The Science Curriculum at Crowthorne – Upper Key Stage 2

Working Scientifically:

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting 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
- identifying scientific evidence that has been used to support or refute ideas or arguments

NC Objective Programme of Study	Year 5	Year 5 Unit	Year 6	Year 6 Unit
Living things and their habitats	Pupils should be taught to: • 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	Chn compare the life cycles of different animals including humans, and how they adapt to their habitats: which life cycle or cycles produce live young that look very like their parents, only smaller? Which don't? Which animals look very different at certain points in their life cycle? What are the different stages of each animal's life cycle, and their similarities and differences? Length of lifecycles? How long before a female can reproduce. How many young might a female have at one birth, over many years)? How long might the animal live. They look at the life cycle of toad, bumblebee, blue tit and elephant. They create a fact file on the life cycle of a mammal, a bird, an amphibian and an insect. P4C Would you rather be a mammal, a bird, an amphibian or an insect? Children learn about the life cycle of a flowering plant and how they reproduce	Pupils should be taught to: • 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 • give reasons for classifying plants and animals based on specific characteristics	**Classification: The Nature Library** Biography Carl Linnaeus Chd devise classification system using sweets – consider features behind their choices. Consider further subsections and characteristics which influence this. Chd work in groups to classify plants scientifically – considering leaf shape, height, habitat. Agree criteria. Chd create a classification chart for animals considering the combination of characteristics – animals are vertebrates. Chd create classification charts for invertebrates with further sub groups. Investigation into microorganisms and how they grow best: In what type of conditions do you think moulds grow best? Why might investigation microorganisms be particularly difficult? Chd write conclusion after collecting results over a period of time. Chd create posters to represent the differences in 5 types of Animalia/plants and fungi. Research into extinct animals creating a fact file about chosen creature.
Animals, including humans	Pupils should be taught to: • describe the changes as humans develop to old age	This is taught alongside the living things and their habitats unit. Children look at how different animals reproduce: Children compare the process of reproduction in mammals and birds, identifying and describing similarities and differences between the two and naming both as examples of sexual reproduction using venn diagrams Children compare the process of reproduction in amphibians and insects, identifying and describing similarities and differences between the two and recognizing both as examples of sexual reproduction, with some exceptions- they give presentations	Pupils should be taught to: • 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	**Humans: Body Health – diet and fitness:** Practical demonstration on how blood is circulated around the body - chd take on the role of the heart, lungs and blood. Chd draw and label diagram Label to show direction of blood flow around the system with addition of oxygenated and deoxygenated blood Investigation into main functions of the heart – possible opportunity to dissect a heart and show chambers. Children draw and label heart. Chd investigate how blood transports gases around the body. Chd 'make' blood and create

		Children compare human life cycle compare with that of other mammals and learn how girls become women and boys become men		presentation for each component and its function. Investigation into valves, arteries and capillaries – concept questions. Questions to investigate how nutrients and water are transported around the body . Chd explore the link between diet, exercise and a healthy lifestyle. Present a concept poster Chd investigate labelling on food packaging and look at the 'Eatwell' plate. Investigation into what is a healthy snack.
	Properties and changes of materials Pupils should be taught to: • 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 • 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 • 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	Children identify, compare and group materials based on their properties and according to their own or given criteria Children test whether solid is always hard and place a range of materials along a hardness scale (Spr) Children experiment with separating dry mixtures using magnetism and sieving They find out what happens when a solid is mixed with a liquid They purify materials by separating a solution through filtering and evaporating Children experiment with dissolving materials in a liquid to form solutions; children find out what makes a difference to how quickly sugar and or salt dissolves They learn that dissolving, mixing and changes of state are reversible changes through observation (Au) Chn are taught about non reversible changes. Discussion on the ways in which metals are used around their school and in the wider world, and link these uses to the properties of the metals. Learn about different types of metal and which are/are not magnetic Children compare plastic, meatal and wooden spoons and how they behave when in hot water (learn about insulator and conductors of heat and electricity) (Spr)	**Evolution and Inheritance** Pupils should be taught to: • 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	**Evolution and Inheritance**: Biography: Charles Darwin Recognise that Earth is billions of years old Identify ways in which living things of the same kind vary and investigate the differences in variety Chd compare similarities and differences between humans Discussion on what is inherited, environmental or combination of both. Discussion on selective breeding in dogs and how and why species have evolved. Application of ideas to how different plants are developed and evolved. Debate: Should we carry out selective breeding? (P4C) Investigation into how animals have adapted to their environment. Observation of local area and how plants grow. How does the environment affect their growth? Use information to consider where and when fossils came from. Chd prepare presentation about evolution of fossil. Chd research and create a presentation on a chosen animal and how it has evolved and adapted to its environment. Chd create a creature to inhabit a given environment, using skills from previous lesson to consider necessary characteristics to allow survival.
	Earth and Space Pupils should be taught to: • 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	Children are taught what is in space and that the Earth, Sun and Moon are spherical shapes and draw a diagram of the solar system They are taught that a year is the time it takes for the earth to travel around the sun and that we get day and night because the Earth is spinning on its axis. They learn that we have different seasons because the Earth is tilted on its axis.	**Light** Pupils should be taught to: • 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	**Light: sight, properties of light, shadows** Biography: Thomas Young Consolidation of Year 3 work about the behaviour of light Chd create an activity to support a younger child to answer questions about light. How do we see things? What is darkness? Why is it easier to find a silver coin than a black button in a dark room? Is it safe to look at the sun?

	• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	A model is used to explain why sunrise and sunset occur at different moments in time in different parts of the world Children learn about the phases of the moon and why it appears to change shape: they learn about its orbit of the Earth (Spr)	• 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	What is a shadow? What do I need to make a good shadow? What do the words 'transparent', 'translucent' and 'opaque' mean? Describe how a mirror reflects an image of an object, using the idea that light travels in straight lines – mirror writing activities Experiment how their faces appear in a spoon and the journey the light source makes. Investigation into how light travels in a straight line – drawing and using of periscopes labelled diagrams how they can use mirrors to direct the light source to the eye. Activity – making a pin hole camera Investigation into measuring a shadow – chd create and plan their own question to investigate; carry out test and write conclusion. What do they know about changing shadow sizes? Children present graph and conclusion form investigation. Look at light refraction using water observation and diagrams Produce posters to represent all they know about light and how it travels.
	Forces Pupils should be taught to: • 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 • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	Children learn that There are different types of forces. Some work in contact with objects, such as friction, air resistance and water resistance; others work at a distance (non-contact forces), such as magnetism and gravity. Friction is a force that opposes motion between moving surfaces in contact. The size of this force depends on the properties of the surfaces (for example, roughness). They use newton metres to measure how much force is needed to pull different weighted surfaces along a table Children learn that When objects fall, gravity pulls them towards the centre of the Earth. The speed of the descent is affected not by an object's mass, but by the opposing drag force – air resistance. Without air resistance any objects dropped simultaneously hit the ground simultaneously. Children conduct investigations to support or refute Aristotle and Galileo's theories about why objects fall. Children draw diagrams and force arrows to represent forces acting upon an object They conduct investigations into how to slow down a falling parachute Children investigate how the Shape of an Object Affects its Movement in a Liquid using their knowledge of water resistance Children are taught the difference between What is the	**Electricity** Pupils should be taught to: • 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	**Electricity: Introducing resistors and changing voltage:** Biography: Thomas Edison Chd represent circuits in diagrams using accurate electrical symbols Construction of circuits with a variety of given materials – chd to select appropriate components. Chd introduce extra lamps/buzzers/motors and investigate how they work differently dependent on amount of components and batteries Chd investigate positioning of switches and components. Introduction of another switch to control separate components and variety of voltage. Introduction of resistors into a circuit and discussion on how this affects components. Circuit diagram bingo for matching symbols. Research into how electricity is made and investigate renewable energy. Chd create presentation

		difference between up thrust and water resistance? Children learn about how different mechanisms (levers, gears and pulleys) allow a smaller force to have a greater effect levers. They produce non-chronological reports and use their knowledge to design and make a moving toy in DT and use K'nex to build mechanisms during STEM Science week (Spr).		