


Knowledge and Skills


	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Physics 	Substantive Knowledge						
	<p>Forces Explore how things work Explore and talk about different forces they can feel Talk about the differences between materials and changes they notice Explore the natural world around them Describe what they see, hear and feel whilst outside</p> <p>Earth and Space Learn about the solar system and stars Learn about space travel Explore the natural world around them Describe what they see, hear and feel whilst outside Understand the effect of change in seasons on the natural world around them Name the 4 seasons</p>	<p>Earth and Space Name the 4 seasons and say when in the year they occur Observe and describe weather associated with the seasons Observe changes across the 4 seasons Describe some other features that change throughout the year that are caused by the change in weather e.g. numbers of mini beasts found outside, seed and plant growth, leaves on trees, clothes worn by people, Explain how daylight (from the sun rising to sun setting) length varies across the year</p>		<p>Forces Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Describe magnets as having two poles Observe how magnets attract or repel each other and attract some materials and not others Predict whether two magnets will attract and repel each other depending on which poles are facing Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Light recognise that they need light in order to see things and that</p>	<p>Sound Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases</p> <p>Electricity Electricity is a form of energy, used for lighting, heating, making sound and making machines and appliances work. Some appliances run on electricity; some plug into the mains</p>	<p>Forces Know the work of Isaac Newton and know that force is measured in Newtons by a Newton meter Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air and water resistance Identify the effects of friction acting between moving surfaces Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have greater effect</p> <p>Earth and Space Name the planets of Our Solar System and understand our place in our universe, describe the Sun, Earth, Moon and other planets as</p>	<p>Electricity Recognise circuit symbols in a simple circuit- identify the simple circuit used in a hand torch Electric current is measured in amperes, current is a flow of charge Associate the brightness of a lamp or volume of a buzzer with the potential difference in a circuit Investigate the brightness of a bulb if the PD is increased or the number of bulbs increased in a series circuit Investigate how the length of wire affects the brightness of a bulb. Potential difference is measured in volts</p>

				<p>dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change</p> <p>Rocks and Soils Name and describe 3 different kinds of rocks. Group and compare different kinds of rocks on the basis of appearance and simple physical properties, basis of appearance and simple physical properties. Describe how each rock type is formed within the rock cycle. Understand different uses for selected rocks and how they change over time. Explain simply how a fossil is formed. Recognise that soils are made from rocks and</p>	<p>electricity and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. A series circuit is where all the components of the circuits are joined in one loop. If one part of the loop is incomplete, then the circuit will not work Names of components include cells, wires, bulbs/ lamps, switches and buzzers A cell is a single unit, and a battery is a collection of cells Know how to test a circuit using a bulb. Switches open and close circuits. When a switch is open the bulb/lamp will not light up as the series circuit is incomplete. Wires are made from metals as they are good conductors of electricity e.g., iron, copper and steel Insulators are materials that do not allow electricity to pass through them easily e.g., plastic, wood, rubber and glass. Thomas Edison invented the first</p>	<p>approximately spherical bodies Describe the movement of the Earth around the sun in the solar system (a full orbit is 365 days, the Earth spins on its axis every 24 hours) Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the day Describe the movement of the moon relative to the Earth (lunar cycles take 28 days, the lunar cycle and eclipses) Describe the movement of the other planets relative to the sun in the solar system (fixed orbits) Describe what meteors are, and name other objects in space Explain how 'The Space Race' has expanded our scientific knowledge and discuss space travel</p>	
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Chemistry	Substantive Knowledge						
	<p>Materials Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Talk about the differences between materials and changes they notice. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>Everyday materials Know the difference between objects from the material from which it is made. Know, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Know and describe the simple physical properties of a variety of everyday materials: hard/soft, flexible/rigid, waterproof/ absorbent. Group together a variety of everyday materials on the basis of their simple physical properties. Know the similarities and differences between some everyday materials.</p>	<p>Uses of everyday materials Identify what properties a material needs for a particular purpose. Name the materials from which different objects are made. Recognise suitable and unsuitable choices of materials for particular purposes based on physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Know that materials can be either man-made or naturally occurring. Group objects into man-made or natural categories. Find out how the shapes of solid objects made from some materials can be</p>			<p>States of Matter Know that all things are made up of particles which are arranged differently in solids, liquids and gases. Name the properties of solids, liquids and gases. Compare and group materials according to if they are solids, liquids and gases, giving reasons to justify their choices. Observe that some materials change state when heated or cooled, and give everyday examples of melting and freezing. Understand that melting and freezing are a state change between solids and liquids. Measure or research the temperature at which melting and freezing occurs for some materials</p>	<p>Properties and changes of materials Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Discuss the suitability of everyday materials for different purposes based on their properties, giving reasons, based on evidence from comparative and fair tests. Know the difference between reversible and irreversible changes. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes results in the formation of new</p>

			<p>changed by squashing, bending, twisting and stretching</p>		<p>Know that water freezes at 0 and boils at 100 Understand that condensation is a state change from a gas to a liquid Understand that evaporation is a state change from liquid to gas Understand that boiling and evaporation are the same state change from liquid to gas but at different temperatures Know that the speed of evaporation depends on a number of variables including the temperature Describe the water cycle Identify the parts played by evaporation and condensation in the water cycle</p>	<p>materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. Understand some materials will dissolve in liquid to form a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating. Describe how to recover a substance from a solution.</p>	
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	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Biology	Substantive Knowledge						
	<p>Plants Describe and comment on things they have seen whilst outside, including plants and animals. Know how to make a simple record of their observations of the natural world, including animals and plants Know how to discuss how we care for the natural world around us. Notice changes in the leaves, weather and seasons.</p> <p>Living Things Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things</p> <p>Animals including humans Make healthy choices about food, drink, activity and toothbrushing. Begin to make sense of their own life-story and</p>	<p>Plants Know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Know, identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Animals including humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Know, identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Plants Plants can grow from seed or bulbs. Seeds and bulbs germinate and grow into seedlings. Seedlings grow into mature plants Plants need light, water, space, suitable temperature in order to grow</p> <p>Living Things Identify the differences between things that are living, dead, and things that have never been alive, using some of the 7 life processes. Identify that most living things live in habitats to which they are suited Name a variety of plants and animals in their habitats, including microhabitats. Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Know and explain how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and</p>	<p>Plants Know and identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Know what plants need for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Know how water is transported within plants</p> <p>Animals including humans Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p>Living things Know the 7 life processes of living organisms and use them to determine if an organism is living. Describe similarities and differences between examples of plants and animals. Group living things in a variety of ways using key characteristics. Use classification keys to help group and identify a variety of living things in their local and wider environment Recognise that environments can change, and this can sometimes pose dangers to living things Understand that human actions can impact on the environment and suggest some solutions to the issues</p> <p>Animals including humans Describe the simple functions of the basic parts of the digestive system in humans</p>	<p>Plants Know that reproduction is when a plant produces one or more individuals similar to itself. Explain that sexual reproduction requires both male and female DNA (sex cells) and will produce offspring that are similar, but not identical to the parents. Explain that asexual reproduction will produce offspring that is identical to the parent and only requires one parent e.g. bulbs, tubers and runners. Use prior knowledge of parts of a flower to explain the stages involved in the reproduction process (pollination, fertilisation and germination)</p> <p>Living things Know that reproduction is when an animal or plant produces one or more individuals similar to itself Explain that sexual reproduction requires both male and female</p>	<p>Living things Know that living things can be grouped according to different criteria. Know that a cell is made up of nucleus, cytoplasm and membrane. Know that living things can be multicellular or unicellular (bacteria).</p> <p>Animals including humans Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans</p> <p>Evolution Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p>

	<p>how they have grown and changed. Understand the key features of the life cycle of a plant and an animal. Know and talk about the different factors that support their overall health and wellbeing Describe and comment on things they have seen whilst outside, including plants and animals. Know how to record their observations of the natural world, Recognise some environments that are different to the one in which they live. Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices</p>		<p>name different sources of food Animals including humans Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>		<p>Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>DNA (sex cells) and will produce offspring that are similar, but not identical to the parents. Explain that asexual reproduction will produce offspring that is identical to the parent and only requires one parent e.g., bulbs, tubers and runners. Explain and describe the life cycle of a mammal, amphibian, insect and a bird noting the differences. Explain the process of metamorphosis using frogs and butterflies as examples. Animals including humans Describe the changes as humans develop to old age Describe the key stages in the growth and development of humans. Recall some of the changes experienced in puberty. Investigate the gestation periods of other animals in comparison to humans.</p>	<p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>
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Disciplinary Skills running through all substantive knowledge

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working scientifically Scientific enquiry 	Disciplinary Knowledge						
	Ask simple questions about the world around them Ask adults about things they observe Make observations about things they see around them Conduct guided investigations with supervision Make choices when performing simple identifying and classifying Make some comparison between objects or living things Make some predictions about living things based on prior knowledge Make suggestions about how things work based on their own observations Use basic observations to help answer questions with support Explore the natural world around me, making observations and drawing pictures of plants and animals.	Ask simple questions and recognise that they can be answered in different ways (fair tests, comparative tests, observation over time, research, pattern seeking) Observe closely, using simple equipment (hand lenses, egg timers) Perform simple tests to investigate the answer to a given question Perform simple identifying and classifying, grouping task using basic observations Use observations and ideas to suggest answers to questions, using simple sentences to describe the answer Gather and record data to help in answering questions, using given tables or data formats	Ask simple questions and recognise that they can be answered in different ways (fair tests, comparative tests, observation over time, research, pattern seeking) Research the answers to questions using books, tablets or computers Observe closely, using simple equipment (hand lenses, egg timers, rulers, stopwatches etc) Perform simple tests to investigate the answer to a given question Begin to design their own tests to investigate the answer to a given question Perform simple identifying and classifying, grouping using basic observations Begin to group using prior knowledge Use observations and ideas to suggest answers to questions, using	Ask relevant questions and use different types of scientific enquiries to answer them (fair tests, comparative tests, observation over time, research, pattern seeking) Begin to select their own methods to find the answer to a scientific question Set up simple practical enquiries, comparative and fair tests Begin to design their own tests and manage variables Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers, rulers, stopwatches, measuring cylinders and jugs. Gather record, classify and present data in a variety of ways to help in answering questions	Ask relevant questions and use different types of scientific enquiries to answer them (fair tests, comparative tests, observation over time, research, pattern seeking) Select their own methods to find the answer to a scientific question Begin to combine research with their own investigations to confirm conclusions. Set up simple practical enquiries, comparative and fair tests design their own tests & identify and manage variables. Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers, rulers, stopwatches, measuring cylinders/jugs and data loggers.	Explain different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (fair tests, comparative tests, observation over time, research, pattern seeking) Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Make their own decisions about what observations to make, repeat readings and learn about reliability	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (fair tests, comparative tests, observation over time, research, pattern seeking) Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Plan and execute appropriate investigations based on a given or student-led question Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

	<p>Identify some similarities and differences between the natural world around me and contrasting environments, drawing on their experiences and what has been read in class</p>		<p>simple sentences to describe the answer to a question give basic conclusions with simple reasoning Gather and record data to help in answering questions, using given tables or data formats drawing own tables, deciding how to record</p>	<p>Begin to use simple keys for classification Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Explain findings from investigations to rest of class Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions draw clear conclusions from findings and make predictions based on this, suggest improvements to the investigation identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support findings</p>	<p>Begin to make decisions about what equipment is appropriate for investigations gather, record, classify and present data in a variety of ways to help in answering questions Identify criteria for classification and use and create simple keys and record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions explain findings from investigations to rest of class Be able to comment on the findings of other investigations compared to their own and how they support or contradict. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Draw conclusions and support with clear evidence, suggest improvements, raise</p>	<p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (in line with Year 5 maths curriculum learning) Use test results to make predictions to set up further comparative and fair tests Make predictions and complete further investigation report and presenting 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, including giving an explanation of trust in results, with reasons Identify scientific evidence that has been used to support or refute ideas or arguments, including identifying which evidence they have produced supports or refutes ideas or arguments</p>	<p>make their own decisions about what observations to make, repeat readings & learn about reliability, developing an increased level of precision and accuracy Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (in line with Year 6 maths curriculum learning) Use test results to make predictions to set up further comparative and fair tests Make predictions and complete further investigation – combine with research report and presenting 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, including giving an explanation of trust in results, with reasons Identify causal relationships in investigations</p>
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					further questions and possible next investigations Identify differences, similarities or changes related to simple scientific ideas and processes		Identify scientific evidence that has been used to support or refute ideas or arguments, including identifying which evidence they have produced supports or refutes ideas or arguments, begin to research evidence to support or refute ideas/arguments and begin to separate opinion from fact
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