

**Science Intent Statement:**

Science at Hallsville is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. We encourage the development of positive attitudes to science and we build on our children's natural curiosity. Science is a body of knowledge built up through experimental testing of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us. We aim to provide our children with an enjoyable experience of science, so that they will develop a deep and lasting interest and may be motivated to study science further. Our lessons are practical and encourage independence. Our aims for the teaching of science include the following:

- Preparing our children for life in an increasingly scientific and technological world.
- Fostering concern about, and active care for, our environment.
- Helping our children acquire a growing understanding of scientific ideas.
- Enabling our children to behave as scientists in developing and extending their understanding of the world.
- Developing our children's understanding of the international and collaborative nature of science

**As a school community, we have established principles for teaching science at Hallsville which are as follows:**

- Our lessons are planned to engage and drive the thirst for learning forward. They are child-led and promote independence throughout the school.
- There is a clear scientific learning journey that gives children the opportunity to work within the five enquiry types.
- Children are confident in asking and raising their own questions for an enquiry, using their subject knowledge.
- Children are confident in using scientific vocabulary to explore, reason and challenge their own and each other's thoughts and choices.
- Lessons are practical and allow children to enquiry using hands-on activities that can be linked to 'real life.'
- Children's misconceptions are addressed and surfaced with carefully planned provision in order to address or challenge them effectively.

- We are able to transfer vocabulary and knowledge from our science lessons, across all subjects and into our daily lives.

**Non negotiables for Science at Hallsville : In each science unit our children should:**

- **Start with a cold task:** to identify what children already know, understand and can do and any misconceptions - Cold tasks should take place where possible in the preceding term
- Be taught explicitly identified scientific tier 2 & 3 vocabulary and use in context when speaking and writing. Review vocabulary at the start of each lesson to help internalise. (See vocabulary vault document)
- Raise questions and engage in the decision making process about the key questions the class choose to address
- Enquire scientifically within the context of the knowledge & understanding objectives for each topic. (See scientific enquiry skills progression ladders within this document.)
- Sort, order, classify, group, compare & contrast information/data
- Access scientific content through drama/educational visit/maps and images/fieldwork/engaging with visitors to the school
- Reflect upon or respond to practical experience capturing key learning outcomes
- Research as appropriate and revisit key questions raised at the outset of the learning journey in order to answer them.
- Reflect upon findings and their implications/relationship for/to everyday life
- Revisit and address misconceptions identified throughout the science journey.
- Read to learn in Science using high quality texts
- Use knowledge organisers and mini quizzes throughout each unit to help transfer new information into the long term memory
- Apply writing skills in the context of science i.e. recounts, diary accounts, letters, newspaper articles, descriptions etc
- **Complete a hot task:** There is an opportunity to communicate the outcomes/learning from a topic

**Science Content Overview**

*Planning support materials for every unit are available on the ASE Science website in the PLAN Exemplification materials. The school subscribes to membership of this site to support teachers with planning, resourcing and subject knowledge.*

	Autumn	Spring	Summer
<b>EYFS</b>	Understanding the world: Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension.		
<b>Year 1</b>	<b>Seasonal Changes Animals (Humans focus)</b>	<b>Seasonal Changes (continued) Everyday materials</b>	<b>Seasonal Changes (continued) Plants Animals (common animals in the locality/pets)</b>
<b>Year 2</b>	<b>Animals including humans Living things in their habitats</b>	<b>Materials (Grouping &amp; classifying &amp; changing materials)</b>	<b>Plants</b>
<b>Year 3</b>	<b>Light Rocks &amp; soils</b>	<b>Forces &amp; magnets</b>	<b>Plants Animals including humans</b>
<b>Year 4</b>	<b>Electricity Sound</b>	<b>States of matter</b>	<b>Animals including humans Living things in their habitats</b>
<b>Year 5</b>	<b>Forces Earth &amp; Space</b>	<b>Properties &amp; changes to materials</b>	<b>Animals including humans Living things in their habitats</b>
<b>Year 6</b>	<b>Evolution &amp; inheritance Classification</b>	<b>Electricity Light</b>	<b>Animals including humans</b>

Working Scientifically Skills Progression:

**EYFS**

Development Matters Document		
	<p>Understanding the world: Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension.</p>	
Birth – 3 years	<p>Repeat actions that have an effect.</p> <p>Explore materials with different properties.</p> <p>Explore natural materials, indoors and outside.</p>	<p><b>Examples of how to support this:</b></p> <p>Encourage babies’ explorations and movements, such as touching their fingers and toes. Show delight at their kicking and waving. Provide open-ended play materials inside and outdoors.</p> <p>Suggestion:</p> <ul style="list-style-type: none"> <li>• Treasure Baskets for repeated exploration of textures, sounds, smells and tastes.</li> <li>• Offer lots of different textures for exploration with fingers, feet and whole body. Suggestions: wet and dry sand, water, paint and playdough.</li> </ul>
	<p>Explore and respond to different natural phenomena in their setting and on trips.</p>	<p>Encourage toddlers and young children to enjoy and explore the natural world.</p> <p>Suggestions:</p> <ul style="list-style-type: none"> <li>• standing in the rain with wellies and umbrellas</li> <li>• walking through tall grass</li> <li>• splashing in puddles</li> <li>• seeing the spring daffodils and cherry blossom</li> <li>• looking for worms and minibeasts</li> <li>• visiting the beach and exploring the sand, pebbles and paddling in the sea</li> </ul>

		<p>Encourage children’s exploration, curiosity, appreciation and respect for living things. Suggestions:</p> <ul style="list-style-type: none"> <li>• sharing the fascination of a child who finds woodlice teeming under an old log</li> <li>• modelling the careful handling of a worm and helping children return it to the dug-up soil</li> <li>• carefully planting, watering and looking after plants they have grown from seeds</li> </ul> <p>Encourage children to bring natural materials into the setting, such as leaves and conkers picked up from the pavement or park during autumn.</p>
	<p>Make connections between the features of their family and other families.</p>	<p>Be open to children talking about differences and what they notice. For example, when children ask questions like: “Why do you wear a scarf around your head?” or “How come your hair feels different to mine?” Point out the similarities between different families, as well as discussing differences.</p>
<p>3 and 4 -year-olds</p>	<p>Use all their senses in hands-on exploration of natural materials.</p> <p>Explore collections of materials with similar and/or different properties.</p> <p>Talk about what they see, using a wide vocabulary.</p>	<p><b>Examples of how to support this:</b></p> <p>Provide interesting natural environments for children to explore freely outdoors.</p> <p>Make collections of natural materials to investigate and talk about.</p> <p>Suggestions:</p> <ul style="list-style-type: none"> <li>• contrasting pieces of bark</li> <li>• different types of leaves and seeds</li> <li>• different types of rocks</li> <li>• different shells and pebbles from the beach</li> </ul> <p>Provide equipment to support these investigations.</p> <p>Suggestions: magnifying glasses or a tablet with a magnifying app.</p> <p>Encourage children to talk about what they see.</p> <p>Model observational and investigational skills. Ask out loud: “I wonder if...?” Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas.</p>
	<p>Begin to make sense of their own life-story and family’s history.</p>	<p>Spend time with children talking about photos and memories. Encourage children to retell what their parents told them about their life-story and family.</p>

	<p>Explore how things work.</p>	<p>Provide mechanical equipment for children to play with and investigate. Suggestions: wind-up toys, pulleys, sets of cogs with pegs and boards.</p>
	<p>Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things.</p>	<p>Show and explain the concepts of growth, change and decay with natural materials. Suggestions:</p> <ul style="list-style-type: none"> <li>• plant seeds and bulbs so children observe growth and decay over time</li> <li>• observe an apple core going brown and mouldy over time</li> <li>• help children to care for animals and take part in first-hand scientific explorations of an-imal life cycles, such as caterpillars or chick eggs.</li> </ul> <p>Plan and introduce new vocabulary related to the exploration. Encourage children to use it in their dis-cussions, as they care for living things. Encourage children to refer to books, wall displays and online resources. This will support their investigations and extend their knowledge and ways of thinking.</p>
	<p>Explore and talk about different forces they can feel.</p>	<p>Draw children’s attention to forces. Suggestions:</p> <ul style="list-style-type: none"> <li>• how the water pushes up when they try to push a plastic boat under it</li> <li>• how they can stretch elastic, snap a twig, but cannot bend a metal rod</li> <li>• magnetic attraction and repulsion</li> </ul> <p>Plan and introduce new vocabulary related to the exploration and encourage children to use it.</p>
	<p>Talk about the differences between materials and changes they notice.</p>	<p>Provide children with opportunities to change materials from one state to another. Suggestions:</p> <ul style="list-style-type: none"> <li>• cooking – combining different ingredients, and then cooling or heating (cooking) them</li> <li>• melting – leave ice cubes out in the sun, see what happens when you shake salt onto them (children should not touch to avoid danger of frostbite)</li> </ul> <p>Explore how different materials sink and float. Explore how you can shine light through some materials, but not others. Investigate shadows. Plan and introduce new vocabulary related to the exploration and encourage children to use it.</p>
	<p>Talk about members of their immediate family and community.</p>	<p>During dedicated talk time, listen to what children say about their family.</p>

		<p>Share information about your own family, giving children time to ask questions or make comments. Encourage children to share pictures of their family and listen to what they say about the pictures. Using examples from real life and from books, show children how there are many different families.</p>
<p>Reception</p>	<p>Explore the natural world around them.</p>	<p><b>Examples of how to support this:</b> Provide children with have frequent opportunities for outdoor play and exploration. Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences. Create opportunities to discuss how we care for the natural world around us. Offer opportunities to sing songs and join in with rhymes and poems about the natural world. After close observation, draw pictures of the natural world, including animals and plants. Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.</p>
	<p>Describe what they see, hear and feel whilst outside.</p>	<p>Encourage focused observation of the natural world. Listen to children describing and commenting on things they have seen whilst outside, including plants and animals. Encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in. Name and describe some plants and animals children are likely to see, encouraging children to recognise familiar plants and animals whilst outside.</p>
	<p>Recognise some environments that are different from the one in which they live.</p>	<p>Teach children about a range of contrasting environments within both their local and national region.</p>

		<p>Model the vocabulary needed to name specific features of the world, both natural and made by people.</p> <p>Share non-fiction texts that offer an insight into contrasting environments. Listen to how children communicate their understanding of their own environment and contrasting environments through conversation and in play.</p>
	<p>Understand the effect of changing seasons on the natural world around them.</p>	<p>Guide children’s understanding by draw children’s attention to the weather and seasonal features.</p> <p>Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons. Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.</p> <p>Look for children incorporating their understanding of the seasons and weather in their play.</p>



**Years 1 and 2**

**Asking simple questions and recognising that they can be answered in different ways**

- While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.
- The children answer questions developed with the teacher often through a scenario.
- The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.

**Observing closely, using simple equipment**

Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initially by comparisons, then using non-standard units.

**Performing simple tests**

- The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

**Identifying and classifying**

- Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.
- They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.

**Gathering and recording data to help in answering questions**

- The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. They record their measurements e.g. using prepared tables, pictograms, tally charts and bar charts.
- They classify using simple prepared tables and sorting rings.

**Using their observations and ideas to suggest answers to questions**

- Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.
- The children recognise 'biggest and smallest', 'best and worst' etc. from their data.

**Years 3 and 4**

**Asking relevant questions and using different types of scientific enquiries to answer them**

- The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. The children answer questions posed by the teacher.
- Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

**Making systematic and careful observations and, taking accurate measurements using standard units, using a range of equipment, inc thermometers and data loggers**

- The children make systematic and careful observations.
- They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

**Setting up simple practical enquiries, comparative and fair tests**

The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.

- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

**Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables**

- The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add

headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. Children are supported to present the same data in different ways in order to help with answering the question.

**Using straightforward scientific evidence to answer questions or to support their findings**

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.

**Identifying differences, similarities or changes related to simple scientific ideas and processes**

- Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.

**Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions**

- They draw conclusions based on their evidence and current subject knowledge.
- They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.
- Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.
- Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.
- They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.

**Year 5 and 6**

**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary**

- Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.
- Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
- The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

**Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate**

- The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.
- During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).

**Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**

- The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.
- Children present the same data in different ways in order to help with answering the question.

**Identifying scientific evidence that has been used to support or refute ideas or arguments**

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.
- They talk about how their scientific ideas change due to new evidence that they have gathered.
- They talk about how new discoveries change scientific understanding.

**Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations**

- In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.
- They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.
- They identify any limitations that reduce the trust they have in their data.
- They communicate their findings to an audience using relevant scientific language and illustrations.

**Using test results to make predictions to set up further comparative and fair tests**

- Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

**Curriculum Content:**

Year group: 1	Topic Title: Seasonal changes	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● <b>collect information about the weather in tables or charts</b></li> <li>● <b>contribute to records of changes in the world around them E.g. collecting photos showing changes in the school grounds / park throughout the year on a display board.</b></li> </ul>		<ul style="list-style-type: none"> <li>● observe changes across the four seasons</li> <li>● name the four seasons in order</li> <li>● observe and describe weather associated with the seasons</li> <li>● observe and describe how day length varies</li> <li>● observe features in the environment and explain that these are related to a specific season</li> <li>● observe and talk about changes in the weather</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (opposing standpoint) It would be better to live somewhere where the weather was always the same. Agree or disagree</p> <p><b>Stimulus re: raising questions:</b> Show the children two different weather forecast maps or images of a tree/habitat in different seasons.</p>		<p><u>Making observations over time:</u>A suggested learning journey re making observations over time is:</p> <p>Set up observations early on during the school year by showing the children a couple of photos or a youtube video illustrating the effects of the passing of time in relation to the focus phenomena e.g. two pictures of the school grounds, one taken during late autumn and the other in late spring. Use these as the basis for a session raising scientific questions to be investigated. With the children’s involvement identify 2 or 3 questions to focus upon re exploring further. Designate a display board on which to capture observations over a period of time. Collect observations, children’s drawings &amp; observation notes (e.g. of birds and animals seen) &amp; photographs throughout the year and display these on the display board in sequence. Involve the children in collecting the observations relating to the investigation, contrast &amp; compare noting the significant changes and learning can be pulled together in order to determine what has been found in relation to the children’s initial questions.</p>

Year group: 1	Topic Title Animals (focus upon humans)	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● use their senses to make comparisons between different things</li> <li>● identify differences between themselves &amp; others</li> <li>● participate in 'grouping games' using and/or suggesting different rules for groupings</li> </ul>		<ul style="list-style-type: none"> <li>● name the parts of the human body that they can see</li> <li>● draw &amp; label basic parts of the human body</li> <li>● identify the main parts of the human body and link them to their senses</li> <li>● identify similarities and differences between different people and create their own criteria/rules for classifying a group of different people and apply them consistently when sorting in a variety of contexts e.g. playing the 'Guess Who ' game</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (Range of answers) Which of these things would you need to build a body Can you label them Would you need anything else</p> <p><b>Stimulus re: raising questions:</b> What's My Rule game using images of body parts and other objects which provide a similar function e.g. heart, bicycle pump, muscle, elastic band..</p>		



Year group: 1	Topic Title: Everyday materials	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>perform simple tests to compare the suitability materials for specific jobs e.g. which of these would make the best *umbrella *bookshelf *ladder for Jack to use once the giant has cut down his bean stalk</b></li> <li>● <b>sort materials into groups by a given criteria</b></li> <li>● <b>create their own criteria/rules for classifying a group of different materials and apply them consistently when sorting</b></li> </ul>	<ul style="list-style-type: none"> <li>● distinguish between an object and the material from which it is made</li> <li>● describe materials using their senses</li> <li>● describe materials using their senses, using specific scientific words such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</li> <li>● identify what material objects are made from</li> <li>● name some different everyday materials e.g. wood, plastic, metal, water and rock</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) Glass is a good material for building with... Agree or disagree</p> <p><b>Stimulus re: raising questions:</b> Start with the story 'The Three Little Pigs'</p>		

Year group: 1	Topic Title: Plants	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● <b>observe closely (using a magnifying glass)</b></li> <li>● <b>compare &amp; contrast familiar plants</b></li> <li>● <b>identify &amp; group plants</b></li> <li>● <b>draw diagrams labelling parts of plants / trees</b></li> <li>● <b>keep records of changes over time</b></li> <li>● <b>compare and contrast what they have found out about plants</b></li> <li>● <b>create their own criteria/rules for classifying a group of different plants and apply them consistently when sorting</b></li> </ul>		<ul style="list-style-type: none"> <li>● name the petals, stem, leaf, bulb, flower, seed, stem and root of a plant</li> <li>● identify and name a range of common plants and trees</li> <li>● recognise deciduous and evergreen trees</li> <li>● name the trunk, branches and root of a tree</li> <li>● describe the parts of a plant (roots, stem, leaves, and flowers)</li> <li>●</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (Odd one out) Variety of images re: different plants / plant parts including different stages of life cycle – Which are the odd ones out Why Could any others be the odd ones out How</p> <p><b>Stimulus re: raising questions:</b> What’s My Rule game using images of common plants in the school grounds at different stages between seed and gone to seed e.g. dandelion, daisy</p>		<p><u>Making observations over time:</u></p> <p>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>

Year group: 1	Topic Title Animals (focus upon other animals and comparisons with humans)	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<p><b>Contrast and make comparisons between different animals on the basis of: *observable features how they move what they eat *where they live</b></p> <ul style="list-style-type: none"> <li>• identify ‘rules’ for grouping and identifying animals e.g. in a game scenario</li> <li>• create their own criteria/rules for classifying a group of different animals and apply them consistently when sorting</li> </ul>		<ul style="list-style-type: none"> <li>• point out some of the differences between different animals</li> <li>• identify and name a variety of common animals (birds, fish, amphibians, reptiles, mammals)</li> <li>• identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> <li>• compare the bodies of different animals</li> <li>• name the parts of an animal’s body</li> <li>• name a range of domestic animals</li> <li>• classify animals by what they eat (carnivore, herbivore, omnivore)</li> <li>• compare the bodies of different animals</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers) variety of images of familiar animals which can be found within the local environment or beyond e.g. sparrow, domestic cat, sheep, badger Question: Which of these animals might we find in the local park/school grounds Or/And (Odd one out) Image of a cow, an elephant and a chimpanzee?</p> <p><b>Stimulus re: raising questions:</b> What’s My Rule using cards with a range of images depicting different animals</p>		<p><u>Making observations over time:</u></p> <p>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>

Year group: 2	Animals including humans	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● <b>observe (through video or first-hand observation &amp; measurement) how different animals (including humans), grow &amp; change</b></li> <li>● <b>raise questions about what different animals (including humans) need to survive (stay healthy)</b></li> <li>● <b>suggest and follow up on ways in which to find answers to their questions</b></li> </ul>		<ul style="list-style-type: none"> <li>● point out some of the differences between different animals (including humans)</li> <li>● notice that some animals including humans have offspring which grow into adults</li> <li>● notice that some animals have offspring which look similar while others have offspring which look very different</li> <li>● match animals to their offspring</li> <li>● notice that animals change as they grow &amp; that for some this is largely related to size e.g. calves/cows while for others there is significant change in structure e.g. caterpillar/butterfly</li> <li>● explain that humans grow and reproduce</li> <li>● recognise that animals including humans have basic needs for survival (water, food and air)</li> <li>● describe the importance, for humans, of exercise, nutrition and hygiene</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) – Babies look like their parents. Agree or disagree</p> <p><b>Stimulus re: raising questions:</b> Show the children two examples of meals/sources of food relative to the creatures that eat them or provide the children with an incomplete table of data relating to growth of human beings.</p>		<p><u>Making observations over time:</u></p> <p>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>

Year group: 2	Living things and their habitats	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● raise &amp; answer questions about the local environment</li> <li>● identify differences &amp; similarities between living things (local environment v less familiar habitat)</li> <li>● sort and classify things (e.g. living, dead, never alive)</li> <li>● record findings in charts</li> <li>● investigate how they conditions in different habitats impact upon the type of animals/plants that live there</li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● match familiar living things to the habitats they are found in</li> <li>● identify and name a variety of plants and animals in their habitats including microhabitats</li> <li>● identify that most living things living in habitats to which they are suited</li> <li>● identify how different habitats provide for the needs of different kinds of animals &amp; plants, and how they depend on each other</li> <li>● describe a range of different habitats</li> <li>● describe what animals need to survive and link this to the habitats they are found in</li> <li>● explain the differences between living and non-living things</li> <li>● describe some of the life processes common to plants and animals, including humans</li> <li>● decide whether something is living, dead or non-living</li> <li>● describe how animals obtain their food from other plants and animals</li> <li>● describe relationships between living things in terms of a simple food chain</li> <li>● identify and name the different sources of food in an animal’s diet</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Odd One Out) Provide a variety of images re: animals from a range of habitats and different habitats - Which are the odd ones out Why Could any others be the odd ones out How</p> <p><b>Stimulus re: raising questions:</b> What’s My Rule using cards with a range of images depicting different living, non-living and once living objects</p>		

Year group: 2	Classifying and grouping materials	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● compare the uses of everyday materials found around the school with materials found elsewhere</li> <li>● identify through observation &amp; classify materials based upon their properties/characteristics</li> <li>● identify through observation &amp; classify materials based upon their uses</li> <li>● record their observations</li> <li>● compare and group together a variety of materials based on their simple physical properties</li> <li>● sort materials into groups and say why they have sorted them in that way</li> </ul>	<ul style="list-style-type: none"> <li>● describe the simple physical properties of a variety of everyday materials</li> <li>● describe the properties of different materials using words like, transparent or opaque, flexible, etc.</li> <li>● say which materials are natural and which are man-made</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) Wool would be a good material for an umbrella. Agree or disagree</p> <p><b>Stimulus re: raising questions:</b> What's My Rule using cards with a range of images depicting a range of different objects/materials (or just a range of objects)</p>		

Year group: 2	Changing materials	
<p>Working scientifically - Children must be able to: *Needs to be found*</p>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● explore how the shapes of solid objects can be changed (squashing, bending, twisting, stretching)</li> <li>● find out about people who developed useful new materials (John Dunlop, Charles Macintosh, John McAdam)</li> <li>● identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, cardboard for particular uses</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) Materials are only used for making clothes with. Agree or disagree <b>Stimulus re: raising questions:</b> Show the children two examples of homemade teabags, one made with kitchen towel and the other with dishcloth material (see 'Tea bag trouble' in Super science booklet)</p>		

Year group: 2	Plants (NB This topic is best started in the spring term, to enable long term observations of growth over three terms)	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>observe &amp; identify changes in plant growth throughout the year e.g. in the school garden</b></li> <li>● <b>record the changes that they identify</b></li> <li>● <b>raise questions about &amp; set up a comparative test to find out what plants need to stay healthy</b></li> <li>● <b>set up a comparative test to show that plants need both light and water to remain healthy</b></li> <li>● <b>record and measure the growth of their plants</b></li> </ul>	<ul style="list-style-type: none"> <li>● describe what plants need to survive</li> <li>● observe and describe how seeds and bulbs grow into mature plants</li> <li>● find out &amp; describe how plants need water, light and a suitable temperature to grow and stay healthy</li> <li>● describe what plants need to survive and link it to where they are found</li> <li>● explain that plants grow and reproduce in different ways</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers) What does a plant need to survive</p> <p><b>Stimulus re: raising questions:</b> Start with the story ‘Jack and the beanstalk’ or start with two plants e.g. tomato plants one of which has been kept in a dark cupboard for a couple of weeks</p>	<p><u>Making observations over time:</u></p> <p>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p> <p>A suggested learning journey re making observations over time is:</p> <p>Set up observations early on during the school year by showing the children a couple of photos or a youtube video illustrating the effects of the passing of time in relation to the focus phenomena e.g. two pictures of the school grounds, one taken during late autumn and the other in late spring. Use these as the basis for a session raising scientific questions to be investigated. With the children’s involvement identify 2 or 3 questions to focus upon re exploring further. Designate a display board on which to capture observations over a period of time e.g. throughout the school year. Collect observations, children’s drawings &amp; observation notes (e.g. of birds and animals seen) &amp; photographs throughout the year and display these on the display board in sequence. Involve the children in collecting the data/observations relating to the phenomena to investigate, contrast &amp; compare noting the significant changes and observations/learning can be pulled together in order to determine what has been found in relation to the children’s initial questions. Mini plenaries could be held towards the end of each term noting any significant changes throughout the previous half term and prompting children to wonder about/predict what will happen next.</p>	



Year group: 3	Light	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>raise questions about shadows/effect of light/absence of light</b></li> <li>● <b>identify the impact on shadows relating to the position of a light source/distance between a light source, an object &amp; its shadow</b></li> </ul>	<ul style="list-style-type: none"> <li>● recognise that they need light in order to see things</li> <li>● recognise that dark is the absence of light</li> <li>● notice that light is reflected from surfaces</li> <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 a solid object</li> <li>● find patterns in the way that the sizes of shadows change</li> <li>● explain the difference between transparent, translucent and opaque</li> <li>● explain why the shadow cast by an object changes when the light source is moved closer or further from the object</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers/concept cartoon) Black is the best colour for curtains because it traps the light + a range of responses along with who do you agree with and why</p> <p><b>Stimulus re: raising questions:</b> Look at the reflection in two adjacent mirrors which are angled slightly differently – or the reflected beam of light from two adjacent mirrors which are angled differently</p>		

Year group: 3		Topic Title: Rocks and soil	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>make observations of different rocks (inc close observation through a hand lens looking at structure e.g. granular/crystalline/fossilised) and record their findings</b></li> <li>● <b>group and classify rocks based upon observable features/using a key</b></li> <li>● <b>identify the differences &amp; similarities between different soils</b></li> <li>● <b>explore how rocks might have changed over time e.g. weathering of gravestones.</b></li> <li>● <b>undertake research to find out the different kinds of living things whose fossils are found in sedimentary rock and how fossils are formed</b></li> <li>● <b>make observations of and raise questions about different kinds of soils and rocks, how they are formed &amp; the changes that occur when they are in water</b></li> </ul>		<ul style="list-style-type: none"> <li>● compare and group together different rocks on the basis of their appearance and simple physical properties</li> <li>● create their own criteria/rules for classifying a group of different rocks/soils and apply them consistently when sorting</li> <li>● describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>● recognise that soils are made from rocks and organic matter</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Odd One Out) Provide a variety of images re: different rocks in different states/forms - Which are the odd ones out Why Could any others be the odd ones out How</p> <p><b>Stimulus re: raising questions:</b> Show the children a fossil and its modern day counterpart e.g. an ammonite and a snail in its shell</p>			

Year group: 3		Topic Title: Forces and magnets	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>group objects/things according to how they move</b></li> <li>● <b>raise questions about the impact of different surfaces upon the movement of objects</b></li> <li>● <b>devise comparative tests to investigate and find answers to their questions</b></li> <li>● <b>make measurements and gather data in order to make comparisons</b></li> <li>● <b>investigate &amp; compare the strength of different magnets</b></li> <li>● <b>sort &amp; group materials according to their magnetic properties</b></li> <li>● <b>explore and identify patterns in the way that magnets behave in relation to one another</b></li> <li>● <b>identify how the properties of magnets are applied re their use in everyday objects</b></li> </ul>		<ul style="list-style-type: none"> <li>● compare how things move on different surfaces</li> <li>● observe that magnetic forces act without direct contact</li> <li>● observe how some magnets attract or repel each other</li> <li>● classify which materials according to whether or not they are attracted to magnets</li> <li>● notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>● identify some magnetic materials</li> <li>● describe magnets have having two poles (N &amp; S)</li> <li>● predict whether two magnets will attract or repel each other depending on which poles are facing</li> <li>● compare the strengths of different magnets and find fair ways of investigating this</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers) What sorts of things are attracted to or affected by magnets &amp;/or (Right &amp; Wrong) Why would this make a good running shoe &amp; this one not &amp;/or (A statement) Bigger magnets are stronger than smaller magnets Agree or disagree &amp;/or (Start from the end) It is better to have a rough sole on your shoe than a smooth sole – Why</p> <p><b>Stimulus re: raising questions:</b> Construct two ‘home made’ compasses using a needle and cork/piece of polystyrene. Rub one needle against a magnet but not the other. Place into a bowl of water, rotate the bowls slowly &amp; observe.</p>			

Year group: 3      Topic Title: Plants	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>raise questions about factors that may impact upon plant growth</b></li> <li>● <b>devise an investigation to compare the effect of different factors upon plant growth</b></li> <li>● <b>observe the changes in a plant's life cycle over time</b></li> <li>● <b>identify patterns in fruit formation/seed dispersal</b></li> <li>● <b>observe how plants are structured to facilitate the transportation of water (e.g. the impact of coloured water upon a vase of carnations)</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● identify and describe the functions of different parts of flowering plants (roots, stem/trunk, leaves and flowers)</li> <li>● observe and describe how seeds and bulbs grow into mature plants</li> <li>● find out &amp; describe how plants need air, water, light, nutrients from the soil a suitable temperature, and room to grow and stay healthy</li> <li>● describe what plants need to survive and link it to where they are found</li> <li>● investigate the way in which water is transported within plants</li> <li>● explain that plants grow and reproduce in different ways</li> <li>● explore the role of flowers in the life cycle of flowering plants</li> <li>● identify the different stages in a plant lifecycle including pollination, seed formation and seed dispersal and relate this to different examples</li> </ul>
<p>Pre assessment tasks / starting points</p>	<p>Contextual info / possible activities / places to go for further info</p>
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers/concept cartoon) Plants need flowers to help us recognise them + a range of responses along with who do you agree with and why <b>Stimulus re: raising questions:</b> Show the children two juvenile plants e.g. sprouting beans – one that has been growing in soil and another that has been growing in damp sand</p>	<p><u>Making observations over time:</u> This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>

Year group: 3		Animals including humans	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>identify and group animals based upon observable features, how they move and what they eat</b></li> <li>● <b>make reasoned conjectures about what would happen if humans didn't have skeletons</b></li> <li>● <b>compare and contrast the diet of different animals</b></li> <li>● <b>research different food groups in order to find out their impact upon health</b></li> </ul>		<ul style="list-style-type: none"> <li>● explain the importance of a nutritionally balanced diet</li> <li>● identify that animals, including humans, cannot make their own food: they get nutrition from what they eat</li> <li>● describe and the skeletal system of a human and explain why it is needed for support, movement &amp; protection</li> <li>● describe and explain the muscular system of a human and explain why it is needed for support, movement &amp; protection</li> <li>● explain how the muscular and skeletal systems work together to enable movement</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Concept mapping – using cards with images and words on them relating to the skeleton and musculature of a variety of animals and the animals themselves including vertebrates and invertebrates</p> <p><b>Stimulus re: raising questions:</b> Show the children a picture or an artefact related to a skeleton e.g. a bone, an x-ray of part of a skeleton, an image showing a skeleton in different positions</p>			

Year group: 4      Topic Title: Electricity	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>identify patterns in how electrical components behave/perform in differently configured circuits</b></li> <li>● <b>compare materials in relation to how effectively they function in an electrical circuit i.e. conductivity</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● identify common appliances that run on electricity</li> <li>● construct a simple series electric circuit</li> <li>● identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers</li> <li>● identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</li> <li>● recognise that a switch opens and closes a circuit</li> <li>● associate a switch opening with whether or not a lamp lights in a simple series circuit</li> <li>● recognise some common conductors and insulators</li> <li>● associate metals with being good conductors</li> <li>● explain how a bulb might get lighter</li> <li>● work out which materials can be used to complete a gap in a circuit</li> <li>● explain why precautions are necessary for working safely with electricity</li> </ul>
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (right and wrong) Why does this circuit work &amp; this one not</p> <p><b>Stimulus re: raising questions:</b> Construct two simple electrical circuits using Play Dough. See ‘Accidental Discoveries: Play-Doh’ Page 5 of the British Science Week booklet ‘Accidental Discoveries’.</p>	

Year group: 4		States of matter	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>group &amp; classify a variety of different materials using a range of criteria</b></li> <li>● <b>make observations about the effect of temperature on different substances (avoid observing situations where the effect of temperature changes a substance e.g. baking bread dough)</b></li> <li>● <b>undertake research to explore the temperatures at which changes of state occur in a range of materials</b></li> <li>● <b>raise questions relating to the effects of time/environment on solids, liquids &amp; gases e.g. puddles after rain, washing on the line, snowmen...</b></li> <li>● <b>explore ways in which to investigate &amp; find the answers to their questions</b></li> </ul>		<ul style="list-style-type: none"> <li>● compare and group materials together, according to whether they are solids, liquids or gases</li> <li>● explain what happens to materials when they are heated or cooled</li> <li>● measure or research the temperature at which different materials change state in degrees Celsius</li> <li>● use measurements to explain changes to the state of water</li> <li>● identify the part that evaporation and condensation has in the water cycle</li> <li>● associate the rate of evaporation with temperature</li> <li>● group and classify a variety of materials according to the impact of temperature on them</li> <li>● explain what happens overtime to materials such as puddles on the playground or washing hanging on a line</li> <li>● relate temperature to change of state of materials</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Range of answers/concept map) condensation on the outside of a cold glass of water containing ice cubes</p> <p><b>Stimulus re: raising questions:</b> Demonstrate the trick – ‘paper towel magic’. See ‘Practical Work in Primary Science’ Page 23 – SCORE (Science Community Representing Education)</p>			

Year group: 4      Topic Title: Sound	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>investigate and identify patterns in how the pitch &amp; volume of sound can be changed</b></li> <li>● <b>identify patterns in the sounds made by objects of different sizes</b></li> <li>● <b>investigate a range of materials in relation to how effectively they insulate against sound</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● describe a range of sounds and explain how they are made</li> <li>● associate some sounds with something vibrating</li> <li>● explain how to change a sound (louder/softer)</li> <li>● recognise how vibrations from sound travel through a medium to an ear</li> <li>● find patterns between the pitch of a sound and features of the object that produce it</li> <li>● find patterns between the volume of the 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> <li>● explain how you could change the pitch of a sound</li> <li>● investigate how different materials can affect the pitch and volume of sounds</li> <li>● explain how pitch and volume can be changed in a variety of ways</li> </ul>
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (Odd One Out) Provide a variety of images re: different instruments / devices which make sound - Which are the odd ones out Why Could any others be the odd ones out How</p> <p><b>Stimulus re: raising questions:</b> Tap two different sized drums...</p>	



Year group: 4		Topic Title: Animals including humans	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>make comparisons between the teeth of different animals</b></li> <li>● <b>suggest reasons for those differences relating this to diet</b></li> <li>● <b>find out about the effect of different foods/drink on teeth</b></li> <li>● <b>find out how to look after teeth</b></li> <li>● <b>suggest ideas about how the digestive system works and explain their ideas using drawings/models</b></li> </ul>		<ul style="list-style-type: none"> <li>● identify and name the basic parts of the digestive system in humans</li> <li>● describe the simple functions of the basic parts of the digestive system in humans</li> <li>● identify the simple function of different types of teeth in humans</li> <li>● compare the teeth of herbivores and carnivores</li> <li>● explain what a simple food chain shows</li> <li>● construct and interpret a variety of food chains, identifying producers, predators and prey</li> <li>● classify living things and non-living things by a number of characteristics that they have thought of</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) Cows get more nutrition from their food than humans because they have more stomachs.</p> <p><b>Stimulus re: raising questions:</b> Look at the skulls including teeth of three different animals – images or real skulls</p>			

Year group: 4      Topic Title: Living things and their habitats	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>raise and answer questions about living things in the local environment throughout the year</b></li> <li>● <b>make observations of changes in habitats over time</b></li> <li>● <b>group and classify a wide range of living things</b></li> <li>● <b>use guides and keys to identify living things in the local environment</b></li> <li>● <b>make guides &amp; keys to identify living things in the local environment</b></li> <li>● <b>research/collect data exploring the impact (+ve &amp; -ve) of humans on the environment E.g. gardens &amp; ponds, litter</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <ul style="list-style-type: none"> <li>● recognise that living things can be grouped in a variety of ways</li> <li>● explore and use a classification key to group, identify and name a variety of living things (plants, vertebrates, invertebrates)</li> <li>● compare the classification of common plants and animals to living things found in other places (under the sea, prehistoric)</li> <li>● recognise that environments can change and this can sometimes pose danger to living things</li> <li>● sort &amp; group animals &amp; plants using their own criteria and apply those criteria consistently</li> <li>● explain the criteria they use for sorting &amp; grouping</li> </ul>
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (Starting from the end) In zoos lions, tigers &amp; cheetahs can often be found in the same area. Why is that</p> <p><b>Stimulus re: raising questions:</b> Show children images of a habitat in different seasons</p>	<p><u>Making observations over time:</u></p> <p>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>

Year group: 5	Topic Title: Forces	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>raise questions about and investigate how objects fall through the air identifying factors that impact upon ‘the flight’</b></li> <li>● <b>create and carry out fair tests to determine what makes an effective design re parachutes, paper aeroplanes etc</b></li> <li>● <b>raise questions and find answers to them as above but in the context of water</b></li> <li>● <b>design and make products using levers, pulleys, gears and/or springs and explore their effects</b></li> </ul>	Pupils should be taught to: <ul style="list-style-type: none"> <li>● build on work from Year 3</li> <li>● explain that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object</li> <li>● identify the effects of air resistance, water resistance and friction that act between moving surfaces</li> <li>● recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> <li>● describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction)</li> <li>● design very effective parachutes</li> <li>● identify that water creates resistance which slows down the movement of objects through water</li> <li>● explore how scientists, such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Right &amp; Wrong) Why does this ball bounce high and the cricket ball not</p> <p><b>Stimulus re: raising questions:</b> ‘Bishops can fly’ from the Practical work in Primary Science publication – Start with observing the flight path of two different ‘Bishops’ <a href="http://www.practicalprimaryscience.org">www.practicalprimaryscience.org</a></p>		

Year group: 5	Topic Title: Properties and changes to materials	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● <b>raise questions to investigate about the properties of materials e.g. Which material would be the best for making a warm jacket A towel Black out curtains</b></li> <li>● <b>make observations about the effect of temperature on different substances (including where there is irreversible change e.g. baking bread dough).</b></li> <li>● <b>undertake research to find out about the impact chemical changes have on our lives e.g. cooking, the creation of new materials e.g. super-thin materials etc</b></li> </ul>		<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>● build on work from Year 3 (materials) and year 4 (electricity)</li> <li>● compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets.</li> <li>● explain how some materials dissolve in liquid to form a solution.</li> <li>● describe how to recover a substance from a solution.</li> <li>● use their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving, evaporating.</li> <li>● give reasons, based on evidence for comparative and fair tests for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>● describe changes using scientific words (evaporation, condensation)</li> <li>● demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>● explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</li> <li>● describe the terms reversible and irreversible.</li> <li>● explore changes that are difficult to reverse e.g. burning, rusting and reactions -such as vinegar with bicarbonate of soda.</li> <li>● Explore the work of chemists who created new materials e.g. Spencer Silver (glue on sticky notes) or Ruth Benerito (wrinkle free cotton)</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (Start from the end) Paper is a good material for tissues. Why <b>Stimulus re:</b> raising questions: Make two lots of ‘silly putty’ with different strengths of borax solution</p>		

Year group: 5	Topic Title: Earth and space	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>collect and present data to show the time of day at different places on the earth</b></li> <li>● <b>gather data and interpret it in order to create simple models of the solar system E.g. How much space is there out in space</b></li> <li>● <b>investigate and make accurate shadow clocks demarcated to show different times of the school day</b></li> <li>● <b>research to find out about how people measured time passing in the past E.g. conjectures re structures such as Stonehenge.</b></li> </ul>	Pupils should be taught to: <ul style="list-style-type: none"> <li>● Describe the movement of the Earth and other planets relative to the Sun in the Solar System</li> <li>● describe and explain the movement of the Moon relative to Earth</li> <li>● describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>● use the idea of the earth’s rotation to explain day and night and the apparent movement of the Sun across the sky.</li> <li>● know that the Sun is a star at the centre of the Solar system and name all the 8 planets (Pluto reclassified as dwarf planet)</li> <li>● know a moon is a celestial body which orbits a planet – earth has one moon, Jupiter has four moons etc.</li> <li>● compare the time of day at different places on the earth</li> <li>● create shadow clocks</li> <li>● begin to understand how older civilisations used the sun to create astronomical clocks, e.g. Stonehenge</li> <li>● explore the work of scientists such as Ptolemy, Alhazen, Copernicus</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (An opposing standpoint) How could the night sky be more reliable for telling the time than a clock</p> <p><b>Stimulus re: raising questions:</b> Provide the children with an incomplete table showing data relating to the planets in our solar system</p>	<p><u>Making observations over time:</u> This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>	

Year group: 5	Topic Title: Animals including humans	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:
<ul style="list-style-type: none"> <li>● <b>research to find out about and compare the gestation periods of different animals</b></li> <li>● <b>gather and present data to show how a baby grows and changes over time</b></li> </ul>		Pupils should be taught to: <ul style="list-style-type: none"> <li>● describe the changes as humans develop to old age</li> <li>● create a time line to indicate stages of growth in certain animals, such as frogs and butterflies</li> <li>● describe the changes experienced in puberty</li> <li>● draw a timeline to indicate stages in the growth and development of humans</li> </ul>
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. Concept mapping – using cards with images and words on them relating to different stages throughout the life of a human being.</p> <p><b>Stimulus re: raising questions:</b> Share a table with some data re: the gestation period of different animals e.g. human being, horse, elephant &amp; gerbil</p>		<p><b>Alert:</b> <i>children have already dissected flower parts &amp; explored the role of flowers in pollination, fertilisation &amp; seed dispersal in Y3. This lesson provides a good opportunity to revisit that learning &amp; to address any ongoing misconceptions, however it should also extend children’s understanding e.g. by labelling the flower parts including describing the function and drawing parallels, highlighting similarities &amp; differences with life cycles in mammals including humans, birds, insects, amphibians etc</i></p>

Year group: 5	Topic Title: Living things and their habitats	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>raise and answer questions about living things in the local environment throughout the year</b></li> <li>● <b>identify life-cycle changes in a variety of living things through observation over time</b></li> <li>● <b>make comparisons between the life-cycles of living things in the local environment and elsewhere in the world</b></li> <li>● <b>raise pertinent questions in relation to those comparisons and suggest reasons for differences and similarities</b></li> <li>● <b>explore trying to grow new plants from different parts of a parent plant</b></li> <li>● <b>observe how animals change over time identifying/comparing how different animals reproduce and grow</b></li> </ul>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>● describe the differences in the life cycles of a mammal, amphibians and insects and a bird</li> <li>● describe the life process of reproduction in some plants and animals</li> <li>● describe the life cycles of common plants</li> <li>● explore the work of well know naturalists and animal behaviourists (David Attenborough and Jane Goodall)</li> <li>● observe lifecycles in a variety of living things e.g. plants in the vegetable garden/flower border and animals in the local environment.</li> <li>● find out about the different types of reproduction including sexual and asexual reproduction in plants and sexual reproduction in animals.</li> <li>● work scientifically by comparing the lifecycles of plants and animals in their local environment with other plants around the world (rainforests, oceans, desert areas and in prehistoric times) comparing similarities and differences.</li> <li>● try to grow plants from different parts of the parent plant e.g. seeds, stem, root cutting, tubers, bulbs.</li> <li>● observe changes in an animal over a period of time (e.g. hatching and rearing chicks) comparing how different animals grow and reproduce.</li> </ul>	
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Odd one out) Provide a variety of images depicting adult animals/plants and their young showing cases where they look similar as well as cases where they look very different- Which are the odd ones out Why Could any others be the odd ones out <b>Stimulus re: raising questions:</b> Look at some lifecycle images for different animals.</p>	<p><u>Making observations over time:</u>This science topic requires planning for making observations over. It needs provision planning from earlier in the school year and sometimes throughout the whole school year.</p>	

Year group: 6		Topic Title: Evolution and inheritance	
Working scientifically - Children must be able to:		Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● <b>raise questions about local animals and those in more extreme environments and how they are adapted to survive</b></li> <li>● <b>analyse the advantages/disadvantages of specific adaptations E.g. two feet or four feet, long or short beak....</b></li> <li>● <b>identify the differences &amp; similarities between an ammonite &amp; a snail shell and use this information to raise pertinent questions for further investigation</b></li> </ul>		Pupils should be taught to: <ul style="list-style-type: none"> <li>● recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>● recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> <li>● identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> <li>●</li> </ul>	
Pre assessment tasks / starting points		Contextual info / possible activities / places to go for further info	
<p><b>Cold Task:</b> Powerful question e.g. (Start from the end) The answer is “That’s how giraffe’s grew long <b>Stimulus re: raising questions:</b> Show the children images depicting variation in animals within the same species e.g. different breeds of dog</p> <p><b>Ideas</b></p> <p>Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time</p> <ul style="list-style-type: none"> <li>● They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, Labradors are crossed with poodles.</li> <li>● They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes’ necks got longer, or the development of insulating fur on the arctic fox.</li> <li>● Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.</li> <li>● <b>Note:</b> At this stage, pupils are not expected to understand how genes and chromosomes work.</li> </ul> <p>Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.</p>			



Year group: 6	Classification	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>raise and answer questions about living things in the local environment and how they are grouped / connected</b></li> <li>● <b>group and classify a wide range of living things</b></li> <li>● <b>use guides and keys to identify living things in the local environment</b></li> <li>● <b>make guides &amp; keys to identify living things in the local environment</b></li> <li>● <b>research unfamiliar plants &amp; animals and work out where they belong in the classification system</b></li> <li>● <b>design 'a new species' and identify where it should belong in the classification system (and why)</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <p>Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail</p> <ul style="list-style-type: none"> <li>● describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</li> <li>● give reasons for classifying plants and animals based on specific characteristics.</li> </ul> <p><b>Ideas</b></p> <ul style="list-style-type: none"> <li>● They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided.</li> <li>● Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).</li> <li>● They should discuss reasons why living things are placed in one group and not another.</li> <li>● Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.</li> <li>● Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment.</li> <li>● They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.</li> </ul>	
<p>Pre assessment tasks / starting points</p>	<p>Contextual info / possible activities / places to go for further info</p>	
<p><b>Cold Task:</b> Powerful question e.g. (A Statement) Lions are more closely related to wolves than they are to domestic cats. Agree or disagree Why?</p>		

Year group: 6   Electricity	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● investigate the effects of changing one component at a time in an electrical circuit</li> <li>● use what they have found out to design &amp; make a set of traffic lights, a burglar alarm or another useful circuit</li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>● build on work from Year 4</li> <li>● associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>● compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</li> <li>● use recognised symbols when representing a simple circuit in a diagram.</li> </ul> <p><b>Ideas</b></p> <ul style="list-style-type: none"> <li>● Pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.</li> <li>● <b>Note:</b> Pupils are expected to learn only about series circuits, not parallel circuits.</li> <li>● Pupils should be taught to take the necessary precautions for working safely with electricity.</li> <li>● Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.</li> </ul>
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (A range of answers/concept cartoon) relating to statements about the brightness of bulbs in two different circuits.</p> <p><b>Stimulus re: raising questions:</b> Present the children with two circuits (or circuit diagrams) which differ in terms of the number of batteries / components / position of components / length or number of wires / number of switches etc</p>	

Year group: 6      Animals including humans	
<p>Working scientifically - Children must be able to:</p> <ul style="list-style-type: none"> <li>● <b>research to investigate the work of scientists &amp; scientific research about the human body's internal systems</b></li> <li>● <b>research &amp; identify the relationships between diet, exercise, drugs, lifestyle &amp; health</b></li> </ul>	<p>Knowledge and Understanding – Children must know and understand:</p> <p>Pupils should be taught to:</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>● recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>● describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul> <p><b>Ideas</b></p> <ul style="list-style-type: none"> <li>● Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system)</li> <li>● to explore and answer questions that help them to understand how the circulatory system enables the body to function.</li> <li>● Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.</li> <li>● Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</li> </ul>
Pre assessment tasks / starting points	Contextual info / possible activities / places to go for further info
<p><b>Cold Task:</b> Powerful question e.g. (An opposing standpoint) Should smoking be a matter of choice</p> <p><b>Stimulus re: raising questions:</b> Show the children a picture of a heart &amp; a bicycle pump along with the phrase 'I wonder.....'</p>	

Year group: 6	Light (Build on work from year 3 and 4)	
Working scientifically - Children must be able to:	Knowledge and Understanding – Children must know and understand:	
<ul style="list-style-type: none"> <li>● raise questions given a stimulus involving light &amp; mirrors</li> <li>● find ways to explore &amp; find answers to their questions using this information to inform the design of a product such as a periscope</li> <li>● identify the impact on shadows relating to the position of a light source/distance between a light source, an object &amp; its shadow E.g. to inform using shadow puppets.</li> <li>● raise and answer further questions related to exploring the phenomena of light e.g. colours in soap bubbles, viewing objects in water...</li> </ul> <p>Pre assessment tasks / starting points  <b>Cold Task:</b> Powerful question e.g. (A range of answers / Concept cartoon) Light travels in straight lines unless.... Or (Right &amp; Wrong) Why does your reflection look just like you in a mirror but not from the back of a spoon  <b>Stimulus re: raising questions:</b> Look at the beam of light/laser beam in a light/laser maze game. What do you notice? What questions does this raise ?</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>● explore the way light behaves including light sources, reflection and shadows</li> <li>● extend experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters</li> <li>● recognise that light appears to travel in straight lines</li> <li>● use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</li> <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 they cast them</li> </ul> <p><b>Ideas</b></p> <ul style="list-style-type: none"> <li>● explore the way that light behaves, including light sources, reflection and shadows.</li> <li>● Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. Telescopes, binoculars, magnifying glasses, Newton’s first reflecting telescope.</li> <li>● They might investigate the relationship between light sources, objects and shadows by using shadow puppets.</li> <li>● They could extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).</li> </ul>	