Science SUBSTANTIVE knowledge progression overview

Substantive knowledge is the collection of established facts within a subject. It's the content that students need to know and provides the foundational knowledge needed to understand the world. In Science, the knowledge is organised by the national curriculum components of animals and humans, seasonal changes, plants, living things and their habitats, rocks, materials, light, forces, sound, electricity, earth and space and evolution and inheritance.

At Hollybrook Schools the children know:

NC Components	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals, including Humans	• I know that we need food and drink to live. • I know that I can see and feel different things outside. • I know that I change from a baby to a toddler, to a child, to an adult. • I know the names of different body parts- head, neck, arms, legs, back, tummy, hands and feet. • I know that some animals are pets, some live in the wild and others I will see at a farm or at a zoo. • I know that birds have feathers, some animals have fur and can talk about the features of animals we keep as 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. • 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 structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	• Notice that animals, including humans, have offspring which grow into adults • 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.	• how to 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 • identify that humans and some other 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 • construct and interpret a variety of food chains, identifying producers, predators and prey	• 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 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.

Seasonal Changes	• I know which weather I can see and feel. • I know that the seasons change. • I know that some trees lose their leaves in Autumn. • I know that the weather changes and can name some sorts of weather. • I know that winter is colder and summer is hotter. • I know the season we are in.	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.						
NC Components	EYFS	Year 1	Year 2	Year 3		Year 4	Year 5	Year 6
Light	•	•	The children in year 2 will look at how light comes through transparent objects but not through opaque.	• 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 • an opaque object find patterns in the way that the size of shadows change				• 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

Plants	• I know that plants need water to grow. • I know that a seed can be planted and will grow. • I know the names of common fruit and vegetables and can talk about ones I have tried. • I know the different parts of a plant, root, stem, petal, leaf. • I know that fruit and vegetables come from plants.	• 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.	• 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/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			
Rocks		• The children will identify rock/stone as part of their materials topic. • Year 1 and 2 may describe it's properties as hard, waterproof, rough or smooth, opaque. • Year 2 may suggest suitable and unsuitable uses for rock as a material.	• compare and group together different kinds of rocks on the basis of their appearance • and simple physical properties • describe in simple terms how fossils are formed when things that have lived are • trapped within rock • recognise that soils are made from rocks and organic matter				

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living Things and their habitats	• I know that some animals live in other countries because of their habitats	• Through a longitudinal study, the children identify plants that survive in and around the pond area.	• Explore and compare the differences between things that are living, 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 microhabitats. • 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 to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things	• 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.	• 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

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	• I know the names of some common materials- fabric, paper, metal, wood and plastic. • I am beginning to know which materials can keep things dry through hands on experiences.- coats, wellies, plastic. • I know that some materials float and some sink. • I know that some materials change when they get wet and can use this knowledge to build a boat that will float. • I know that ice is frozen water. • I know that ice melts and changes from a solid to a liquid.	• 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, identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. •		<u>States of Matter</u> • 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 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 • 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.	

Forces					• 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.	• 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.	
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		
Electricity					• identify common appliances that run on electricity		• associate the brightness of a lamp or the

					• construct a simple series electrical circuit, identifying and naming its basic parts, 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		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 and space						• 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.	
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.