



## Long Term Plan for Science

**Subject Leader: Jemma Wallace**

**Date: September 2022**

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Year 1</b> <b>Substantive concepts</b>	<b>Materials</b> Pupils develop vocabulary to describe material properties. They carry out a range of simple tests on materials and investigate the best material to make a particular object.	<b>Seasonal change</b> Pupils study the same natural area during the course of the year, looking at how the area as a whole changes and at how individual aspects such as a single tree change during the different seasons.	<b>The Animal Kingdom</b> Pupils describe the external parts of the human body and learn the basic needs of human beings. They look at a range of familiar and unfamiliar British animals and establish some basic ideas about what constitutes an animal. They learn that animals belong to one of six main groups: birds, fish, amphibians, reptiles, mammals and invertebrates.	<b>Seasonal change</b> Pupils study the same natural area during the course of the year. They use their senses to observe the area and find common animals and plants within the area. They learn how to show respect for the area and for the living things in it.	<b>Plants</b> Pupils develop vocabulary to describe material properties. They carry out a range of simple tests on materials and investigate the best material to make a particular object.	<b>Our Environment</b> Pupils study the same natural area during the course of the year, looking at how the area as a whole changes and at how individual aspects such as a single tree change during the different seasons. They use their senses to observe the area and find common animals and plants within the area.
<b>Disciplinary concepts</b>	Identifying & classifying  Fair test		Identifying & classifying  Investigating models	Observing changes over time	Observing changes over time  Looking for patterns and relationships	
<i>Enhancement</i>		Outdoor learning	Exotic Zoo or Hoo Zoo visit			

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Year 2</b> <b>Substantive Concepts</b>	<b>Materials</b> Pupils explore different materials and begin to link properties with the use of the material, carrying out an investigation to decide on the best material for a particular use and imagining what objects would be like if they were made from “silly” materials. They learn about the life of John Boyd Dunlop who invented the pneumatic tyre.	<b>Forces (Working like a Scientist)</b>	<b>Living Things</b> Pupils classify things as living, once alive and never alive. They learn about the characteristics of living things and building and observing a wormery and going outside to hunt for examples of living and non-living things. They look for characteristic of life in plants and establish that plants are living things.	<b>Animals and their Needs</b> Pupils begin by learning about the stages of human growth. They learn that animals grow until they are adult and that that different animals start life in different forms, some as eggs and some as live births and they look at the needs of the young of different species.	<b>Plants</b> Pupils think about the difference between seeds and other objects and work out what a seed is. They plant beans and monitor them weekly, observing, measuring, sketching and photographing them to provide a record of growth. They investigate the basic needs of plants for healthy growth and explore the way that plants change through the seasons.	<b>Local Habitats (food chains)</b> Pupils visit the same habitats and microhabitats at different times of year and explore the seasonal changes in a habitat and a micro-habitat. They continue to develop their observation skills.
<b>Disciplinary concepts</b>	<i>Identifying &amp; classifying, Fair test (spoons)</i>  <i>Investigating models (paper)</i>	<i>Fair test</i>  Investigative skills using Forces		<i>Identifying &amp; classifying</i>  <i>Research</i>	<i>Observing changes over time</i>  <i>Looking for patterns and relationships</i>	
<i>Enhancement</i>		Outdoor learning		Exotic Zoo or Hoo Zoo visit		Dissect ‘animal poo’

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<b>Year 3</b> <b>Substantive concepts</b>	<b>Light</b> Pupils learn to distinguish a light source from reflected light. They learn that light travels in straight lines, study how we see and are taught how to protect their eyes. They investigate the transparency of fabrics using data loggers and carry out some experiments to find out about shadow formation.	<b>Forces &amp; Magnets</b> Pupils explore magnetism and non-contact forces, suspending magnetic items in mid-air under the influence of magnetic forces. They test materials for magnetic properties and think about what materials are magnetic. They describe the properties of a magnet in simple terms and learn about the uses of magnets.	<b>Materials (Rocks)</b> This unit is intended to be taught across the whole year with a minimum of two lessons in each term. Suggested core activities are intended to be carried out each term at least once. Pupils look at the "homes" that insects and birds need and make the school friendlier towards these creatures. They evaluate the success of the measures they have taken. Pupils also observe plants over time to explore the development of seeds and the life cycle of plants.	<b>Animals and Skeletons</b> Pupils revisit the classification of animals. Begin to identify different food types and their different uses in the body. Pupils learn about external and internal skeleton, making a life size skeleton diagram and studying the names and functions of the major bones in the human skeleton.	<b>Plants</b> Pupils carry out a long-term investigation of the factors that affect the growth of plants, observing and measuring their plants for the course of the unit. They learn about the main functions of the different parts of a plant and will study the life cycle of a flowering plant, including studying the structure of a flower and the different methods of seed dispersal.	<b>Investigative skills</b> Link to seasonal change from KS1 and touch on seasons, climate change, hose pipe bans and why people may need to store water for the Summer.
<b>Disciplinary concepts</b>	<i>Fair test (curtains)</i>  <i>Patterns and relationships</i>	<i>Investigating models (toy car distance)</i>	<i>Changes over time (salt crystals)</i>  <i>Investigating models (all rocks are as hard as each other)</i>	<i>Identifying and classifying</i>	<i>Investigating models</i>	<i>Making things and developing systems (design a water storage devise)</i>
<i>Enhancement</i>						

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<b>Year 4</b> <b>Substantive concepts</b>	<b>Materials (states of matter)</b> Pupils learn that materials come in three states of matter: solid, liquid or gas. They identify materials as solids, liquids or gases, including some that are harder to classify such as sand or sponge. They learn how to use a thermometer and investigate changes of state. They learn about the water cycle.	<b>Electricity</b> Pupils learn that some materials allow electricity through them and others do not. They learn about the history of electricity and they make and test electrical circuits with a variety of components. They use their knowledge of electricity to design and build a model of a burglar alarm for a house.	<b>Sound</b> Pupils listen to and identify sounds and learn how our ears work to detect sounds. They carry out experiments to help them learn about loudness and pitch and use data loggers to investigate the best material for muffling sound. They make and play musical instruments.	<b>Digestion</b> In this unit pupils learn about the structure of the mouth and about how to care for their teeth, investigating which drink stains teeth the most. They learn about the structure of the digestive system, build a model of the digestive process and make "poo", using their new knowledge to produce a piece of creative writing. They explore interrelationships in food, constructing food chains and food webs.	<b>Classification</b> Pupils learn about the variety of living things and how they can be grouped according to shared characteristics. They use and construct keys to identify unfamiliar animals and plants	<b>Investigative skills</b> <b>Habitats to recap as this has not been covered since Year 2.</b>
<b>Disciplinary concepts</b>	<i>Changes over time (evaporation of water, temp of choc)</i>	<i>Patterns and relationships</i>  <i>Fair test</i>	<i>Fair test (liquids muffling sound)</i>  <i>Patterns and relationships (distance vs volume)</i>	<i>Research</i>	<i>Identifying and classifying a</i>  <i>Research</i>	<i>Making things and developing systems</i>
<i>Enhancement</i>						

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<b>Year 5</b> <b>Substantive concepts</b>	<b>Earth &amp; space</b> Pupils study our solar system, learning about the relative movements of the planets and the Moon and relating these to the way we experience the Sun and the Moon on Earth. They carry out some research into planets and investigate the way meteorites have shaped the surface of the Moon.	<b>Forces</b> Pupils learn more about the forces of gravity and friction and investigate the friction of different surfaces. They study air resistance, investigate paper spinners falling, look at floating and sinking and build a self-righting boat. Learning about simple forces includes activities to study pulleys, gears and other simple machines and gives pupils the chance to use their knowledge of machines to build a catapult.	<b>Mixtures &amp; reactions</b> After reviewing and extending their knowledge of materials from previous years, pupils study dissolving and learn how to recover materials from a solution. They look at other methods of separating mixtures and investigate chemical reactions including burning and use a key and a series of simple tests to identify some mystery powders. They learn about reversible and irreversible changes and they create a drama about the life of a famous materials scientist.	<b>Human Development</b> Pupils learn about the human life cycle and about the changes of the body during puberty. They learn about the development of a baby during pregnancy and about the birth of a baby. This unit has been written to match lessons in Personal, Social and Health Education on puberty and the feelings associated with growing up.	<b>Life cycles</b> Pupils revisit the life cycle of plants, and learn about pollination. They compare the life cycles of birds, mammals, insects and amphibians and learn that insects and amphibians undergo metamorphosis.	<b>Investigative skills</b> Plants to recap as this has not been covered since Year 3.
<b>Disciplinary concepts</b>	<i>Research</i>	<i>Investigating models</i>	<i>Investigating models (all kitchen ingredients dissolve in warm water)</i>	<i>Making things and developing systems</i>  <i>Fair test</i>	<i>Changes over time</i>	Fair test
<i>Enhancement</i>						

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<b>Year 6</b> <b>Substantive concepts</b>	<b>Light</b> Pupils build on their work on light in Year 3 to make more detailed investigations of shadows. They use their conclusions from this work to create shadow puppets and use special effects in their puppet shows. They study reflectivity, build a periscope and investigate the effectiveness of sunglasses, learning about the dangers of UV light.	<b>Electricity</b> Pupils learn more about circuits, including how to use recognised symbols to represent circuits. They investigate how to change the amount of electricity flowing round a circuit, looking at how different components affect the flow of electricity and at the difference that the length and thickness of wires can make.	<b>Evolution &amp; inheritance</b> Pupils learn about the life and work of Charles Darwin and what is meant by the terms evolution and survival of the fittest. They learn how animals and plants are adapted to their environment. They investigate camouflage and find out how humans evolved.	<b>Heart &amp; lungs</b> Pupils study the circulatory system, learning about the basic components that make up blood, how the heart works and how blood circulates round the body. They learn about the lungs and the process of breathing and learn about the effects of smoking and alcohol.	<b>Classification</b> Pupils build on their knowledge of classification from previous years and look at the classification of invertebrates and microorganisms in more detail. They study yeast, observing its growth and using it to make bread.	<b>Investigative skills &amp; field studies</b> Sound to recap as this has not been covered since Year 4.
<b>Disciplinary concepts</b>	<i>Fair test (shadows), changes over time (data logger overnight)</i>	<i>Patterns and relationships (cause and effect on bulb brightness)</i>	<i>Changes over time (evolution of whale)</i>  <i>Research (Charles Darwin)</i>	<i>Fair test</i>  <i>Research</i>	<i>Identifying and classifying</i>	<i>Investigating models</i>  <i>Making things and developing systems</i>
<i>Enhancement</i>	Shadow puppet shows			Play in day – Charles Darwin		