


Knowledge Overview: Science

Year 6 (Last year of two year cycle – Working Document to be completed this year)

	Autumn 1	Autumn 2 & Spring 1	Spring 2 & Summer 1	Summer 2
	Light (Y6)	Animals (Y6) Circulatory System	Forces (Y5)	Living Things and habitats (Y5) Animals (Y5)
<p>NC Objectives Covered (Taken directly from the National Curriculum)</p> <p>Red= substantive knowledge</p> <p>Blue= disciplinary knowledge</p>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 the changes as humans develop to old age
<p>Working Scientifically-disciplinary (Taken from the PLAN materials/NC)</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Making observations and taking measurements.</p> <p>Reporting and presenting 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</p>	<p>Reporting and presenting 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</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Making observations and taking measurements.</p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>Reporting and presenting 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</p>
<p>Previous Knowledge -What have children learnt previously that will support this next step?</p>	<ul style="list-style-type: none"> Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light) Notice that light is reflected from surfaces. (Y3 - Light) Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light) • Find patterns in the way that the size of shadows change. (Y3 - Light) 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. (Y5 - Properties and changes of materials) 	<ul style="list-style-type: none"> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans) 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. (Y3 - Animals, including humans) Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans) 	<ul style="list-style-type: none"> Compare how things move on different surfaces. (Y3 - Forces and magnets) Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets) 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. (Y3 - Forces and magnets) Describe magnets as having two poles. (Y3 - Forces and magnets) Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets) 	<ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

<p>Misconceptions -What are the common misconceptions in knowledge for this unit?</p>	<p>Some children may think:</p> <ul style="list-style-type: none"> We see objects because light travels from our eyes to the object. 	<p>Some children may think:</p> <ul style="list-style-type: none"> your heart is on the left side of your chest the heart makes blood the blood travels in one loop from the heart to the lungs and around the body when we exercise, our heart beats faster to work the muscles more some blood in our bodies is blue and some blood is red we just eat food for energy all fat is bad for you all dairy is good for you protein is good for you, so you can eat as much as you want foods only contain fat if you can see it drugs are bad for you. 	<p>Some children may think:</p> <ul style="list-style-type: none"> the heavier the object the faster it falls, because it has more gravity acting on it forces always act in pairs which are equal and opposite smooth surfaces have no friction objects always travel better on smooth surfaces a moving object has a force which is pushing it forwards and it stops when the pushing force wears out a non-moving object has no forces acting o 	<p>Some children may think:</p> <ul style="list-style-type: none"> all plants start out as seeds all plants have flowers plants that grow from bulbs do not have seeds only birds lay eggs a baby grows in a mother's tummy a baby is "made".
<p>Learning Sequence -Detail the learning sequence using key questions in an ordered sequence. -The questions should have a sequential build up to answer the overall learning challenge.</p>	<ol style="list-style-type: none"> Can I prove that light travels in straight lines? Can I understand that objects are seen because they give out or reflect light into the eye? Can I explain how light is reflected from different materials? Can I explore reflection? Can I explain why shadows have the same shape as the objects that cast them Can I explore what happens when light travels through water? 			
<p>Curriculum End Points -What will children know and be able to do by the end of the unit? -What will the children produce to demonstrate this knowledge?</p>	<p>Diagrams of light – using practical examples, drawn explanations. Diagrams showing how an object blocks light from travelling in a straight line. An investigation to show how they have explored light travelling through water.</p>			
<p>Knowledge Sentences -Using the end points, what are the key statements children need to remember by the end of the unit? (I know that...) (To share with children when it is taught during the unit)</p>	<ol style="list-style-type: none"> I know that light travels in a straight line. I know that some objects give out light and some objects reflect light into our eyes. I know that we see things because light is reflected into our eyes. I know that shadows are created when an object blocks light. 			

Key Vocabulary (To share with children and add to working walls/knowledge mats)	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, straight lines, light rays	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings, Puberty – the vocabulary to describe sexual characteristics	
What does this look like at Bramhope?	Enrichment Activities (trips, residential, speakers, SMSC)		Heart dissection activity/visit		Wildlife garden – for planting bulbs/potatoes, observing pollination, making observations of strawberry plants
	Physical Resources (artefacts)	Torches Batteries Mirrors Shiny metal spoons		Equipment for making parachutes gears, levers and pulleys	Different plant examples e.g. tubers, bulbs, plants with runners Plant cuttings for propagation Potatoes to chit
	Cross Curricular learning (Include opportunities for writing and quality texts)	DT – creating shadow puppets Computing – using micro:bits as light sensors	Dr Astrocat’s Human Body Odyssey	DT - Design, build and test model cars, rockets or bridges, and investigate the forces acting on them. PE – investigating forces/air resistance through throwing rugby balls, javelins. See outdoor ideas.	Botanicum The boy in the tower
	Local Learning including outdoor learning (These need editing)		The playground provides a larger space to create a model of the circulatory system. Pupils explore how their pulse rate changes during and after exercise.	Make parachutes and drop from greater height in school e.g. Y5/6 classrooms to investigate air resistance. It may be more convenient to explore water resistance in the playground to avoid water on the floor in the classroom. Visit the local playground and explore friction by going down the slide on different materials.	Pupils take cuttings from plants in the wildlife to grow. Pupils could plant potatoes and strawberry plants in raised beds and observe their reproduction process over time (looking at tubers on potatoes and runners on strawberries). Pupils visit wildlife garden to make observations of different plants e.g. moss/ferns for spores /different ways of plants reproducing. Take photos and make annotations. Pupils could make wildflower bombs and decide where is a good location in the wildlife garden for the seeds

				<p>Running across the playground, then running across with an open umbrella to introduce the concept of air resistance.</p> <p>Throwing different equipment like rugby balls and javelins across the playground to investigate air resistance.</p> <p>Hitting a tennis ball into the air in the playground to understand gravity. What other forces are influencing the ball? What happens when you hit it with a harder force?</p> <p>Sports equipment</p> <p>Umbrellas</p> <p>Water trays</p> <p>Materials for parachutes</p>	to disperse and grow. This could link back to lifecycle work in the classroom.
	Opportunities for cultural Diversity				