

# Science Long Term Planning

## Intent Table

SCIENCE	Hillfort Specific	<b>Embody the school's values</b> Kindness, resilience, challenge, courage, aspiration. Understanding how successful scientists have had to show these core values.		<b>Cultural isolation</b> Embracing multiculturalism and fighting the corrosive effects of intolerance. Understanding how the work of scientists from around the world positively impact our everyday lives.		<b>Closing the vocabulary gap</b> Plan for reading to improve tier 2 words. Introducing key scientific vocabulary (tier 3 words) through RADAR model, Knowledge organisers and working walls.		<b>Developing Oracy</b> Asking and answering questions. Articulating scientific concepts clearly and precisely. Being able to explain what we have learnt rather than what we have done.	
	Key Concepts	<b>Science within a context</b> Use of real life context to maximise pupil's engagement and learning. The context of our learning should be linked to current events both locally and around the world e.g. cleaning water for children in a third world country.		<b>Consequences and impact</b> How science has changed our lives in the past and how it will influence our future. Teaching of significant scientific discoveries of the past. How did these change thinking and understanding at the time? How did these discoveries drive society forwards?		<b>Local vs Global</b> Understanding of whether the observations we make or results we see are likely to be similar or different in other parts of the country or in other parts of the world.		<b>Concrete vs Abstract</b> Producing scientists who understand the difference between science that we are able to observe or experience in our own classroom or the local environment and science that requires children to think in a more abstract way.	
	Scientific Concepts- Types of enquiry	<b>Observation over time</b> Observing changes that can take place over seconds, minutes, hours, days or longer (seasons).		<b>Pattern Seeking</b> Looking for patterns between two sets of measurements or variables.		<b>Identifying, Classifying and Grouping</b> Children use observational skills to look for similarities and differences. Children make links and organise things into groups.		<b>Comparative and Fair testing</b> Children testing outcomes based on changing specific variables.	
Scientific Skills (enquiry)	<b>Plan</b>			<b>Do</b>				<b>Review</b>	
	Asking questions and planning an enquiry	Making predictions	Setting up an enquiry	Observe and measure	Record	Interpret and report	Evaluate		
Scientific Skills (wider)				Using equipment accurately	Application of Maths skills	Skills of a scientist: problem solving, trial and error, systematic thinking, systematic working.			

## Progression Map

	EYFS	KS1	LKS2	UKS2
Hillfort specific: Embody the school values	Kindness, Challenge, Resilience, Courage, Aspiration			
Hillfort Specific: Cultural Isolation	<p><b>People</b> Know some similarities and differences between different cultural communities in this country, drawing on their experiences and what has been read in class;</p> <p>Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts.</p>	<p><b>Gender</b> Children study both famous male and female scientists that have made significant contributions in fields related to the topics that they study.</p> <p>This could be linked to 'significant individuals' in History e.g. Marie Curie, Jane Goodall and Valentina Tereshkova.</p>	<p><b>Race</b> Children study famous scientists of different race and ethnicity that have made significant contributions in fields related to the topics that they study.</p> <p>E.g. George Washington Carver, Percy Julian, Mae Carol Jemison, Katherine Johnson, Marie M. Daly, Edward Bouchet.</p>	<p><b>Disability</b> Children study famous scientists who had some form of disability and overcame this to make significant contributions in fields related to the topics that they study.</p> <p>E.g. Isaac Newton (Epilepsy, Speech and Language difficulties), Alexander Graham Bell (Cognition and learning), Thomas Edison (partial deafness, learning Disabilities- he didn't learn to read until he was 12), Henry Ford (Dyslexia), Albert Einstein (Asperger Syndrome- a form of autism and dyslexia), Stephen Hawking (motor neuron disease).</p>
Hillfort Specific: Closing the vocabulary gap	<p>Specific scientific language will be modelled by the class teacher and children will be expected to use this during discussion and when labelling pictures.</p>	<p>Pupils should begin to use simple scientific language.</p> <p>"Pupils should read and spell scientific vocabulary at a level consistent with their reading and spelling knowledge".</p>	<p>"Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge".</p> <p>With support, pupils should use relevant scientific language to discuss their ideas and communicate their findings <b>in ways that are appropriate for different audiences.</b></p>	<p>Pupils should read, spell and pronounce scientific vocabulary correctly.</p> <p>With increasing independence, they should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.</p>

	EYFS	KS1	LKS2	UKS2
Hillfort Specific: Developing Oracy	Children will be expected to describe ' <b>what happened?</b> ' and answer simple questions in relation to their observations.	Children will be assisted in making their thinking clear to both themselves and others. They will use simple scientific language to better explain their understanding. Teachers will use 'say it again better' strategies to support children in developing their oracy skills. Teachers will model how to use simple scientific language to explain understanding.	Children will begin to talk with more confidence and use a growing range of specific scientific vocabulary. The focus will shift to children explaining <b>what</b> they have learnt rather than what they have seen or done.	"Children should recognise the power of rational explanation"; Articulating scientific concepts clearly and precisely. Children will be able to explain what they have learnt in more precise and articulate ways.
Key concept: Context	The continuous provision activities chosen by teachers will be guided by children interests. Nursery rhymes and fairy tales will be used as a hook into science related activities. E.g. Jack and the Beanstalk.	Familiar fiction stories will be used to hook children into their investigations, giving them an understanding of how the science they see in the classroom is linked to real life.  E.g. Farmer Duck wanting to find out which type of fruit to grow in his orchard or Funny Bones being used to introduce the different parts of the human body.	"Teachers will provide their classes with different <b>contexts</b> to maximise their pupil's engagement."  Students will begin to understand the real world <b>application</b> of the science that they have learnt. They will understand how science can have a positive impact on people's lives.	Children will begin to think for themselves about how the science they have experienced in the classroom can be applied in the real world.
Key concept: Consequences and impact	Social, economic implications of science "taught most appropriately through the wider curriculum". (NC)			
Key concept: Local vs Global	Children will develop their understanding of the world through their immediate environment.	Children will predominantly experience and observe science within their local area. However, they will also be introduced to science in other parts of the country and other parts of the world. E.g. the structure of animals such as elephants and other animals	Children will become more aware of science on a global scale E.g. the impact of humans on different environments and the things that live there.	Children will be aware of science in the local environment, around the globe and then beyond (space).

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			which cannot be observed first-hand.		
Key concept: Concrete vs Abstract		Science experienced will all be first hand.	The vast majority of science experienced will be first hand but secondary sources can be used to put science into context.	Children will begin to experience more abstract concepts e.g. electricity. Although they will have some understanding of this through personal experience, they will not be able to observe everything for themselves.	Children will be introduced to far more abstract ideas such as Evolution or Earth and Space where they be required to use deeper thinking to understand the related scientific concepts.
Scientific enquiry concepts	Observation over time	Children will observe changes in nature over the course of the year. They may see leaves changing colour, observe seeds growing into plants and changes in weather patterns.	Pupils will observe closely using simple equipment. With help, observe changes over time. This could include answering questions like: How does a caterpillar change into a butterfly? How do plants change as they grow? How do humans change as they grow?	Make systematic and careful observations. <b>Help</b> to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. This could include answering questions like: What are the stages in a plant life cycle? What happens when a cut flower is stood in coloured water? As well as observing and record evaporation from a puddle.	Make their <b>own decisions</b> about what observations to make, what measurements to use and how long to make them for.  This could include: Observe life cycle changes of animals in the local environment Observe and compare how different animals reproduce and grow. Observe the phases of the moon.
	Pattern Seeking	Children will begin to notice patterns in the world around them e.g. Are all daisy leaves the same? Is there a pattern to where they grow? Do all apples have the same number of seeds?	With guidance, they should begin to notice patterns and relationships in relation to the scientific topics that they are studying.	Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.	Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.
	Identifying, Classifying and Grouping	Pupils will begin to notice some similarities and differences in the natural world. Pupils will sort items	Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them. Children will initially sort	Talk about criteria for grouping, sorting and classifying; and use simple keys.	Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be

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		into two groups e.g. things that float and things that sink.	items into two groups but as they progress through the key stage will sort into a larger number of categories.		found in the natural environment.
	Comparative and Fair testing	Children will compare objects through play.	Carry out simple comparative tests.	Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up.	Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.
	Researching	Most 'research' at this stage will be in the form of the children exploring and developing their tacit knowledge. However, they may also use songs, rhymes and stories to learn about the world around them.	Ask people questions and use simple secondary sources (books, photographs and videos) to find answers.	Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.  Identify scientific evidence that has been used to support or refute ideas or arguments
Key Skill: Asking questions and planning an enquiry		Pupils in EYFS will be expected to show curiosity about objects, events and people. They will also ask questions about why things happen. (Speaking: 30-50 months)	Pupils in Y1 and 2 should raise their own questions about the world around them and answer simple scientific questions put forward by the class teacher.	Pupils in Y3 and 4 will experience a range of scientific experiences and raise their own questions about the world around them.  They should begin to make their own decisions about the most appropriate type of scientific enquiry to use to answer questions.  Pupils will help to decide <b>what</b> data they need to collect, what observations to make, how long they need to make them for and they type of equipment that they need to use.	Pupils will use their science experiences to explore ideas and raise different kinds of questions.  Pupils will select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.  In Y5 and 6 pupils will plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.  They should make their own decisions about what observations to make, what

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				<p>measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately.</p> <p>They should decide how to record data from a choice of familiar approaches.</p>
Key Skill: Making predictions	Children will test their own ideas during play. Teachers will guide children's learning by asking 'what happens if you...' questions.	Children will make simple <b>verbal</b> predictions based on their own prior life experiences.	Pupils will use prior scientific learning and results to make predictions.	Pupils use prior scientific learning and test results to make predictions and to set up further comparative and fair tests.
Key Skill: Setting up an enquiry	Continuous provision activities will be set up by class teachers but children will also choose the resources they need for their chosen activities.	Children will assist in setting up an enquiry decided upon by the class teacher.	Pupils will recognise when a simple fair test is necessary and <b>help to decide</b> how to set it up.	Pupils will recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.
Key Skill: Observe and measure	When comparing growth, children may measure using non-standard units such as cubes or footprints.	Pupils will use simple measurements (initially using non-standard units but progressing into standard units towards the end of the key stage) and equipment to gather data.	Pupils will take accurate measurements using familiar standard units. This will be predominantly guided by the class teacher at this stage.	<p>Pupils will make their own decisions about what observations to make, what measurements to use and how long to make them for.</p> <p>Pupils will also be introduced to new units of measurements such as newtons (N).</p> <p>Pupils will also learn the importance of taking repeat measurements where appropriate.</p>

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Key Skill: Record	Children may also be asked to draw pictures of what they have seen and more able learners will be asked to write labels on their work.	Children in Y1 and Y2 will record information, including simple data, in a variety of ways. This will include: labelling, matching, grouping and filling in simple tables.	Pupils will first to talk about and then to write about what they have found out.  They will produce drawings, labelled diagrams, keys, bar charts, tables as well as short written explanations (tweets) about what they have learnt.	Pupils in UKS2 will decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. As in LKS2, they will also produce short written explanations (tweets) about what they have learnt.
Key Skill: Interpret and report	Reporting in EYFS will be done through discussion with the class teacher. Children will answer simple questions about what happened during their play.	Pupils will talk about <b>what</b> they have found out and <b>how</b> they found it out. With help, they should record and communicate their findings in a range of ways (see above) and begin to use simple scientific language.	Reporting on findings including written and oral explanations, displays, presentations and conclusions.  Identify differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to support findings.	Pupils should draw conclusions based on their data and observations.  Pupils will use relevant scientific language and illustrations to discuss, communicate and <b>justify</b> their scientific ideas.  Pupils will use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.  Y5/6 pupils will report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.

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Key Skill: Evaluate		Although children will not evaluate their activities, they will make suggestions about new items that they wish to include in their play.	Children will suggest alternative objects that they may wish to test.	Pupils will be able to suggest improvements to their investigations, making them more effective, and raise further questions.	Year 5/6 pupils should use their results to identify where and when further tests and observations might be needed.
Wider Skills:	Using equipment accurately	Handle equipment and tools effectively. This will include everyday equipment such as watering cans, spades and sieves.	Use simple equipment (e.g. hand lenses, egg timers) to gather data.	Learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately.	Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately.
	Application of Maths skills	See 'Maths Skills Taught or Applied Through Science' document.			
	Skills of a scientist:	<p><b>The Explorer</b> Pupils will develop their understanding of the world around them through first hand, play based experiences.</p> <p>Pupils will find ways to solve problems / find new ways to do things / test their ideas.</p>	<p><b>The Observer</b> Pupils are encouraged to be 'curious' and ask questions about what they notice.</p> <p>The principal focus at this level is to experience and observe phenomena. "Most of the learning should be done through the use of first-hand; practical experiences but there should be some use of secondary sources: books, photographs and videos."</p>	<p><b>The Investigator</b> Begin to develop their own ideas about function, relationships and interactions. They should ask their own questions about what they observe and make decisions about which type of scientific enquiry are likely to be the best in answering them (planning their own investigations).</p> <p>The principal focus at this stage is for children to "broaden their scientific view of the world around them through exploration, talking about, testing and developing ideas about everyday phenomena."</p>	<p><b>The Scientist</b> Pupils will achieve a deeper understanding of a wide range of scientific ideas by exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.</p> <p>The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time.</p>



## Curriculum Map

Y1	Everyday materials 6 weeks	Seasonal changes 4 weeks	Animals 7 weeks	Seasonal changes 2 weeks	Animals 2 weeks	Animals 7 weeks	Plants 6 weeks	Seasonal changes 2 weeks	Everyday materials 3 weeks
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Y2	Use of everyday materials 7 weeks	Electricity 2 weeks	Animals including humans 6 weeks	Forces and Movement 3 weeks	Plants (including planting) 7 weeks	Animals including humans 3 weeks	Living things and their habitats 11 weeks
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Y3	Forces and Magnets 7 weeks	Light 7 weeks	Animals including humans 7 weeks	Plants 10 weeks	Rocks and soils 8 weeks
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Y4	States of matter 8 weeks	Sound 8 weeks	Electricity 7 weeks	Animals including humans 8 weeks	Living things and their habitats 8 weeks
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Y5	Forces 8 weeks	Earth and space 6 weeks	Changes of materials 7 weeks	Properties of materials 7 weeks	Living things and their habitats 7 weeks	Animals including humans 4 weeks
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Y6	Electricity 7 weeks	Light 6 weeks	Animals including humans 9 weeks	Living things and their habitats 8 weeks	Evolution and inheritance 9 weeks
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