



St.Clement's Church of England Academy Science Long Term Plan and Progression

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Y1	<b>Human body and senses</b>	<b>Seasonal changes</b>	<b>Naming and describing materials</b>	<b>Properties and uses of materials</b>	<b>Animals (vertebrates)</b> <i>Jane Goodall (studied chimps)</i>	<b>Identifying plants and their parts</b>
Y2	<b>Local habitats</b>	<b>Choosing materials</b>	<b>Growing seeds and bulbs</b>	<b>Growing up (animals and humans)</b>	<b>Changing materials</b>	<b>Growing healthy plants</b>
Y3	<b>Rocks, soils and fossils</b> <i>Mary Anning (fossil hunter)</i>	<b>Light and shadows</b>	<b>Forces, friction magnets</b>	<b>Movement and nutrition for the human body</b>	<b>Flowering plants and plant growth</b>	<b>Flowering plants life cycle</b>
Y4	<b>Changes of state</b>	<b>Electricity: circuits</b> <i>Nikola Tesla (engineer)</i>	<b>Human impact on the environment</b> <i>Rachel Carson (Marine Biologist)</i>	<b>Digestion and food chains</b>	<b>Sound</b> <i>Alexander Bell (inventor of telephone)</i>	<b>Classification of plants and animals</b>
Y5	<b>Forces &amp; mechanisms</b> <i>Isaac Newton (gravity)</i> <i>Albert Einstein (physicist)</i> <i>Stephen Hawking (physicist)</i>	<b>Properties and uses of materials</b>	<b>Earth and space</b> <i>Galileo Galilei (astronomer)</i> <i>Copernicus (solar system)</i> <i>Mae Jemison (astronaut)</i> <i>Hasan ibn al-Haytham (astronomer)</i>	<b>Plant and animal life cycles</b> <i>David Attenborough (naturalist)</i>	<b>Separating mixtures and changing materials</b>	<b>Human growth</b>
Y6	<b>Classification of living things</b> <i>Carl Linnaeus (classification)</i>	<b>Evolution and inheritance</b> <i>Charles Darwin and Alfred Wallace (theory of evolution)</i> <i>Rosalind Franklin</i>	<b>What light does</b>	<b>Human circulation</b>	<b>Electricity: changing circuits</b>	<b>Body health</b>

<b>Biology</b>	<b>Chemistry</b>	<b>Physics</b>	<b>Earth Sciences</b>
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## St.Clement's Church of England Academy Science Long Term Plan and Progression

The long-term plan fully covers the National Curriculum Years 1–6 and builds on the Early Learning Goals. The order of modules has been planned to ensure progressive connections between topics, for example habitats and plants (Year 2); lifecycles and human growth (Year 5); human circulation and human health (Year 6). Modules where children learn about living things are taught at the right time of the calendar year. The maths and literacy skills children use in the lessons are appropriate so that these subjects work together with science to progress children's learning across the primary curriculum. National Curriculum conceptual knowledge statements are broken down into a series of steps.

Disciplinary knowledge that children need for working scientifically has also been identified & sequenced, so that it is included in the long-term plan. Scientific skills, for example how to use a thermometer or to control variables, are explicitly taught and practised, in appropriate contexts, so that children can use them with increasing accuracy and independence. The same is true of the knowledge about science that children need to learn, for example that scientists work in different ways to collect evidence to answer questions.

Using Snap Science to support planning for science, brings together a wide repertoire of effective and tested teaching approaches, including practical work, teacher demonstration, direct teaching, enquiry-based learning, vocabulary development, modelling, drama, outdoor learning and dialogic teaching to help all children develop both conceptual and disciplinary knowledge. Teachers are guided to identify any hazards and to a reliable source of guidance for managing health and safety risks. † Snap is an equitable approach to science teaching which means that all children, whatever their background or prior knowledge, can access and enjoy the learning. We want all children to benefit from the opportunities that science offers them now and in their futures.

Formative assessment is built into each module, using strategies to find out about children's prior knowledge and skills from previous school years or life experiences outside of school, and build on this, as well as identify any gaps or misconceptions that may need to be addressed. Assessment strategies are used formatively during lessons to check on learning and provide the right support. Learning from the previous lesson in the module is always checked and built on, ensuring that there is coherence and that children make secure progress. Cognitive overload is managed by not introducing too many new ideas or overly complex tasks. Activities are carefully planned so that children learn and consolidate new knowledge and skills, and use a range of ways to express and demonstrate these.

Each module contains tier 2 and tier 3 vocabulary, divided into two sections: disciplinary vocabulary (the words used when Working scientifically) and conceptual vocabulary (the physics, biology or chemistry words).

### **Adapting the curriculum for pupils with SEND in science**

- Adaptive teaching takes place.
- For sensory or physically impaired pupils, science learning may necessitate enlarging texts, using clear fonts, using visual overlays, or audio description of images.
- Dyslexic pupils may benefit from well-spaced print.
- Teachers identify and break down the components of the subject curriculum into manageable chunks for pupils who find learning more difficult, particularly those with cognition and learning needs. These may be smaller 'steps' than those taken by other pupils to avoid overloading the working memory.
- A variety of additional scaffolds may be used in lessons, such as vocabulary banks, additional visual stimuli or adult support.

### **Disciplinary knowledge: Working scientifically**

Disciplinary knowledge is taught and embedded within the teaching of each unit of substantive knowledge.

- **Methods used to answer questions** (use of models, classification, correlations and patterns, experimentation, fair testing)
- **Using apparatus and techniques** (accurate measurement, collecting and recording data, carrying out procedures safely and accurately)



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- **Data analysis** (processing and presenting data, exploring relationships, communicating results in tables / graphs, identifying correlations)
- **Using evidence to develop explanations** (using evidence / scientific knowledge to draw conclusions, explain laws, models, concepts and findings)

As part of working scientifically which is embedded throughout all units, pupils will also learn to use a variety of enquiry strategies to answer scientific questions. Different questions lead to different types of enquiry and are not limited to fair testing. By the end of primary school, children will be able to use these enquiry strategies confidently and know that different strategies may be needed at different times.

- Observing over time: (observing or measuring how one variable changes over time)
- Identifying and classifying: (identifying and naming materials/living things and making observations or carrying out tests to organise them into groups)
- Looking for patterns: (making observations or carrying out surveys of variables that cannot be easily controlled and looking for relationships between two sets of data)
- Comparative and fair testing: (observing or measuring the effect of changing one variable when controlling others)

Answering questions using secondary sources of evidence: (answering questions using data or information that they have not collected first hand)

As well as this, pupils will learn about:

- Using models: (Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process)

<b>Disciplinary knowledge ( working scientifically)</b>		
<b>EYFS children can</b>	<b>Year 1 children can</b>	<b>Year 2 children can</b>
ask simple questions about the world around them <ul style="list-style-type: none"> <li>• ask teachers or adults within school about things they observe</li> <li>• make observations about things they see around them</li> <li>• conduct guided investigations with supervision</li> <li>• make choices when performing simple identifying and classifying</li> </ul>	ask simple questions and recognise that they can be answered in different ways <ul style="list-style-type: none"> <li>• (fair tests, comparative tests, observation over time, research, pattern seeking)</li> <li>• observe closely, using simple equipment (hand lenses, egg timers)</li> <li>• perform simple tests to investigate the answer to a given question</li> <li>• perform simple identifying and classifying, grouping task using basic observations</li> </ul>	ask simple questions and recognise that they can be answered in different ways (fair tests, comparative tests, observation over time, research, pattern seeking) <ul style="list-style-type: none"> <li>• research the answers to questions using books, tablets or computers</li> <li>• observe closely, using simple equipment (hand lenses, egg timers, rulers, stopwatches etc)</li> <li>• perform simple tests to investigate the answer to a given question</li> </ul>



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<ul style="list-style-type: none"> <li>• make some comparison between objects or living things</li> <li>• make some predictions about living things based on prior knowledge</li> <li>• make suggestions about how things work based on their own observations</li> <li>• use basic observations to help answer questions with help from the teacher</li> <li>• explore the natural world around me, making observations and drawing pictures of plants and animals.</li> <li>• identify some similarities and differences between the natural world around me and contrasting environments, drawing on their experiences and what has been read in class</li> </ul>	<ul style="list-style-type: none"> <li>• use observations and ideas to suggest answers to questions, using simple sentences to describe the answer</li> <li>• gather and record data to help in answering questions, using given tables or data formats</li> </ul>	<ul style="list-style-type: none"> <li>• begin to design their own tests to investigate the answer to a given question</li> <li>• perform simple identifying and classifying, grouping using basic observations</li> <li>• begin to group using prior knowledge</li> <li>• use observations and ideas to suggest answers to questions, using simple sentences to describe the answer to a question</li> <li>• give basic conclusions with simple reasoning</li> <li>• gather and record data to help in answering questions, using given tables or data formats</li> </ul> <p>drawing own tables, deciding how to record</p>
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<b>Disciplinary knowledge ( working scientifically)</b>			
<b>Year 3 children can</b>	<b>Year 4 children can</b>	<b>Year 5 children can</b>	<b>Year 6 children can</b>
<p>different types of scientific enquiries to answer them (fair tests, comparative tests, observation over time, research, pattern seeking)</p> <ul style="list-style-type: none"> <li>• begin to select their own methods to find the answer to a scientific question</li> <li>• set up simple practical enquiries, comparative and fair tests</li> </ul>	<p>ask relevant questions and use different types of scientific enquiries to answer them (fair tests, comparative tests, observation over time, research, pattern seeking)</p> <ul style="list-style-type: none"> <li>• select their own methods to find the answer to a scientific question</li> </ul>	<p>enquiries to answer questions, including recognising and controlling variables where necessary (fair tests, comparative tests, observation over time, research, pattern seeking)</p> <ul style="list-style-type: none"> <li>• select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise</li> </ul>	<p>plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (fair tests, comparative tests, observation over time, research, pattern seeking)</p> <ul style="list-style-type: none"> <li>• select and plan the most appropriate type of scientific enquiry to use to</li> </ul>



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<ul style="list-style-type: none"> <li>• begin to design their own tests and manage variables</li> <li>• make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers, rulers, stopwatches, measuring cylinders and jugs.</li> <li>• gather record, classify and present data in a variety of ways to help in answering questions</li> <li>• begin to use simple keys for classification</li> <li>• record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• explain findings from investigations to rest of class</li> <li>• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• draw clear conclusions from findings and make predictions based on this, suggest improvements to the investigation</li> <li>• identify differences, similarities or changes related to simple scientific ideas and processes</li> </ul>	<ul style="list-style-type: none"> <li>• begin to combine research with their own investigations to confirm conclusions.</li> <li>• set up simple practical enquiries, comparative and fair tests</li> <li>• design their own tests &amp; identify and manage variables.</li> <li>• make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers, rulers, stopwatches, measuring cylinders/jugs and data loggers.</li> <li>• begin to make decisions about what equipment is appropriate for investigations</li> <li>• gather, record, classify and present data in a variety of ways to help in answering questions</li> <li>• identify criteria for classification and use and create simple keys</li> <li>• record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• explain findings from investigations to rest of class</li> <li>• be able to comment on the findings of other investigations compared to their</li> </ul>	<p>when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p> <ul style="list-style-type: none"> <li>• take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• make their own decisions about what observations to make, repeat readings and learn about reliability</li> <li>• record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (in line with Year 5 maths curriculum learning)</li> <li>• use test results to make predictions to set up further comparative and fair tests</li> <li>• make predictions and complete further investigation</li> <li>• report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations, including giving an explanation of trust in results, with reasons</li> <li>• identify scientific evidence that has been used to support or refute ideas or arguments, including identifying which evidence they have produced supports or refutes ideas or arguments</li> </ul>	<p>answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p> <ul style="list-style-type: none"> <li>• plan and execute appropriate investigations based on a given or student-led question</li> <li>• take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• make their own decisions about what observations to make, repeat readings &amp; learn about reliability, developing an increased level of precision and accuracy</li> <li>• record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (in line with Year 6 maths curriculum learning)</li> <li>• use test results to make predictions to set up further comparative and fair tests</li> <li>• make predictions and complete further investigation – combine with research</li> <li>• report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations, including giving an</li> </ul>
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<ul style="list-style-type: none"> <li>• use straightforward scientific evidence to answer questions or to support their findings</li> </ul>	<p>own and how they support or contradict.</p> <ul style="list-style-type: none"> <li>• use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• draw conclusions and support with clear evidence, suggest improvements, raise further questions and possible next investigations</li> <li>• identify differences, similarities or changes related to simple scientific ideas and processes</li> <li>• use straightforward scientific evidence to answer questions or to support their findings</li> </ul>		<p>explanation of trust in results, with reasons</p> <ul style="list-style-type: none"> <li>• identify causal relationships in investigations</li> <li>• identify scientific evidence that has been used to support or refute ideas or arguments, including identifying which evidence they have produced supports or refutes ideas or arguments</li> <li>• begin to research evidence to support or refute ideas/arguments &amp; begin to separate opinion from fact</li> </ul>
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**Substantive Knowledge: Concepts, models, laws and theories**

**Biology**

- Living things and their environment (Animals, humans, plants, habitats)
- Reproduction, inheritance and evolution (Evolution, inheritance, life processes, life cycles)

**Chemistry**

- States of matter (Solids, liquids, gases)
- Materials (properties and changes including reversible/irreversible changes,)

**Physics**

- **Energy (Light, sound, electricity)**
- Forces (Friction, air resistance, gravity, magnets)

**Earth Science**

- Earth and space (Seasons, day and night, solar system and beyond)
- Rocks and fossils

**Science in EYFS**



## St.Clement's Church of England Academy Science Long Term Plan and Progression

All areas of learning and development at the Foundation Stage are inter-connected. Through engaging in science activities, children not only learn about the world around them but develop disciplinary skills in all areas.

### **Characteristics of Effective Learning**

The ways in which a child engages with other people and their environment - playing and exploring, active learning, and creating and thinking critically – underpin learning and development across all areas and support the child to remain an effective and motivated learner.

### **'Understanding the World'**

This is a specific area of the Early Years Curriculum that includes essential skills and knowledge about the world and provides firm foundations on which children can build their scientific understanding. Early Years children will be actively involved in play and exploration and be encouraged to be creative. They will be supported to think critically and ask questions, which will help them to make sense of their world through well-planned play opportunities.

### **ELGs:**

- 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

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
- Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions.
- Make comments about what they have heard and ask questions to clarify their understanding.



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Substantive knowledge		Autumn Term		Spring Term		Summer Term	
Biology							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Plants</b>	<p>Describe and comment on things they have seen whilst outside, including plants and animals.</p> <ul style="list-style-type: none"> <li>• Know how to make a simple record of their observations of the natural world, including animals and plants</li> <li>• Know how to discuss how we care for the natural world around us.</li> <li>• Notice changes in the leaves, weather and seasons.</li> </ul>	<p><b>Identifying Plants &amp; their parts-T3.2</b>            Know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <ul style="list-style-type: none"> <li>• Know, identify and describe the basic structure of a variety of common flowering plants, including trees</li> </ul>	<p><b>Growing seeds &amp; bulbs T2.1</b>            Plants can grow from seed or bulbs. Seeds and bulbs germinate and grow into seedlings. Seedlings grow into mature plants</p> <p><b>Growing healthy plants T3.2</b>  <ul style="list-style-type: none"> <li>• Plants need light, water, space, suitable temperature in order to grow and stay healthy</li> </ul> </p>	<p><b>Flowering plants and plant growth T3.1</b>            Know and identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <ul style="list-style-type: none"> <li>• Know what plants need for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li> <li>• Know how water is transported within plants</li> </ul> <p><b>Flowering plants life cycle T3.2</b>            Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation &amp; seed dispersal</p>		<p><b>Plant and animal life cycles T2.2</b>            Know that reproduction is when a plant produces one or more individuals similar to itself.</p> <ul style="list-style-type: none"> <li>• Explain that sexual reproduction requires both male and female DNA (sex cells) and will produce offspring that are similar, but not identical to the parents.</li> <li>• Explain that asexual reproduction will produce offspring that is identical to the parent and only requires one parent e.g. bulbs, tubers and runners.</li> <li>• Use prior knowledge of parts of a flower to explain the stages involved in the reproduction process (pollination, fertilisation and germination)</li> </ul>	
<b>Living Things</b>	<p>Understand the key features of the life cycle of a plant and an animal.</p> <ul style="list-style-type: none"> <li>• Begin to understand the need to respect and</li> </ul>		<p><b>Local habitats T1.1</b>            Identify the differences between things that are living, dead, and things that have never been</p>		<p><b>Classification of plants and animals T3.2</b>            Know the 7 life processes of living organisms and use them to determine if an organism is living.</p>	<p><b>Plant and animal life cycles T2.2</b>            Know that reproduction is when an animal or plant produces one or more</p>	<p><b>Classification of living things T1.1</b>            Describe how living things are classified into broad groups according to common observable</p>





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	<p>care for the natural environment and all living things</p>		<p>alive, using some of the 7 life processes.</p> <ul style="list-style-type: none"> <li>Identify that most living things live in habitats to which they are suited</li> <li>Name a variety of plants and animals in their habitats, including micro-habitats.</li> <li>Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>Know and explain 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</li> </ul>		<p>Describe similarities and differences between examples of plants and animals.</p> <ul style="list-style-type: none"> <li>Group living things in a variety of ways using key characteristics.</li> <li>Use classification keys to help group and identify a variety of living things in their local and wider environment.</li> </ul> <p><b>Human impact on the environment T2.1</b></p> <ul style="list-style-type: none"> <li>Recognise that environments can change, and this can sometimes pose dangers to living things.</li> <li>Understand that human actions can impact on the environment and suggest some solutions to the issues</li> </ul>	<p>individuals similar to itself</p> <ul style="list-style-type: none"> <li>Explain that sexual reproduction requires both male and female DNA (sex cells) and will produce offspring that are similar, but not identical to the parents.</li> <li>Explain that asexual reproduction will produce offspring that is identical to the parent and only requires on parent e.g., bulbs, tubers and runners.</li> <li>Explain and describe the life cycle of a mammal, amphibian, insect and a bird noting the differences.</li> <li>Explain the process of metamorphosis using frogs and butterflies as examples.</li> </ul>	<p>characteristics, and based on similarities and differences, including microorganisms, plants and animals</p> <p>Understand basic taxonomy</p> <p>Understand different classes of vertebrates and major characteristics (review of Y4)</p> <p>Know that living things can be multicellular or unicellular (bacteria).</p> <p><b>Human CirculationT2.2</b></p> <p>Understand basic cell structure</p> <p>Understand the differences between animal &amp; plant cells</p> <p>Know that a cell is made up of nucleus, cytoplasm and membrane.</p>
<p><b>Animals inc Humans</b></p>	<p>Make healthy choices about food, drink, activity and toothbrushing.</p> <ul style="list-style-type: none"> <li>Begin to make sense of their own life-story and how they have grown and changed.</li> <li>Understand the key features of the life cycle of a plant and an animal.</li> </ul>	<p><b>Animals T3.1</b></p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <ul style="list-style-type: none"> <li>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> </ul>	<p><b>Growing up T2.2</b></p> <p>Notice that animals, including humans, have offspring which grow into adults</p> <ul style="list-style-type: none"> <li>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>Describe the importance for humans</li> </ul>	<p><b>Movement and nutrition for the human body T2.2</b></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><b>Digestion and food chains T2.2</b></p> <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <ul style="list-style-type: none"> <li>Identify the different types of teeth in humans and their simple functions</li> <li>Construct and interpret a variety of food chains,</li> </ul>	<p><b>Human Growth T3.2</b></p> <p>Describe the changes as humans develop to old age</p> <ul style="list-style-type: none"> <li>Describe the key stages in the growth and development of humans.</li> <li>Recall some of the changes experienced in puberty.</li> </ul>	<p><b>Human CirculationT2.2</b></p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>Describe the ways in which nutrients and water are transported</li> </ul>



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	<ul style="list-style-type: none"> <li>• Know and talk about the different factors that support their overall health and wellbeing</li> <li>• Describe and comment on things they have seen whilst outside, including plants and animals.</li> <li>• Know how to record their observations of the natural world,</li> <li>• Recognise some environments that are different to the one in which they live.</li> <li>• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices</li> </ul>	<ul style="list-style-type: none"> <li>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</li> </ul> <p><b>Human Body &amp; senses T1.1</b>          Know, identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>of exercise, eating the right amounts of different types of food, and hygiene</p>	<ul style="list-style-type: none"> <li>• Identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> </ul>	<p>identifying producers, predators and prey</p>	<ul style="list-style-type: none"> <li>• Investigate the gestation periods of other animals in comparison to humans.</li> </ul>	<p>within animals, including humans</p> <p><b>Body Health T3.2</b>  <ul style="list-style-type: none"> <li>• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> </ul></p> <p><b>Evolution and Inheritance T1.2</b>          Recognise that living things have changed over time and that fossils provide info about living things that inhabited Earth millions of years ago Recognise that living things produce offspring of the same kind but they vary and aren't identical to parents Identify how animals and plants are adapted to suit their environment in different ways and that this leads to evolution</p>
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Substantive knowledge							
Chemistry							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	<p>Use all their senses in hands-on exploration of natural materials.</p> <ul style="list-style-type: none"> <li>Explore collections of materials with similar and/or different properties.</li> <li>Talk about what they see, using a wide vocabulary.</li> <li>Talk about the differences between materials and changes they notice.</li> <li>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</li> </ul>	<p><b>Everyday materials: Naming &amp; describing materials T2.1</b></p> <ul style="list-style-type: none"> <li>Know the difference between objects from the material from which it is made</li> <li>Know, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li> </ul> <p><b>Properties &amp; uses of materials T2.2</b></p> <ul style="list-style-type: none"> <li>Know and describe the simple physical properties of a variety of everyday materials: hard/soft, flexible/rigid, waterproof/absorbent.</li> <li>Group together a variety of everyday materials on the basis of their simple physical properties.</li> <li>Know the similarities and differences between some everyday materials.</li> </ul>	<p><b>Uses of everyday materials: Choosing materials T1.2</b></p> <ul style="list-style-type: none"> <li>Identify what properties a material needs for a particular purpose.</li> <li>Name the materials from which different objects are made.</li> <li>Recognise suitable and unsuitable choices of materials for particular purposes based on physical properties</li> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</li> <li>Know that materials can be either man-made or naturally occurring.</li> <li>Group objects into man-made or natural categories.</li> </ul> <p><b>Changing materials T3.1</b></p> <ul style="list-style-type: none"> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul>	<p><b>Rocks &amp; Soils T1.1:</b></p> <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>Soils are a mixture of rocks and organic matter</p> <p>Mixtures occur when materials are mixed together but don't react to each other</p>	<p><b>States of Matter: Changes of state T1.1</b></p> <ul style="list-style-type: none"> <li>Know that all things are made up of particles which are arranged differently in solids, liquids and gases.</li> <li>Name the properties of solids, liquids and gases.</li> <li>Compare and group materials according to if they are solids, liquids and gases, giving reasons to justify their choices.</li> </ul> <p>Observe that some materials change state when heated or cooled, and give everyday examples of melting and freezing.</p> <p>Some materials change state when heated or cooled Heating causes melting and evaporation Removing heat causes condensing and solidifying (freezing)</p> <ul style="list-style-type: none"> <li>Understand that melting and freezing are a state change between solids and liquids.</li> <li>Measure or research the temperature at</li> </ul>	<p><b>Properties and uses of materials T1.2</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Discuss the suitability of everyday materials for different purposes based on their properties, giving reasons, based on evidence from comparative and fair tests</li> </ul> <p><b>Separating mixtures and changing materials T3.1</b></p> <ul style="list-style-type: none"> <li>Know the difference between reversible and irreversible changes.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>Explain that some changes results in the formation of new</li> </ul>	



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			<p>The shape of some solid materials can be changed by a contact force acting on them</p>		<p>which melting and freezing occurs for some materials.</p> <ul style="list-style-type: none"><li>• Know that water freezes at 0oc and boils at 100oc.</li><li>• Understand that condensation is a state change from a gas to a liquid.</li><li>• Understand that evaporation is a state change from liquid to gas.</li><li>• Understand that boiling and evaporation are the same state change from liquid to gas but at different temperatures.</li><li>• Know that the speed of evaporation depends on a number of variables including the temperature.</li><li>• Describe the water cycle.</li><li>• Identify the parts played by evaporation and condensation in the water cycle.</li></ul>	<p>materials, and that this kind of change is not usually reversible, including changes associated with burning, baking and the action of acid on bicarbonate of soda.</p> <ul style="list-style-type: none"><li>• Understand some materials will dissolve in liquid to form a solution.</li><li>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating.</li><li>• Describe how to recover a substance from a solution.</li></ul>	
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Substantive knowledge							
Physics							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces	<p>Explore how things work</p> <ul style="list-style-type: none"> <li>Explore and talk about different forces they can feel</li> <li>Talk about the differences between materials and changes they notice</li> <li>Explore the natural world around them</li> </ul> <p>Describe what they see, hear, and feel whilst outside.</p>			<p><b>Forces, friction and magnets T2.1</b></p> <p>Compare how things move on different surfaces</p> <ul style="list-style-type: none"> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>Describe magnets as having two poles</li> <li>Observe how magnets attract or repel each other and attract some materials and not others</li> <li>Predict whether two magnets will attract and repel each other, depending on which poles are facing</li> <li>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</li> </ul>		<p><b>Forces and Mechanisms T1.1</b></p> <p>Know the work of Isaac Newton and know that force is measured in Newtons by a Newton Meter</p> <ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> </ul> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys, gears, inclined planes, wedges and screws allow a smaller force to have a greater effect</p> <p>Understand how a gear works and some of its common uses</p>	
Light				<p><b>Light &amp; shadow T1.2</b></p> <p>Recognise that they need light in order to see things and that dark is the absence of light</p>			<p><b>What light does T2.1</b></p> <p>Recognise that light appears to travel in straight lines</p> <ul style="list-style-type: none"> <li>Use the idea that light travels in straight lines to explain that</li> </ul>



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				<p>There is a variety of sources of light, including the Sun</p> <ul style="list-style-type: none"><li>• notice that light is reflected from surfaces</li></ul> <p>Some materials reflect light better than others</p> <ul style="list-style-type: none"><li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li><li>• recognise that shadows are formed when the light from a light source is blocked by an opaque object</li></ul> <p>Some materials let light pass through them</p> <p>find patterns in the way that the size of shadows change</p> <p>The size of shadows change according to the size and shape of objects and distance from the light source</p>			<p>objects are seen because they give out or reflect light into the eye</p> <ul style="list-style-type: none"><li>• 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</li><li>• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li></ul> <p>Understand workings of different mirrors: plane, concave, convex</p> <p>Shadows and reflections are different</p>
Sound					<p><b>Sound T3.1</b></p> <p>Identify how sounds are made, associating some of them with something vibrating</p> <ul style="list-style-type: none"><li>• Recognise that vibrations from sounds travel through a medium to the ear</li><li>• Find patterns between the pitch of a sound and</li></ul>		



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					<p>features of the object that produced it</p> <ul style="list-style-type: none"> <li>• Find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>• Recognise that sounds get fainter as the distance from the sound source increases</li> </ul>		
Electricity					<p><b>Circuits T1.2</b> Electricity is a form of energy, used for lighting, heating, making sound and making machines and appliances work.</p> <ul style="list-style-type: none"> <li>• Some appliances run on electricity; some plug into the mains electricity and others run on batteries.</li> <li>• An electrical circuit consists of a cell or battery connected to a component using wires.</li> <li>• A series circuit is where all the components of the circuits are joined in one loop. If one part of the loop is incomplete, then the circuit will not work</li> <li>• Names of components include cells, wires, bulbs/ lamps, switches and buzzers</li> <li>• A cell is a single unit, and a battery is a collection of cells</li> </ul>		<p><b>Electricity: changing circuits T3.1</b> Recognise circuit symbols in a simple circuit- identify the simple circuit used in a hand torch</p> <ul style="list-style-type: none"> <li>• Electric current is measured in amperes, current is a flow of charge</li> <li>• Associate the brightness of a lamp or volume of a buzzer with the potential difference in a circuit such as, voltage of cells used in the circuit</li> <li>• Investigate the brightness of a bulb if the PD is increased or the number of bulbs increased in a series circuit</li> <li>• Investigate how the length of wire affects the brightness of a bulb.</li> </ul> <p>Compare/give reasons for variations in how</p>



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					<ul style="list-style-type: none"><li>• Know how to test a circuit using a bulb.</li><li>• Switches open and close circuits. When a switch is open the bulb/lamp will not light up as the series circuit is incomplete.</li><li>• Wires are made from metals as they are good conductors of electricity e.g., iron, copper and steel</li><li>• Insulators are materials that do not allow electricity to pass through them easily e.g., plastic, wood, rubber and glass.</li><li>• Thomas Edison invented the first practical incandescent light bulb</li></ul>	<p>components function, including brightness of bulbs, loudness of buzzers and on/off position of switches</p> <ul style="list-style-type: none"><li>• Potential difference is measured in volts</li><li>• Differences in resistance between conducting and insulating components (quantitative)</li></ul> <p>Use recognised symbols when representing a simple circuit in a diagram</p>
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Substantive knowledge							
Earth Sciences							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		<p><b>Seasonal changes T1.2</b>            Name the 4 seasons and say when in the year they occur</p> <ul style="list-style-type: none"> <li>• Observe and describe weather associated with the seasons</li> <li>• Observe changes across the 4 seasons</li> <li>• Describe some other features that change throughout the year that are caused by the change in weather e.g. numbers of mini beasts found outside, seed and plant growth, leaves on trees, clothes worn by people,</li> <li>• Explain how day light (from the sun rising to sun setting )length varies across the year (longer in summer, shorter in winter)</li> </ul>				<p><b>Earth &amp; Space T2.1</b>            Name the planets of Our Solar System and understand Our place in Our universe, describe the Sun, Earth, Moon and other planets as approximately spherical bodies</p> <ul style="list-style-type: none"> <li>• Describe the movement of the Earth around the sun in the solar system (a full orbit is 365 days, the Earth spins on its axis every 24 hours)</li> <li>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the day</li> <li>• Describe the movement of the moon relative to the Earth (lunar cycles take 28 days, the lunar cycle and eclipses)</li> <li>• Describe the movement of the other planets relative to the sun in the solar system (fixed orbits)</li> </ul>	



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						<ul style="list-style-type: none"><li>• Describe what meteors are, and name other objects in space</li><li>• Explain how 'The Space Race' has expanded our scientific knowledge and discuss space travel</li></ul>	
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