



Great Ponton's Science Curriculum



Intent







To develop and encourage curiosity in our universe and promote respect for the living and non-living. Exploring and discovering what is around them, so that they have a deeper understanding of the world we live in. By facilitating a sense of wonder in the world around us and understand the use of science in our everyday lives.

We have designed our Science Curriculum with the intent to stimulate and empower all our children to develop a life-long learning of, and a competence to develop skills in, scientific investigation. We celebrate our children's success as scientists through this curriculum, and to enable them to flourish we encourage visiting speakers and workshops, get involved in Science Week activities, and enjoy school visits.













At Great Ponton, we use Hamilton Science to deliver our curriculum. This is a two-year rolling programme for each mixed year group that covers the National Curriculum for England's Science objectives for a single key stage (KS1, LKS2 and UKS2). Working scientifically, investigations and meaningful outcomes are fully incorporated in each block. The Hamilton Scheme is used as a resource to enhance the teaching of science and lessons are adapted by teachers where appropriate to suit cohorts and needs of our children.







Our children's Science journey starts in EYFS and is mapped out across all year groups to ensure knowledge and skills are built on and developed each year. We have identified both past and future learning to allow the children to make connections in their knowledge and remember more long term.

Key Concepts and Skills:

Comparative/fair testing	Identify and classify	Observation over time	Pattern seeking	Research	Exploring
					

Science Curriculum Topic Overview - Cycle A

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS /Year 1	<p>Hamilton: Habitats and Homes -Y2 <i>Living things and their habitats</i>: focus on habitats</p> <p>Reception Focus: Animals living in different environments</p> 	<p>Hamilton: Growing Things -Y1 and Y2 <i>Plants</i>: focus on needs of plants and growth</p> <p>Reception Focus: Plants and how to care for them.</p> 	<p>Hamilton: Amazing Me -Y1 <i>Animals including humans</i> and Y2 <i>Animals including humans</i>: focus on our bodies and health</p> <p>Reception Focus: Keeping healthy and Our senses.</p> 	<p>Hamilton: Wild Weather -Y1 <i>Seasonal Changes</i></p> <p>Reception Focus: Seasons and the changes they bring.</p> 	<p>Hamilton: Wild and Wonderful Creatures -Y1 <i>Animals including humans</i> and Y2 <i>Animals including humans</i>: focus on wild animals/fish.</p> <p>Reception Focus: Observe animals and their similarities and differences.</p> 	<p>Hamilton: Brilliant Builders -Y1 <i>Everyday materials</i> and Y2 <i>Uses of everyday materials</i>: focus on uses of materials including building</p> <p>Reception Focus: Vocabulary relating to materials and their properties.</p> 
Year 3/4	<p>Hamilton: Magnetic Fun and Games -Y3 <i>Forces and Magnets</i></p> 	<p>Hamilton: What's the Matter? -Y4 <i>States of Matter</i></p> 	<p>Hamilton: Sounds Spectacular -Y4 <i>Sound</i></p> 	<p>Hamilton: A World of Living Things -Y4 <i>Living Things and Their Habitats</i></p> 	<p>Hamilton: Fit for Success - Y3 <i>Animals including humans</i>: focus on food, nutrition, skeleton</p> 	<p>Hamilton: A Feast of Flowers, Fruits, and Seeds -Y3 <i>Plants</i>: focus on life cycles</p> 

Year 5/6	Hamilton: SPACE! -Y5 Earth and Space 	Hamilton: Illustrating Life Cycles -Y5 Living Things & Their Habitats 	Hamilton: The Human Species -Y5 and Y6 Animals Including Humans 	Hamilton: The Classification Code -Y6 Living Things and Their Habitats 	Hamilton: Electric Art -Y6 Electricity 	Hamilton: Sensational Science Revision Unit -Y5 and Y6 Properties and Changes of Materials 
































































	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	<u>Unit: Habitats and Homes</u> Enquiry Question: Why do animals live in different places?	<u>Unit: Growing Things</u> Enquiry Question: What should I do to grow and healthy plant?	<u>Unit: Amazing Me</u> Enquiry Question: How has my body changed and what should I do to keep it healthy?	<u>Unit: Wild Weather</u> Enquiry Question: What are the different types of weather?	<u>Unit: Wild and Wonderful Creatures</u> Enquiry Question: What are animals like and what do they need?	<u>Unit: Brilliant Builders</u> Enquiry Question: What are the things I used made from?
	Intent: Children begin to understand that different animals are suited to different habitats. Children are introduced to different habitats (ponds, woods etc. hot and cold environments)	Intent: Children begin to understand that plants are living things and need certain things to grow and stay healthy. Children are introduced to how to take care of plants.	Intent: Children begin to understand that our bodies change as we grow up and what we must do to stay healthy. Children are introduced to the five senses.	Intent: Children begin to understand what the seasons are the weather changes they bring. Children are introduced to weather related vocabulary.	Intent: Children begin to understand that we can observe animals and identify similarities and differences. Children are introduced to how we can group animals.	Intent: Children begin to understand that different objects are made from different materials. Children are introduced to the concept of why certain materials are used for certain objects.
	Future Learning: Explore and compare things that are living, dead or never been alive. Know that animals are suited to different	Future Learning: Identify and name common plants. Describe how seeds grow into mature plants and what they need to do this.	Future Learning: Animals have senses to help individuals survive. When animals sense things they are able to respond.	Future Learning: There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc Days are longer and hotter in the summer.	Future Learning: There are many different animals with different characteristics. Know that animals, including humans, have	Future Learning: There are many different materials that have different describable and measurable properties.







Year 3/4	<u>Unit: Magnetic Fun and Games</u> Enquiry Question: How can we move magnets?	<u>Unit: What's the matter?</u> Enquiry Question: Where do ice cubes go when they disappear?	<u>Unit: Sounds Spectacular</u> Enquiry Question: How can we make different sounds?	<u>Unit: A World of Living Things</u> Enquiry Question: How can we group living things?	<u>Unit: Fit for Success</u> Enquiry Question: 1. Why do animals have skeletons? 2. What is a healthy diet and why is it important?	<u>Unit: A Feast of Flowers, Fruits and Seeds</u> Enquiry Question: Why do plants have flowers?
	Builds on: Awareness of how to make things stop and start, using simple pushes and pulls.	Builds on: Distinguishing 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.	Builds on: Some understanding that objects make different sounds. Understanding that they use their ears to hear sounds. Knowledge about their different senses.	Builds on: Identify and name a variety of plants and animals in their habitats, including micro habitats. Explore and compare the difference between things that are living, dead and things that have never been alive.	Builds on: Find out 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.	Builds on: Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and warmth to grow and stay healthy.
	Future Learning: Knowledge of the Earth, Sun and Moon and how they move. Identify the effects of air resistance, water resistance and friction, which act between moving surfaces. Recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect.	Future Learning: Know that some materials will dissolve 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.	Future Learning: (KS3) Frequencies of sound waves measured in hertz (Hz), echoes, reflection and absorption of sound. Sound needs a medium to travel, the speed of sound in air, in water, in solids.	Future Learning: Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Future Learning: 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.	Future Learning: Identify how animals and plants are adapted to suit their environment in different ways, and that adaptation can lead to evolution.
	<u>Unit: SPACE!</u>	<u>Unit: Illustrating Life Cycles</u>	<u>Unit: The Human Species</u>	<u>Unit: The Classification Code</u>	<u>Unit: Electrical Art</u>	<u>Unit: Sensational Science</u>

Year 5/6	Enquiry Question: Sun, Earth & Moon: What is moving and how do we know?	Enquiry Question: Do all plants and animals reproduce in the same way?	Enquiry Question: Why and how does the human body change over time?	Enquiry Question: In what ways can we sort living things?	Enquiry Question: Can we vary the effects of electricity?	Revision Unit
	Builds on: Understand changes in weather patterns and seasons. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Builds on: Construct and interpret a variety of food chains, identifying producers, predators and prey. Identify and name a variety of plants and animals in their habitats, including micro habitats.	Builds on: 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.	Builds on: Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.	Builds on: Construct a simple series electrical circuit, identifying and naming its basic parts. Identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery. • Recognise that a switch opens and closes the circuit and associate this with whether a lamp lights in a simple series circuit.	
	Future Learning: (KS3) Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun. Our Sun as a star, other stars in our galaxy, other galaxies. The seasons and the Earth's tilt, day length at different times of year, in different hemispheres the light	Future Learning: (KS3) The adaptations of leaves for photosynthesis. The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops. The importance of plant reproduction through insect pollination in human food security.	Future Learning: (KS3) The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts).	Future Learning: (KS3) The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere.	Future Learning: (KS3) Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Potential difference measured in volts, battery and bulb ratings, resistance measured in ohms, as the ratio of potential difference (p.d.) to current. Separation of positive or negative charges	

	year as a unit of astronomical distance.				when objects are rubbed together: transfer of electrons, forces between charged objects.	
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Science Curriculum Topic Overview - Cycle B

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS Reception Focus <i>Understanding the World</i>	All About Me! Our bodies and keeping healthy  	Once Upon a Time! Plants and how to care for them    	Past and Present Materials and their properties   	To Infinity and Beyond Weather   	Blast Off Life Cycles    	Under the Sea Animals living in different environments  
	<i>Taught throughout the year - Finding out how things work through experiments and observations. Seasonal changes.</i>					
Year 1/2	Hamilton: People and Pets -Y1/Y2 <i>Animals including Humans:</i> focus on pets     	Hamilton: Weather Art -Y1 <i>Seasonal Changes</i>   	Hamilton: Food Chains -Y2 <i>Living Things and Their Habitats:</i> focus on food chains   	Hamilton: Art and Nature -Y1/Y2 <i>Plants:</i> focus on parts of flowering plants and trees    	Hamilton: Brilliant Builders! -Y1 <i>Everyday Materials</i> and Y2 <i>Uses of Everyday Materials:</i> focus on comparing materials    	Hamilton: Exploring Changes -Y1 <i>Everyday Materials</i> and Y2 <i>Uses of Everyday Materials:</i> focus on change   
Year 3/4	Hamilton: This Planet Rocks -Y3 <i>Rocks</i>    	Hamilton: Greatly Green Growers -Y3 <i>Plants:</i> focus on plants and their needs and how they work    	Hamilton: Habitat Helpers -Y4 <i>Living Things and Their Habitats</i>    	Hamilton: Shining the Light -Y3 <i>Light</i>   	Hamilton: The Circle of Life -Y3/4 <i>Animals including Humans</i>   	Hamilton: Electric Personalities -Y4 <i>Electricity</i>     

Year 5/6	Hamilton: Special Effects Materials -Y5 Properties and changes of Materials 	Hamilton: Materials Consultants -Y5 Properties and changes of Materials 	Hamilton: Welcome to Force Land -Y5 Forces 	Hamilton: Theatre Lighting Technicians -Y6 Light 	Hamilton: Survival of the Fittest -Y6 Evolution and Inheritance 	Hamilton: Medical Manoeuvrers Revision Unit -Y5 and Y6 Animals including Humans 

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS	<u>Focus: Our Bodies</u> Enquiry Question: How can we keep our bodies healthy?	<u>Focus: Plants</u> Enquiry Question: What should I do to grow and healthy plant?	<u>Focus: Materials</u> Enquiry Question: What are the things I used made from?	<u>Focus: Weather</u> Enquiry Question: What are the different types of weather?	<u>Focus: Life Cycles</u> Enquiry Question: How do animals change over time?	<u>Focus: Habitats</u> Enquiry Question: Why do animals live in different places?
	Intent: Children begin to understand what it means to be healthy. Children are introduced to ways we can keep healthy.	Intent: Children begin to understand that plants are living things and need certain things to grow and stay healthy. Children are introduced to how to take care of plants.	Intent: Children begin to understand that different objects are made from different materials. Children are introduced to the concept of why certain materials are used for certain objects.	Intent: Children begin to understand what the seasons are the weather changes they bring. Children are introduced to weather related vocabulary.	Intent: Children begin to understand that living things change as they get older. Children are introduced to the different stages of animal life cycles.	Intent: Children begin to understand that different animals are suited to different habitats. Children are introduced to different habitats (ponds, woods etc. hot and cold environments)

	Future Learning: Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Future Learning: Identify and name common plants. Describe how seeds grow into mature plants and what they need to do this.	Future Learning: There are many different materials that have different describable and measurable properties. Materials that have similar properties and can be grouped. The properties of a material determine whether they are suitable for a purpose.	Future Learning: There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc Days are longer and hotter in the summer. Days are shorter and colder in the winter	Future Learning: Identify how humans change from being a baby. Basic life cycle stages for animals and humans.	Future Learning: Explore and compare things that are living, dead or never been alive. Know that animals are suited to different habitats and that habitats provide for the basic needs and survival of living things.
Year 1/2	<u>Unit: People and Pets</u> Enquiry Question: What do you need to do to look after a pet and keep it healthy?	<u>Unit: Weather Art</u> Enquiry Question: Does the wind always blow the same way?	<u>Unit: Food Chains</u> Enquiry Question: Do all animals eat the same thing?	<u>Unit: Art and Nature</u> Enquiry Question: What's inside flowers and trees?	<u>Unit: Brilliant Builders!</u> Enquiry Question: How do we choose the best material?	<u>Unit: Exploring Changes</u> Enquiry Question: Can we change materials?
	Builds on: Knowledge of growth and change. Knowing the names of common types of animals. Knowing about how to keep healthy.	Builds on: Knowing what the seasons are, which season we are in and the changes they bring. Weather vocabulary and observations. Knowing the different types of weather.	Builds on: Knowledge of animals being suited to different environments and habitats. Knowledge of what animals need to survive.	Builds on: Observations and knowing the names of trees and plants. Knowledge of plant lifecycles.	Builds on: Being able to talk about why things happen and how things work. Discussing the things they have observed such as natural and found objects. Knowledge of what objects are made from.	Builds on: Describing the simple physical properties of a variety of everyday materials. Comparing and group together a variety of everyday materials based on their simple physical properties.

	Future Learning: Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.	Future Learning: Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the sizes of shadows change.	Future Learning: Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.	Future Learning: Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers. Explore the part flowers play in a flowering plant's life cycle, including pollination, seed formation and seed dispersal	Future Learning: 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 based on their appearance and simple physical properties.	Future Learning: Compare and group together different kinds of rocks based on their appearance and simple physical properties.
Year 3/4	<u>Unit: This Planet Rocks</u> Enquiry Question: What are rocks and soils like?	<u>Unit: Greatly Green Growers</u> Enquiry Question: How can we grow a strong plant?	<u>Unit: Habitat Helpers</u> Enquiry Question: Are living things in danger?	<u>Unit: Shining the Light</u> Enquiry Question: What is a shadow?	<u>Unit: The Circle of Life</u> Enquiry Question: What do our bodies do with the food we eat?	<u>Unit: Electric Personalities</u> Enquiry Question: What can we do with electricity?
	Builds on: Being able to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. <i>Some may</i> have some understanding of a variety of different rocks in the natural world.	Builds on: Observing and describing how seeds and bulbs grow into mature plants. Finding out and describing how plants need water, light and a suitable temperature to grow and stay healthy.	Builds on: Identify and name a variety of plants and animals in their habitats, including microhabitats. 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.	Builds on: Describe what they see, hear and feel whilst outside. Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. <i>Some may</i> have seen their shadows and may know they appear when it is sunny.	Builds on: Find out about 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	Builds on: <i>Some may</i> understand that objects need electricity to work. <i>Some may</i> understand that a switch will turn something on or off.

	Future Learning: Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius	Future Learning: Describe the life process of reproduction in some plants and animals. (KS3) Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.	Future Learning: Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Future Learning: Recognise 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 eye. Explain that we see things because light travels from light sources to our eyes.	Future Learning: Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.	Future Learning: 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.
Year 5/6	<u>Unit: Special Effects Materials</u> Enquiry Question: How can we change materials reversibly and irreversibly?	<u>Unit: Materials Consultants</u> Enquiry Question: How can materials help us?	<u>Unit: Welcome to Force Land</u> Enquiry Question: How and why do objects move?	<u>Unit: Theatre Lighting Technicians</u> Enquiry Question: Why does my shadow change length over the course of the day?	<u>Unit: Survival of the Fittest</u> Enquiry Question: Why are we all different?	<u>Unit: Medical Manoeuvres</u> Revision Unit
	Builds on: Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Compare and group materials together, according to whether they are solids, liquids or gases. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Builds on: Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).	Builds on: Compare how things move on different surfaces. Know how a simple pulley works and use making lifting an object simpler. Observe how magnets attract and repel each other and attract some materials and not others. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Builds on: Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the sizes of shadows change.	Builds on: Understand there is a variety of life on Earth. Know that some animal's differences are important to their survival. Know how animals and plants reproduce. Know how fossils form over time.	

	<p>Future Learning: (KS3) Chemical reactions as the rearrangement of atoms. Representing chemical reactions using formulae and using equations. Combustion, thermal decomposition, oxidation and displacement reactions. Defining acids and alkalis in terms of neutralisation reactions. The pH scale for measuring acidity/ alkalinity; and indicators.</p>	<p>Future Learning: (KS3) Forces as pushes or pulls, arising from the interaction between two objects. Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Moment as the turning effect of a force. Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. Forces measured in Newtons, measurements of stretch or compression as force is changed.</p>	<p>Future Learning: (KS3) The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</p>	<p>Future Learning: (KS3) Heredity as the process by which genetic information is transmitted from one generation to the next. A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.</p>	
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