less complex. Evolution is directed by a goal and is an active process (a living thing can try to adapt). **Evolution is only a theory:** There is overwhelming scientific evidence to support the theory of evolution. This evidence includes fossils, DNA, and comparative anatomy. **Evolution and religion contradict one another:** Scientific explanations and religious beliefs are different ways of understanding the world. It is important not to set them against each other and to respect both, even if they seem to conflict. Science is based on evidence and observation, while religion is based on faith. **An individual can evolve during its lifetime:** Evolution is a change in the genetic makeup of a population over time. Evolution produces living things perfectly adapted to their environment. Natural selection is always good for the species. Offspring must resemble their parent of the same sex. An example of variation is that a dog looks different to a cat. Confusing environmental and inherited factors. All characteristics can be inherited (e.g. sporting ability or dyed hair). Humans used to be monkeys/evolved from chimpanzees.

Science Curriculum Progression Map

KS1 & KS2 – Summer 1						
	Year 1 **Plants**	Year 2 **Animals Including Humans 2 – Life Cycles**	Year 3 **Plants**	Year 4 **Sound**	Year 5 **Earth and Space**	Year 6 **Evolution and Inheritance**
	Biology – Plants	**Biology – Animals including Humans**	**Biology – Plants**	**Physics – Energy**	**Physics – Earth Science**	**Biology – Animals including Humans**
Key Vocabulary	predict, observe plant, tree, seed, oak, flower, root, leaf, petal, stem, weed, daisy, dandelion, wild, buttercup, evergreen, deciduous, seasons, bush, branch, vegetable, farm, tractor, supermarket, fruit, adult plant, seedling, young plant, growth	predict, bar chart grow, survive, adult, independent, life cycle, helpless, toddler, womb, develop, foetus, differences, offspring, resemble, gene, inherit, reproduction, chick, hatchling, transformation, chrysalis, caterpillar, metamorphosis, larva, frog, amphibian, frogspawn, tadpole, froglet	potassium, fertiliser, nutrient, nursery, stunted, chlorophyll, photosynthesis, UV light, xylem, stomata, transpiration, phloem, absorb, stigma, filament, reproduction, style, anther, nectar, seed dispersal, pollen, pollination, pollinator, vulnerable, anchor, germination, sapling, formation	eardrum, signals, vibration, medium, waves, particles, energy, source, echo, vacuum, materials, absorb, defenders, insulate, reflect, volume, decibel meter, decibels, amplitude, power, pitch, low, high, instruments, orchestra, sound source, particles, fade, energy, travel	solar system, orbit, rocky planet, terrestrial planet, gas giant planets, spherical, heliocentric, geocentric, astronomy, dwarf planet, poles, season, axis, hemisphere, shadow, time zone, sundial, dial, gnomon, moon, phase, waxing, waning, eclipse	characteristic, theory offspring, environmental, inherit, variation, nutrition, climate, adaptation, habitat, feature, predator, pollinate, nutrients, epiphytes, toxic, Mary Anning, ichthyosaurus, fossil, Jurassic Coast, palaeontologist, natural selection, Charles Darwin, evolve, tool, neanderthal, ancestor, homo sapiens, primate

Science Curriculum Progression Map

KS1 & KS2 – Summer 2

	Year 1 **Animals Including Humans 2 – All About Animals**	Year 2 **Plants**	Year 3 **Light**	Year 4 **Electricity**	Year 5 **Living Things and their Habitats**	Year 6 **Looking After our Environment**
	Biology – Animals including Humans	**Biology – Plants**	**Physics – Energy**	**Physics – Energy**	**Biology – Living Things and their Habitats**	**Biology – Living Things and their Habitats**
Substantive Knowledge Scientific knowledge, conceptual understanding, theory, laws and models *Know that... because...*	Vertebrates are animals that have a backbone. There are five groups of vertebrates: fish, amphibians, reptiles, birds and mammals. Scientists group animals according to their features. Cold-blooded animals are fish, amphibians and reptiles. Warm-blooded animals are mammals and birds. Fish, reptiles and amphibians lay eggs, mostly in water but on land too. Amphibians are cold-blooded animals that live in water and on land. They lay eggs underwater. Mammals are warm-blooded animals that give birth to live young. They have hair or fur on some or all of their bodies. Birds lay eggs on land. Birds all have wings but not all birds can fly. They are the only living animals with feathers. Fish have gills to help them breathe, fins to help them swim and scales to protect their bodies. Animals can be grouped according to what they eat. Some are herbivores, some are carnivores and some are omnivores. Herbivores eat plants. Carnivores eat meat. Omnivores eat both. Predators hunt other animals for food. Wild animals do not live with humans. They live in natural environments and have to find their own shelter and food. Pets have needs that humans fulfil. There are similarities and differences between animals.	There are many different types of plants. Mature plants can grow from both seeds and bulbs. A seed stores food for the plant until it can produce its own. A bulb stores enough food for the plant to grow and flower. It goes dormant when the plant is not growing. A bulb is formed underground and has its own stem and leaves. Plants need sunlight, water and carbon dioxide to grow. Plants use these things to produce glucose, which gives the plant energy. This is called photosynthesis. A seed will germinate in good soil with water and minerals. After germination, the roots begin to grow down and a shoot begins to grow up. When the plant has grown above the soil, it is a seedling. It begins to photosynthesise and grow into a mature plant. Pollination is how some flowering plants reproduce. Plants only grow well within a certain temperature range. Many grow in spring when it becomes warmer and there is more sunlight. Plants ae adapted to suit different environments, like cacti in the desert.	A light source is anything that makes light. There are two types of light sources: natural and artificial. Natural light sources include the sun, other stars and lightning. Artificial light sources include light bulbs, torches and screens. Fire can be a natural or artificial light source. Some objects reflect light, like the moon. They are not light sources. Light travels very quickly. It travels in straight lines. Light reflects off of objects and travels to our eyes. Humans need sunlight for vitamin D. It is our main light source. Sunlight can be dangerous because of ultraviolent (UV) rays. We need to protect our skin with suncream, wearing clothing to cover up and by staying in the shade. We need to protect our eyes from UV rays too. Some objects are more reflective than others. We can use reflective materials to keep safe. Shadows are formed when an opaque object blocks the light. Objects always cast a shadow in the opposite direction from where the light source is shining. If a light source is far away, shadows are shorter or smaller. If a light source is close, shadows are longer or bigger. People can tell the time using the sun and shadows.	Batteries are a source of electricity. Mains electricity travels from power stations through wire cables. Electricity can be very dangerous. We can use electricity safely by not putting fingers in plug sockets, not using electrical items with wet hands and checking that wires are not frayed. An electrical circuit is a loop that allows electricity to travel around it. Electricity always flows from the power source. An electrical circuit must have wires and a power source (a battery or the mains). If a circuit is broken, electricity will not be able to flow around it. A switch opens and closes a circuit. Opening a circuit prevents electricity from flowing. Complete circuits must have wires connected to both the positive and negative ends of the power supply. Materials that allow electricity to pass through them are conductors. Materials that do not allow electricity to pass through them are insulators. Many (but not all) metals conduct electricity.	Sexual reproduction is where offspring is produced by 2 parents: a male and a female. Sex cells from each parent only contain half of the information needed to create a new organism. When 2 sex cells combine, it is called fertilisation. Pollen contains male sex cells. Pollination carries pollen to the eggs of another flower. Asexual reproduction is where only one parent is needed to create offspring. The offspring is identical to the parent. Potatoes, onions and garlic reproduce asexually. Mammals can be split into three groups: placentals, monotremes and marsupials. Placental mammals give birth to live young after it has developed in the womb. Monotreme mammals lay eggs, like the platypus and echidna. Marsupials carry their young in a pouch. Insects have four distinct life stages: egg, larva, pupa and adult. Many amphibians do too. Many insects and amphibians go through a process called metamorphosis, as they grow into an adult. When birds and reptiles reproduce, fertilised eggs develop inside the body of the female until she lays them. Bird hatchlings look different from their parents. Their feathers are not yet fully developed. The stage between birds hatching and being able to fly is called the fledgling stage. Reptile hatchlings look like their parents. Fertilised eggs contain: eggshell, inner membrane, embryo, yolk, albumen, air cell. If an egg is unfertilised, it will not contain an embryo.	Climate is the average weather conditions over a long period of time. Global warming is the change to our climate. The planet is warming up. Human actions have added greenhouse gases into the atmosphere. These gases "trap" more of the sun's heat. Effects of climate change include increased flooding, rising sea levels, drought, reduction in glaciers, melting ice caps, reduced food production and a loss of wildlife. Trees absorb a greenhouse gas – carbon dioxide. Planting trees can tackle climate change. Landfills are holes in the ground where non-recyclable waste is buried. Many materials take hundreds of years to biodegrade, such as plastic. Products that decompose at landfills emit gases. Reducing energy use, consumption of plastic, reusing, repairing and recycling are other ways to tackle climate change. Renewable energy sources are a natural source. They will not run out. Examples are solar power and wind energy. Non-renewable energy sources burn fossil fuels, like coal, crude oil and natural gas. They emit greenhouse gases. Fossil fuels are formed from the remains of dead organisms. Nuclear fuel is non-renewable but does not emit carbon dioxide. Net zero is where we add no more greenhouse gases than we take away. During combustion, fuel reacts with oxygen to release energy. It also produces greenhouse gases such as carbon dioxide. COP stands for conference of parties: countries that have agreed to work together aim to take action against climate change. Species are having to adapt quickly to new climate patterns and loss of habitats.

Science Curriculum Progression Map

KS1 & KS2 – Summer 2

	Year 1 **Animals Including Humans 2 – All About Animals**	Year 2 **Plants**	Year 3 **Light**	Year 4 **Electricity**	Year 5 **Living Things and their Habitats**	Year 6 **Looking After our Environment**
	Biology – Animals including Humans	**Biology – Plants**	**Physics – Energy**	**Physics – Energy**	**Biology –** Living Things and their Habitats	**Biology –** Living Things and their Habitats
Disciplinary Knowledge Working scientifically skills *Enquiry approaches*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Observing and measuring *Research*	Lesson 1 – Recording data *Identifying, grouping & classifying*	Lesson 1 – Interpreting and communicating results *Problem-solving*	Lesson 1 – Making predictions *Pattern seeking*	Lesson 1 – Observing and measuring *Observation over time*
	Lesson 2 – Recording data *Identifying, grouping & classifying*	Lesson 2 – Asking questions *Comparative / fair testing*	Lesson 2 – Making predictions *Comparative / fair testing*	Lesson 2 – Setting up tests *Problem-solving*	Lesson 2 – Interpreting and communicating results *Identifying, grouping & classifying*	Lesson 2 – Interpreting and communicating results *Research*
	Lesson 3 – Observing and measuring *Identifying, grouping & classifying*	Lesson 3 – Recording data *Research*	Lesson 3 – Recording data *Comparative / fair testing*	Lesson 3 – Making predictions *Pattern seeking*	Lesson 3 – Recording data *Observation over time*	Lesson 3 – Recording data *Pattern seeking*
	Lesson 4 – Recording data *Identifying, grouping & classifying*	Lesson 4 – Recording data *Research*	Lesson 4 – Observing and measuring *Pattern seeking*	Lesson 4 – Setting up tests *Comparative / fair testing*	Lesson 4 – Observing and measuring *Identifying, grouping & classifying*	Lesson 4 – Interpreting and communicating results *Research*
	Lesson 5 – Recording data *Identifying, grouping & classifying*	Lesson 5 – Interpreting and communicating results *Pattern seeking*	Lesson 5 – Recording data *Observation over time*	Lesson 5 – Setting up tests *Problem-solving*	Lesson 5 – Interpreting and communicating results *Research*	Lesson 5 – Interpreting and communicating results *Problem-solving*
	Lesson 6 – Recording data *Research*	Lesson 6 – Recording data *Identifying, grouping & classifying*	Lesson 6 – Observing and measuring *Pattern seeking*	Lesson 6 – Asking questions *Comparative / fair testing*	Lesson 6 – Interpreting and communicating results *Problem-solving*	Lesson 6 – Observing and measuring *Observation over time*

Science Curriculum Progression Map

KS1 & KS2 – Summer 2

	Year 1 **Animals Including Humans 2 – All About Animals**	Year 2 **Plants**	Year 3 **Light**	Year 4 **Electricity**	Year 5 **Living Things and their Habitats**	Year 6 **Looking After our Environment**
	Biology – Animals including Humans	**Biology – Plants**	**Physics – Energy**	**Physics – Energy**	**Biology – Living Things and their Habitats**	**Biology – Living Things and their Habitats**
Disciplinary Knowledge Knowledge of methods, measurement, variables and practical procedures *Know how to…* *Be able to…*	**Ask simple questions and recognise that they can be answered in different ways** - *creating and playing an animal guessing game – does it have scales? Is it a reptile?* **Observe closely, using simple equipment** **Identify and classify** - *table: sorting animals into correct animal groups (mammals, reptiles, amphibians, birds, fish), Venn diagram: identifying herbivores, carnivores and omnivores* **Use observations and ideas to suggest answers to questions –** *suggesting what mammals and birds have in common and what the differences are, explaining how a mammal is different from an amphibian, using knowledge of animal needs to suggest which are suitable to be kept as a pet and which are not, producing fact files about chosen animals* **Gather and record data to help in answering questions**	**Ask simple questions and recognise that they can be answered in different ways –** *will a plant grow and remain healthy if it has no water / sunlight?* **Observe closely, using simple equipment –** *dissecting a range of seeds and bulbs, observing using microscopes/magnifying glasses and drawing or making prints with them* **Perform simple tests –** *keeping a control plant when changing factors that affect growth / health* **Identify and classify –** *sort plants into their natural habitats, describing what conditions might be like for the plant* **Use observations and ideas to suggest answers to questions –** *explaining how plants use water and sunlight to make the food they need to grow, creating and labelling diagrams to show the life cycle of a plant* **Gather and record data to help in answering questions –** *using results of plant growth experiment over time to compare predictions against the control plant*	**Gather, record, classify and present data in a variety of ways to help in answering questions** – *sorting light sources and non-light sources, explaining the difference between natural and artificial light* **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** – *investigating effect of sunlight on UV beads with / without suncream of different SPFs, exploring the reflectiveness of different materials, drawing outlines of shadows as measurements (cm) from light source change, reporting shadow investigation results in a table and bar graph* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *investigating effect of sunlight on UV beads with/without suncream of different SPFs, exploring the reflectiveness of different materials, writing conclusion about shadow investigation, explaining what is happening during a shadow puppet show* **Identify differences, similarities or changes related to simple scientific ideas and processes**	**Ask relevant questions and using different types of scientific enquiries to answer them** – *what can I use to make my switch? How can I make my bulb dimmer / brighter?* **Set up simple practical enquiries, comparative and fair tests** – *creating switches by exploring different materials and electricity conductivity, choosing own scientific question and setting up investigation to find out what happened in the circuit* **Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** – *explaining what happens when the switches children have made are used* **Gather, record, classify and present data in a variety of ways to help in answering questions** – *predicting which materials and objects will work as conductors / insulators and presenting results in a Venn diagram* **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** – *creating an electrical safety poster, predicting whether circuit diagrams will work and explaining what happened* **Use straightforward scientific evidence to answer questions or to support their findings** – *making series circuits with a bulb, buzzer and bell and matching components to pictures and circuit diagram symbols*	**Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** – *taking cuttings of a plant and predicting / drawing diagrams to predict what the plant could turn into* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *ordering images of 3 types of mammal life cycles (placental, monotreme, marsupial), creating a pinwheel to demonstrate similarities / differences between stages in amphibian and insect life cycles, dissecting an egg and identifying / explaining key parts, researching and presenting the life cycles of different organisms* **Identify scientific evidence that has been used to support or refute ideas or arguments** – *producing a presentation about the work of Jane Goodall and David Attenborough (growing understanding of the need for conservation)*	**Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** – *Making a water gauge and measuring daily temperature / weekly rainfall (taking averages once unit is complete and comparing them to national statistics)* *Auditing how much energy is used throughout school (using provided kWh), presenting rainfall data (past and present) in a comparative graph using a spreadsheet* **Use test results to make predictions to set up further comparative and fair tests** – *comparing data collected to historical data to make comparisons* **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** – *writing a pledge to explain how we can limit what is thrown away and how we can improve recycling at school, researching pros and cons of the industrial revolution and explaining different viewpoints* **Identify scientific evidence that has been used to support or refute ideas or argument** – *summarising outcomes and objectives from COP and presenting to peers*

Science Curriculum Progression Map

KS1 & KS2 – Summer 2

	Year 1 **Animals Including Humans 2 – All About Animals**	Year 2 **Plants**	Year 3 **Light**	Year 4 **Electricity**	Year 5 **Living Things and their Habitats**	Year 6 **Looking After our Environment**
	Biology – Animals including Humans	**Biology – Plants**	**Physics – Energy**	**Physics – Energy**	**Biology – Living Things and their Habitats**	**Biology – Living Things and their Habitats**
Possible Misconceptions	**All animals are the same:** For some children, their experiences so far might have taught them that all animals have four legs and fur and look much like a family pet. Children are taught about mammals, birds, amphibians, reptiles and fish. **Humans are not animals:** This is likely to be a common misconception. Learning should identify all the human features that categorise us as mammals. **Insects are not animals:** Although insects and microhabitats are not taught until Year 2, it is important to discuss the fact that insects are also animals and are classified as invertebrates. Planting these simple facts now will help children grasp more complex classifications further up the school. Lizards and snakes are amphibians. Whales and dolphins are fish as they live in the sea.	**All plants start out as seeds:** Some plants start out as bulbs. They will be able to draw comparisons between bulbs and seeds and be able to give examples of plants with seeds and plants with bulbs. **Seeds and bulbs need sunlight to germinate:** Seeds and bulbs are planted underground (no sunlight). Within a seed or bulb, there is enough food for the plant until it can start producing its own. The plant will grow its roots and stem under the ground and will start producing its own food once it has risen out of the soil and into the sunlight. Seeds and bulbs are not alive (they are – they are just dormant).	**The size of a shadow is equal to the size of the object:** Children may believe that the size of the shadow directly corresponds to the size of the object casting the shadow. They will begin to understand how the distance between the object, the light source and the surface affects the size and shape of the shadow. **Light cannot pass through objects:** Children may think that light cannot pass through solid objects. They might not understand that some materials are transparent or translucent, allowing light to pass through to varying degrees. We can still see even where there is an absence of any light. Our eyes 'get used to' the dark. Light is only found in bright areas. We see things because light travels from our eyes to objects. The moon and reflective surfaces are light sources. Shadows result from objects "giving off darkness."	**Switches create electricity:** Some children might think that turning on a switch creates electricity. In this unit, they will begin to understand that switches are used to control the flow of electricity by opening or closing a circuit, allowing or preventing the electricity from reaching a device. **More batteries mean more power:** Children may believe that adding more batteries to a circuit automatically makes it more powerful. Through investigation work, children will start to see that the voltage and current of a circuit depend on the properties of the components and the arrangement of the circuit, not just the number of batteries. **All materials conduct electricity equally:** Some children might think that all materials conduct electricity equally well. Investigative work in this unit will demonstrate the concept of conductors and insulators, which determine how easily electricity can flow through a material. Electricity only comes from the mains/batteries (e.g. lightning is not mains/battery powered). Confusing between battery and cell (cell – single unit. Battery – group of cells). Electricity flows to components, not through them. Electricity flows out of both ends of a battery. Components in a circuit closer to a cell "get more electricity."	**All living things have the same life cycle:** This is not true. The life cycles of different living things vary greatly. For example, most mammals give birth to live young, while amphibians lay eggs. **All animals within the same group have the same life cycle:** Although most animals within the basic animal groups (mammals, insects, birds etc) have the same, or a similar, life cycle, there are some anomalies, such as monotremes - egg-laying mammals - and complete/incomplete metamorphosis in insects. **The echidna and platypus are not mammals because they lay eggs:** The echidna and platypus are considered mammals because they produce milk for their young. **Parental care is done by both parents:** There are many fascinating examples of unique life cycles and parental care of young in the animal kingdom. From the female Surinam toad, who incubates eggs on her back until they hatch, to male seahorses who give birth, to the kangaroo's short gestation period, children should have the opportunity to explore these and more! **All living things reproduce the same way:** This is also not true. There are a variety of ways that living things reproduce. For example, mammals reproduce sexually, while plants reproduce asexually.	**Climate change is the same as global warming:** While global warming is one aspect of climate change, climate change is a broader term that refers to the long-term changes in Earth's climate. These changes can include changes in temperature, precipitation, sea level, and other factors. **Climate change is not happening:** The Earth's climate has been changing for millions of years, but the rate of change has accelerated in recent decades. This acceleration is due to human activities, such as the burning of fossil fuels. **There is nothing we can do about climate change:** While it is true that climate change is a complex problem, there are things that we can do to mitigate its effects. **I'm too young to worry about climate change:** Climate change is a problem that will affect everyone, regardless of age. It is important for everyone to do their part to address this problem, even if they are young.

Science Curriculum Progression Map

KS1 & KS2 – Summer 2						
	Year 1 **Animals Including Humans 2 – All About Animals**	Year 2 **Plants**	Year 3 **Light**	Year 4 **Electricity**	Year 5 **Living Things and their Habitats**	Year 6 **Looking After our Environment**
	Biology – Animals including Humans	**Biology – Plants**	**Physics – Energy**	**Physics – Energy**	**Biology – Living Things and their Habitats**	**Biology – Living Things and their Habitats**
Key Vocabulary	similarities, differences, compare amphibian, reptile, bird, fish, mammal, hatchling, feather, backbone, characteristic, warm-blooded, scale, gill, cold-blooded, carnivore, omnivore, herbivore, predator, canine, natural, wild, shelter, pet, veterinary, climate, unsuitable	compare, investigate, experiment, method, predict, control bulb, seed, growth, plant, carbon dioxide, photosynthesis, glucose, oxygen, energy, life cycle, germination, seedling, pollination, reproduction, crop, thrive, insulate, manure, healthy, forest, desert, survive	natural, artificial, source, light, reflect, ultraviolet (UV) rays, sunburn, vitamin D, protection, exposure, high visibility, reflective, surface, materials, fluorescent, sundial, ray, block, shadow, opaque, opposite, position, direction, cast, length, size, puppet, shape, closer, further	electricity, mains electricity, appliance, socket, batteries, series circuit, voltage, cell, circuit, component, power, current, bulb, wire, conductor, insulator, metal, copper, rubber, control, complete circuit, incomplete circuit, switch, renewable energy, non-renewable energy, wind turbines, solar panels, hydropower	genes, tuber, reproduction, asexual reproduction, fertilisation, placental mammal, monotreme mammal, mammary glands, pouch, marsupial, amphibian, metamorphosis, larva, caterpillar, pupa, egg, fledgling, egg tooth, embryo, hatch, primatologist, endangered, natural sciences, documentary, naturalist, life cycle, vertebrate, warm-blooded, cold-blooded, living organism	prevent, global warming, climate, climate change, weather, landfill, rubbish, waste material, council, biodegrade, recycle, emissions, renewable, non-renewable, greenhouse gases, net zero, combustion, fossil fuel, fuel, coal, industrial revolution, Conference of Parties (COP), sustainability, subsidy, pledge, species, natural disaster, sensitive, habitat, vulnerable