



SPARK
EDUCATION TRUST



Whinstone Primary School

SCIENCE CURRICULUM

SCIENCE INTENT

Our intent at Whinstone Primary School is to encourage children to be naturally curious about the world around them. Our science teaching has been developed to ensure full coverage of the curriculum from Nursery to Year 6 and to foster a sense of wonder about natural phenomena. Throughout our schools' children are encouraged to develop and use a range of working scientifically skills including questioning, researching and observing. We promote and celebrate inquisitive minds through hands on learning and investigation. Scientific knowledge and vocabulary is taught, developed and revisited as the children progress through school.

Our teaching aims in Science include the following:

- Promote an enjoyment for science
- Increased confidence when working scientifically
- Full implementation of Science NC and EYFS guidance across the whole school
- Develop access to Science beyond statutory National Curriculum
- All children to experience 'hands on' Science investigations
- Teach science in ways that are imaginative, enjoyable, purposeful and well managed.
- Giving clear and accurate teacher explanations and offering skilful, higher order questioning.

IMPLEMENTATION

- Quality first teaching with opportunity for CPD.
- Encouraging the delivery of Science through practical activities
- Developing units of work that are rooted in self led investigation and exploration
- Allow children to develop and pose questions that need answering.
- Enable children to develop their ideas, knowledge and understanding by planning, carrying out and evaluating their own investigations.
- Give children the opportunity to repeat investigations in order to compare evidence and its reliability.
- Encourage children to work both independently and with others.
- Motivate children to reason, problem solve and process information.
- Focus reasoning and thinking through open ended questioning.
- Provide a range of stimulating experiences to engage and inspire.
- Monitoring of the quality of teaching through work scrutiny, planning, acquisition of skills and pupil voice.
- Collect and analyse data.

IMPACT:

At Whinstone Primary School, our science curriculum has a strong and lasting impact on pupils' understanding of the world and their ability to think scientifically. Children leave Whinstone equipped with the knowledge, skills and curiosity needed to explore, question and make sense of natural phenomena. Through a carefully planned progression of learning from Preschool to Year 6, pupils develop secure scientific knowledge which is revisited, strengthened and applied in increasingly complex contexts.

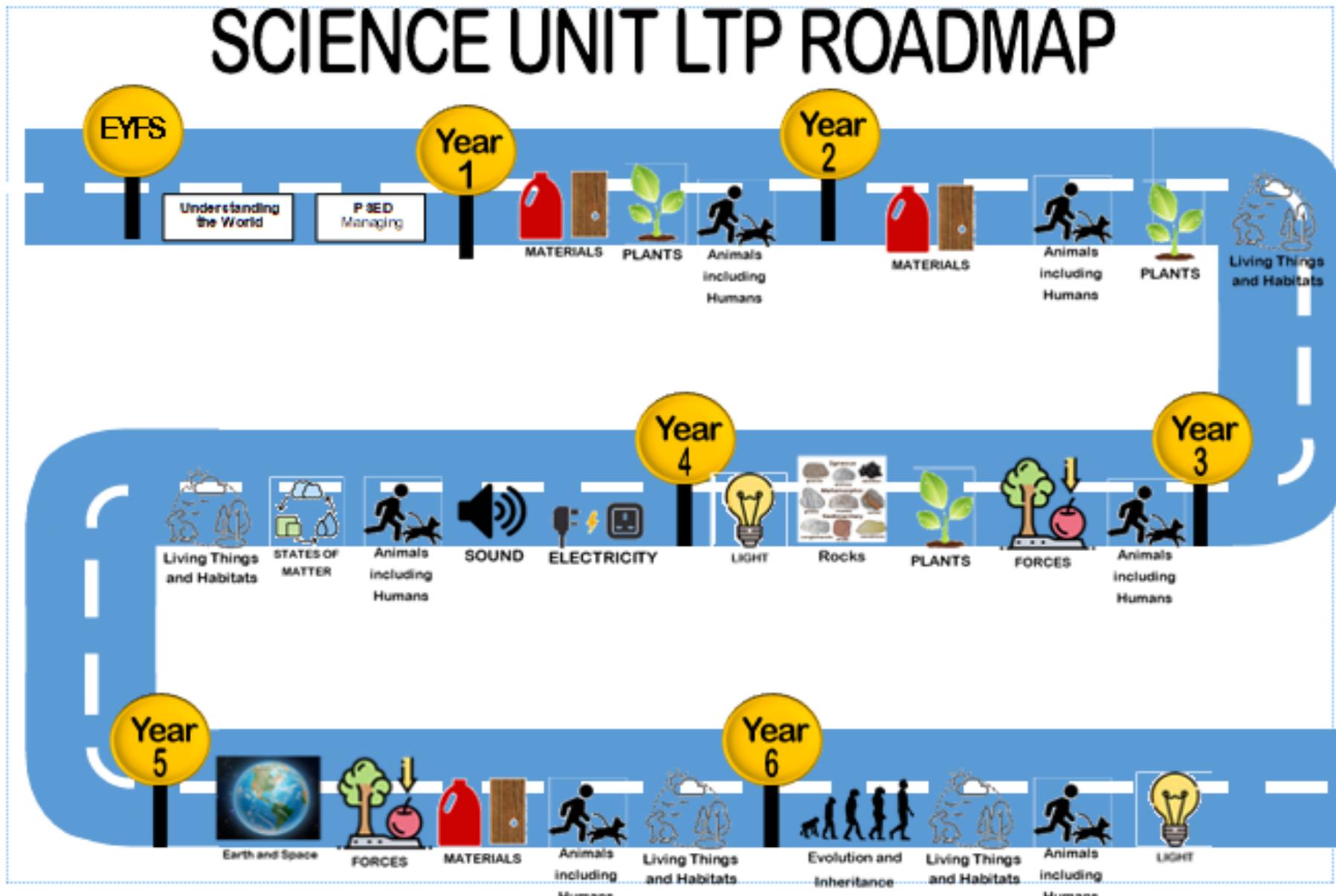
Our emphasis on hands-on investigation ensures pupils experience science as a dynamic, practical and relevant subject. As a result, they confidently use a range of working scientifically skills, including predicting, observing, recording, researching and drawing conclusions. Children become increasingly able to ask thoughtful questions, solve problems and make links between scientific ideas.

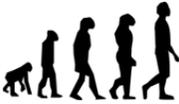
Regular opportunities to use scientific vocabulary support pupils in articulating their understanding clearly and accurately. Over time, they become confident communicators who can explain processes, describe changes and discuss evidence.

Through celebrating curiosity and enquiry, pupils develop positive attitudes towards science and an appreciation of its importance in everyday life. By the time they leave Whinstone, children demonstrate resilience, independence and a sustained sense of wonder, preparing them for future learning and enabling them to view the world with inquisitive, scientific minds.

SCIENCE UNIT LONG TERM PLAN ROADMAP

SCIENCE UNIT Roadmap Tracker Year R - 6 Curriculum Overview: (Adapt order for each school)



		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Working Scientifically	 MATERIALS	 SEASONAL CHANGE	 PLANTS	 SEASONAL CHANGE	 Animals including Humans	 SEASONAL CHANGE
Year 2	Working Scientifically	 MATERIALS		 Animals including Humans	 PLANTS		 Living Things and Habitats
Year 3	Working Scientifically	 Animals including Humans	 FORCES	 PLANTS		 Rocks	 LIGHT
Year 4	Working Scientifically	 ELECTRICITY	 SOUND	 Animals including Humans	 STATES OF MATTER	 Living Things and Habitats	Recap of all topics
Year 5	Working Scientifically	 Earth and Space	 FORCES	 MATERIALS	 Animals including Humans	 Living Things and Habitats	Recap of all topics
Year 6	Working Scientifically	 Evolution and Inheritance	 Living Things and Habitats	 Animals including Humans	 LIGHT	 ELECTRICITY	Recap of all topics

SCIENCE Year 1-6 Curriculum Overview: Long Term Plan:

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Working Scientifically	1. Everyday Materials Seasonal Changes		2. Plants Seasonal Changes		3. Animals including humans Seasonal Changes	
		Chemistry Physics		Biology Physics		Biology Physics	
Year 2	Working Scientifically	1. Uses of Everyday Materials		2. Animals Including Humans	3. Plants	4. Living things and Habitats	
		Chemistry		Biology	Biology	Biology	
Year 3	Working Scientifically	1. Animals, including humans	2. Forces & Magnets	3. Plants		4. Rocks	5. Light
		Biology	Physics	Biology		Chemistry	Physics
Year 4	Working Scientifically	1. Electricity	2. Sounds	3. Animals including humans	4. States of Matter	5. Living things and their habitats	Recap of all topics
		Physics	Physics	Biology	Chemistry	Biology	
Year 5	Working Scientifically	1. Earth and Space	2. Forces	3. Properties and changes in materials	4. Animals, including humans	5. Living things and their habitats	Recap of all topics
		Physics	Physics	Chemistry	Biology	Biology	
Year 6	Working Scientifically	1. Evolution & Inheritance	2. Living things and Habitats	3. Animals including humans	4. Light	5. Electricity	Recap of all topics
		Biology	Biology	Biology	Physics	Physics	
Biology		The study of life and living organisms. This includes subjects such as the cell, genes, inheritance, microorganisms, plants, animals, and the human body.					
Chemistry		The study of properties of matter/materials and how these interact with energy.					
Physics		The study of matter and its motion as well as how it interacts with energy and forces. There are many branches of physics including electricity, astronomy, motion, waves, sound, and light.					



SCIENCE Curriculum Overview

Early Learning Goals and National Curriculum Aims:

Early Years Foundation Stage:		
<p>EYFS Linked Areas of Learning:</p> <p>The most relevant statements for science are taken from the following areas of learning:</p> <ul style="list-style-type: none"> • Understanding the World (The Natural World) • PSED (Managing Self) • Communication and Language 	<p>Early Learning Goal:</p> <p>Understanding the World (The Natural World)</p> <ul style="list-style-type: none"> - Explore the natural world around them, making observations and drawing pictures of animals and plants - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class - Understand some important processes and changes in the natural world around them, including the seasons <p>PSED (Managing Self)</p> <ul style="list-style-type: none"> -Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. 	<p>'Year 1 Ready' Goals:</p> <ul style="list-style-type: none"> -Observe and describe the natural environment around them. -Describe and discuss differences between their local environment and contrasting environments in the local area and around the world. -Describe and discuss changes e.g. seasonal changes, states of matter -Know different ways to keep healthy -Use specific vocabulary related to different scientific topics.

Key Stage 1
<p>The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.</p> <p>'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.</p>

Lower Key Stage 2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Upper Key Stage 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

SCIENCE Curriculum – WORKING SCIENTIFICALLY PROGRESSION (Bold – NC statements)

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Questioning NC statement		Ask simple questions and recognise they can be answered in different ways		Ask relevant questions and use different types of scientific enquiries to answer them		Plan different types of scientific enquiries to answer questions, including recognising and controlling variables, where necessary	
Questioning	Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world.	Ask simple questions stimulated by their exploration of their world	Ask simple questions about their experiences and observations of objects, living things or events and with help use these observations to suggest ways to discover an answer or solve a problem, recognising that some can be answered in a variety of ways	Within a group suggest relevant questions that can be explored/investigated further using different types of science enquiry	Ask relevant questions that can be answered by the appropriate scientific enquiry, research or experiment/test	Ask relevant questions that can be answered by the appropriate scientific enquiry, research or experiment/test	Recognise scientific questions to which they do not yet have definitive answers using a range of scientific enquiries to explore possible answers
Observe and Measure NC statement		Observe closely using simple equipment		Make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment including thermometers and data loggers.		Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Observe and Measure	<p>Respond to prompts by making some suggestions about how to make an observation.</p> <p>Use senses and simple equipment to make observations.</p> <p>Talk about what happens and record using words and pictures.</p>	<p>Make measurements using non-standard units of measure</p> <p>Observe objects, living things, events and the world around them closely, using their senses and simple equipment</p>	<p>Make measurements using non-standard and standard units of measure</p> <p>Use equipment, provided for observation and measuring, correctly</p> <p>Observe closely</p>	<p>Take simple accurate measurements and/or careful observations using standard units relevant to questions or ideas under investigation</p> <p>Use a range of equipment for measuring and observing, including thermometers and data loggers</p>	<p>Take accurate measurements using more complex standard units and parts of units</p> <p>Choose from a range provided, appropriate equipment for measuring and observing including thermometers and data loggers</p> <p>Make systematic and careful observations of objects, living things and events</p>	<p>Take measurements using a range of scientific equipment with increasing accuracy and precision identifying the ranges and intervals used</p> <p>With help recognise that some measurements and observations may need to be repeated</p>	<p>Decide whether it is appropriate to repeat observations or measurements and explain how this impacts on data collection</p> <p>Choose and use correctly appropriate equipment to support observation and data collection with increasing accuracy</p>
Planning and Performing Tests NC statement	Exploration and testing in the continuous provision.	Perform simple tests		Set up simple practical enquiries, comparative and fair tests		Plan different types of scientific enquiries to answer questions, including recognising and controlling variables, where necessary	
Planning and Performing Tests	Ask questions based on exploration of the world around them. Respond to prompts by making some suggestions about how to find an answer	Perform simple tests to explore a question or idea suggested to them, with support	<p>Identify things to measure or observe that are relevant to the questions or ideas they are investigating using a simple test</p> <p>Suggest a practical way of how to find things out, or collect data to answer a question or idea they are investigating</p>	Plan and carry out simple practical enquiries, comparative and fair tests relevant to the questions or ideas they are investigating, with support	Plan and carry out simple practical enquiries, comparative and fair tests relevant to the questions or ideas they are investigating	<p>Plan enquiries deciding when it is appropriate to carry out a fair test or another type of practical enquiry from a range suggested</p> <p>Identify one or more control variables in investigations when conducting a fair test</p>	<p>Recognise significant variables in investigations selecting the most suitable to investigate controlling variables where appropriate</p> <p>Recognise which type of practical enquiry is most appropriate to the question or idea being investigated, before planning and carrying out the enquiry</p>

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Identifying and Classifying NC statement	Identify and classify	Identify and classify		Identify differences, similarities or changes related to simple scientific ideas and processes		Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
Identifying and Classifying	Children know about similarities and differences in relation to places, objects, materials and living things.	<p>Recognise basic features, similarities and differences of objects or living things</p> <p>Sort and group objects or living things in different ways</p>	<p>Make comparison between basic features or components of objects, living things or events to support identification and/or classification</p> <p>Sort and group objects, living things or events on the basis of their observations and explain why</p>	Identify and group objects, living things, processes or events by linking them to the characteristics of known objects, living things, processes or events	Identify differences, similarities or changes related to simple scientific ideas or processes and more complex groups of objects, living things and events	Classify objects, living things and events creating and using simple tables, keys or data bases with support	<p>Use tables, keys and data bases to classify or identify specific objects, living things or events by their characteristics</p> <p>Begin to identify some positives and some limitations of specific forms of classification</p>
Gathering and Recording Data NC statement	Oral recall and discussion.	Gather and record data to help in answering questions		Gather, record, classify and present data in a variety of ways to help in answering questions		Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	
				Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables			

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gathering and Recording Data	Begin to record data in simple templates	<p>Present evidence they have collected in simple templates provided for them to help in answering questions</p> <p>Draw or photograph evidence and label with support</p>	<p>Gather and record data in appropriate ways with increasing independence to help in answering questions</p>	<p>Gather and present evidence and data using simple scientific language and vocabulary as writing, drawing, labelled diagrams, display, through ICT, keys, bar charts or tables (using ranges and intervals chosen for them) to help in answering questions</p>	<p>Gather and present simple scientific data in a variety of ways as Year 3 including tables and bar charts where intervals and ranges agreed through discussion, to help in answering questions</p>	<p>Select appropriate ways of gathering and presenting scientific data from models, writing, drawing, display, through ICT, tables or graphs (choosing appropriate ranges and intervals)</p> <p>Use correct scientific symbols where appropriate in recording</p>	<p>Decide on the most appropriate formats to present sets of scientific data such as using line graphs for continuous variables</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>
Drawing Conclusions and Reporting NC statement	Oral recall and discussion.	Use observations and ideas to suggest answers to questions		<p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Use straightforward scientific evidence to answer questions or to support their findings</p>	<p>Use test results to make predictions to set up further comparative and fair tests</p> <p>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</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments</p>		

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Drawing Conclusions and Reporting	<p>Begin to use simple features to compare objects, materials and living things.</p> <p>Identify what has changed when observing objects, living things or events.</p> <p>Talk in simple terms about what might happen based own experiences.</p> <p>Noticing 'which worked best' – simple comparative statements.</p>	<p>Use their ideas to suggest answers to questions</p> <p>Say what has changed when observing objects, living things or events</p> <p>Respond to suggestions to connect what has been observed with possible further actions or observations</p> <p>Present findings in simple templates provided for them or orally</p> <p>Draw or photograph evidence and label with support</p>	<p>Use their observations and ideas to suggest answers to questions and to make predictions</p> <p>Respond to suggestions to identify some evidence needed to answer a question</p> <p>Use understanding of what has been observed or own experience to predict outcomes of further actions or observations</p> <p>Report on and record findings as drawings, photographs, labelled diagrams, orally, as displays, or in simple prepared tables or charts</p>	<p>Use straightforward scientific evidence to answer questions and make predictions</p> <p>Say whether what happened was what they expected, acknowledging any unexpected outcomes</p> <p>Use results of enquiries to consider whether they meet predictions and explain why</p> <p>With help use results, observations or own experience to prompt new questions and predictions for a further test</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions with support/as a group</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables with support/as a group</p>	<p>Use straightforward scientific evidence to support their findings, make further predictions and explain their findings</p> <p>Identify scientific evidence they have used in drawing conclusions</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys,</p>	<p>Recognise when scientific evidence is for or against an argument</p> <p>Recognise when scientific evidence supports an idea or not and use this to support predictions</p> <p>Use test results to draw conclusions, recognising that the test may need improvements to improve reliability</p> <p>Use test results to prompt new questions and make predictions for setting up further tests</p> <p>Present findings in written form, displays and other presentations including orally, explaining results and conclusions drawn from results</p> <p>Identify causal relationships in reporting outcomes where appropriate</p>	<p>Identify scientific evidence that has been used to support or refute ideas or arguments</p> <p>Recognise scientific questions that do not yet have definitive answers</p> <p>Provide straightforward explanations for differences in repeated measurements or observations</p> <p>Use test results to make predictions for setting up further comparative and fair tests</p> <p>Compare their results with others and give reasons why they may be different</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of results in oral and written form such as displays and other presentations</p>

					bar charts and tables		
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SCIENCE Curriculum – SCIENTIFIC KNOWLEDGE AND UNDERSTANDING PROGRESSION

PLANTS						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> • Know that most plants start growing from a seed or bulb • All plants need water & light to grow & survive • Observe plants closely through a variety of means e.g. magnifiers & photographs • Use all the senses in hands-on exploration of plants • Plant seeds and care for growing plants • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things 	<p>Identify and name a variety of common plants, including garden plants, wild plants and trees, and those classified as deciduous and evergreen</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.</p> <p>EXS+/GTMA Can they name the main parts of a flowering plant?</p>	<p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>EXS+/GTMA Can they describe the function of the different parts of a flowering plant / tree? Can they describe what plants need to survive and link it to where they are found? Can they explain that plants grow and reproduce in different ways?</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers</p> <p>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>EXS+/GTMA Can they classify a range of common plants according to many criteria (environment found, size, climate required, etc.)?</p>			
Animals including Humans						

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Identify different parts of their body & animals Be able to show care and concern for living things Have some understanding of growth and change Talk about things they have observed including animals Observational drawings of animals Understand the key features of the life cycle of an animal Know and talk about the different factors that support their overall health and wellbeing: <ul style="list-style-type: none"> regular physical activity - healthy eating toothbrushing - sensible amounts of 'screen time' having a good sleep routine being a safe pedestrian 	<p>Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, and including pets)</p> <p>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>EXS+/GTMA Can they begin to classify animals according to a number of given criteria?</p> <p>Can they point out differences between living things and non-living things?</p> <p>Can they name some parts of the human body that cannot be seen?</p>	<p>Notice that animals, including humans, have offspring which grow into adults</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>EXS+/GTMA Can they explain that animals reproduce in different ways?</p> <p>Can they explain the importance of the rights types and amounts of nutrition on the body?</p> <p>Can they explain the importance of a balanced diet and the importance of the main food groups?</p>	<p>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</p> <p>Identify that humans and some animals have skeletons and muscles for support, protection and movement.</p> <p>EXS+/GTMA Can they explain how the muscular and skeletal systems work together to create movement?</p> <p>Can they classify living things and non-living things by a number of characteristics that they have thought of?</p> <p>Can they explain how people, weather and the environment can affect living things?</p> <p>Can they explain how certain living things depend on one another to survive?</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p>EXS+/GTMA Can they classify living things and non-living things by a number of characteristics that they have thought of?</p> <p>Can they explain how people, weather and the environment can affect living things?</p> <p>Can they explain how certain living things depend on one another to survive?</p>	<p>Describe the changes as humans develop from birth to old age.</p> <p>EXS+/GTMA Can they create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies?</p> <p>Can they describe the changes experienced in puberty?</p> <p>Can they draw a timeline to indicate stages in the growth and development of humans?</p>	<p>Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p>

Living Things and their Habitats						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		<p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> <p>EXS+/GTMA Can they name some characteristics of an animal that help it to live in a particular habitat?</p> <p>Can they describe what animals need to survive and link this to their habitats?</p>		<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>EXS+/GTMA Can they give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment?</p> <p>Can they explore the work of pioneers in classification? (e.g. Carl Linnaeus)</p> <p>Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore)</p>	<p>Explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals.</p> <p>EXS+/GTMA Can they observe their local environment and draw conclusions about life-cycles, e.g. plants in the vegetable garden or flower border?</p> <p>Can they compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests?</p>	<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p>

Evolution and Genetics						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						<p>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>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>

Materials						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6
<p>Observe & interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object & a boat floating on water · Use vocabulary to name specific features of the natural world, both natural & man-made · Notice & discuss patterns around them e.g. the effect of seasons on flora & fauna</p>	<p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>EXS+/GTMA Can they describe things that are similar and different between materials?</p> <p>Can they explain what happens to certain materials when they are heated, e.g. bread, ice, chocolate?</p> <p>Can they explain what happens to certain materials when they are cooled, e.g. jelly, heated chocolate?</p>	<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>EXS+/GTMA Can they describe the properties of different materials using words like, transparent or opaque, flexible, etc.?</p> <p>Can they sort materials into groups and say why they have sorted them in that way?</p> <p>Can they say which materials are natural and which are man made?</p> <p>Can they explain how materials are changed by heating and cooling?</p> <p>Can they explain how materials are changed by bending, twisting and stretching?</p> <p>Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted?</p>		<p>(States of Matter) Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>EXS+/GTMA Can they group and classify a variety of materials according to the impact of temperature on them?</p> <p>Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?</p> <p>Can they relate temperature to change of state of materials?</p>	<p>Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>Explain that some changes result in the formation of new 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.</p> <p>EXS+/GTMA Can they describe methods for separating mixtures? (filtration, distillation)</p> <p>Can they work out which materials are most effective for keeping us warm or for keeping something cold?</p> <p>Can they explore changes that are difficult to reverse, e.g. burning, rusting and reactions such as vinegar with bicarbonate of soda?</p>	
Rocks and Fossils						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6

			<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter.</p> <p>EXS+/GTMA Can they classify igneous and sedimentary rocks?</p> <p>Can they begin to relate the properties of rocks with their uses?</p>			
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Motion and Forces						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6

			<p>(Magnetism) Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others</p> <p>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>Describe magnets as having two poles</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>EXS+/GTMA Can they investigate the strengths of different magnets and find fair ways to compare them?</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.</p> <p>EXS+/GTMA Can they describe and explain how motion is affected by forces?</p> <p>Can they design very effective parachutes?</p> <p>Can they work out how water can cause resistance to floating objects?</p> <p>Can they explore how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation?</p>	
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Light						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6
			<p>Recognise that they need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object</p> <p>Find patterns in the way that the size of shadows change.</p> <p>EXS+/GTMA Can they explain why lights need to be bright or dimmer according to need?</p> <p>Can they explain the difference between transparent, translucent and opaque?</p> <p>Can they explain why their shadow changes when the light source is moved closer or further from the object?</p>			<p>Recognise that light appears to travel in straight lines</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>

Sound						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6
				<p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>EXS+/GTMA Can they explain why sound gets fainter/ louder according to the distance?</p> <p>Can they explain how pitch and volume can be changed ?</p> <p>Can they work out which materials give the best insulation for sound?</p>		

Electricity						
EYFS	Year 1	Year 2	Y 3	Year 4	Year 5	Y 6
				<p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> <p>EXS+/GTMA Can they explain how a bulb might get brighter?</p> <p>Can they recognise if all metals are conductors of electricity?</p> <p>Can they explain why cautions are necessary for working safely with electricity?</p>		<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>

Earth and Space						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p>Observe changes across the four seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>EXS+/GTMA Can they observe features in the environment and explain that these are related to a specific season?</p> <p>Can they observe and talk about changes in the weather?</p> <p>Can they talk about weather variation in different parts of the world?</p>				<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night.</p> <p>EXS+/GTMA Can they compare the time of day at different places on the earth?</p> <p>Can they begin to understand how older civilizations used the sun to create astronomical clocks, e.g. Stonehenge?</p> <p>Can they explore the work of some scientists? (Ptolemy, Copernicus)</p>	



SCIENCE – Key Vocabulary (Revisit and build upon previous years vocabulary with each new unit of study)

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Working Scientifically	1. Everyday Materials Seasonal Changes		2. Plants Seasonal Changes		3. Animals including humans Seasonal Changes	
What...? How? Why ...? similar different best and worst change plan look biggest and smallest compare sort and group		material, wood, plastic, glass, paper, water, metal, rock, properties, hard, soft, bendy, rough, smooth, waterproof <i>Summer, Spring, Autumn, Winter, Sun, Moon, day, night, light, dark, weather</i>		plants, trees, flowers petals, fruit, seed, roots, trunk, branches, stem, leaves, deciduous, evergreen <i>Summer, Spring, Autumn, Winter, Sun, Moon, day, night, light, dark, weather</i>		fish, reptiles, mammals, birds, amphibians senses, sight, hearing, touch, smell, taste, diet, herbivore, omnivore, carnivore, <i>Summer, Spring, Autumn, Winter, Sun, Moon, day, night, light, dark, weather</i>	
Year 2	Working Scientifically	1. Uses of Everyday Materials		2. Animals Including Humans	3. Plants	4. Living things and Habitats	
observe change slowly quickly describe name identify label record measure bigger smaller pattern notice cycle predict		material, properties, stretchy, stiff, shiny, dull, squashing, bending, twisting, stretching, waterproof, absorbent, opaque, transparent		basic needs, water, air, food, life cycle, baby, toddler, child, teenager, adult, elderly, survival, offspring, hygiene, exercise	seeds, bulbs, water, light, temperature, growth, germination	living, dead, never alive, woodland, pond, desert, habitat, food chain, energy, predator, prey,	
Year 3	Working Scientifically	1. Animals, including humans	2. Forces & Magnets	3. Plants		4. Rocks	5. Light
gradually identify observe recognise investigate record units table fair evidence research length observations prediction		muscles, bones, skeletons, joint, nutrition, vertebrate invertebrate	contact, poles, push, pull, magnetic, force, attract, repel, friction,	air, light, water, soil, flower, nutrients, dispersal, pollination, reproduction, evaporation		fossils, soils, rocks, magma, lava, igneous, metamorphic, sedimentary	light, shadows, source, dark, reflective, reflection, opaque, translucent, transparent

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 4	Working Scientifically	1.Electricity	2.Sounds	3.Animals including humans	4.States of Matter	5. Living things and their habitats	Recap of all topics
similarities differences research source scientists discovery process cycle measurements conclude evaluate rank plan vary constant bar graph table tally		cells, wires, bulbs, switches, buzzers, battery, circuit, series, conductors, insulators, switch	volume, vibration, wave, pitch, tone, soundproof, amplitude.	mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, herbivore, carnivore, canine, incisor, molar, producer, consumer, predator, prey.	solid, liquid, gas, temperature evaporation, condensation, particles, water cycle, precipitation	vertebrates, invertebrates, environment, habitats classification, characteristics, endangered species, extinct	
Year 5	Working Scientifically	1.Earth and Space	2.Forces	3.Properties and changes in materials	4. Animals, including humans	5.Living things and their habitats	Recap of all topics
classify interpret pattern relationship prediction analyse interpret conclude evaluate rank variable constants control repeat key relationship line graph		Solar System, axis, rotation, phases of the Moon, constellation, geocentric, heliocentric	air resistance, water resistance, friction, gravity, gears, pulleys newton,	filter, mixture, reversible, irreversible, solubility, transparency, conductivity, evaporation, dissolving, solute, solution,	foetus, embryo, womb, gestation, puberty, fertilisation, menstruation, prenatal.	mammal, reproduction, insect, amphibian, bird, offspring, sexual, asexual, gestation.	
Year 6	Working Scientifically	1.Evolution & Inheritance	2. Living things and Habitats	3.Animals including humans	4.Light	5.Electricity	Recap of all topics
hypothesis variable constants evaluate plan conclude interpret classify categorise database enquiry control repeat support refute degree of trust scatter graph		fossils, characteristics, reproduction, adaptation, evolution, genetics	vertebrates, invertebrates, classification, micro-organisms, bacteria, microscope.	heart, blood vessels, veins, arteries, valve, respiration, circulatory, oxygenated, deoxygenated, drugs, exercise,	spectrum, ray, prism, refraction, reflection.	cells, circuit, series, conductors, insulators, amps, volts, resistance.	

SCIENCE – Assessment Sheets (Whinstone)

YEAR 1									
WHINSTONE SCIENCE ASSESSMENT YEAR 1				Evidence	Additional Evidence				
	Working Scientifically Y1 & Y2			Grade 1=WTS 2=EXS 3=GDS					
	Date	Grade 1,2,3	Date	Grade 1,2,3					
<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions. 									
<p>N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group. Taken from KS2.</p> <p>Exceeding 60%+ Excelling 75%+</p>									
1,2,3. Seasonal Change (PHYSICS) (All Year)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> observes changes across the 4 seasons* observes and describe weather associated with the seasons and how day length varies. <p>Exceeding - discuss and compare changes between seasons (spring, summer, autumn, winter)</p> <p>Excelling - makes links between day length, warmth, season and growth.</p>									
1. Uses of Everyday Materials (CHEMISTRY) (Autumn)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> Distinguishes between an object and the material from which it is made. identifies and names a variety of everyday materials, including wood, plastic, glass, metal, water, and rock* describes the simple physical properties of a variety of everyday materials* compares and groups together a variety of everyday materials on the basis of their simple physical properties <p>Exceeding - identify and compare the suitability of a variety of everyday materials for particular uses</p> <p>Excelling - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>									
2. Plants (BIOLOGY) (Spring)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> Identifies and names a variety of common wild and garden plants, including deciduous and evergreen trees* identifies and describe the basic structure of a variety of common flowering plants, including trees. <p>Exceeding - describe how seeds and bulbs grow into mature plants.</p> <p>Excelling - describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>									
3. Animals, including humans (BIOLOGY) (Summer)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> identifies and names a variety of common animals including fish, amphibians, reptiles, birds and mammals* identifies and names a variety of common animals that are carnivores, herbivores and omnivores* describes and compares the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) identifies, names, draws and labels the basic parts of the human body and say which part of the body is associated with each sense.* <p>Exceeding - notice that animals, including humans, have young which grow into adults</p> <p>Excelling - describe the basic needs of animals, including humans, for survival (water, food and air)</p>									

YEAR 2									
WHINSTONE SCIENCE ASSESSMENT YEAR 2				Evidence	Additional Evidence				
	Working Scientifically Y1 & Y2			Grade 1=WTS 2=EXS 3=GDS					
	Date	Grade 1,2,3	Date	Grade 1,2,3					
<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions. 									
<p>N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group. Taken from KS2.</p>									
1. Uses of Everyday Materials (CHEMISTRY) (Autumn)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. <p>Exceeding - Understand reversible and irreversible change and give examples.</p> <p>Excelling - 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</p>									
2. Animals, including humans (BIOLOGY) (Spring)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> 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>Exceeding - identifies 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</p> <p>Excelling - knows the importance of the main food groups (carbohydrates, proteins, dairy, fruit and veg) and why each is needed.</p>									
3. Plants (BIOLOGY) (Spring)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. identify - identifies and describes the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers* <p>Excelling - investigates and explains the way in which water is transported within plants.</p>									
4. Living things & their habitats (BIOLOGY) (Summer)		TEST %		TEST GRADE					
<ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including micro-habitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. <p>Exceeding - recognises that living things can be grouped in a variety of ways</p> <p>Excelling - recognises that environments can change and that this can sometimes pose dangers to living things</p>									

YEAR 3				Evidence		Additional Evidence	
WHINSTONE SCIENCE ASSESSMENT YEAR 3							
	Working Scientifically Y3 & Y4			Date	Grade 1,2,3	Date	Grade 1,2,3
	Grade 1=WTS 2=EXS 3=6DS						
<ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings. 							
<p>N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group. Exceeding 60%+ Excelling 75%+ Taken from Y4, Y5 & Y6</p>							
1. Animals Including Humans (BIOLOGY) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> identifies 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* identifies that humans and some other animals have skeletons and muscles for support, protection and movement. 							
<p>Exceeding - Understand the importance of: carbohydrates, lipids (fats and oils), proteins, dairy, fruit and veg, vitamins, minerals, dietary fibre and water, and why each is needed. Excelling - Explain the consequences of imbalances in the diet, including deficiency diseases.</p>							
2. Forces and Magnets (PHYSICS) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> compares how things move on different surfaces notifies that some forces need contact between 2 objects, but magnetic forces can act at a distance * observes how magnets attract or repel each other and attract some materials and not others* compares and groups together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describes magnets as having 2 poles predicts whether 2 magnets will attract or repel each other, depending on which poles are facing. 							
<p>Exceeding - Understand and explain the different forces that act on an object. Excelling - Use and explain force arrows in diagrams</p>							
3. Plants (BIOLOGY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> identifies and describes the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers* explains the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant* investigates the way in which water is transported within plants explains the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 							
<p>Exceeding - Understand and explain how plants have adapted to live in a particular environment. Excelling - Describe the life process of reproduction in a range of different plants.</p>							
4. Rocks (CHEMISTRY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> compares and groups together different kinds of rocks on the basis of their appearance and simple physical properties* describes in simple terms how fossils are formed when things that have lived are trapped within rock recognises that soils are made from rocks and organic matter 							
<p>Exceeding - recognise that fossils provide information about living things that inhabited the Earth millions of years ago. Excelling - recognise suitability and make comparisons between rocks and their uses based on their properties.</p>							
5. Light (PHYSICS) (Summer)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> recognises that they need light in order to see things and that dark is the absence of light* notifies that light is reflected from surfaces* recognises that light from the sun can be dangerous and that there are ways to protect their eyes recognises that shadows are formed when the light from a light source is blocked by a solid object* finds patterns in the way that the size of shadows <u>change</u>. 							
<p>Exceeding - recognise that light appears to travel in straight lines. Excelling - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>							

YEAR 4				Evidence		Additional Evidence	
WHINSTONE SCIENCE ASSESSMENT YEAR 4							
	Working Scientifically Y3 & Y4			Date	Grade 1,2,3	Date	Grade 1,2,3
	Grade 1=WTS 2=EXS 3=6DS						
<ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings. 							
<p>Exceeding & Excelling 80% N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group. Taken from Y4, Y5 & Y6</p>							
1. Electricity (PHYSICS) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> identifies common appliances that run on electricity constructs a simple series electrical circuit, identifies and names its basic parts, including cells, wires, bulbs, switches and buzzers identifies whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognises that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognises some common conductors and insulators, and associate metals with being good conductors. 							
<p>Exceeding - use recognised symbols when representing a simple circuit in a diagram Excelling - associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p>							
2. Sound (PHYSICS) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> identifies how sounds are made, associating some of them with something vibrating* recognises that vibrations from sounds travel through a medium to the ear* finds patterns between the pitch of a sound and features of the object that produced it finds patterns between the volume of a sound and the strength of the vibrations that produced it recognises that sounds get fainter as the distance from the sound source increases* 							
<p>Exceeding - Build a deeper understanding sound produced by vibrations of objects and relate to the ear drum Excelling - Understand and explain that sound waves needs a medium to travel through.</p>							
3. Animals Including Humans (BIOLOGY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> describes the simple functions of the basic parts of the digestive system in humans* identifies the different types of teeth in humans and their simple functions constructs and interprets a variety of food chains, identifying producers, predators and prey 							
<p>Exceeding - describe the ways in which nutrients and water are transported within animals, including humans. Excelling - Understand and explain content of a healthy human diet and the role of the major organs.</p>							
4. States of Matter (CHEMISTRY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> compares and groups materials together, according to whether they are solids, liquids or gases observes that some materials change state when they are heated or cooled, and measures or researches the temperature at which this happens in degrees Celsius (°C)* identifies the part played by evaporation and condensation in the water cycle and associates the rate of evaporation with temperature 							
<p>Exceeding - Understand and explain reversible and irreversible change Excelling - Build a deeper understanding of materials by exploring and comparing the properties of a broad range of materials.</p>							
5. Living Things and Their Habitats (BIOLOGY) (Summer)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> recognises that living things can be grouped in a variety of ways explores and uses classification keys to help group, identifies and name a variety of living things in their local and wider environment* recognises that environments can change and that this can sometimes pose dangers to living things 							
<p>Exceeding - describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences. Excelling - explain and give reasons for classifying plants and animals based on specific characteristics.</p>							

YEAR 5				Evidence		Additional Evidence	
WHINSTONE SCIENCE ASSESSMENT YEAR 5				Date		Date	
 <p>Working Scientifically Y5 & Y6</p> <p>Grade 1=WTS 2=EXS 3=GDS</p>				Grade 1, 2, 3	Grade 1, 2, 3	Grade 1, 2, 3	Grade 1, 2, 3
<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting 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 identifying scientific evidence that has been used to support or refute ideas or arguments. 							
<p><i>Exceeding 60%+ Excelling 75%+ From Y6 & KS3.</i> <i>N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group.</i></p>							
1. Earth and Space (PHYSICS) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> describes the movement of the Earth and other planets relative to the sun in the solar system* describes the movement of the moon relative to the Earth describes the sun, Earth and moon as approximately spherical bodies uses the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky* 							
<p><i>Exceeding - Discuss and explain seasons in relation to Earth's axis and orbit of the sun.</i> <i>Excelling - Understand and explain how geocentric models of the solar system gave way to the heliocentric model by considering the work of scientists such as Copernicus.</i></p>							
2. Forces (PHYSICS) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> explains that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identifies the effects of air resistance, water resistance and friction, that act between moving surfaces recognises that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect 							
<p><i>Exceeding - Understand and make comparisons between the different forces that act on an object.</i> <i>Excelling - Use and explain force arrows in diagrams (balanced and unbalanced forces)</i></p>							
3. Properties and Changes of Materials (CHEMISTRY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> compares and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets* knows that some materials will dissolve in liquid to form a solution, and describes how to recover a substance from a solution* uses knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating gives reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic* demonstrates that dissolving, mixing and changes of state are reversible changes explains that some changes result in the formation of new 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. 							
<p><i>Exceeding - Understand and explain reversible and irreversible changes and give numerous examples of both.</i> <i>Excelling - Build a more systematic understanding of materials by exploring and comparing the properties and uses of a broad range of materials making links to previous learning (e.g. magnetism and electricity)</i></p>							
4. Animals Including Humans (BIOLOGY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> describes the changes as humans develop to old age 							
<p><i>Exceeding - Understand the gestation period of other animals and make comparisons with humans.</i> <i>Excelling - Explain the gestation period of other mammals and make comparisons and links to common ancestors.</i></p>							
5. Living Things and Their Habitats (BIOLOGY) (Summer)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> describes the differences in the life cycles of a mammal, an amphibian, an insect and a bird* describes the life process of reproduction in some plants and animals 							
<p><i>Exceeding - Understand and explain sexual and asexual reproduction and give relevant examples.</i> <i>Excelling - Enquire and asking pertinent questions and suggesting reasons for similarities and differences.</i></p>							

YEAR 6				Evidence		Additional Evidence	
WHINSTONE SCIENCE ASSESSMENT YEAR 6				Date		Date	
 <p>Working Scientifically Y5 & Y6</p> <p>Grade 1=WTS 2=EXS 3=GDS</p>				Grade 1, 2, 3	Grade 1, 2, 3	Grade 1, 2, 3	Grade 1, 2, 3
<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting 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 identifying scientific evidence that has been used to support or refute ideas or arguments. 							
<p><i>Working Scientifically Exceeding & Excelling 100%</i> <i>N.B. Exceeding and Excelling are given as guidance examples only. TA should be used and judgments made based on achievements over and above the statutory requirements for each year group.</i></p>							
1. Evolution and Inheritance (BIOLOGY) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago 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><i>Exceeding - Understand and explain heredity as the process by which genetic information is transmitted from one generation to the next.</i> <i>Excelling - Explain that changes in the environment may leave species less well adapted to compete successfully and reproduce, which may lead to extinction.</i></p>							
2. Living Things and Their Habitats (BIOLOGY) (Autumn)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics. 							
<p><i>Exceeding - Understand and explain the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules.</i> <i>Excelling - Enquire and asking pertinent questions and suggesting reasons for similarities and differences across species.</i></p>							
3. Animals Including Humans (BIOLOGY) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> 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><i>Exceeding - Understand and explain content and importance of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed.</i> <i>Excelling - Explain the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.</i></p>							
4. Light (PHYSICS) (Spring)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 							
<p><i>Exceeding - use of ray model to explain imaging in mirrors, pinhole camera and action of convex lens in focusing: the human eye.</i> <i>Excelling - Study colours and the different frequencies of light, white light and prisms.</i></p>							
5. Electricity (PHYSICS) (Summer)				TEST %		TEST GRADE	
<ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram. 							
<p><i>Exceeding - Understand and design a circuit to achieve a desired purpose. e.g. alarm.</i> <i>Excelling - Identify and explain the effect of changing one component at a time in parallel and series circuits.</i></p>							

Addressing misconceptions in Science:

This document serves as a map of common misconceptions that children encounter in their Science learning journey. By looking out for and addressing these misconceptions, teachers are equipped with a powerful tool to enhance their teaching effectiveness.

ANIMALS INCLUDING HUMANS	
YEAR 1	<ul style="list-style-type: none"> • Children can use different names for the same part of the body. For example, the area between the chest and hips can be called the stomach, tummy or belly. • Children may think age determines size. • Children may not have experienced true darkness and, therefore, think humans can see in the dark. • Some children may think that sight is not affected when one eye is covered. • Children may think that they can only hear one sound at once. • Children may not recognise that some people cannot hear or have different levels of what they can hear. • Children may think that the hand is the only body part that can sense touch. • Children may not recognise that there are a range of different smells • Children may think, for example, that a mouse and an elephant cannot belong to the mammals category due to their distinct physical differences. • Children may assume all mammals can be kept as pets and not live in the wild. • Children may think all birds can fly. Children may think fur and feathers are the same thing, as they both feel soft. • Children may think all animals with wings are birds. • Children may use the term “fish” to describe all animals that live in water. • Children may think that fish do not breathe as they are underwater. • Children may think that amphibians have scales like fish • Children may think that all reptiles are small. • Children may think that all reptiles live on land. Discuss examples of aquatic reptiles, such as crocodiles or turtles, • Children may think that only mammals can be carnivores. Sorting carnivores into their different animal groups will address this misconception. • Children may assume carnivores can only be large animals. • Children may assume large animals, such as elephants, eat other animals • Children may assume animals of the same type (for example, birds) all have the same diet..
YEAR 2	<ul style="list-style-type: none"> • Children may think that all mammals live on land. Discuss whales and dolphins to help address this misconception • Children may use the term “fish” to describe all animals that live in water. • Children may think that fish do not breathe because they live underwater. • Children may think that all reptiles are small. • Children may think that reptiles do not live in the United Kingdom. • Children may sort and group animals based on physical features rather than their needs for survival • Children may believe that bones in the body do not have specific names, for example, they may think all bones in the leg are called “leg bones”. • Children may think that the arms and legs have one long bone, rather than multiple bones.

	<ul style="list-style-type: none"> • Children may find the concept of germs difficult to understand as germs cannot be seen without a microscope. Use a substance to represent germs to show how easily they can be spread. • Children may think that washing their hands with water alone is enough to remove germs. • Children may think that their teeth only fall out if they are decaying. Baby teeth fall out naturally and are replaced with adult teeth.
YEAR 3	<ul style="list-style-type: none"> • Children may think that the skeleton is one large bone, rather than lots of bones. • Children may believe that bones in the body do not have specific names, for example, they may think all bones in the leg are called “leg bones”. • Children may think that the arms and legs have one long bone, rather than multiple bones. • Children may believe that all bones must protect an internal organ, like the skull and ribcage do. • Children may think that all bones have the same function. • Children may think that humans are not mammals and that other mammals have a different skeletal system to humans. • Children may think that if an animal does not have a spine, then it cannot move. • Children may believe that all animals without a spine have no form of skeleton. • Children may think that all animals without a spine have an exoskeleton. • When looking at specific groups, children may think that all animals within that group have the same skeletal structure. For example, snakes and lizards are both classified as reptiles but have very <ul style="list-style-type: none"> • different skeletons. Another example of this could be humans and whales. • Children may think that all food has the same nutritional benefits for the body. • Children may think that drinks have no impact on a healthy/balanced diet. • Children may use their personal preferences to sort food based on whether it should be eaten regularly, sometimes or occasionally • Children may think that adults who follow a vegan or vegetarian diet cannot get any protein within their diet. • Children may believe that all food groups need to be eaten in equal amounts and may design a meal that is not nutritional ly balanced. Children may incorrectly classify food in their meal. For <ul style="list-style-type: none"> • example, they may state that potatoes are their source of vegetables, rather than a source of carbohydrates.
YEAR 4	<ul style="list-style-type: none"> • Children may incorrectly group worms and spiders as insects. They are classified in a different category of invertebrate. • Children may think that all invertebrates have an exoskeleton. • Children may create questions that are too broad and therefore do not help to classify. • Some children may think that only the fruit that they eat are fruits. • Children may think that all animals have similar teeth. • Children should be reminded that adult teeth are not replaced, and enamel does not regrow. • Children should understand that they will not see the effects on the eggshell straightaway, but they should observe a change over time. Children may point out that the egg is not the same as a <ul style="list-style-type: none"> • tooth. Explain that the material of eggshells is similar to that of human teeth. • When demonstrating the digestion model, it is difficult to separate the small and large intestine. Ensure children are aware that these are two different organs in the digestive system.
YEAR 5	<ul style="list-style-type: none"> • Children often think that a foetus grows in the mother’s stomach rather than in the womb. • Children may think a baby and a foetus are the same thing. • Children may think that all babies hit milestones at exactly the same time. • Children may think that all babies are the same length and mass when they are born.

	<ul style="list-style-type: none"> • Children may think that puberty begins at the same age for every person. Explain to children that it usually happens between the ages of 8 and 16. On average, girls start puberty two years before boys. • Children may think that all physical changes happen quickly. • Children should be aware that puberty is a gradual process that happens over several years. • Children may think that all humans have the same life expectancy. Explain that life expectancy varies among humans for many different reasons such as health, sex and where you live. • Children may think that all humans experience the same physical changes at the same time as they age. Explain that a variety of factors can influence this, such as exercise and keeping your brain active. • Children may think that there is no correlation between the length of an animal's gestation period and its lifespan. Usually, the longer the gestation period of an animal, the longer the lifespan
YEAR 6	<ul style="list-style-type: none"> • Children may think that life begins once a baby is born. • Children may think that a foetus grows in the mother's stomach rather than the womb. • Children may think that the circulatory system is one thing, rather than different parts working together. • Children may confuse arteries, veins and capillaries. • Children may think that blood is only made up of red blood cells, because it is red. • Because children cannot control their heart, they may not realise it is a muscle. • Children may think that the heart is one solid or empty vessel, rather than split into four different chambers. • Children may think that because deoxygenated blood travels to the heart, that is where it becomes oxygenated. • Children may think that deoxygenated blood is blue. • Children may be confused about which sides of the heart we call the left and right sides. • Children may not understand the significance of the left side of the heart being thicker than the right side

LIVING THINGS AND THEIR HABITATS	
YEAR 1	<ul style="list-style-type: none"> •
YEAR 2	<ul style="list-style-type: none"> • Children may think that it is only animals that have a habitat. Explain to children that plants also have a habitat which provides everything they need to survive. • Children may think that plants will not grow in polar habitats. • Children may think that it is always hot in the desert. Explain that at night, the desert can be extremely cold too. • Children may think that no plants and animals can survive in the desert due to the heat and lack of water. • Children may think that a particular animal only has one habitat. For example, a fox can be found in a woodland habitat but it can also inhabit an urban area. • Children may think that all animals live in the same microhabitats. • Children may think that all carnivores/herbivores/ omnivores eat the same diet and not consider the food available in their habitats.

	<ul style="list-style-type: none"> • Children may not realise that energy is passed within a food chain. • Children may not draw arrows the right way round to show the passing of energy on their food chains.
YEAR 3	<ul style="list-style-type: none"> •
YEAR 4	<ul style="list-style-type: none"> • Children may struggle to use closed questions. They may base their questions upon opinion, or ask questions that are too broad or narrow. • Plants can be harder to classify than animals because children may think that plants all have similar features. • Children may only be familiar with the negative ways that humans affect the environment. Point out some of the positive ways that humans have affected habitats, and how children can make a • difference in their local area
YEAR 5	<ul style="list-style-type: none"> • Children may think that humans are not animals and therefore are not classed as mammals. • Children may think frog eggs (frogspawn) have a hard outer covering like bird eggs. • Children may incorrectly classify spiders as insects. Spiders are classified as arachnids because they have eight legs and two body sections. Children do not need to be introduced to the term • “arachnids” in Year 5 as this is introduced within the Year 6 curriculum. • Some children may think that eggs hatch into fully formed birds. • Children may think that all birds build nests in trees. • Children may not realise that most flowering plants have both male and female reproductive parts. • Children may think that reproduction must involve two parents. Explain that asexual reproduction involves just one parent. • Some plants, such as daffodils, can reproduce both asexually from bulb • division and sexually from the flowers
YEAR 6	<ul style="list-style-type: none"> • Children may think that animals move and plants do not. It is important to explain to them that parts of a plant do move towards sunlight. • Children may think that all plants have flowers. Remind them that some plants are non-flowering. • Children may think that all bacteria are harmful. State to them that humans have bacteria inside them which help to digest food. • Children may believe that all microorganisms can be seen with the • eye. Clarify to them that a powerful microscope is needed to view them. • Children may think that microorganisms cannot be classified. Clarify that microorganisms can be classified based on their features, just as animals and plants can. • • Children may think that Linnaeus created the classification system that we have today. • Children may think that Linnaeus only classified animals. He created a classification system for plants • also.

PLANTS

YEAR 1	<ul style="list-style-type: none"> • Children may make incorrect generalisations, for example that all flowers are yellow. • Children may not understand that most roots grow underground. • Children may think that plants are small and trees are tall. Show them a range of trees to address this misconception. • Children may think that trees die in winter • Children may believe that any tree with green leaves is an “evergreen” tree. • Children need to recognise that a tree cannot change between “evergreen” and “not evergreen”
YEAR 2	<ul style="list-style-type: none"> • Children may have preconceived ideas about what a plant is. They may not classify fruit, vegetables or herbs as plants.

	<ul style="list-style-type: none"> • Children may have preconceived ideas about fruit based on the fruit they eat regularly. • Children may think that all seeds grow into the same plants. grow into. • Children may think that the seed consumes the soil to begin it's life cycle. • Children may think that plants do not need any light at all to grow. • Children may think that all plants need the same amount of light. • Children may think that plant growth will happen over a short period of time, such as overnight
YEAR 3	<ul style="list-style-type: none"> • Children may think plants get their food from the soil or that plants eat food like animals do. Explain to them that green plants make their own food from sunlight. • Children may think that the flowers do not have a specific function for the plant. Clarify to them that the flowers play an important role in helping plants to reproduce and create new life. • Children may think that the stems, leaves and flowers of different plants all look the same • Children may think that the roots “suck” in the water. Clarify to them that the roots absorb the water. • Children may think that plants take in water from the leaves or the flowers. Explain that the roots absorb water from the soil, which then travels to the stem. • Children may think that a seed and a seedling are the same thing. • Children may think that bees are the only pollinators. Explain that other animals, such as butterflies, hummingbirds and bats, are also pollinators. • Children may think that flowers can only be pollinated by animals. Pollination can also occur when wind carries the pollen from the stamen to the pistil. • Children may believe that only animals, including humans, go through a life cycle. Explain to children that as plants are living things, they also go through a life cycle. • Some children may think that • the life cycles of all plants take the same amount of time.
YEAR 4	<ul style="list-style-type: none"> •
YEAR 5	<ul style="list-style-type: none"> • Children may not realise that most flowering plants have both male and female reproductive parts. • Children may think that reproduction must involve two parents. Explain that asexual reproduction involves just one parent. • Some plants, such as daffodils, can reproduce both asexually from bulb • division and sexually from the flowers.
YEAR 6	<ul style="list-style-type: none"> •

MATERIALS AND THEIR PROPERTIES

YEAR 1	<ul style="list-style-type: none"> • Children may think that materials can only be sorted in one way. • Children may focus on sorting based on the material only. Encourage children to think about other categories for sorting, such as texture, size or mass. • Children may think that all rocks have the same properties, such as colour or texture. Show children a range of examples of rocks to address this misconception. • Some children may not realise that rocks can be shaped and used as a material in everyday life, such as in buildings. • Children may not be able to tell the difference between an object and the material it is made from. • Some children may think certain objects are always made from the same material, for example, all spoons are made from metal.
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	<ul style="list-style-type: none"> • Children may think the larger an object is, the more likely it is to sink. • Children may think that if the water is absorbed by the material, then it has disappeared. Show them that the water can be removed by squeezing the absorbent material.
YEAR 2	<ul style="list-style-type: none"> • Children may think that all materials are human-made. Show examples of common natural materials such as wood, wool and sand. • Children may think that all paper has the same thickness and texture. • Children may think that all rocks are heavy. Children may think that all rocks are hard and cannot be broken easily. • Children may think that rocks and stones are different materials. Explain to children that stone is a word used to describe smaller rocks. • Children may think all plastic is hard. • Children may think that all metals are silver in colour. An easy way to avoid this misconception is to allow children to explore different coins. • Children may think that natural fabrics, such as wool and cotton, are not fabrics. • Children may think that objects can only be made from one material. Show them three water bottles – plastic, glass and metal • Children may think that all solid materials are hard. • Children may think that all solid materials are heavy. • Children may think that if a solid material changes shape, it cannot change back to its original shape.
YEAR 3	<ul style="list-style-type: none"> •
YEAR 4	<ul style="list-style-type: none"> •
YEAR 5	<ul style="list-style-type: none"> • Children may think that all metals are magnetic • Children may think that only metals are conductors of electricity. • Children may think that insulators are only used to keep things warm. They can also keep things cold. • Children may think that an object can only be made from one material. Show examples of objects that are made from a mixture of multiple materials and discuss their suitability for purpose. • Children may think that all metals are rigid. Aluminium foil is a familiar material that can be used to show children that some metals can change shape easily. • Children may think that all metals are heavy.
YEAR 6	<ul style="list-style-type: none"> •

ELECTRICITY

YEAR 1	<ul style="list-style-type: none"> •
YEAR 2	<ul style="list-style-type: none"> •
YEAR 3	<ul style="list-style-type: none"> •
YEAR 4	<ul style="list-style-type: none"> • Children may find it difficult to understand that appliances that are plugged into the mains and appliances that use batteries both operate using electricity. • Children may not be aware of the dangers of electricity as it is not visible. • Children may not identify that a circuit will not work if the switch is open
YEAR 5	<ul style="list-style-type: none"> •
YEAR 6	<ul style="list-style-type: none"> • Children may draw pictorial representations of circuit components rather than symbols when drawing circuits.

	<ul style="list-style-type: none"> • When drawing circuits, children may think that wires should be drawn as “wiggly” lines. • Children may believe that when a circuit is incomplete, the electricity, or current, disappears or escapes from the circuit. Explain that a current does not flow at all in incomplete circuits and does not disappear or escape. • Children may think that if all the components are in place, then the circuit is complete. Explain that even if all the components are in place, if the switch is open then the circuit is incomplete
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EARTH AND SPACE	
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YEAR 1	•
YEAR 2	•
YEAR 3	•
YEAR 4	•
YEAR 5	<ul style="list-style-type: none"> • Children may think that there is more than one star in the Solar System. Clarify that the only star in the Solar System is the Sun. • Children may think that Pluto is a planet. Explain that Pluto was reclassified as a dwarf planet because it is not big enough to be regarded as a planet. • Children may believe that Earth is larger than the Sun. • Children may think that all planets have a hard rocky surface like Earth. • Children may believe that Earth is the only planet with a moon. Earth has one moon but several other planets have more than one moon. For example, Uranus has 28 known moons. • Children may believe that all planets are the same size. • Children may think that all planets are the same distance from the Sun. • Children may believe that the Sun is the same size as the planets. • Children may believe that it takes every planet about 365 days to orbit the Sun. • Children may believe that the planets cannot be seen without a telescope. • Children may believe that Earth is flat. Explain that people once thought this, but now we know that Earth is spherical. • Children may think that Earth is at the centre of the Solar System • Children may believe that the Sun rotates around the Earth. • Children may think that Earth is the largest object in the Solar System, not the Sun. • Children may think that other planets can support life. • Children may think that the Sun disappears at night. • Children may believe that night and day are caused by the Sun moving around Earth.
YEAR 6	•

FORCES AND MAGNETS	
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YEAR 1	•
YEAR 2	•

YEAR 3	<ul style="list-style-type: none"> • Children may believe that only one force can act on an object at once. • As children cannot see forces, they may find it difficult to understand their effects. • Children may believe that a stationary object does not have any forces acting on it. Explain to them that friction can prevent an object from moving. • The height of the ramp and the way the car is released can affect the distance that the car travels. Before the investigation, decide the most suitable height of the ramp and the most appropriate measuring equipment to use. • Encourage children to release the car at the top of the ramp rather than pushing it as this will affect the results of their investigation. • Children may find magnets and magnetic forces difficult to understand as magnetic forces cannot be seen. • Children may find it difficult to understand that disc and ring magnets also have north and south poles • Children may conclude that all metals are magnetic • Children may think that all coins are magnetic. Clarify to them that depending on their composition, some coins are magnetic and other coins are non-magnetic. Since January 2012 the <ul style="list-style-type: none"> • compositions of 5p and 10p coins have been made from a plated steel, making them magnetic. • Children may think magnets have to be the same type to attract each other, for example two bar magnets.
YEAR 4	<ul style="list-style-type: none"> •
YEAR 5	<ul style="list-style-type: none"> • Children may think friction only occurs when two surfaces are moving. Clarify that friction occurs even when the two surfaces are not moving. They may think that friction only occurs between • rough surfaces. • Children might think that it is wind acting on the parachute that slows it down rather than air resistance.
YEAR 6	<ul style="list-style-type: none"> •

LIGHT AND SOUND

YEAR 1	<ul style="list-style-type: none"> •
YEAR 2	<ul style="list-style-type: none"> •
YEAR 3	<ul style="list-style-type: none"> • As we see with our eyes, children may think that our eyes produce light, rather than light is reflected into our eyes allowing us to see. • Children may think that the Moon is a source of light as it can be seen in the night sky. • Children may only recognise sunburn as a harmful effect of the Sun. • Children may think that only shiny, smooth surfaces reflect light. • Children may think a shadow is a reflection of the Sun. • Children may think a shadow can only be created by the Sun rather than by other light sources. • Children may think that all materials cast shadows. • Children may think that translucent objects would cast clear, defined shadows because they are not completely transparent.
YEAR 4	<ul style="list-style-type: none"> • Children may think that sound only travels through air. • Children may find it difficult to understand how vibrations are detected by the ear. • Children may find it difficult to make the link between the strength of the vibrations and and the volume of a sound. • Children may think that the pitch of an instrument can only be changed in one way. Demonstrate to children that it can be changed in different ways using lengthening/shortening strings or using

	<ul style="list-style-type: none"> • more or fewer fingers on holes in the instrument.
YEAR 5	<ul style="list-style-type: none"> •
YEAR 6	<ul style="list-style-type: none"> • Some children may think that light is emitted from our eyes. Explain that objects can be seen when the light from the object enters our eyes. • Children may initially believe that we can only see objects that emit light, such as the Sun or a light bulb. Explain that not all objects emit light themselves. Instead, we can see objects that reflect <ul style="list-style-type: none"> • light into our eyes. • Children may think that shadows are always the same size. The shape and size of the shadow formed depend on the size of the object blocking the light and the angle of the light source. • Children may become confused as to why light refracts. Clarify to them that light can change direction when it travels from one medium to another. • Children may think the processes of refraction and reflection are the same.

SOLIDS, LIQUIDS AND GASES (STATES OF MATTER)

YEAR 1	<ul style="list-style-type: none"> •
YEAR 2	<ul style="list-style-type: none"> •
YEAR 3	<ul style="list-style-type: none"> •
YEAR 4	<ul style="list-style-type: none"> • Children may think that solid materials cannot change shape. Some solid materials can be squashed, bent, twisted or stretched. • Children may think that the volume of a liquid changes when it is poured into different containers. • Children may think that all solid materials are heavy. • Children may think that it is only liquids that can be poured. Some solids, such as sand, sugar and rice, are solid materials that can be poured. • Children may think that when a liquid flows slower than water, it is not a liquid. Oil and syrup are liquids that flow slower than water. • Children may confuse boiling and evaporation. They may think that evaporation can occur only when water boils at 100°C. • Children may think that once a material has melted it cannot turn back to a solid. • Children may think that the Sun absorbs water. • Children may think that clouds are a gas (water vapour) and not water/ice droplets in the atmosphere. It is the water that makes clouds visible
YEAR 5	<ul style="list-style-type: none"> • Children may think that clouds are a gas (water vapour) and not water/ice droplets in the atmosphere. It is the water that makes clouds visible. • Year 5 Children may think that when a substance dissolves in water it disappears. However, soluble substances are added to liquids to make a solution. • Children may confuse dissolving with melting. When a substance dissolves, the solid is added to the liquid to make a solution, as opposed to melting, which is when a solid changes state to a liquid. • Children may think that filtering and sieving are the same thing. Completing simple tests will help children to notice the differences. • Children may think that soluble substances can be separated by sieving or filtering. Solutions will just pass through the sieve or filter paper. • Children may think that the liquid disappears when it evaporates. • Children may think that all changes are reversible.

YEAR 6	•
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EVOLUTION	
YEAR 1	•
YEAR 2	•
YEAR 3	•
YEAR 4	•
YEAR 5	•
YEAR 6	<ul style="list-style-type: none"> • Some children may think that only animals such as humans, dogs and cats show variation. Clarify to them that organisms such as plants and microorganisms also show variation. • Children may think that they are identical to one of their parents if they look similar. Explain to children that organisms that are produced through sexual reproduction make non-identical offspring. • Some children may believe that humans do not inherit hair colour from their parents, because we can dye our hair to change its colour. Clarify to them that the natural colour of human hair is inherited from our parents. • In this step we are discussing biological families. Different children have different families. This topic is sensitive and knowledge of your children’s family situations is beneficial. • Children may think that animal adaptations such as camouflage occur because the animal has “chosen” to camouflage itself. State to them that the animal cannot “choose” this. • Children may think that animals are able to adapt within their own lifetime. • Children may believe that a camel’s hump stores water. The hump contains fat, which can break down to release energy and water. • Children may think that cacti just have “spikes” and not leaves. Explain to them that cacti have spines or needles, which are a type of leaf, designed to reduce water loss. • Children may believe that plants in deserts have the same size or length of roots as plants in a rainforest. • Clarify that desert plants may have extremely long roots to help them absorb water. • Children may think that evolution is a quick process. • Children may believe that evolution causes animals and plants to be perfectly adapted to their environments. Explain that evolution causes animals and plants to be better adapted to their habitats. • Children may think only animals have evolved adaptations to their environments. Clarify that evolution happens in all organisms. • Children may think that plants and animals choose to adapt to their environments or habitats by natural selection. Highlight to them that the plants and animals do not choose to adapt. • Children may think that evolution and natural selection is the same thing. • Clarify that this is not the case and that natural selection is a cause of evolution. • Children may believe that all prehistoric animals are extinct because all that remains of them are fossils. However, some reptiles and birds alive today share common ancestors with prehistoric animals. • Children may think that fossils are the actual animals or plants rather than an ancient cast or mold of them.

- Children may think there is no link between fossils and evolution. Fossils can be found in older and newer rocks with physical similarities. This suggests that animals have changed or evolved over time

