



Whole School Science Progression of Sticky Knowledge and Skills

	Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 (Yateley)
Working Scientifically	<p>Question words include who, why, what, when, where and how.</p> <p>Ask a relevant scientific question to find out more, explain how things work and why they might happen.</p> <p>When we try things out to see if they work, it is called a test.</p> <p>With support, use simple equipment, such as timers, rulers and containers, to measure length, height, capacity and time.</p> <p>Observe how activities are going and adapt their ideas if necessary.</p> <p>Data can be recorded in tables and pictograms.</p> <p>Record data in simple tables and pictograms.</p> <p>Represent scientific observations by mark making, drawing or creating simple charts and tables.</p> <p>Offer explanations for why things happen, making use of vocabulary, such as, because, then and next.</p>	<p>Question words include what, why, how, when, who and which.</p> <p>Ask simple scientific questions.</p> <p>Simple tests can be carried out by following a set of instructions.</p> <p>With support, follow instructions to perform simple tests and begin to talk about what they might do or what might happen.</p> <p>Simple equipment can be used to measure distance, height, weight and time.</p> <p>With support, use simple equipment to measure and make observations.</p> <p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features.</p> <p>Data can be recorded and displayed in different ways, including tables, charts, pictograms and drawings.</p> <p>The results are information that has been found out from an investigation.</p> <p>With support, gather and record simple data in a range of ways (data tables, diagrams, Venn diagrams).</p> <p>Talk about what they have done and say, with help, what they think they have found out.</p>	<p>Questions can help us find out about the world.</p> <p>Ask and answer scientific questions about the world around them.</p> <p>Tests can be carried out by following a set of instructions. A prediction is a guess at what might happen in an investigation.</p> <p>Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.</p> <p>Simple equipment is used to take measurements and observations. Examples include timers, hand lenses, metre sticks and trundle wheels.</p> <p>Use simple equipment to measure and make observations.</p> <p>Observe objects, materials, living things and changes over time, sorting and grouping them based on their features and explaining their reasoning.</p> <p>Data can be recorded and displayed in different ways, including tables, charts, pictograms and drawings.</p> <p>The results are information that has been found out from an investigation and can be used to answer a question.</p> <p>Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.</p> <p>Begin to notice patterns and relationships in their data and explain what they have done and found out using simple scientific language.</p>	<p>Questions can help us find out about the world and can be answered in different ways.</p> <p>Ask questions about the world around them and explain that they can be answered in different ways.</p> <p>Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.</p> <p>Set up and carry out some simple, comparative and fair tests, making predictions for what might happen.</p> <p>Equipment is used to take measurements in standard units.</p> <p>Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C) and metre sticks (millimetres, centimetres and metres). Taking repeat readings can increase the accuracy of the measurement.</p> <p>Take measurements in standard units, using a range of simple equipment.</p> <p>An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.</p> <p>Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.</p> <p>Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams.</p> <p>Data can be used to provide evidence to answer questions.</p> <p>Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.</p> <p>Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.</p> <p>Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.</p>	<p>Questions can help us find out about the world and can be answered using scientific enquiry.</p> <p>Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.</p> <p>Scientific enquiries can be set up and carried out by following or planning a method. A prediction is a statement about what might happen in an investigation, based on some prior knowledge or understanding. A fair test is one in which only one variable is changed and all others remain constant.</p> <p>Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.</p> <p>Equipment is used to take measurements in standard units.</p> <p>Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C), and metre sticks, rulers or trundle wheels (millimetres, centimetres, metres).</p> <p>Take accurate measurements in standard units, using a range of equipment.</p> <p>An observation involves looking closely at objects, materials and living things.</p> <p>Observations can be made regularly to identify changes over time.</p> <p>Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.</p> <p>Data can be recorded and displayed in different ways, including tables, charts, graphs, keys and labelled diagrams.</p> <p>Gather, record, classify and present observations and measurements in a variety of ways (pictorial representations, timelines, diagrams, keys, tables, charts and graphs).</p> <p>Results are information, such as data or observations, that have been found out from an investigation. A conclusion is the answer to a question that uses the evidence collected.</p> <p>Use scientific vocabulary to report and answer questions about their findings based on evidence collected, draw simple conclusions and identify next steps, improvements and further questions.</p>	<p>Questions can help us find out about the world and can be answered using a range of scientific enquiries.</p> <p>Ask a wide range of relevant scientific questions that broaden their understanding of the world around them and identify how they can answer them.</p> <p>A method is a set of clear instructions for how to carry out a scientific investigation. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding.</p> <p>Plan and carry out a range of enquiries, including writing methods, identifying variables and making predictions based on prior knowledge and understanding.</p> <p>Specialised equipment is used to take measurements in standard units. Examples include data loggers plus sensors, such as light (lux), sound (dB) and temperature (°C); timers (seconds, minutes and hours); thermometers (°C), and measuring tapes (millimetres, centimetres, metres).</p> <p>Take increasingly accurate measurements in standard units, using a range of chosen equipment.</p> <p>An observation involves looking closely at objects, materials and living things. Accurate observations can be made repeatedly or at regular intervals to identify changes over time.</p> <p>Within a group, decide which observations to make, when and for how long, and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.</p> <p>An observation involves looking closely at objects, materials and living things. Accurate observations can be made repeatedly or at regular intervals to identify changes over time.</p> <p>Data can be recorded and displayed in different ways, including tables, bar and line charts, classification keys and labelled diagrams.</p> <p>Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models).</p> <p>The results are information, such as measurements or observations, that have been collected during an investigation. A conclusion is an explanation of what has been discovered using evidence collected.</p> <p>Use relevant scientific vocabulary to report on their findings, answer questions and justify their conclusions based on evidence collected, identify improvements, further questions and predictions.</p>	<p>Questions can help us find out about the world and can be answered using a range of scientific enquiries, including fair tests, research and observation.</p> <p>Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.</p> <p>A method is a set of clear instructions for how to carry out a scientific investigation, including what equipment to use and observations to make. A variable is something that can be changed during a fair test. A prediction is a statement about what might happen in an investigation based on some prior knowledge or understanding.</p> <p>Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding.</p> <p>Specialised equipment is used to take accurate measurements in standard units. Examples include data loggers plus sensors, such as light (lux), sound (dB) and temperature (°C); timers (seconds, minutes and hours); thermometers (°C) and measuring tapes (millimetres, centimetres, metres).</p> <p>Take accurate, precise and repeated measurements in standard units, using a range of chosen equipment.</p> <p>An observation involves looking closely at objects, materials and living things. Accurate observations can be made repeatedly or at regular intervals to identify changes over time, identify processes and make comparisons.</p> <p>Data can be recorded and displayed in different ways, including tables, bar and line charts, scatter graphs, classification keys and labelled diagrams.</p> <p>Independently decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.</p> <p>The results are information, such as measurements or observations, that have been collected during an investigation. A conclusion is an explanation of what has been discovered, using correct, precise terminology and collected evidence.</p> <p>Choose an appropriate approach to recording accurate results, including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge. Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.</p>	<p>When studying Science, there are many skills that you will develop. These include analysing information to allow you to find a pattern, discussing limitations of what you have observed and drawing conclusions from experiments that you have completed.</p> <p>- In Science in Key Stage 3, you will build a foundation skill set that will allow you to build further, making links between models and concepts, enabling you to apply your knowledge to unfamiliar contexts. This will give you a solid base from which to build on in GCSE.</p> <p>- You will develop a level of knowledge through to mastery of the 10 Big Ideas in Science and be able to explain phenomena and make predictions.</p>

Living things; Humans and other Animals; Plants and Habitats

The basic body parts are the head, arms, legs, nose, eyes, ears, mouth, hands and feet. Different body parts are used for different things, such as the eyes are used to see. **Draw pictures of human body and name different body parts.** Know and talk about factors that support overall health/wellbeing: regular physical activity; healthy eating; toothbrushing; sensible 'screen time'; having good sleep routine; being a safe pedestrian. Wash/dry hands, especially after using toilet and before eating, to stop spread of harmful germs. **Wash and dry hands regularly and say why this is important.** Animals are living things. There are different types of animal. Parent and baby mammals include cow and calf, sheep and lamb, and cat and kitten. Parent and baby birds include duck and duckling, chicken and chick, and goose and gosling. **Match animals to their young.** Different animal groups have some common body parts, such as birds have wings and fish fins. **Observe/describe living things. Identify common features for different groups of animals, inc. wild & domestic animals.** Animals are living things and need food, water, air and shelter to survive. **Describe how to care for animals, including pets.** Animals eat different kinds of food; other animals, plants, both. **Match animals to the foods that they eat.** Living things change over time. This includes growth and decay. **Describe ways that plants or animals should be cared for for them to survive.** Plants and trees are living things and can be identified according to features, such as leaves, seeds, flowers. Plants need sunlight, water and air to survive. **Describe how to care for plants. Begin to name and group plants and trees by observable features.** Parts of plants and trees include trunk, branch, twig, roots, stem, flowers, leaves. **Name and describe basic features of plants & trees.** All living things (plants and animals) change over time as they grow and mature. **Describe, following observation, how plants and animals change over time.** Living things need to be cared for in order for them to survive. They need water, food, warmth and shelter.

The basic body parts are the head, arms, legs, nose, eyes, ears, mouth, hands and feet. The five senses are hearing, sight, smell, taste and touch. Ears are used for hearing, eyes are used to see, the nose is used to smell, the tongue is used to taste and skin gives the sense of touch. **Draw/label main parts of human body and say which body part is associated with which sense.** Animals are living things. Animals can be sorted and grouped into six main groups: fish, amphibians, reptiles, invertebrates, birds and mammals. **Identify, compare, group and sort a variety of common animals, including fish, amphibians, reptiles, birds, invertebrates and mammals, based on observable features.** Different animal groups have some common body parts, such as eyes and a mouth, and some different body parts like fins, wings. **Label and describe the basic structures of a variety of common animals, including fish, amphibians, reptiles, birds, mammals.** Carnivores eat other animals (meat), herbivores eat plants, omnivores eat other animals and plants. **Group and sort a variety of common animals based on foods they eat.** Plants are living things. Common plants include the daisy, daffodil and grass. Trees are large, woody plants and are evergreen or deciduous. Trees that lose leaves in the autumn are called deciduous trees. Examples include oak, beech, rowan. Trees that shed old leaves and grow new leaves all year round are called evergreen trees. Eg.s include holly and pine. **Identify, compare, group and sort a variety of common wild and garden plants, including deciduous and evergreen trees, based on observable features.** The basic plant parts include root, stem, leaf, flower, petal, fruit, seed and bulb. Trees have a woody stem called a trunk. **Label and describe the basic structure of a variety of common plants.**

Human offspring go through different stages as they grow to become adults. These include baby, toddler, child, teenager, adult and elderly. **Describe the stages of human development (baby, toddler, child, teenager, adult and elderly).** Animals, including humans need water, food, air and shelter to survive. **Explain how animals, including humans, need water, food, air and shelter to survive.** A healthy lifestyle includes exercise, good personal hygiene, good quality sleep and a balanced diet. Risks associated with an unhealthy lifestyle include obesity, tooth decay and mental health problems. **Describe the importance of a healthy lifestyle, including exercise, a balanced diet, good quality sleep and personal hygiene.** Living things are alive. Dead things are those that were once living but are no longer. Some things have never been alive. **Compare and group things that are living, dead or have never been alive.** A habitat is a place where a living thing lives. Local habitats include parks, woodland and gardens. Habitats beyond the locality include beaches, rainforests, deserts, oceans and mountains. All living things live in a habitat to which they are suited and it must provide everything they need to survive. A microhabitat is a very small habitat. **Describe a range of local habitats and habitats beyond their locality (beaches, rainforests, deserts, oceans and mountains) and what all habitats provide for the things that live there.** Identify and name a variety of plants and animals in a range of habitats and microhabitats. Food chains show how living things depend on one another for food. All food chains start with a plant, followed by animals that eat plants or other animals. **Interpret and construct simple food chains to describe how living things depend on each other as a source of food.** Animals have offspring that grow into adults. Different animals have different stages of growth or life cycles. **Describe the basic life cycles of some familiar animals (egg, caterpillar, pupa, butterfly; egg, chick, chicken; spawn, tadpole, froglet, frog).** Plants need air, light, water, minerals from the soil, room to grow and a suitable temperature to grow and stay healthy. Without any one of these things, they will die. Different plants have different needs depending on their habitat. Examples include cacti, which need less water than typical, and ferns, which can grow in lower light levels. **Describe the requirements of plants for life and growth (air, light, water, nutrients, room to grow and a suitable temperature) to grow and stay healthy and how they vary from plant to plant.** The plant's roots anchor the plant in the ground and transport water and minerals from the ground to the plant. The stem (or trunk) support the plant above the ground. The leaves collect energy from the Sun and make food for the plant. Flowers make seeds to produce new plants. **Name/describe the functions of the different parts of flowering plants (roots, stem, leaves and flowers).** Water is transported in plants from roots, through the stem and to leaves, through tiny tubes called xylem. **Investigate how water is transported within plants.** Plants grow from seeds and bulbs which need water and warmth to start growing (germinate). As the plant grows bigger, it develops leaves and flowers. **Observe and describe how seeds and bulbs change over time as they grow into mature plants.**

Animals, including humans cannot make their own food and have to get nutrition from what they eat. Carnivores get their nutrition from eating other animals. Herbivores get their nutrition from plants. Omnivores get their nutrition from eating a combination of both plants and other animals. It is important to have a balanced diet made up of the main food groups, including carbohydrates, proteins, fruit and veg, dairy products and alternatives, and fats and spreads. Humans need to stay hydrated by drinking water. **Compare and contrast the diets of different animals. Explain the importance and characteristics of a healthy, balanced diet.** Humans have a skeleton and muscles for movement, support and protecting organs. Major human bones include the skull, ribs, spine, humerus, ulna, radius, pelvis, femur, tibia and fibula. Major human muscle groups include biceps, triceps, abdominals, trapezius, gluteals, hamstrings, quadriceps, deltoids, gastrocnemius, latissimus dorsi and pectorals. **Describe how humans need the skeleton and muscles for protection, movement, support.** Some animals have skeletons for support, movement, protection. Endoskeletons are those found inside some animals, such as cats and horses. Exoskeletons are those found on the outside of some animals, such as beetles and flies. Some animals have no skeleton, such as slugs and jellyfish. **Identify and group animals that have no skeleton, an internal skeleton (endoskeleton) and an external skeleton (exoskeleton).**

The digestive system is responsible for digesting food and absorbing nutrients and water. The main parts of the digestive system are the mouth, oesophagus, stomach, small intestines, large intestines and rectum. The mouth starts digestion by chewing food and mixing it with saliva. The oesophagus transports the chewed food to the stomach, where it mixes with stomach acid and gets broken down into smaller pieces. In the small intestine, nutrients from the food are absorbed by the body. In the large intestine, water is absorbed by the body. The remaining undigested waste is stored in the rectum before excretion through the anus. **Describe the purpose of the digestive system, its main parts and each of their functions.** There are four different types of teeth: incisors, canines, premolars and molars. Incisors are used for cutting. Canines are used for tearing. Premolars and molars are used for grinding and chewing. Carnivores, herbivores and omnivores have characteristic types of teeth. Herbivores have many large molars for grinding plant material. Carnivores have large canines for killing their prey and tearing meat. **Identify/describe functions of four types of teeth in humans and other animals.** Regular teeth brushing, limiting sugary foods and visiting the dentist are important for good oral hygiene. **Describe what damages teeth and how to look after them.** Habits change over time, either due to natural or human influences. Natural influences include extreme or unseasonable weather. Human influences include habitat destruction or pollution. Changes can pose a risk to animals and plants in the habitat **Describe how environments and habitats, such as a mountain or ocean, can change over time due to natural influences, what influences these changes, the impact this can have on living things and how living things need to be able to adapt to changes.** An adaptation helps an animal or plant survive in its habitat. If living things are unable to adapt to changes within their habitat, they risk becoming extinct. **Explain how adaptations help living things to survive in their habitat.** Food chains show what animals eat within a habitat and how energy is passed on over time. All food chains start with a producer, typically a green plant. The producer is eaten by a primary consumer (prey), which is eaten by a secondary consumer (prey), which is eaten by a tertiary consumer. All food chains end with a top or apex predator. Changes within a food chain, such as Population changes. or an abundance or lack of one food type, have an impact on the entire food chain and web. **Construct and interpret a variety of food chains and webs to show interdependence and how energy is passed on over time. Describe, using their knowledge of food chains and webs, what could happen if a habitat had a living thing removed or introduced.**

Humans go through characteristic stages as they develop towards old age. These stages include baby, infant, toddler, child, adolescent, young adult, adult and senior citizen. Puberty is a transition between childhood and adulthood. **Describe the changes as humans develop from birth to old age.** Puberty is the period during which adolescents reach sexual maturity and become capable of reproduction. It causes physical and emotional changes. Good personal hygiene (washing, wearing clean clothes and brushing teeth) can prevent disease or illness. **Explain why personal hygiene is important during puberty.** Humans reproduce sexually, which involves two parents (one female, one male) and produces offspring that are different from the parents. **Describe the process of human reproduction.** A life cycle is the series of changes in the life of a living thing and includes these basic stages: birth, growth, reproduction and death. Mammals' life cycles include the stages: embryo, juvenile, adolescent and adult. Amphibians' life cycles include the stages: egg, larva (tadpole), adolescent and adult. Some insects' (butterflies, beetles and bees) life cycles include the stages: egg, larva, pupa and adult. Birds' life cycles include the stages: egg, baby, adolescent and adult. Reproduction is the process of producing offspring and is essential for the continued survival of a species. There are two types of reproduction: sexual and asexual. Sexual reproduction involves two parents (female and male) and produces offspring that are different from the parents. Asexual reproduction involves one parent and produces offspring identical to the parent. **Identify that living things produce offspring of the same kind, although the offspring are not identical to either parent. Compare the life cycles of animals, including a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.** Flowers are important in the life cycle of flowering plants. The processes of a plant's life cycle include germination, flower production, pollination, seed formation and seed dispersal. Insects and the wind transfer pollen from 1 plant to another (pollination). Animals, wind, water and explosions can disperse seeds away from the parent plant (seed dispersal). **Draw/label the life cycle of a flowering plant.** Flowering plants reproduce sexually. The flower is essential for sexual reproduction. Other plants reproduce asexually. Bulbs, corms and rhizomes are some parts used in asexual reproduction in plants. **Group and sort plants by how they reproduce.** Parts of a flower include the stamen, filament, anther, pollen, carpel, stigma, style, ovary, ovule and sepal. Pollination is when the male part of a plant (pollen) is carried, by wind, insects or other animals, to the female part of the plant (carpel). Pollen travels to the ovary, where it fertilises the ovules (eggs). Seeds are then produced, which disperse far away from the parent plant and grow new plants. **Label and draw the parts of a flower involved in sexual reproduction in plants (stamen, filament, anther, pollen, carpel, stigma, style, ovary, ovule and sepal).**

The role of the circulatory system is to transport oxygen, water and nutrients around the body. The circulatory system includes the heart, blood vessels and blood. The heart pumps blood through blood vessels and around the body. There are three types of blood vessel: arteries, veins and capillaries. They each have a different-sized hole (lumen) and walls. The blood carries gases (oxygen and carbon dioxide), water and nutrients to where they are needed. Red blood cells carry oxygen and carbon dioxide around the body. Blood also contains white blood cells, which protect body from infection. **Name and describe purpose of the circulatory system and the functions of the heart, blood vessels and blood.** Lifestyle choices can have a positive (exercise and eating healthily) or negative (drugs, smoking and alcohol) impact on the body. **Explain the impact of positive and negative lifestyle choices on the body.** Scientists classify living organisms into broad groups according to their common observable characteristics and based on similarities and differences. Animals can be divided into six main groups: mammals, reptiles, amphibians, birds, fish and invertebrates. These groups can be further subdivided. Vertebrates are an example of a classification group. There are a number of ranks, or levels, within the biological classification system. The first is called a kingdom, the second a phylum, then class, order, family, genus, species. **Classify living things, including microorganisms, animals and plants, into groups according to common observable characteristics and based on similarities and differences.** Classification keys are scientific tools that aid the identification of living things based on their physical characteristics. **Use & construct classification systems to identify animals and plants from a range of habitats, giving reasons.**

Biology: What exactly is a cell? How can we study them? How do they become giant organisms that can do many things through specialisation and collaboration? How do joints and muscles really work? Why is interdependence so important? What impact are we having on the natural world? Why are we all different? What is reproduction? Why are pollinators so important?

	Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 (Yateley)
Everyday Materials, Rocks, States of Matter, Evolution and Inheritance	<p>Objects are made from different materials. Everyday materials include, wood, plastic, glass, fabric, metal and stone. Materials have different properties. Explore and sort materials through play and exploration, identifying different properties. Some foods, such as ice and chocolate, melt when heated, but then harden (solidify or freeze) when cooled. Observe what happens when a range of everyday materials, including foods, are heated and cooled, sorting and grouping them based on their observations.</p>	<p>A material is what an object is made from. Everyday materials include wood, plastic, glass, metal, water, rock, brick, paper and fabric. Identify and name what an object is made from, including wood, plastic, glass, metal, water and rock. Objects and materials can be looked at, compared and grouped according to their properties. Materials have different properties, such as hard or soft; stretchy or stiff; rough or smooth; opaque or transparent; bendy or rigid; waterproof or not waterproof. Investigate and describe the physical properties of some everyday materials, such as hard or soft; stretchy or stiff; rough or smooth; opaque or transparent; bendy or rigid and waterproof or not waterproof. Compare and group materials in a variety of ways, such as based on their physical properties or being natural or man-made, recyclable or non-recyclable.</p>	<p>Some objects and materials can be changed by squashing, bending, twisting, stretching, heating, cooling, mixing and being left to decay. Describe how some objects and materials can be changed and how these changes can be desirable or undesirable. A material's physical properties make it suitable for particular purposes, such as glass for windows and brick for building walls. Many materials are used for more than one purpose, such as metal for cutlery and cars. Compare the suitability of a range of everyday materials for particular uses, including wood, metal, plastic, glass, brick, rock, paper and cardboard.</p>	<p>There are three different rock types: sedimentary, igneous and metamorphic. Sedimentary rocks form from mud, sand and particles that have been squashed together over a long time to form rock. Examples include sandstone and limestone. Igneous rocks are made from cooled magma or lava. They usually contain visible crystals. Examples include pumice and granite. Metamorphic rocks are formed when existing rocks are heated by the magma under the Earth's crust or squashed by the movement of the Earth's tectonic plates. They are usually very hard. Examples include slate and marble. Compare and group rocks based on their appearance, properties or uses. Fossils form over millions of years and are the remains of a once-living organism, preserved as rock. Scientists can use fossils to find out what life on Earth was like in prehistoric times. Fossils form when a living thing dies in a watery environment. The body gets covered by mud and sand and the soft tissues rot away. Over time, the ground hardens to form sedimentary rock and the skeletal or shell remains turn to rock. Describe simply how fossils are formed, using words, pictures or a model. Soils are made from tiny pieces of eroded rock, air and organic matter. There are a variety of naturally occurring soils, including clay, sand and silt. Different areas have different soil types. Investigate soils from the local environment, making comparisons and identifying features.</p>	<p>Materials can be grouped according to whether they are solids, liquids or gases. Solids stay in one place and can be held. Some solids can be squashed, bent, twisted and stretched. Examples of solids include wood, metal, plastic and clay. Liquids move around (flow) easily and are difficult to hold. Liquids take the shape of the container in which they are held. Examples of liquids include water, juice and milk. Gases spread out to fill the available space and cannot be held. Examples of gases include oxygen, helium and carbon dioxide. Air is a mixture of gases. Group and sort materials into solids, liquids or gases. Heating or cooling materials can bring about a change of state. This change of state can be reversible or irreversible. The temperature at which materials change state varies depending on the material. Water changes state from solid (ice) ⇌ liquid (water) at 0°C and from liquid (water) ⇌ gas (water vapour) at 100°C. The process of changing from a solid to liquid is called melting. The reverse process of changing from a liquid to a solid is called freezing. The process of changing from a liquid to a gas is called evaporation. The reverse process of changing from a gas to a liquid is called condensation. Observe and explain that some materials change state when they are heated or cooled and measure or research the temperature in degrees Celsius (°C) at which materials change state. The water cycle has four stages: evaporation, condensation, precipitation and collection. Water in lakes, rivers and streams is warmed by the Sun, causing the water to evaporate and rise into the air as water vapour. As the water vapour rises, it cools and condenses to form water droplets in clouds. The clouds become full of water until the water falls back to the ground as precipitation (rain, hail, snow and ice). The fallen water collects back in lakes, rivers and streams. Evaporation and condensation are caused by temperature changes. Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.</p>	<p>Materials can be grouped according to their basic physical properties. Properties include hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Heat energy is transferred in three different ways: conduction, convection and radiation. A material that allows heat energy to travel through it is a thermal conductor. Poor thermal conductors are known as thermal insulators. Compare and group everyday materials by their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Investigate and identify good thermal insulators, describing their common features. Some mixtures can be separated by filtering, sieving and evaporating. Sieving can be used to separate large solids from liquids and some solids from other solids. Filtering can be used to separate small solids from liquids. Some materials (solutes) will dissolve in liquid (solvents) to form a solution. The solute can be recovered by evaporating off the solvent by heating. Separate mixtures by filtering, sieving and evaporating. Explain, following observation, that some substances (solutes) will dissolve in liquid (solvents) to form a solution and the solute can be recovered by evaporating off the solvent. A material's properties dictate what it can be used for. For example, cooking pans are made from metal, which is a good thermal conductor, allowing heat to quickly transfer from the hob to the contents of the pan. Describe, using evidence from comparative or fair tests, why a material has been chosen for a specific use, including metals, wood and glass. Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions. Identify, demonstrate and compare reversible and irreversible changes. Very hot and very cold materials can burn skin. Heating materials should be done safely. Explain the precautions needed for working safely when heating, burning, cooling and mixing materials.</p>	<p>Scientists compare fossilised remains from the past to living species that exist today to hypothesise how living things have evolved over time. Humans and apes share a common ancestry and evidence for this comes from fossil discoveries and genetic comparison. Describe some significant changes that have happened on Earth and the evidence, such as fossils, that support this. Animals that sexually reproduce generate new offspring of the same kind by combining the genetic material of two individuals. Each offspring inherits two of every gene, one from the female parent and one from the male parent. Animals and plants can be bred to produce offspring with specific and desired characteristics. This is called selective breeding. Examples include cows that produce large quantities of milk or crops that are disease-resistant. Explain that living things have changed over time, using specific examples and evidence. Describe how animals and plants can be bred to produce offspring with specific and desired characteristics (selective breeding). An adaptation is a physical or behavioural trait that allows a living thing to survive. Adaptations evolve by natural selection. Favourable traits help an organism survive and pass on their genes to subsequent generations. Identify how animals and plants are adapted to suit their environment, such as giraffes having long necks for feeding, and that adaptations may lead to evolution.</p>	<p>Chemistry: What is everything made of? Why are some things solid and others liquid or gases? How can we get pure water from the sea? Is black ink really black? Why does iron rust but copper doesn't? Which is better to put on a bee sting – vinegar or toothpaste?</p>

Seasonal Changes, Light and Sound, Earth in Space, Forces, Magnets and Electricity

	Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 (Yateley)
	<p>Natural phenomena include weather, shadows, clouds, rainbows, flooding, waves. Name and describe natural phenomena, eg shadows, colours of rainbow, speed of clouds moving across sky and the strength of a wave. Explore the natural world around them; give simple descriptions, following observation, of changes. The weather can change throughout the day, week and month. The weather is different at different times in the year. We describe daily weather as sunny, rainy, windy, cloudy, warm or cold. Weather is warmer in summer (more sunshine) and colder in the winter (more snow, hail and rain.) Notice and describe patterns of weather in summer and winter. A shadow is the same shape as the object that makes it. Compare shadows made by diff. objects and materials. Some light sources need electricity or batteries to work (eg torch) and some do not, such as candles. Explore and describe electrical and non-electrical light sources. Objects move in different ways including roll, slide, bounce, etc. Explore how objects move through their play. Some objects float and others sink. When an object sinks it falls through water to the bottom of the vessel. An object that floats stays at the water's surface. Objects that float are typically light or hollow. Objects that sink are typically heavy or dense. Describe, predict and sort things that float and sink and talk about the forces that they can feel. Rules help to keep us safe in different environments and when using certain equipment. Follow instructions when in different environments and when handling simple equipment, such as scissors.</p>	<p>There are four seasons: spring, summer, autumn and winter. Certain events/weather patterns happen in different seasons. Observe the local environment through the year; ask/answer questions about living things/seasonal change. Different types of weather include sunshine, rain, hail, wind, snow, fog, lightning, storm and cloud. Some weather types are more common in certain seasons, such as snow in winter. The UK has typical weather in each of the seasons. For example, winter is cold and sometimes frosty, whereas summer is warm and sometimes sunny. Observe and describe different types of weather. Describe typical UK seasonal weather patterns. The number of daylight hours varies throughout the year, according to the season. Day length (the number of daylight hours) is longer in the summer months and shorter in the winter months. Observe and describe how day length changes between the seasons. An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force. Forces can change how things move and can change their shape. Explain that an object will not move unless a push or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).</p>	<p>Simple equipment can be used for measuring weather, such as measuring temperature with a thermometer; identifying wind direction and force with a windsock or measuring rainfall with a rain gauge. Investigate weather using simple equipment. It is important to stay safe. Some ways to stay safe include staying safe in strong sunlight (sun cream, sun hat and sunglasses), crossing roads (stop, look and listen), in the kitchen (not touching hot or sharp objects) and with household chemicals (not touching, drinking or eating) and not touching electricity. Describe ways to stay safe in some familiar situations.</p>	<p>Dark is the absence of light and we need light to be able to see. Describe differences between dark and light and how we need light to see. Light can be reflected from different surfaces. Some surfaces are poor reflectors, such as some fabrics; other surfaces are good reflectors (mirrors.) Group and sort materials as being reflective or non-reflective. Light from the Sun is damaging for vision and skin. Protection from Sun includes sun cream, sunglasses, sun hats and staying indoors/in the shade. Explain why light from the Sun can be dangerous. A shadow is formed when light from a light source, such as the Sun, is blocked by an object. Shadows are normally the same shape as the object that cast them. Opaque objects cast dark shadows, translucent objects cast pale shadows, transparent pale shadows. Explain, using words or diagrams, how shadows are formed when a light source is blocked by an opaque object. Shadows change shape and size when the light source moves. For example, when the light source is high above the object, the shadow is short and when the light source is low down, the object's shadow is long. Thus, shadows change during the day as the Sun appears to change position in the sky. Find patterns in the way shadows change during the day. Friction is a force between two surfaces as they move over each other. Friction slows down a moving object. Smooth surfaces usually generate less friction than rough surfaces. Compare how objects move over surfaces of different materials. Some materials have magnetic properties. Magnetic materials are attracted to (pull towards) magnets. All magnetic materials are metals but not all metals are magnetic. Iron is a magnetic metal. Other materials are non-magnetic, such as wood, dough and glass. Compare and group materials based on their magnetic properties. Magnets have two poles (north and south). Opposite poles (north and south) attract each other, while like poles (north and north, or south and south) repel each other. Investigate and compare a range of magnets (bar, horseshoe and floating) and explain that magnets have two poles (north and south) and that opposite poles attract each other, while like poles repel each other.</p>	<p>When an instrument is played by plucking, striking or blowing, the air around or inside it vibrates. These vibrations travel as a sound wave. Sound waves travel through a medium, such as air or water, to the ear. Explain how sounds are made and heard using diagrams, models, written methods or verbally. Pitch is how high or low a sound is. Parts of an instrument that are shorter, tighter or thinner produce high-pitched sounds. Parts of an instrument that are longer, looser or fatter produce low-pitched sounds. Compare and find patterns in the pitch of a sound, using a range of equipment, including voices and musical instruments. Volume is how loud or quiet a sound is. The harder an instrument is hit/plucked/blown, the stronger the vibrations and louder the sound. Compare and find patterns in the volume of a sound, using a range of equipment, including voices and musical instruments. Sounds are louder closer to the sound source and fainter as the distance from the sound source increases. Compare how the volume of a sound changes at different distances from the source. Electricity is a type of energy. It is used to power many everyday items, such as kettles, computers and televisions. Electricity can also come from batteries. Batteries eventually run out of power and need to be recycled or recharged. Batteries power devices that can be carried around, such as mobile phones and torches. Compare common household equipment and appliances powered or not by electricity. Working with electrical circuits can be dangerous. Precautions include not touching electrical components with wet hands and not putting batteries in mouths. Explain the precautions needed for working safely with electrical circuits. A circuit needs a power source, such as a battery or cell, with wires connected to both the positive and negative terminals. Other components include lamps, buzzers or motors, which an electric current passes through and affects a response, such as lighting lamp or turning motor. Switches open and close a circuit and provide control. When a switch is open, it creates a gap and the current cannot travel around the circuit. When closed, a switch completes the circuit and allows a current to flow all the way around it. Predict and describe whether a circuit will work based on whether or not the circuit is a complete loop and has a battery or cell. A series circuit is a simple loop with only one path for the electricity to flow. A series circuit must be a complete loop to work and have a source of power from a battery or cell. Construct operational simple series circuits using a range of components and switches for control. Electrical conductors let electricity flow through them, insulators do not. Common electrical conductors are metals. Common insulators include wood, glass, plastic and rubber. Describe materials as electrical conductors or insulators.</p>	<p>As Earth orbits the Sun, it also spins on its axis. It takes Earth a day (24 hours) to complete a full spin. During the day, the Sun appears to move through the sky. However, this is due to the Earth rotating and not the Sun moving. Earth rotates to the east or, if viewed from above the North Pole, it rotates anti-clockwise, which means the Sun rises in the east and sets in the west. As the Earth rotates, different parts of it face the Sun, which brings what we call daytime. The part facing away is in shadow, which is night time. When it is daytime in one location, it is night time on the other side of the world. Use the idea of the Earth's rotation to explain day and night, and the Sun's apparent movement across the sky. The Solar System is made up of the Sun and everything that orbits around it. There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. The Earth is covered in water and land. Earth orbits the Sun and a year (365.25 days) is the length of time it takes for Earth to complete a full orbit. Describe or model the movement of planets in our Solar System, including Earth, relative to the Sun. The Moon orbits Earth, completing a full orbit every month (27.3 days). Describe or model the movement of the Moon relative to Earth. The Sun, Earth, Moon and the planets in our solar system are roughly spherical. All planets are spherical because their mass is so large that they have their own force of gravity. This force of gravity pulls all of a planet's material towards its centre, which compresses it into the most compact shape – a sphere. Describe the Sun, Earth and Moon as approximately spherical bodies and use this knowledge to understand the phases of the Moon and eclipses. Gravity is a force of attraction. Anything with a mass can exert a gravitational pull on another object. The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground. Explain that objects fall to Earth due to the force of gravity. Friction, air resistance and water resistance are forces that oppose motion and slow down moving objects. These forces can be useful, such as bike brakes and parachutes, but sometimes we need to minimise their effects, such as streamlining boats and planes to move through water or air more easily and using lubricants and ball bearings between two surfaces to reduce friction. Compare and describe, using a range of toys, models and natural objects, the effects of water resistance, air resistance and friction. Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage. A mechanical advantage is a measurement of how much a simple machine multiplies the force that we put in. The bigger the mechanical advantage, the less force we need to apply. Describe and demonstrate how simple levers, gears and pulleys assist the movement of objects.</p>	<p>Light travels in straight lines. Identify that light travels in straight lines. 'White' light is a term used to describe visible, ordinary daylight. White light can be split into a spectrum of colours (rainbow) by droplets of water or prisms. Describe, using scientific language, phenomena associated with refraction of light. Light sources give out light. They can be natural or artificial. When light hits an object, it is absorbed, scattered, reflected or a combination of all three. Light from a source or reflected light enter the eye. Vertebrates, such as mammals, birds and reptiles, have a cornea and lens that refracts light that enters the eye and focuses it on the nerve tissue at the back of the eye, which is called the retina. Once light reaches the retina, it is transmitted to the brain via the optic nerve. Explain that, due to how light travels, we can see things because they give out or reflect light into the eye. A shadow appears when an object blocks the passage of light. Apart from some distortion or fuzziness at the edges, shadows are the same shape as the object. The distortion or fuzziness depends on the position or type of light source. Explain, using words, diagrams or a model, why shadows have the same shape as the objects that cast them and how shadows can be changed. Lasers are intense beams of light and they should never be pointed at people's faces or aircraft. Explain the dangers of using lasers and ways to use them safely. Voltage is measured in volts (V) and is a measure of the difference in electrical energy between two parts of a circuit. The bigger the voltage, the more electrons are pushed through the circuit. The more voltage flowing through a lamp, buzzer or motor, the brighter the lamp, the louder the buzzer and the faster the motor. Compare and give reasons for variations in how components in electrical circuits function (brightness of lamps; volume of buzzers and function of on or off switches). Explain how the brightness of a lamp or volume of a buzzer is affected by the number and voltage of cells used in a circuit. There are recognised symbols for different components of circuits. Create circuits using a range of components and record diagrammatically using the recognised symbols for electrical components.</p>	<p>Physics: Why do high heeled shoes sink into mud but boots don't? How is it that I can see lightning before I hear thunder? Why do some things move faster than others and what stops us floating off of the planet?</p>