



Minsterley Primary School
Science Policy

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Approved by Governors:

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Aim:

At Minsterley primary school we believe that learning is a change to long term memory. We intend to create knowledge through spaced repetition and backwards and forwards learning. Our curriculum is built around repeated opportunities to strengthen key concepts. Opportunities are provided to revisit these skills within different scientific contexts and other curriculum subjects.

Statutory Requirements

Statutory requirements for the teaching and learning of Science are laid out in the National Curriculum in England Framework Document for Teaching, September 2014 and the Statutory framework for the Early Years Foundation Stage, 2021.

Planning and delivery of science

Due to the mixed year group classes at Minsterley Primary school, science units are taught by class. This ensures full coverage of the National curriculum by the end of each key stage for every child and builds in repeated opportunities to revisit scientific concepts and key skills. Throughout the delivery of science we have the key threads of: plants; animals including humans; life processes; living things and their habitats; materials; light & sound; electricity; forces and magnets.

KS1 Science Rolling Programme

	<u>Clee</u> (These units can be taught continuously <u>i.e.</u> units can be started earlier or moved, but must be taught by the end of the year)	<u>Wrekin</u> (These units can be taught continuously <u>i.e.</u> units can be started earlier or moved, but must be taught by the end of the year)
Autumn	Everyday materials Y1 (1.3) Seasonal changes Y1 (1.5)	Uses of Everyday Materials Y2 (2.5) Scientist = Charles Macintosh Seasonal changes (recap) Living and Non-living (2.2)
Spring	Animals including humans Y1 (1.2) Scientist = Chris Packham Seasonal changes Y1 (1.5)	Animals including humans (recap) & Animals including humans Y2 (2.3) Plants Y2 (2.4) Seasonal changes
Summer	Plants Y1 (1.4) Scientist = Beatrix Potter Seasonal changes Y1 (1.5)	Living things & their habitats (2.6) Scientist = Rachel Carson Seasonal changes

We have two focus scientists per year but may well focus on more.

KS2 Science LTP Minsterley

	<u>Lawley</u>	<u>Stiperstones</u>	<u>Long Mynd</u>
<u>Aut</u>	light (3.5) Sound (4.5)	States of Matter (4.6) Electricity (4.4)	Earth & Space (5.3) Scientist = Nicolaus Copernicus Light (6.5)
<u>Spr</u>	Forces & magnets (3.3) Rocks (3.6) Scientist = Mary Anning	Properties & changes of materials (5.4) Forces (5.6) Scientist = Isaac Newton	Animals including humans (6.2) Electricity (6.4)
<u>Sum</u>	Plants (3.4) Scientist = David Attenborough Animals inc humans (3.2)	Living things & their habitats (4.2) Scientist = Carl Linnaeus Animals including humans (4.3) Animals including humans (link to PSHE) (5.5)	Living things & their habitats (5.2) Living things & their habitats (6.3) Evolution & inheritance (6.6) Scientist = Charles Darwin

We have two focus scientists per year but may well focus on more.

Across KS1 and KS2 we follow the medium-term plans for 'Engaging Science primary science scheme of work' (saved on School server), however teachers have the flexibility to adapt these plans to meet the needs of their class and ensure maximum progress and engagement of all pupils while at the same time ensuring full coverage of the Science National curriculum. At Minsterley we use progression documents for working scientifically (see Appendix 2 also saved on Staff Server) and scientific knowledge (see Appendix 3 saved on Staff Server). This ensures that building blocks are met and allows staff to easily plan and deliver recap sessions to help children develop their long-term memory in relation to science. Misconceptions are pre-empted as much as possible and addressed within our science lessons (Appendix 4).

At the start of each unit of work a topic overview sheet, which includes a brief overview of the unit, unit objectives and working scientifically objectives, will be shared with pupils and glued into pupils' books. These units will be delivered through both weekly science lessons and across other curriculum areas where appropriate.

During science lessons pupils should be able to describe their scientific knowledge and conceptual understanding in everyday language, but they should also be to use technical/scientific terminology accurately and precisely (Appendix 4).

Working Scientifically

Through the use of the 'Engaging Science primary science scheme of work' we ensure that 'working scientifically' is embedded across all areas of the science curriculum at Minsterley primary school and is always taught and clearly related to the scientific learning being covered at the time. The types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. The types of scientific enquiry are identified by stickers in the children's books as a prompt to encourage the children to revisit, discuss and build on their knowledge (learn more, remember more). Across the school from Year 1 to Year 6 we ensure that working scientifically is delivered as set out in the National Curriculum (2014) and that teachers are aware of the notes and guidance that is associated with working scientifically in each key stage.

Science in EYFS

The EYFS strand 'Understanding the World' leads directly to scientific elements of the curriculum and this is delivered through both child-led and adult led play activities. These activities will encourage reception pupils to explore, problem solve, observe, predict, think, make decisions and talk about the world around them.

Assessment

Assessment will be carried out in accordance with the school's assessment policy. In EYFS, Key Stage 1 and Key Stage 2 teachers will assess children's knowledge and understanding in a variety of ways to ensure they gain a full understanding of what each child has learnt, and what is needed to progress their understanding. Teachers will mark science in line with the 'Feedback Policy'.

Each term, KS1 and KS2 will make a judgement if a pupil is WTS (working towards age related expectations) or EXS (working at age related expectations)

for both scientific knowledge and working scientifically and record this on the Science Assessment Overview (Saved on Staff Server). To help teachers inform their judgements they can use: end of unit tests/quizzes, PSTT TAPS resources, observations and independent scientific investigations. EYFS staff will use observations linked to 'Understanding the World' to make judgements on and record pupil's attainment and record this at the end of each term on the tracker document.

Progression in science is discussed in pupil progress meetings and relevant targets and actions are considered if required.

In line with statutory requirements the attainment of each child in science will be reported at the end of EYFS, KS1 and KS2.

Resources

All science resources in school and their locations are stored in a list on the Staff sever (curriculum resources – science). The majority of science resources are stored in the main corridor or in the Stationery cupboard in clearly labelled trays/cupboards.

Equal Opportunities and Inclusion

All children have equal access to the full Science programme of study that satisfies the National Curriculum 2014 requirements. For additional information see our Equal Opportunities and Inclusion policy.

Safe Practice

Children are encouraged to consider their own safety, and the safety of others at all times. Staff will provide a safe and secure environment, for children to learn, at all times. Any experiments or visits which are considered a particular risk will need a Risk Assessment Form to be completed and consult the Headteacher/School visit co-ordinator prior.

Appendix 2 (Progression Working Scientifically)

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	KS3
Working Scientifically Planning	<p>Explore the natural world around them (UtW).</p> <p>Listen attentively and respond to what they hear with relevant questions, comments and actions during whole class discussions and small group interactions; - Make comments about what they have heard and ask questions to clarify their understanding; (C&L)</p> <p>Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; (C&L)</p>	<p>Ask questions based on exploration of the world around them.</p> <p>Respond to prompts by making some suggestions about how to find an answer.</p> <p>Talk about similarities and differences.</p> <p>Are aware that we use resources to answer questions using different types of enquiry (classify; comparative test; pattern seeking and observations over time).</p>	<p>Ask simple questions and recognise that they can be answered in different ways.</p> <p>Ask people questions and use simple secondary sources to find answers.</p> <p>Talk about similarities and differences.</p> <p>Are involved in planning how to use resources to answer questions using different types of enquiry (classify; comparative test; pattern seeking and observations over time).</p>	<p>Respond to suggestions of how to answer questions about the world around them and ask effective and relevant questions.</p> <p>Recognise when and how secondary sources should be used.</p> <p>Discuss and begin to set up the most appropriate type of scientific enquiry (classify; fair test; comparative test; pattern seeking and observations over time) to use to answer questions.</p> <p>Recognise that questions can be answered in different ways.</p> <p>Begin to recognise and identify the factors needed to make a test 'fair'. Identify the factors in a simple 'fair' test that we will measure (variables) and keep the same (control).</p>	<p>Raise own relevant questions and use different types of scientific enquiry (classify; fair test; comparative test; pattern seeking and observations over time) to answer questions.</p> <p>Recognise when and how secondary sources should be used.</p> <p>Make decisions about the most appropriate type of scientific enquiry (classify; fair test; comparative test; pattern seeking and observations over time) to answer questions and set these up.</p> <p>Recognise and identify the factors needed to make a test 'fair'. Identify the factors in a simple 'fair' test that we will measure (variables) and keep the same (control).</p>	<p>Explore ideas and raise a range of relevant questions.</p> <p>Recognise which secondary sources are most useful and begin to recognise the difference between fact and opinion.</p> <p>Select and plan the most appropriate type of scientific enquiry for answering a scientific question.</p> <p>Decide which variables to measure change and keep the same. Demonstrate how to change one factor (variable) whilst keeping others the same (control).</p> <p>Identify and use an appropriate unit to measure variables effectively.</p>	<p>Explore ideas and raise a range of different kinds of relevant questions based on accurate scientific principles.</p> <p>Recognise and use the secondary sources that are most useful separating opinion from fact.</p> <p>Select and plan accurately the most appropriate type of scientific enquiry (classify; fair test; comparative test; pattern seeking and observations over time) for answering scientific questions.</p> <p>Decide which variables to measure change and keep the same and demonstrate how to change one factor (variable) whilst keeping others the same (control).</p> <p>Identify and use an appropriate unit to measure variables effectively</p>	<p>Use simple models to describe scientific ideas.</p> <p>Explain how to construct a complex test.</p> <p>Plan different types of enquiries to answer questions and put measures in place to ensure accuracy and reliability.</p> <p>Select the most suitable variables to be investigated.</p> <p>Identify some variables that cannot be controlled or explain.</p> <p>Recognise some situations in which a fair test cannot be carried out.</p>
Making observations & taking measurements	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants; (UtW)</p> <p>Know some similarities and differences between the natural world</p>	<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>With support, decide how to sort and group</p>	<p>Make close observations.</p> <p>Carry out instructions for a simple investigation.</p> <p>Use simple features to compare objects, materials and living things.</p>	<p>Describe what happens when taking part in simple investigations/fair tests.</p> <p>Begin to make decisions about what to observe, how long to observe for?</p> <p>Read simple scales and take accurate measurements using standard units, e.g.</p>	<p>Recognise when to set up simple practical enquires, comparative and fair tests.</p> <p>Make decisions about what to observe, how long to observe for, and the type of equipment needed.</p>	<p>Recognise when and how to set up comparative and fair tests and begin to explain which variables need to be controlled and why.</p> <p>Make decisions about what to observe, what measurements to use and how long to measure them for.</p>	<p>Recognise when and how to set up comparative and fair tests and clearly explain which variables need to be controlled and why.</p> <p>Make independent and well founded decisions about what to observe, what measurements to use and how long to measure them for.</p>	<p>Recognise when and how to set up comparative and fair tests and clearly explain which variables need to be controlled and why.</p> <p>Record observations and</p>

	<p>around them and contrasting environments, drawing on their experiences and what has been read in class; (UtW)</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. (UtW)</p> <p>Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; (C&L)</p> <p>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; (NP)</p>	<p>objects, materials and living things.</p> <p>Talk about what happens and record using words and pictures.</p> <p>Begin to take measurements, initially by comparisons, the using non-standard units.</p> <p>Begin to record data in simple templates.</p>	<p>Begin to decide how to sort and group objects, materials and living things (identifying their own criteria).</p> <p>Talk about and record what is seen and observed, including changes over time.</p> <p>Use simple equipment e.g. magnifying glasses, digital microscopes, and take accurate measurements using simple equipment, e.g. cm and scales with one interval.</p> <p>Begin to identify and classify data and information.</p> <p>Record data using simple charts, tables, pictograms, tally charts and block graphs.</p>	<p>Thermometers, graduated beakers, stop watches and data loggers.</p> <p>Talk about criteria for grouping, sorting and classifying, use simple keys, Venn and Carroll diagrams.</p> <p>Record data using a range of charts, tables and block graphs and labelled diagrams.</p>	<p>Make systematic and accurate observations and measurements.</p> <p>Use a range of measuring equipment appropriately including thermometers, data loggers, stop watches, trundle wheels etc.</p> <p>Use and design keys, Venn/Carroll diagrams for grouping, sorting and classifying.</p> <p>Gather, record, classify and present data in a variety of ways to help answer questions (including Venn and Carroll diagrams).</p> <p>Use and construct increasingly complex tables, line graphs and keys to record findings.</p>	<p>Choose appropriate equipment to make measurements, using standard units of measure and simple scales accurately and with precision.</p> <p>Use/develop keys and other information records to identify, classify and describe living things and materials and identify patterns.</p> <p>Gather, record, classify and present a range of data in different ways.</p> <p>Record data and results using scientific diagrams and labels, classification keys, tables, and bar and line graphs.</p>	<p>Choose the most appropriate equipment (with a variety of intervals and units) to make measurements and explain how to use accurately and with precision. Repeating readings when appropriate.</p> <p>Use/develop keys to and other information records identify, classify and describe living things and materials and identify patterns.</p> <p>Gather, record, classify and present data in a wide range of ways.</p> <p>Use a wide range of methods to record data including line graphs, scientific diagrams, classification keys, scatter, bar and line graphs etc.</p>	<p>measurements systematically.</p> <p>Choose the most efficient units of measurement and convert as and when appropriate.</p> <p>Present comparative data in a range of formats including, pie charts, line graphs and scatter grams etc. Label diagrams using appropriate scientific symbols, e.g. circuit diagrams in parallel.</p>
<p>Working Scientifically Conclusions & raising further questions, predictions</p>	<p>Offer explanations for why things might happen, making use of recently introduced vocabulary (C&L)</p> <p>Express their ideas and feelings about their experiences using full sentences, (S)</p>	<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>Record observations using pictures, labels, photos and videos.</p>	<p>Talk about describe and sort simple similarities and differences, begin noting patterns and relationships.</p> <p>Record and communicate findings in a range of ways using simple scientific language.</p> <p>Talk about what has been found out and how it was discovered.</p>	<p>Begin to look for patterns and decide what data to collect to identify them.</p> <p>Talk about data collected from observations and measurements, using drawings, labelled diagrams, notes, simple tables and keys, standard units and simple equipment including data loggers.</p> <p>Begin to draw and express some</p>	<p>Look for patterns and decide on the range of data needed to identify them.</p> <p>Collect data from observations and measurements, using notes, simple tables and standard units, using drawings, labelled diagrams, keys, bar charts and tables.</p> <p>Identify changes, patterns, similarities</p>	<p>Decide how to record data from a choice of familiar approaches.</p> <p>Use relevant scientific language to communicate findings and justify scientific ideas. Begin to also report on relationships and degrees of trust in results.</p> <p>Look for different relationships in data and begin to identify evidence</p>	<p>Decide in detail how to record data accurately from a choice of familiar approaches.</p> <p>Use relevant scientific language and illustrations to discuss, communicate and justify findings and scientific ideas including relationships, explanations and degrees of trust in results.</p>	<p>Use quantitative and qualitative data to support conclusions.</p> <p>Use scientific knowledge and understanding to challenge the conclusions of others.</p> <p>Identify a range of scientific evidence that has been used to support</p>

		Talk in simple terms about what might happen based on own experiences.	Talk in simple scientific terms about what might happen and why? (prediction)	conclusions, by looking at changes, patterns, similarities and differences in data and relate to simple scientific ideas. Begin to identify new questions arising from data, make new predictions for new values within or beyond the data collected. Report on and begin to use scientific evidence to support findings	and differences in data in order to draw conclusions and relate to simple scientific ideas and processes. Suggest improvements and identify new questions arising from data, make new predictions for new values within or beyond the data collected. Report on findings from enquires including oral and written explanations. Use scientific evidence to support findings.	that refutes or supports ideas. Make practical suggestions about how working methods could be improved. Use results to identify when further tests and observations might be needed. Make general statements such as: 'the hotter the water, the faster the sugar dissolves'	Look for a range of different relationships in data and begin to identify evidence that refutes or supports ideas. Identify when tests need to be repeated in order to attain reliable results. Use test results to make predictions and set up further comparative and fair tests. Use scientific evidence to support or refute findings from investigations and explorations, making increasingly measured general statements. Talk about how scientific ideas have developed over time.	or refute ideas or arguments. Identify when tests need to be repeated in order to attain reliable results. Use test results to make predictions, supported by relevant and accurate evidence to set up further comparative and fair tests.
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Appendix 3 (Progression scientific knowledge)

	EYFS	Clee	Wrekin	Lawley	Stiperstones	Long Mynd	KS3/GDS
Plants	Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. Explore the natural world around them, making observations and drawing pictures of plants; Know some similarities and differences between the	1.4 Know what a seed/bulb is and how to plant it. Know what plants and seeds need to grow and how to take care of plants. Name the basic parts of a plant: stem, leaves, roots, flower, petals, fruit, bulb and seed. Know that seeds/bulbs grow into new plants. Know that some plants produce flowers which develop into seeds. Name some common native trees.	2.4 Distinguish between seeds and other similar materials. Give a basic explanation/prediction of what a seed is know that plants have stem, leaves, roots. Know that plants lose water from their leaves. Know that bulbs and seeds differ in structure and formation. Know that plants provide humans and other animals with food. Identify the parts of the plant that are consumed for a range of vegetables.	3.4 describe the structure of a flowering plant explain that water moves from the roots through branches and stems to leaves and flowers describe some methods of seed dispersal explain why seeds need to be dispersed describe the life cycle of a flowering plant describe the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal explain that plants do not need to eat food because they make their own describe why plants need water, light, space and nutrients for growth		5.2 Make observations of plant life cycles Recognise that flowering plants produce seeds from their flowers which grow into new plants Describe the life cycle of flowering plants including pollination, fertilisation, seed production, seed dispersal and germination Describe the structure of a flower, naming the main parts of the flower Describe different ways of growing new plants other than using seeds	Describe using accurate scientific vocabulary the features of a plant, such as the function of a stamen. Describe and explain the main functions of a plant and its organs. Discuss photosynthesis,

	natural world around them and contrasting environments, drawing on their experiences and what has been read in class; Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Know that the fruit produced by trees contains its seeds.	Describe how plants change through the seasons. Know that some plants are perennial and some are annual or biennial. Describe the difference between perennial plants and annual plants. Know, through investigation, that seeds and bulbs need water and warmth but not light to grow. Know that growing plants need light to stay healthy.			Know the difference between asexual and sexual reproduction in plants. Compare the production of new plants through the planting of seeds and the taking of cuttings	
Animals, including Humans	Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. Explore the natural world around them, making observations and drawing pictures of animals. 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	1.2 Name the parts of the external human body (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth lips etc.) Describe what we use these body parts for or what they do. Discuss some basic ways of staying healthy – eating well, exercising, keeping clean. Sort and group different kinds of animals. Know the basic animal classes of birds, fish, amphibians, reptiles, mammals and invertebrates. Name the main body parts that characterise different animal classes. Describe the diet of some of the common British animals they have been studying. Compare the diet of these animals with the human diet.	2.3 Know that animals grow in different ways. Know that mammals have live young but other animals do not. Describe how humans grow. Describe the basic needs of animals – food, air, warmth. State some ways in which humans stay healthy. Know that eating a good diet is helps us stay healthy. Know that foods can be sorted into groups. State the basic foods that are needed for a healthy diet and those foods that should be eaten in moderation. Describe how humans stay healthy – hygiene, exercise and rest.	3.2 Identify the diets of a number of animals including birds. Classify animals as omnivores, herbivores and carnivores. Understand that animals need to eat because they do not make their own food like plants do. Develop a classification system for foods. Know that the digested food is used for energy, to help us grow and to repair the body. Know that different kinds of food are used for different things: protein for growth and repair, fat and carbohydrate for energy. Know that some animals have skeletons inside their bodies and others, such as insects and crustaceans, have a skeleton outside their bodies. Classify animals as vertebrates or invertebrates. Note some differences in movement between animals with a skeleton and animals without a skeleton. Know the main parts of the body associated with the muscular and skeletal system. Know that different parts of the muscular-skeletal system have different functions. Know that muscles are attached to the skeleton and help us move.	4.3 Describe the human teeth and their positions in the mouth. Name the different sorts of teeth found in humans. Know that children have milk teeth that are lost as adult teeth develop. Understand the need to take care of your teeth and how to do this. Describe the differences in teeth that have been cared for and those that have not. Know that the tongue is the organ for taste and that it helps to move food into the oesophagus. Name the different parts of the digestive system. Outline the basic function of each part of the digestive system. Identify in a model each part of the digestive system and describe its basic function. Know that all food chains start with plants that create their own food using energy from the Sun. Know that some animals are predators and some are prey. Understand food chains and use them to describe feeding relationships. Identify animals that are predators, those that are prey and those that are both. Link the use of the terms predator and prey to the terms herbivore, omnivore and carnivore.	6.2 Describe the functions of blood, including clotting. Know that blood is pumped round the body by the heart. Know that there are different groups of human blood. Describe the basic structure of the circulatory system. Explain the functions of the heart, arteries veins and capillaries. Describe the structure of the heart. Explain the basic function of the heart. Describe the structure of the lungs and the basic functions of the lungs. Describe how the heart and lungs work together to keep us alive. Know that the heart rate can be determined by taking a pulse, and where pulse points are found. Describe the changes that take place in pulse rate and breathing rate before, during and after exercise. Relate these changes to the need for more oxygen and energy in the muscles.	Explain how and why our muscles use oxygen. Explain in detail the impact of diet, exercise, drugs and lifestyle on the way the body functions. Name all the main food groups and explain how they are used by the body.

	seasons and changing states of matter.				Construct a food web to show more complex feeding relationship.	Know that alcohol, smoking and the use of some drugs can harm the body. Describe some of the short term and long term effects of alcohol, smoking and drugs.	
Life Processes	Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	1.5 Make and use simple instruments for observing the weather, setting up a simple weather station. Describe the changes in the weather with the seasons. Take measurements from the weather station and observe the weather outside. Learn how to stay safe in the sun. Learn about the effects of the Sun in the UK and around the world. Take measurements from the weather station and observe the weather outside. Know that rain comes from clouds. Know that not all clouds produce rain and that there are different kinds of clouds. Look at different types of storm around the World – hurricanes, tornados, monsoons. Know that some storms in the UK are accompanied by thunder and lightning. Know that snow comes from clouds. Know that some parts of the world and some seasons are more likely to have snow.	1.5 (RECAP) Make and use simple instruments for observing the weather, setting up a simple weather station. Describe the changes in the weather with the seasons. Take measurements from the weather station and observe the weather outside. Learn how to stay safe in the sun. Learn about the effects of the Sun in the UK and around the world. Take measurements from the weather station and observe the weather outside. Know that rain comes from clouds. Know that not all clouds produce rain and that there are different kinds of clouds. Look at different types of storm around the World – hurricanes, tornados, monsoons. Know that some storms in the UK are accompanied by thunder and lightning. Know that snow comes from clouds. Know that some parts of the world and some seasons are more likely to have snow.		5.5 Describe the basic changes as humans develop from birth to old age. Compare the human life cycle to the life cycle of other animals. Describe the changes that happen during puberty. Describe the development of a baby. Know how babies are born.	6.6 Research and recount the main events in the life of Charles Darwin. Describe the contribution he made to scientific knowledge about evolution. Understand the term evolution. Explore the reasons that some people do not believe that evolution happened and look at some creation stories from different religions, e.g. the Vikings. Research the ways in which animals and plants are adapted to their environment. Describe ways in which animals are adapted to avoid predation, for example camouflage, use of warning colours in insects, spines on plants. Explain how fossils provide evidence for evolution. Explain how humans have evolved. Model evolution through the use of games/simulations. Model and compare evolution and selective breeding.	Reproduction in humans and plants. Relationships in ecosystems. Variation between individuals within a species. Changes in environment impact on adaptation.
All Living Things and their Habitats	Describe their immediate environment using knowledge		2.3 & 2.6 Classify items as living things, things that were alive and		4.2 Use a key to identify an unknown plant or animal. Understand how keys are constructed.	6.3 Name the five kingdoms of living things.	Explain why different organisms, including micro-

	<p>from observation, discussion, stories, non-fiction texts and maps.</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants;</p> <p>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;</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>		<p>things that have never been alive.</p> <p>Understand that plants are living things.</p> <p>know some of the characteristics of living things –movement, growth, excretion, reproduction, <i>sensitivity</i>.</p> <p>Know that all living things have certain needs.</p> <p>Learn the term habitat and micro-habitat.</p> <p>Give examples of different habitats.</p> <p>Describe a woodland habitat.</p> <p>Describe the kind of microhabitats found in woodland.</p> <p>Know some of the common woodland animals and plants.</p> <p>Describe a seashore habitat.</p> <p>Describe the kind of microhabitats found in the seashore.</p> <p>Know some of the common seashore animals and plants.</p> <p>Know that living things should be treated with respect.</p> <p>Explore a pond habitat identify some animals and plants living in and around ponds.</p> <p>Know that plants do not need to eat because they make their own food.</p> <p>Know that some animals are carnivores, herbivores and omnivores.</p> <p>Understand the term food chain and give some simple examples of food chains.</p>		<p>Create a key to identify a number of plants or animals.</p> <p>Describe the classification of vertebrates into fish, amphibians, reptiles, birds, and mammals.</p> <p>Identify the characteristics of each class.</p> <p>Correctly place unfamiliar vertebrates into one of these classes.</p> <p>Describe the classification of invertebrates into snails/slugs, worms, insects, crabs and spiders.</p> <p>Identify the characteristics of each class.</p> <p>Correctly place unfamiliar invertebrates into one of these classes.</p> <p>Recognise that some flowers such as grasses and some tree flowers do not have petals.</p> <p>Describe the classification of plants into flowering plants (including grasses) and non-flowering plants such as ferns and mosses.</p> <p>Identify the characteristics of each class.</p> <p>Correctly place unfamiliar plants into one of these classes.</p> <p>Identify, using support materials where necessary, the common animals and plants in the local area.</p> <p>Recognise that these animals and plants vary widely but that they can be sorted into different groups.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>Describe the characteristics of different vertebrate and invertebrate groups.</p> <p>Understand that there is a great variety of living things.</p> <p>Understand the term biodiversity.</p> <p>Know about some of the threats to biodiversity, including the threats posed by humans.</p> <p>Know that micro-organisms living things that are often too small to be seen with the naked eye.</p> <p>Know that whilst some micro-organisms bring about disease many others are useful.</p> <p>Create a key to identify microorganism classes.</p> <p>Observe the growth of yeast and the waste products of yeast.</p> <p>Investigate the things yeast needs to grow.</p> <p>State some of the uses for yeast.</p>	<p>organisms are found in different habitats.</p> <p>Explain the purpose & importance of classification.</p> <p>Develop and use complex keys and food chains.</p> <p>Generate detailed life cycles for plants and animals.</p> <p>Describe the impact of changes to environmental factors [for example, the availability of light or water].</p>
<p>Everyday Materials</p> <p>Earth & Space</p> <p>Rocks & Soils</p>	<p>Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.</p>	<p>1.3 Begin to name common materials and describe their properties.</p> <p>Distinguish between an object and the material it is made from.</p>	<p>2.5 Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Compare and contrast the advantages of using</p>	<p>3.6 Examine and describe different specimens of rock.</p> <p>Classify rocks according to their own criteria.</p> <p>Name some of the most common rocks.</p> <p>Investigate the properties of igneous and sedimentary rocks.</p>	<p>4.6 Identify materials as solids, liquids or gases.</p> <p>Begin to assign properties to different states of matter.</p> <p>Describe the properties of solids, liquids and gases.</p>	<p>5.3 Describe the relative motion of the Earth, the Moon and the Sun.</p> <p>State the difference between a sun, a planet and a moon.</p> <p>Know that the Sun, planets and moons in the solar</p>	<p>Describe in detail properties of metals, e.g. electrical conductivity.</p> <p>Use my growing knowledge to compare the</p>

	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>Know that materials can be used in a variety of ways. Group materials together and make a record of groupings. Know that materials can be sorted in a variety of ways according to their properties. Know that materials are chosen for specific purposes on the basis of their properties. Know that there is a range of materials with different characteristics. Develop the vocabulary needed to describe material properties. Explore materials using appropriate senses, making observations and simple comparisons. Know that objects made from elastic or malleable materials can be altered by squashing, bending, twisting and stretching. Know that transparent objects let the light through but opaque objects do not.</p>	<p>different materials for the same object. List the uses of a particular material in and around school. Recognise that some materials are naturally occurring and some are not. Name some naturally occurring materials compare the range and use of materials in a different time period with their use nowadays. Describe in simple terms how and why the use of materials has changed. Know the contribution made to materials science by John Boyd Dunlop.</p>	<p>Describe in simple terms how igneous, sedimentary and metamorphic rocks are formed. Investigate the composition of soil. Use the investigation to come up with a model of how soil is formed. Describe how fossils are made. Explain how the fossil record helps us learn about life millions of years ago. Use fossil pictures to draw conclusions about dinosaurs.</p>	<p>Know that solids consisting of very small pieces (e.g. sand) behave like liquids in some ways. Know that there are gases all around us but they are invisible. State the properties of gases. Know how to use a thermometer. Know that the same material can exist as both solid and liquid. Name the changes of state. Set up simple comparative and fair tests to establish the factors that affect evaporation. Describe the water cycle in terms of changes of state.</p> <p>5.4 Extend their knowledge of properties to include more abstract properties such as hardness, thermal and electrical conductivity, magnetic attraction. Know that metals have similar, specific properties. Match material properties to their use. Know that some materials dissolve in water and others do not and give examples of both. Know that a substance is still present in the solution when it has dissolved. Describe ways in which dissolved substances can be recovered from solution. Understand that melting and dissolving are different processes. Separate solute from a solution by crystallisation. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering and sieving. Plan an investigation to determine ways in which solids can be removed from liquids. Report the findings from their investigation into treating sewage including conclusions and explanations of their findings. Know that burning results in the formation of new materials including gases that we cannot see. Know that chemical changes are usually not reversible.</p>	<p>system are approximately spherical in shape. Explain how ideas about the solar system have changes through the centuries. Identify the eight planets within the solar system and their positions relative to the Sun. Compare planets in terms of atmosphere, time to orbit the Earth, period of rotation, number of moons etc. Explain night and day in terms of the rotation of the Earth. Investigate differences in the time of day and the length of day in different parts of the World. Describe and explain in simple terms how the appearance of the Moon in the sky changes over the course of 28 days. Investigate factors that affect the formation of craters.</p>	<p>similarities and differences between a wide range of materials and their properties, including metals and other solids. Give reasons for the magnetic behaviour of a range of materials Identify and describe a range of contexts in which change takes place, e.g. evaporation and condensation. Describe, and give reasons for the differences between solids, liquids and gases. Describe in detail, processes such as separation, filtration, mixtures and solutions. Describe the way in which the arrangement of molecules is affected by the change of state Describe the composition & structure of Earth and the carbon cycle.</p>
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Light & Sound	<p>Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants;</p> <p>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;</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>			<p>3.5</p> <p>Know that some objects produce light energy and that these are light sources.</p> <p>Know that some surfaces reflect light. Distinguish between light sources and objects that reflect light.</p> <p>Know that the Sun is a light source but the Moon is not.</p> <p>Know that some surfaces reflect light. Know which surfaces have the best reflective properties.</p> <p>Know that the eyes are the organs of sight.</p> <p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Know how to protect their eyesight, including protection from sun damage.</p> <p>Know that some substances allow light to pass through completely or partially and use the terms transparent, translucent and opaque. Know how shadows are formed.</p> <p>Know what determines the length of shadows.</p> <p>4.5</p> <p>Associate sound with vibrating objects.</p> <p>Describe a range of ways of getting things to vibrate.</p> <p>Create sounds in a variety of ways. Use their ears to listen to and identify sounds.</p> <p>Describe how the shape of our ears helps us hear.</p> <p>Describe the basic structure of the ear.</p> <p>Establish that sounds get fainter as the distance increases.</p>		<p>6.5</p> <p>Describe and give examples of light sources.</p> <p>State some basic properties of light.</p> <p>Know that light travels in straight lines.</p> <p>Investigate changes in shadows depending on the relative positions of the light source and object and the use of filters.</p> <p>Establish the best arrangement of light source and position of object in a shadow puppet theatre.</p> <p>Devise and perform a shadow puppet show using their knowledge of shadows to add dramatic interest.</p> <p>Know that many objects reflect light.</p> <p>Represent the direction of a beam or ray of light travelling from a light source by a straight line with an arrow.</p> <p>Use the properties of reflection to make periscopes.</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>Know the basic structure of the eye.</p>	<p>Use knowledge of how light travels to predict the size of a shadow when the position of the light source changes.</p> <p>Explain the concept of reflection and explain how a non-luminous object can be seen. Use my knowledge of materials and the way in which sound travels to explain how we hear through different states of matter.</p>

				<p>Know that sound travels through solids and liquids as well as air. Associate loudness with stronger vibrations.</p> <p>Investigate the effectiveness of different materials to muffle sound. understand what pitch is.</p> <p>Describe some ways of changing the pitch of a vibrating object.</p>			
Electricity	<p>Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants;</p> <p>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;</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>			<p>4.4</p> <p>Identify that a number of common appliances and pieces of equipment use electricity.</p> <p>Know that some appliances use mains electricity and some use batteries.</p> <p>Associate the use of batteries with the need for less power.</p> <p>Know the dangers of mains electricity and how to avoid them.</p> <p>Understand that a flow of electricity (electric current) is only possible when there is a complete loop of conducting material.</p> <p>Construct a simple circuit involving batteries.</p> <p>Know that some materials let electricity flow through them and others do not.</p> <p>Recognise that all metals are conductors and most non-metals are insulators.</p> <p>Know that air is an insulator.</p> <p>Relate some incidents in the history of electricity.</p> <p>Investigate the effect of changing components in a series circuit.</p> <p>Describe the purpose of different components in a circuit components, including switches and buzzers.</p> <p>Describe the relationship between the numbers of batteries, the numbers of bulbs and the brightness of bulbs.</p> <p>Know that too much current will cause the bulb to blow.</p>	<p>6.4</p> <p>Construct simple series circuits and identify the uses of different components.</p> <p>Know how to stay safe when working with electricity.</p> <p>Investigate how differences in voltage affect the performance of components within a circuit.</p> <p>Record data and results of increasing using circuit diagrams, tables and line graphs</p> <p>Describe the differences between series and parallel circuits.</p> <p>Build simple series and parallel circuits to solve problems.</p> <p>Design and build a game that involves an electric circuit.</p>	<p>Draw a complex circuit using standard scientific symbols.</p> <p>Explain and use the term resistance correctly. Talk about what happens when connecting components in circuits. Use an effective model to explain electrical flow.</p>	
Forces & Magnets	<p>Describe their immediate environment using knowledge from observation,</p>			<p>3.3</p> <p>Identify forces as pushes, pulls or twists.</p>	<p>5.6</p> <p>Know that the Earth and objects are pulled towards each other; this gravitational attraction causes objects to</p>	<p>Draw a diagram to show the size and direction of forces acting on an object. Use a</p>	

<p>discussion, stories, non-fiction texts and maps. Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>				<p>Know that a force can change the speed, direction or shape of an object. Know that force is measured using a force meter and that the units of measurement are Newtons. Recognise that many forces require a contact between them for the force to take effect. Know that friction is a force between two surfaces that slows objects down. Describe some factors that affect friction. Provide examples of useful and non-useful friction in everyday life. Describe what a magnet is. Know that magnets can exert forces at a distance. Know that magnets have two ends called poles that attract or repel each other depending on how they are arranged. Describe some everyday uses for magnets. Classify materials as magnetic or non-magnetic. Determine a general rule for predicting which materials are magnetic. Investigate the relationship between the size of a magnet and its strength. Describe some uses of magnets. Summarise their learning about magnetism.</p>	<p>have weight. Be able to use a force meter carefully, interpreting the scale correctly. Know that weight is a force and is measured in Newtons and that mass is the amount of matter and is measured in kilograms. Know that air resistance slows moving objects. Know that when an object falls, air resistance acts in the opposite direction to the weight. Know that when an object is submerged in water, the water provides an upward force (upthrust) on it. Know that things will float if the upthrust is greater than the weight. Know that water resistance acts to slow down objects that are moving through the water. Compare air and water resistance. Know that the force between two moving surfaces in contact is called friction. Know that friction can be useful or a problem and provide examples of both. Investigate a range of simple machines: pulleys, gears, ramps, wheel and axle and levers. Describe how simple machines such as gears, levers and pulleys are used to transfer forces or to change speed or direction.</p>		<p>force meter, with a range of scales, to weigh objects accurately Discuss balanced forces, forces and motion</p>
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Appendix 4 (Misconceptions & Vocabulary)

	Clee	Wrekin	Lawley	Stiperstones	Long Mynd	KS3
Plants	<p>1.4 Children do not always see the word plant as a general term. For example, some may think a tree is a plant when it is little but not when it's</p>	<p>2.4 Some pupils may still think that seeds contain miniature plants – plant babies - waiting to grow</p>	<p>3.4 Children don't distinguish between the germination of seeds and their later growth. Different conditions are required for each – during germination only respiration takes place and the seed provides the necessary food store, but once the</p>		<p>Children sometimes know that sexual reproduction occurs in animals but do not think it happens in plants. They may believe that asexual reproduction produces weak offspring and sexual reproduction produces superior offspring.</p>	

		<p>big - it's a tree not a plant. Others think that plants are always cultivated so weeds such as dandelions are not plants. Some children use the term vegetable rather than plant to describe carrots and cabbages.</p> <p>Children often think that seeds contain miniature plants waiting to grow because human babies are miniature versions of the adult. They mistakenly connect one form of baby with a "baby" plant.</p> <p>distinguish between trees and other flowering plants</p> <p>know the main parts of a tree: trunk, roots, branches, leaves, fruit</p> <p>know that some trees are evergreen and do not lose their leaves in winter but others are deciduous and do identify trees as deciduous and evergreen</p>		<p>green shoots appear</p> <p>photosynthesis can start.</p> <p>They sometimes think that the nutrients that plants take in are their food.</p>			
Plants Vocabulary		<p>1.4</p> <p>Seed, compost, water, sprout, bulb, grow, plant, root, leaf, petal, stem, flower, fruit, sprout, germinate, shoot, tree, branch, evergreen, deciduous, trunk, twig, fruit, acorn, sycamore, nut, conker, pip, wild, cultivated, garden, park, meadow,</p>	<p>2.4</p> <p>Plant, root, water, bean, leaf, flower, warmth, nut, stem, bud, tree, grow, soil, sprout, growth, wilt, compost, germinate, healthy, shrivel, light, excrete, humans, food, vegetables, seed, store, fruit, stem, taproot, edible, sprout, warmth, biennial, perennial, annual, tree, bush, evergreen, deciduous, temperature, propagator,</p>	<p>3.4</p> <p>Seed, seedling, conditions, water, compost, soil, light, filter, structure, function, fruit, stem, leaf, leaves, shoot, root, flower, growing tip, bud, petal, plant, nutrient, tap root, wilt, thorn, bark, spines, fibrous root, competition, dispersal, gravity, wind dispersal, animal dispersal, scatter, seed pod, nut, berry, seed head, life cycle, germination, mature, pollen, pollination, seed formation,</p>		<p>5.2</p> <p>Life cycle, structure, stage, growth, habitat, germination, plant, flower, leaf, stem, seed, root, photosynthesis, seed dispersal, petal, stamen, carpel, anther, filament, stigma, ovules, sepals, nectary, pollination, fertilisation, insect, asexual reproduction, sexual reproduction, germination,</p>	

<p>Animals, including Humans</p>		<p>1.2 Young children often fail to realise that humans are animals. Some children may think that only large animals (as found in zoos or farms or at home as pets) are animals.</p>	<p>2.3 Most children understand that they came from their mother, and sometimes apply the mammalian style of reproduction to other living things. Understanding that birds and reptiles lay eggs, for example, helps reinforce understanding of the different classes' methods of reproduction. It is often said that 'food is energy', rather than that it provides us with fuel. Try to avoid using this phrase and refer to food as "fuel for energy and as building materials" instead.</p>	<p>3.2 Because there is continued reference to food as energy, children sometimes fail to understand that food also provides material for growth. 90% of our food is used as fuel and 10% is for growth. It is helpful to use the terms fuel and building materials when talking about food to avoid this misconception.</p>	<p>4.3 Children sometimes think that food and drink travel through the body separately. They will draw different tubes through the neck.</p>	<p>6.2 Children are sometimes confused about the pathway blood takes to a specific body part, believing that the blood travels round the body before reaching that part rather than taking a branch of the arterial system.</p>	
<p>Animals, including Humans Vocabulary</p>		<p>1.2 Arm, elbow, shoulder, chest, waist, belly, tummy button, hips, bottom, limbs, leg, knee, foot, ankle, toes, heel, toenails, hand, fingers, index finger, middle finger, ring finger, little finger, thumb, knuckles, wrist, palm, fingernails, head, hair, neck, chin, forehead, cheeks, cheekbones, face, eyes, eyelid, eyelashes, eyebrows, nose, nostrils, mouth, lips, gums, teeth, tongue, ears, ear lobes, diet, exercise, hygiene, bath, soap, fit, clean, shower, water, energetic, toilet, toothbrush, towel, germs, toothpaste, Animal, bird, mammal, fish, amphibian, reptile, invertebrate, wing,</p>	<p>2.3 Mammals, eggs, live young, birth, nest, parents, milk, hatch, baby, toddler, teenager, adult, development, growth, independence, care, food, warmth, air, breathe, nutrition, air, young, caterpillar, chick, tadpole, diet, fruit, vegetables, protein, fuel, dairy, calcium, vitamins, minerals, prevention, carbohydrates, energy, fats, sugars, balanced diet, taste, weight, healthy, grow, food, exercise, activity, hygiene, germs, bacteria, washing, soap, cleanliness, fitness, benefits, sleep, health, wellbeing, growth, changes, development,</p>	<p>3.2 Diet, omnivore, carnivore, herbivore, invertebrate, mammal, plant, animal, bird, fish, reptile, food, food group, carbohydrate, protein, fat, vitamin, mineral, healthy, unhealthy, balanced diet, fibre, dairy, food group, repair, energy, fuel, owl pellet, owl pellet, tail, bones, fur, pelvis, skull, ribs, vertebra, invertebrate, backbone leg bones, spine, teeth, skeleton, shell, external, internal, movement, joint, muscles, joint, jaw, collar bone, shoulder blades, breast bone, pelvis, arm bones, leg bones, knee cap, hand bones, foot bones, rigid, protect, tendons, heart, brain, lungs, muscle, tendon, attached, shrink, stretch, contract, expand, involuntary muscle, cardiac muscle, voluntary muscle, biceps, triceps,</p>	<p>4.3 Tooth, teeth, carnivore, herbivore, omnivore, incisor, canine, premolar, molar, gum, saliva, tongue, taste, sweet, salt, sour, bitter, taste buds, decay, cavity, toothbrush, bacteria, acid, mouth, chew, swallow, oesophagus (gullet), stomach, stomach juices, bile, small intestine, large intestine, anus, faeces, digest, absorb, waste, food, chew, swallow, chyme, muscle, squeeze, liquid, enzyme, digest, absorb, excrete, key, food chain, producer, predator, consumer, prey, energy, food web, top carnivore,</p>	<p>6.2 Blood, circulate, heart, blood type, red cells, white cells, plasma, microscope, platelets, nutrients, oxygen, transfusion, carbon dioxide, clotting, infection, haemoglobin, lungs, circulation, pump, artery, vein, capillary, blood vessel, tube, heartbeat, right ventricle, left ventricle, right atrium, left atrium, aorta, vena cava, pulmonary artery, pulmonary vein, lungs, oxygenated blood, deoxygenated blood, breathing, inhale, exhale, nose, mouth, bronchus, trachea, bronchioles, voice box, diaphragm, alveolus(i), muscles, breathing rate, heart rate, pulse, exercise, health, harmful, addiction, tobacco, nicotine, drugs, cigarettes, caffeine, alcohol, beer, effects, side effects, prescription drugs, medicine</p>	

		fur, feathers, scales, tail, fin, warm blooded, cold blooded, eggs, Diet, plant, animal, carnivore, herbivore, omnivore, hunt, food,					
Life Processes		<p>1.5 Children often have their own theories about the weather. They may believe any of the following: The same weather is experienced in different parts of the World as it spins, just as the Sun shines on different parts of the World as it spins. Clouds come from somewhere above the sky. Clouds are formed by water being sucked up from the sea, vapour from kettles or are made when the sea boils. Rain comes from holes in clouds. Rain is made when clouds sweat, are shaken or melt. Rain falls from funnels in the clouds. God or the angels make the weather. Water does not dry up; it just disappears of its own accord.</p>	<p>1.5 (Recap) Children often have their own theories about the weather. They may believe any of the following: The same weather is experienced in different parts of the World as it spins, just as the Sun shines on different parts of the World as it spins. Clouds come from somewhere above the sky. Clouds are formed by water being sucked up from the sea, vapour from kettles or are made when the sea boils. Rain comes from holes in clouds. Rain is made when clouds sweat, are shaken or melt. Rain falls from funnels in the clouds. God or the angels make the weather. Water does not dry up; it just disappears of its own accord.</p>		<p>5.5 Whilst there are no obvious misconceptions associates with the science of this unit, children may have heard a range of ideas and myths associated with puberty and relationships.</p>	<p>6.6 Some children believe that humans are responsible for the extinction of the dinosaurs. They also often think that early humans and dinosaurs co-existed. Sometimes pupils believe that evolution is driven by need or by a desire to achieve a certain goal, e.g. animals want longer necks and so try to develop them. Children sometimes think that fossils are actual preserved animals or plant parts.</p>	
Life Processes Vocabulary		<p>1.5 Weather, season, spring, winter, summer, autumn, typical, climate, measure, predict, weather station, weather forecast, weather station, weather, satellite, sun, temperature, wind, rain, rainfall, clouds, precipitation, fog, frost, mist, snow, thunder, lightning, symbol, sunglasses, sunburn,</p>	<p>1.5 Weather, season, spring, winter, summer, autumn, typical, climate, measure, predict, weather forecast, weather station, weather, satellite, sun, temperature, wind, rain, rainfall, clouds, precipitation, fog, frost, mist, snow, thunder, lightning, symbol, sunglasses, sunburn,</p>		<p>5.5 Life cycle, baby, toddler, child, teenager, adult, man, woman, adolescence, maturity, grow, develop, birth, pregnancy, old age, die, puberty, physical changes, emotional changes, genitals, vagina, breasts, menstruation, period, penis, testicles, voice, pubic hair, growth, hormones, gestation, foetus, embryo, womb,</p>	<p>6.6 Biography, variation, inherited, natural selection, survival, naturalist, voyage, specimens, adaptations, evolution, hypothesis, survival of the fittest, disadvantage, mutation, DNA, competition, offspring, reproduce, advantage, disadvantage, religion, theory, proof, creation, belief, suitable, camouflage, predator, prey, deterrent, environment, habitat, reproduce, characteristics, fossil, evidence, fossilisation, organism, timeline,</p>	

		thunder, lightning, symbol, sunglasses, sunburn, sunstroke, sun cream, sun hat, ultra-violet, season, dry, drought, desert, equator, jungle, rainbow, storm, gale, hurricane, tornado, blizzard, thunderstorm, rainstorm, hailstorm, Beaufort scale, damage, blizzard, frost, freeze, snowflake, snowdrift, sleet, temperature, damp, ice, icicle, moisture,	sunstroke, sun cream, sun hat, ultra-violet, season, dry, drought, desert, equator, jungle, rainbow, storm, gale, hurricane, tornado, blizzard, thunderstorm, rainstorm, hailstorm, Beaufort scale, damage, blizzard, frost, freeze, snowflake, snowdrift, sleet, temperature, damp, ice, icicle, moisture,			imprint, selective breeding, trait, inherited, generation,	
All Living Things and their Habitats			2.6 & 2.3 Some children assume that animals can choose attributes that suit them for different environments.		4.2 Children are not likely to have come across classification before and there are no commonly held misconceptions related to this topic.	6.3 Children sometimes think that habitat and behaviour are criteria for classification.	
All Living Things and their Habitats Vocabulary			2.6 & 2.3 Habitat, microhabitat, water, land, fields, garden, park, marsh, meadow, river, stream, woodland, forest, beach, sand dunes, sandy, rocky, trees, grass, damp, open, windy, sheltered, exposed, dry, wet, dark, shady, sunny, woodland, woodland floor, shade, shelter, dead leaves, pine needles, logs, branches, birds, robin, blackbird, wood pigeon, insect, ants, beetles, mice, squirrel, fox, se, seawater, tide, high tide, low tide, rock pool, trapped, shellfish, sea shells, sea weed, fish, limpet, barnacle, periwinkle, whelk, crab, sea gull, carnivore, omnivore, herbivore, pond, net, dipping, specimen,		4.2 Classification, kingdom, decision, question, answer, key, branch, identify, compound leaf, simple leaf, plain, serrated, backbone, vertebra, amphibian, gills, lungs, coldblooded, class, mammal, bird, feathers, fur, reptile, scales, eggs, suckle, fish, limbs, fins, warm-blooded, invertebrate, annelid, mollusc, crustacean, insect, arachnid, head, thorax, abdomen, antennae, legs, shell, plant, root, stem, moss, fern, conifer, cone, seed, grass, tree, flower, leaves, algae, spore, environment,	6.3 Classification, kingdom, phylum, order, plants, flowering plants, conifers, ferns, mosses, algae, animals, vertebrates, invertebrates, mammals, birds, fish, reptiles, amphibians, arthropods, insects, arachnids, myriapods, crustaceans, sponges, annelids, flatworms, cnidarians, nematodes, echinoderms, molluscs, characteristic, species, biodiversity, variety, species, environment, threat, habitat, identify, timber, industry, farming, pollution, climate change, population, extinct, microorganism, virus, bacteria, algae, protozoa, fungi, decay, single-celled, multi-celled, characteristic, disease, recycling, yeast, microbe, sugar, conditions, ride, carbon dioxide, air-borne, optimum,	

			magnifying glass, pond net, specimen tray, identification guide, examine, observe, water snail, frog, newt, water flea, water boatman, stickleback, goldfish, caddis fly, caddis fly nymph, leech, larvae, iris, duckweed, curly weed, marsh marigold, water lily, producer, food chain, diet				
Everyday Materials Earth & Space Rocks & Soils		1.3 Some children think that an object and the material it is made from are the same thing	2.5 Pupils sometimes use circular arguments when matching a material property and its use, e.g. we use wood for making tables because wood is a good material to make tables from. The misconception that an object and the material it is made from are the same thing should have been dealt with in Year 1.	3.6 Children sometimes think that all rocks must be heavy. They often believe that soil must have always been in its present form.	4.6 Children sometimes use the word solid to mean heavy, not flexible, or in one big piece. It is then difficult for them to classify substances such as flour, or salt as a solid. Children often confuse melting and dissolving. Children also sometimes believe that gases are not matter because most are invisible, and that gases do not have mass.	5.3 It is not self-evident that the Earth is a planet orbiting the sun. The Sun's apparent movement across the sky shows it rising, coming up, going down, setting going behind clouds etc. whilst we are in one place, all of which imply that it is the Sun rather than the Earth that is moving. Children sometimes think there is no gravity on the Moon or that things will float away on the Moon because there is no air to hold them down. They often think that we have summer when the Earth is close to the Sun rather than because of the tilt of the axis. If this were so all the Earth would have summer at the same time.	
Everyday Materials Earth & Space Rocks & Soils Vocabulary		1.3 Material, appearance, texture, property, wood, water, stone, fabric, plastic, clay, rubber, metal, glass, paper, cardboard, china, cotton, wool, cellophane, rough, smooth, hard, soft, shiny, dull, silky, stretchy, inelastic, stiff, bendy, rigid, waterproof, absorbent, transparent, opaque, translucent, transparent, malleable, force, permanent, flexible, tear,	2.5 Material, properties, force, wood, glass, metal, fabric, plastic, wool, stone, brick, elastic, rubber, opaque, transparent, translucent, malleable, hard, soft, flexible, rigid, texture, rough, smooth, twist, stretch, bend, squash, suitable, unsuitable, appropriate, inappropriate, weak, natural, manmade, synthetic, leather, wicker, silver, lycra, glass fibre, aluminium, clay, bone, carbon fibre, crepe paper, twist, strand, multiple, variable, weak, strong, inventor, waterproof, greaseproof	3.6 Criteria, appearance, texture, weight, rough, smooth, sharp, hard, lumpy, cracked, flaky, coarse, flat, round, layered, glassy, sparkling, polished, jagged, shiny, crystalline, sandy, fine, granular, clay, crystal, limestone, basalt, marble, mudstone, sandstone, slate, granite, pumice, particle, sieve, permeable, impermeable, volume, rock, formation, volcano, underground, heat, crust, molten, lava, erupt, solidify, sediment, bones, shells, sand, mud, igneous, sedimentary, metamorphic, soil, organic matter, layer, gritty, sticky, fossil, animal, plant, mould, prehistoric, minerals, deduce, dinosaur, skull, legs, limbs, claws, teeth, wings, model, skeleton, diet, carnivore, herbivore, hunter, graze, agile,	State, solid, liquid, gas, shape, volume, fixed, spread, compressed, squashed, change of state, melt, freeze, evaporate, condense, pour, evaporate, condense, evidence, bubbles, mass, weight, expand, space, changes of state, water, ice, water vapour, steam, sun, surface area, temperature, thermometer, moving air, factor, affect, increase, energy, snow, sleet, rain, precipitation, stream, river, ground water, ocean, clouds, flow,	5.3 Earth, sun, planets, orbit, sphere, horizon, moon, astronomer, astronomy, heavenly body, distance, star, year, day, asteroid, orbit, rotation, atmosphere, gravity, axis, sunrise, sunset, summer, autumn, winter, spring, seasons, shadow, daylight, rotation, full moon, half moon, wax, wane, crescent, gibbous, new moon, phase, crater, impact,	

Light & Sound				<p>3.5 Children sometimes think of seeing as an active process, in other words we see an object because light comes out of our eyes (like superman) and travels to the object. Some may suggest that opening and closing the eye is similar to switching on a light in a room. When the eye is open light pours out from it. Children can get very confused about shadows and reflections. For example they may think a shadow is a particular type of reflection.</p>		<p>6.5 Some children think of seeing as an active process, i.e. that we see objects because light comes out of our eyes rather than enters them (Superman films have not helped here). This leads to problems interpreting the light arrows in diagrams. Children sometimes confuse shadows and reflections. It is important to clarify that children understand that reflection occurs when a light beam changes direction on hitting a surface. A shadow is formed when a light beam is blocked by an opaque object.</p>	
Light & Sound Vocabulary				<p>3.5 Light, dark, night, day, light source, sun, moon, torch, candle, lamp, glow, shine, reflect, sparkle, reflected light, mirror, surface, dull, reflective strip, fluorescent, high visibility, twilight, dim, senses, eye, eye lid, eye lashes, pupil, iris, eye brow, blink, transparent, opaque, translucent, block, shadow, travel, bright, sensor, data logger, data, straight line, distance, variable,</p>		<p>6.5 Light, ray, beam, light source, data logger, light sensor, Lux, opaque, transparent, translucent, object, shadow, reflection, mirror, eye, distance, image, screen, focus, filter, reflection, ray, beam, mirror, surface periscope, eye, eyeball, eyelash, eyebrow, sight, pupil, iris, lens, eyelid, cornea, optic nerve, retina, glasses, contact lenses, eye test, colour blind, sunlight, visible light, protection, sunburn, filter, light sensor, data logger,</p>	
Electricity					<p>4.4 Some children think that batteries have electricity inside them. They imagine electricity as a kind of fuel that flows into electrical appliances. Children sometimes think that electricity flows from both ends of the battery. Some children persist in the belief that a single wire is all that is needed to create a circuit. Children sometimes think that when there are two bulbs in the circuit, the electricity will reach one bulb first and this will be brighter than the second because the bulb uses up the electricity.</p>	<p>6.4 Batteries have electricity inside them. Describe the use of different components within a circuit: cells, wire, switch, buzzer, bulb, motor. Represent and reproduce simple circuits in diagrams using recognised symbols. Examine an unfamiliar diagram of a simple circuit and explain how they know whether it will work when constructed.</p>	

Electricity Vocabulary					<p>4.4 Mains electricity, battery, electricity, appliance, electric shock, electrocution, wire, plug, socket, adaptor, current, power, power station, electricity substation, RCD/circuit breaker, pylon, bulb, complete, flow, crocodile clip, circuit, conductor, insulator, material, metal, non-metal, graphite, switch, buzzer, motor, break, fan, brightness, bright, brighter, burn out, dim, dimmer, alarm, trigger, detect,</p>	<p>6.4 Plug, mains electricity, battery, switch, bulb, motor, crocodile clips, wire, complete circuit, conductor, insulator, buzzer, fan, bright, dim, brightness, ammeter, resistance, loop, path, branch, short circuit,</p>	
Forces & Magnets				<p>3.3 Children commonly believe that because friction hinders motion you always want to eliminate friction. They may think that all metals are attracted to a magnet or that any silver coloured metal is attracted to a magnet. They are likely to think that larger magnets are stronger than smaller magnets.</p>	<p>5.6 Some children think that gravitational attraction only occurs on Earth and that gravity does not act through water. They persist in the belief that different masses fall at different speeds. Force is a property of an object. The sometimes think that an object has force, and when it runs out of force it stops moving.</p>		
Forces & Magnets Vocabulary				<p>3.3 Force, newton, twist, force meter, direction, compress, pull, speed, stretch, push, distance, shape, friction, force, rub, drag, smooth, surface, rough, pull, mass, magnet, repel, like, unlike, magnetic, pole, North pole, South pole, compass, direction, north, south, east, west, attract, rotate, non-magnetic, iron, metal, non-metal, relationship, attract, attraction, repulsion, steel</p>	<p>5.6 Force, gravity, speed, acceleration, fall, attract, variation, planet, moon, Newtons, force meter, kilograms, weightless, air resistance, push, area, mass, weight, balance, size, direction, tension, shape, upthrust, float, sink, keel, self-righting, friction, ramp, wheel, axle, friction, pulley, ramp, inclined plane, angle, lever, fulcrum, gear, ratio, effort, machine</p>		

