Science Curriculum Long Term Overview

CURRICULUM	CHARACTER	COMMUNITY

Science Curriculum Overview

Intent: To ignite children's curiosity about how the world around them works and to equip them with the skills and knowledge to explore and find answers to questions they may pose about the world they live in.

Substantive Knowledge

- This is the established facts and knowledge that we want to transfer into the pupil's long-term memory.
- This knowledge is shared knowledge organisers.
- This substantive knowledge is categorised by the National Curriculum units and this supports children in making links with previous knowledge and building scientific schemas.

Biology
Animals, including humans
Living Things
Evolution and Inheritance
To understand plants

Physics
Electrical Circuits
Movement, Forces and Magnets
Light and Seeing
Sound and Hearing
Earth's Movement in Space

Chemistry
Materials

- Detailed progression of substantive knowledge is outline in the progression document and on knowledge organisers.

Scientific Skills

There are 7 scientific skills that are taught alongside the substantive knowledge. These are embedded into lessons to ensure skills are developed throughout and build year on year.



Asking Questions | Observing | Communicating Results | Predicting | Setting up Tests | Evaluating | Recording

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Enquiry Types	We focus on 5 enquiry types that develop pupil's knowledge and application of the methods or approaches used to investigate, explore and answer scientific questions. The methods used in each lesson depends on the type of investigation, the discipline and the goal of the research  Comparative or Fair Testing Observation over time Pattern Seeking Research Grouping and Classifying

Year 1 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To understand animals and humans						To understand Earth's movement in Space	To understand electrical circuits		To investigate sound and hearing	To understand light and seeing	Consolidation/ POP Task
	Retrieval Practice											
Spring	To understand movement, forces and magnets		To investigate living things				To understand evolution and inheritance	To understand Earth's movement in Space			STEM Week	Consolidation/ POP Task
	Retrieval Practice											
Summer	To investigate materials						To understand plants				To understand Earth's movement in Space	Consolidation/ POP Task
	Retrieval Practice											

Year 2 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To investigate sound and hearing	To understand electrical circuits		To understand animals and humans						To understand light and seeing	To understand Earth's movement in Space	Consolidation/ POP Task
	Retrieval Practice											
Spring	To investigate living things				To understand evolution and inheritance	To understand movement, forces and magnets		To understand Earth's movement in Space			STEM Week	Consolidation/ POP Task
	Retrieval Practice											
Summer	To understand plants				To understand Earth's movement in Space	To investigate materials						Consolidation/ POP Task
	Retrieval Practice											

Year 3 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To understand plants			To understand animals and humans				To understand evolution and inheritance		To investigate living things		Consolidation/ POP Task
	Retrieval Practice											
Spring	To investigate materials							To understand electrical circuits			STEM Week	Consolidation/ POP Task
	Retrieval Practice											
Summer	To understand movement, forces and magnets				To understand light and seeing				To investigate sound and hearing		To understand the Earth's movement in space	Consolidation/ POP Task
	Retrieval Practice											

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Year 4 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To investigate living things		To understand evolution and inheritance		To understand animals and humans				To understand plants			Consolidation/ POP Tasks
	Retrieval Practice											
Spring	To understand electrical circuits				To investigate materials						STEM Week	Consolidation/ POP Tasks
	Retrieval Practice											
Summer	To understand the Earth's movement in space	To investigate sound and hearing			To understand movement, forces and magnets			To understand light and seeing				Consolidation/ POP Tasks
	Retrieval Practice											

Year 5 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To investigate materials					To understand movement, forces and magnets						Consolidation/ POP Task
	Retrieval Practice											
Spring	To investigate living things		To understand evolution and inheritance			To understand light and seeing			To understand plants		STEM Week	Consolidation/ POP Task
	Retrieval Practice											
Summer	To understand the Earth's movement in Space				To investigate sound and hearing		To understand electrical circuits		To understand animals and humans			Consolidation/ POP Task
	Retrieval Practice											

Year 6 Science Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	To understand movement, forces and magnets						To investigate materials					Consolidation/ POP Task
	Retrieval Practice											
Spring	To understand plants		To understand light and seeing			To understand evolution and inheritance			To investigate living things		STEM Week	Consolidation/ POP Task
	Retrieval Practice											
Summer	To understand animals and humans			To understand electrical circuits		To understand the Earth's movement in Space				To investigate sound and hearing		Consolidation/ POP Task
	Retrieval Practice											

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Substantive Knowledge Categories End of Year Coverage			
EYFS – Nursery – Specific Area: Understanding the World: The Natural World			
Through a variety of topics, children will work towards these end of year goals (see EYFS progression documents breakdown): **ELG: Understanding the World: The Natural World** Children at the expected level of development will: - **Explore the natural world around them, making observations and drawing pictures of animals and plants.** - **Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.** - **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.** - Make comments about what they have heard and ask questions to clarify their understanding. - Have an awareness of the jobs available to them linked with science. - Have an awareness of the jobs available to them linked with science. - Have a sense of excitement and curiosity about natural phenomena.			
	Milestone 1 **Year 1 and 2**	**Milestone 2** **Year 3 and 4**	**Milestone 3** **Year 5 and 6**
Plants	Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Relate knowledge of plants to studies of evolution and inheritance Relate knowledge of plants to all living things
Animals, including humans	Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense Notice that animals, including humans, have offspring which grow into adults Investigate and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition form what they eat Construct and interpret a variety of food chains, identifying producers, predators and prey Identify that humans and some animals have skeletons and muscles for support, protection and movement Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions	Describe the changes as humans develop to old age Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions Describe the ways in which nutrients and water are transported within animals, including human

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Living things	Explore and compare the differences between things that are living, that are dead and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other Identify and name a variety of plants and animals in their habitats, including micro-habitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	Recognise that living things can be grouped in a variety of ways Explore and use classification keys Recognise that environments can change and that this can sometimes post dangers to specific habitats	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the process of reproduction in some plants and animals Describe how living things are classified into broad groups according to common observable characteristics Give reasons for classifying plants and animals based on specific characteristics
Evolution and inheritance	Identify how humans resemble their parents in many features	Identify how plants and animals, including humans, resemble their parents in many features Recognise that living things have changed over time and the fossils provide information about the living things that inhabited the Earth millions of years ago Identify how animals and plants are suited to and adapt to their environment in different ways	Recognise that living things have changed over times and that fossils provide information about living things that inhabited the Earth Millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to the parent Identify how animals and plants are adapted to suit their environment in different ways and how that adaptation may lead to evolution
Movement, forces, and magnets	Notice and describe how things move, using simple comparisons such as faster and slower Compare how different things move	Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having two poles Predict whether two magnets will attract or repel each other depending on which poles are facing	Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effect of drag forces such as air resistance, water resistance and friction that act between moving surfaces Describe, in terms of drag forces, why moving objects that are not driven tend to slow down Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs Understand that some mechanisms, including levers, pulleys and gears, allow a smaller force to have greater effect
Light and seeing	Observe and name a variety of sources of light including electric lights, flames and the sun, explaining the we see things because light travels from them to our eyes	Recognise that light is required in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from sun can be dangerous and that there are ways to protect your eyes Recognise that shadows are formed when light from a light source Is blocked by a solid object	Understand that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes Use the idea that light travel in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes

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		Find patterns in the way that the size of a shadow changes	Explain that we see things because light travels from light sources to our eyes or from light sources to objects then to our eyes
Sound and hearing	Observe and name a variety of sources of sound, noticing that we hear with our ears	Identify how sounds are made, associating some of them with vibrating Recognise that vibrations from sounds travel through a medium to the ear	Find patterns between the pitch of a sound and features of the object the produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases
Electrical circuits	Identify common appliances that run on electricity Construct a simple series electrical circuit	Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including calls, wires, bulbs, switches and buzzers 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 Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp light in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram
Earth's movement in space	Observe the apparent movement of the Sun during the day Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies	Describe the movement of the Earth relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth	Describe the movement of the Earth relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth Describe the sun, Earth and the Moon as approximately spherical bodies
Materials	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	Compare and group together different kinds of rocks on the basis of their simple, physical properties Relate the simple physical properties of some rocks to their formation (igneous or sedimentary) Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock Recognise that soils are made from rocks and organic matter Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (^{o}C), building on the teaching in mathematics	Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets Understand how some materials will dissolve quickly in liquid to form a solution and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes

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	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock and paper/cardboard for particular uses.	Identify the part played by evaporation and condensation in the water cycle and associate that rate of evaporation with temperature	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, oxidisation and the action of acid on bicarbonate of soda
Scientific Skills			
	Milestone 1 Year 1 and 2	**Milestone 2 Year 3 and 4**	**Milestone 3 Year 5 and 6**
Asking Questions	Ask simple questions and recognise they can be answered in different ways.	Ask relevant questions and using different types of scientific enquiries to answer them. Use results to raise further questions.	Ask relevant questions, suggesting different types of enquiry to answer them. Use results to raise further questions.
Predicting	To make simple predictions based upon their knowledge.	Use results to make predictions for further results based upon previous results and own knowledge.	Use test results to make predications and to set up further comparative and fair tests.
Setting uo tests	Perform simple tests using simple equipment.	Set up simple practical enquiries, comparative and fair tests. Use results to suggest improvements for an enquiry.	Plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary.
Observing	Use simple measurements and equipment. Observe similarities and differences closely.	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment.	Take measurements using a range of scientific equipment with increasing accuracy and precision.
Recording	Gather and record data to help answer questions.	Record findings using simple scientific language, drawings, labelled diagrams and keys. Gather, record and classify data in a variety of ways Record findings using bar charts and tables.	Record data and results of increasing complexity. Portray data using tables, scatter graphs, bar and line graphs.
Communicating Results	Talk about what they found out and how it can be used in a wider context. Use simple secondary sources to find answers. Communicate in a range of ways and being to use simple scientific vocabulary.	Use results to draw simple conclusions. Identify differences, similarities or changes to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support their findings.	Use scientific diagrams, labels, classification keys to represent scientific knowledge. Report and present findings from enquiries, including conclusions and causal relationships.
Evaluating	Use observations and ideas to suggest answers to questions.	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Present data in a variety of ways.	Discuss whether results are trustworthy, in oral and written forms, such as displays and other presentations.
Enquiry Types			
	Milestone 1 Year 1 and 2	**Milestone 2 Year 3 and 4**	**Milestone 3 Year 5 and 6**
Grouping and Classifying	Find out about the world by asking simple questions. Make simple observations using simple equipment. Compare objects with support.	Ask questions building on prior knowledge from Milestone 1. Decide which criteria you will sort objects into. Explain how objects are sorted. Use simple classification keys.	Ask scientific questions building on primary learning and wider general knowledge. Identify, classify and sort through a range of different types of classification and describe how they've been sorted and other possibilities.
Research	With support, look in non-fiction books, newspapers, magazines and the internet to find answers. Talk to 'experts' and ask the simple questions.	Look in books, newspapers, magazines and the internet to find answers. Talk to 'experts' and ask them questions based upon what you want to find out and ask them scientific questions about what they do.	Conduct own scientific research using a range of sources - books, newspapers, magazines, journals and the internet. Begin to critically analyse scientific research. Identify scientific evidence that has been used.

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Pattern Seeking	With support, begin to notice patterns and relationships. Record data through pictograms, tally charts or simple tables.	Look for naturally occurring patterns and relationships. Begin to identify, with support, changes, similarities and differences then drawing simple conclusions. Answer questions and begin to identify new questions. Record data through bar charts, pictogram and tables.	Look for different causal relationships in data and identify evidence that refutes or supports ideas. Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas.
Observtaions over Time	Observe closely using simple equipment, with support.	Make careful observations using simple equipment. Think about how long to observe for and which equipment is most suitable to use.	Decided what is best to observe and why. Choose which equipment is best suited and why. Decide what measurements to take and how to
Comparative or Fair Testing	Experience practical testing opportunities, planned with support. Use simple equipment, with support. Carry out simple tests.	Set up simple, comparative and fair tests with support. Recognise the difference between comparative and fair tests and which on is necessary. Take measurements using standard units and begin to use data loggers with support.	Choose the most appropriate equipment to make measurements and explain how to use it. Use results to make predictions and identify when further observations, comparative and fair tests might be needed.

Values	
Throughout our science curriculum, we seek to promote both our school values and our British values.	
Live without harm	We seek for children to understand the history of science and how, through the **patience** and **humility** of great scientists, the modern era has been shaped and developed We will also show children the importance of **trusting** in the scientific process, learning how to build a fair or comparative test of their own. We will give children an understanding how the study of science has helped us build a society with the **rule of law** to ensure our wellbeing and the protection of those who are vulnerable.
Equal opportunities	Our science curriculum is accessible to all children with staff differentiating appropriately so that all children can **respect** and understand the value of science. We champion group work, where possible, to enable children to **empathise** with each other's opinions and **tolerate** opposing views. We also seek to foster a sense of **responsibility** for high quality group work and accurate results.
Altruism	Through learning about the natural world around them, we aim for Hill Farm scientists to **love** the natural world around them, discovering how to **care** for and show **kindness** to their environments. By researching how humans and their environment will thrive on the basis of **mutual respect,** we will foster a sense of **generosity** towards environmental issues.
Resourcefu lness	Through practical investigation we will develop children's **curiosity** about the world around them and how it is made. We will investigate a range of scientific principles including how **individual liberty,** can affect an investigation. Children will be **courageous** in their approach to scientific investigation, being determined to reach a conclusion despite obstacles.
Navigate the world	Children at Hill Farm will become **reflective** practitioners of science, building on their prior learning, mistakes made and research undertaken with a high level of **resilience.** They will be **ambitious** with their investigations, working with other in a **democratic** process to build on and share ideas to aid investigative thinking.

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Oracy

Oracy is a vital part of scientific understanding and investigation and at Hill Farm, we recognise the importance of this. Without articulating predictions, results and methods clearly, children will not be able to demonstrate a good understanding of their task. We seek to promote oracy in science by:

- Giving children opportunity to discuss and plan tasks before embarking on them
- Mixed ability paired and group work to allow higher attaining children to model good practice to those children who haven't developed their oracy yet.
- Providing children with a range of problems which they will have to work collaboratively to solve
- Presenting results and observations to peers, groups and to the class as a whole
- Sharing high quality sentence stems related to science and having them on display within the classroom

Digital Technology

Delivery of Science lessons provides students with a perfect opportunity to use the technology around us to foster an atmosphere of creative learning.

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