Science

BOCP CURRICULUM - KNOWLEDGE PROGRESSION

At Burnham on Crouch Primary School, our vision is to give children a Science curriculum which enables them to explore and discover the world around them to create a deeper understanding of the world that we live in. To achieve this we ensure that science in our school includes practical experiments which create a sense of wonder.
Our aim is to create future thinkers that are ambitious and want to extend their scientific knowledge and vocabulary. Our curriculum aims to broaden the children's scientific view of the world around them, whilst promoting a love for enquiry and wanting to explore new things. It gives them the chance to learn a range of skills which they can use throughout their life. We will harness and challenge their scientific skills to equip them to become young, confident scientists of the 21st Century. As a school we are delighted to have achieved the Primary Science Quality Mark, a nationally recognised award which celebrates a commitment to excellence in Science teaching and learning.
We believe that everyone is a scientist!

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In the science curriculum, topics are often revisited and developed through different key stages. This allows children to build upon their prior knowledge, develop their curiosity and embed essential knowledge into their long-term memory.

In EYFS, every term includes at least one class investigation question which children explore in adult led sessions, developing their skills in suggesting ways to find answers, predicting what will happen, observing and explaining. There are also frequent opportunities for children to pose their own questions and explore ways to answer them.

In KS1, every lesson has an element of scientific enquiry developing one or more working scientifically skills. Children are given opportunity to observe and explore real items wherever possible and to pose and answer their own questions. Each unit also includes one full investigation where children apply their knowledge and a range of scientific skills. Review of previous knowledge and a specific focus on scientific vocabulary are features of all units.

In KS2, scientific enquiry skills are delivered systematically allowing them opportunities to observe, explore, investigate, research and communicate their ideas. Each unit has an opportunity for child-led enquiry, helping them to develop their understanding of scientific ideas and begin to make sense of science as a way of finding out about the world.

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working scientifically.	To be able to talk about scientific concepts such as floating and sinking and make predictions.	Answer simple questions and understand that they can be answered in different ways use simple equipment perform simple tests identify and classify a range of objects use observations to and ideas to suggest answers to questions to gather and record data to help answer questions (Year 1 focus)	Answer simple questions and understand that they can be answered in different ways including use of scientific language Use simple equipment to observe closely including changes over time Communicate his/hers ideas, what he/she does and what he/she finds out in a variety of different ways perform simple comparative tests Identify, group and classify Use observations to suggest answer to questions noticing similarities, differences and patterns Gather and record data to help answer questions including from secondary sources information	Ask relevant questions and use different types for scientific enquiry to answer them Set up simple practical enquiries, comparative and fair tests Make systematic and fair observations and where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions Record finding using simple scientific language, drawings , labelled diagrams, keys, bar charts and tables Report on findings from enquiries, including oral and written explanation, displays or presentations of results and conclusions Make predictions for new values, suggest improvements and raise further questions Identify similarities, differences or changes related to simple scientific ideas or processes	Ask relevant questions and use different types of scientific enquiries to answer them (Year 4 focus). Set up simple practical enquiries, comparative and fair tests (Year 4 focus). Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (Year 4 focus). Gather, record, classify and present data in a variety of ways to help with answering questions (Year 4 focus). Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (Year 4 focus). Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Year 4 focus). Use results to draw simple conclusions, make predictions for new values,	Identify scientific evidence that has been used to support or refute ideas or arguments (Year 5 focus). Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (Year 5 focus). Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Year 5 focus). Record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (Year 5 focus). Use test results to make predictions to set up further comparative and fair tests (Year 5 focus). Report and present findings from enquiries,	Identify scientific evidence that has been used to support or refute ideas or arguments (Evolution). Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Use test results to make predictions to set up further comparative and fair tests. Report and present 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.

				Use straightforward scientific evidence to answer questions and support findings	suggest improvements and raise further questions (Year 4 focus). Identify differences, similarities or changes related to simple scientific ideas and processes (Year 4 focus). Use straightforward scientific evidence to answer questions or to support his/her findings (Year 4 focus).	including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 5 focus).	
Observing the world around us.	To talk about things they have observed. To ask questions about aspects of their familiar world e.g. where they live. To show care and concern for living things in the environment. To be able to understand how we can protect our environment e.g. picking up litter and the use of plastic.						
Physical Properties (including states of matter) Changes of Materials	To know that different materials have various uses e.g. which materials are magnetic. Melting and freezing - describing the changes Sorting materials, recycling material	• 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.	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Explain why I would choose a material for a particular job. • Find out how the shapes of objects made from some materials can be changed by squashing, bending, twisting and stretching.	• Recognise that soils are made from rocks and organic matter. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • I can examine and do practical experiments on various types of rocks in order to group them on the basis of their appearance and simple physical properties.	• Compare and group materials together, according to whether they are solids, liquids or gases, including tricky ones like gels, foams, mists and pastes. • 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). • Identify the part played by evaporation and condensation in the water cycle, and associate the rate of evaporation with temperature. •	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Recognise 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 by 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. • 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.	
Plants	• To know how things grow. • To understand simple life cycles. • To be able to talk about the features of plants and animals. • To know that things change over time e.g. plants and animals.	• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees.	• Explore and compare the differences between things that are living, dead and things that have never been alive. • Identify and name a variety of plants and animals in their habitats including micro-habitats. • Observe and describe how seeds and bulbs grow into plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy • Describe how animals get their food from plants and other animals using a simple food chain.	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, 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 part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
Earth and Space (including seasonal change)	• To observe the changes through autumn, winter, spring and summer. • To observe and describe weather associated with the seasons. •	• 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, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies.	

						• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
Animals including humans Living things and their habitats	Identify, name, draw and label the basic parts of the human body To know how things grow. To understand simple life cycles. To be able to talk about the features of plants and animals. To know that things change over time e.g. plants and animals. Nocturnal animals – making sense of habitats. Non-fiction arctic environment and animals. Comparing the Arctic to their local environment. **Minibeasts – naming different minibeasts and labelling the body parts, looking at habitats and microhabitats**	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the reptiles, birds and mammals, 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 babies, which grow into adults. Investigate and describe the basic needs of animals, including humans, for survival. Describe the importance of exercise, eating healthily and keeping clean. Identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name variety of plants and animals in their habitats including micro-habitats.	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.	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. Construct and interpret a variety of food chains, identifying producers, predators and prey.	Describe the changes as humans develop into old age. 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.	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. Describe the ways in which nutrients and water are transported within animals, including humans Give reasons for classifying plants and animals based on specific characteristics. 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.
Light	Exploring light and dark. How can we see in the dark? • Dark tent exploration and using torches • Explore shadows –can you catch your shadow? • Shadow drawing			Notice that light is reflected from surfaces. Recognise that he/she needs light in order to see things and that dark is the absence of light. Recognise that light from the sun can be dangerous and that there are ways to protect 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 size of shadows changes.			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 or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Sound					Identify how sounds are made, associating some of them with something 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 that 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.		
Forces and Magnets	To talk about scientific concepts such as floating and sinking To know that different materials have various uses e.g. which materials are magnetic.			Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Compare and group together a variety of everyday materials on the basis of whether or not they are attracted to a magnet, and identify some magnetic materials. Observe how magnets attract or 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.		Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Understand that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	
Electricity					Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts,		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.

					including cells, 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 lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.		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.
Evolution and inheritance							Recognise that living things have changed over time 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 their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.