

Wath Victoria Primary School

Science Progression of Skills and Knowledge – based on Chris Quigley’s essentials curriculum

	Milestone 1: By the age of 7, children should be able to:	Milestone 2: By the age of 9, children should be able to:	Milestone 3: By the age of 11, children should be able to:
To work scientifically	<ul style="list-style-type: none"> • Ask simple questions. 	<ul style="list-style-type: none"> • Ask relevant questions. 	<ul style="list-style-type: none"> • Plan enquiries, including recognising and controlling variables where necessary.
	<ul style="list-style-type: none"> • Observe closely, using simple equipment 	<ul style="list-style-type: none"> • Set up simple, practical enquiries and comparative and fair tests. 	<ul style="list-style-type: none"> • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
	<ul style="list-style-type: none"> • Perform simple tests. 	<ul style="list-style-type: none"> • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. 	<ul style="list-style-type: none"> • Take measurements, using a range of scientific equipment, with increasing accuracy and precision.
	<ul style="list-style-type: none"> • Identify and classify. 	<ul style="list-style-type: none"> • Gather, record, classify and present data in a variety of ways to help in answering questions. • Identify differences, similarities or changes related to simple, scientific ideas and processes. 	<ul style="list-style-type: none"> • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.
	<ul style="list-style-type: none"> • Use observations and ideas to suggest answers to questions. 	<ul style="list-style-type: none"> • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. 	<ul style="list-style-type: none"> • Use test results to make predictions to set up further comparative and fair tests.
	<ul style="list-style-type: none"> • Gather and record data to help in answering questions. 	<ul style="list-style-type: none"> • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use straightforward, scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used

			to support or refute ideas or arguments.
Biology: To understand plants	<ul style="list-style-type: none"> Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. 	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. 	<p><i>Making connections from prior learning into UKS2 learning could be done through:</i></p> <ul style="list-style-type: none"> Relating knowledge of plants to studies of evolution and inheritance. Relating knowledge of plants to studies of all living things.
	<ul style="list-style-type: none"> Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. 	<ul style="list-style-type: none"> 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. 	
	<ul style="list-style-type: none"> Observe and describe how seeds and bulbs grow into mature plants. 	<ul style="list-style-type: none"> Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	
	<ul style="list-style-type: none"> Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> Investigate the way in which water is transported within plants. 	
Biology: To understand animals and humans	<ul style="list-style-type: none"> Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. 	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. 	<p><i>Making connections from prior learning into UKS2 learning could be done through:</i></p> <ul style="list-style-type: none"> Relating knowledge of common animal types to studies of evolution and inheritance.
	<ul style="list-style-type: none"> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. 	<ul style="list-style-type: none"> Construct and interpret a variety of food chains, identifying producers, predators and prey. 	
	<ul style="list-style-type: none"> Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets). 	<ul style="list-style-type: none"> Identify that humans and some animals have skeletons and muscles for support, protection and movement. 	<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.
	<ul style="list-style-type: none"> Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans. 	<ul style="list-style-type: none"> Describe the ways in which nutrients and water are transported within animals, including humans.
	<ul style="list-style-type: none"> Investigate and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating 	<ul style="list-style-type: none"> Identify the different types of teeth in humans and their simple functions. 	<ul style="list-style-type: none"> Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

	the right amounts of different types of food and hygiene.		
	<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. 	<p><i>Making connections from prior learning between KS1 and UKS2 could be done through:</i></p> <ul style="list-style-type: none"> • <i>Relating knowledge of humans having offspring into PSHE and SRE.</i> 	<ul style="list-style-type: none"> • Describe the changes as humans develop to old age.
<p>Biology:</p> <p>To investigate living things</p>	<ul style="list-style-type: none"> • Explore and compare the differences between things that are living, that are dead and that have never been alive. 	<ul style="list-style-type: none"> • Recognise that living things can be grouped in a variety of ways. 	<ul style="list-style-type: none"> • 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.
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Recognise that environments can change and that this can sometimes pose dangers to living things. 	<p><i>Making connections from prior learning into UKS2 learning could be done through:</i></p> <ul style="list-style-type: none"> • <i>Relating knowledge of changing habitats and environments to studies of evolution and inheritance.</i>
	<ul style="list-style-type: none"> • Identify and name a variety of plants and animals in their habitats, including micro-habitats. 	<ul style="list-style-type: none"> • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. 	
	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • <i>Construct and interpret a variety of food chains, identifying producers, predators and prey. (repeated milestone from 'understanding animals and humans unit'</i> 	<ul style="list-style-type: none"> • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.

<p>Biology:</p> <p>To understand evolution and inheritance</p>	<p><i>Preparatory knowledge for UKS2 (daily dashboard) and links to familiar stories:</i></p> <ul style="list-style-type: none"> • <i>Identify how humans resemble their parents in many features.</i> 	<p><i>Preparatory knowledge for UKS2 (daily dashboard) and links to familiar stories:</i></p> <ul style="list-style-type: none"> • <i>Identify how plants and animals, including humans, resemble their parents in many features.</i> • <i>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (prior knowledge gained through Stone Age work in theme and English).</i> • <i>Identify how animals and plants are suited to and adapt to their environment in different ways (prior knowledge gained from science: habitats work)</i> 	<ul style="list-style-type: none"> • 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.
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<p>Chemistry:</p> <p>To investigate materials</p> <p>Note: direct progression between milestones is not possible in this objective. Breadth and depth within the milestone will allow for progression in knowledge and understanding.</p>	<ul style="list-style-type: none"> • 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 out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. 	<p>Rocks and Soils</p> <ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). • Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter. <p>States of Matter</p> <ul style="list-style-type: none"> • 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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<ul style="list-style-type: none"> • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how 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, oxidation and the action of acid on bicarbonate of soda.
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<p>Physics:</p> <p>To understand movement, forces and magnets.</p> <p>Note: direct progression between milestones is not possible in this objective. Breadth and depth within the milestone will allow for progression in knowledge and understanding.</p>	<p><i>Prior learning to support learning in LKS2 – links to be made in DT: mechanisms and in familiar stories.</i></p> <ul style="list-style-type: none"> • <i>Notice and describe how things move, using simple comparisons such as faster and slower.</i> • <i>Compare how different things move.</i> 	<ul style="list-style-type: none"> • 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. 	<p>Magnets</p> <ul style="list-style-type: none"> • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. <p>Forces</p> <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 effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • <i>Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.</i> • <i>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. DT: mechanisms connection.</i> • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect.
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<p>Physics:</p> <p>To understand light and seeing.</p> <p>Note: direct progression between milestones is not possible in this objective. Breadth and depth within the milestone will allow for progression in knowledge and understanding.</p>	<p><i>Prior learning in preparation for LKS2 can be carried out in daily dashboard and linked to seasons and weather.</i></p> <ul style="list-style-type: none"> • <i>Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.</i> 	<ul style="list-style-type: none"> • 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 a solid object. • Find patterns in the way that the size of shadows change. 	<ul style="list-style-type: none"> • Understand 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 eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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.
<p>Physics:</p> <p>To investigate sound and hearing</p> <p>Note: direct progression between milestones is not possible in this objective. Breadth and depth within the milestone will allow for progression in knowledge and understanding.</p>	<p><i>Preparation for LKS2 can come through a number of subjects e.g. music and PSHE.</i></p> <ul style="list-style-type: none"> • <i>Observe and name a variety of sources of sound, noticing that we hear with our ears</i> 	<ul style="list-style-type: none"> • Identify how sounds are made, associating some of them with something vibrating. • Recognise that vibrations from sounds travel through a medium to the ear. 	<ul style="list-style-type: none"> • 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.
<p>Physics:</p> <p>To understand electrical circuits</p> <p>Note: direct progression between milestones is not possible in this objective. Breadth and depth within the milestone will allow for progression in knowledge and understanding.</p>	<p><i>Preparation for LKS2 can develop through DT: electronics, ICT, PSHE (safety)</i></p> <ul style="list-style-type: none"> • <i>Identify common appliances that run on electricity.</i> • <i>Construct a simple series electrical circuit.</i> 	<ul style="list-style-type: none"> • Identify common appliances that run on electricity. • 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, 	<ul style="list-style-type: none"> • 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.

		<p>and associate metals with being good conductors.</p>	
<p>Physics:</p> <p>To understand the earth's movement in space.</p>	<ul style="list-style-type: none"> • <i>Observe the apparent movement of the Sun during the day – daily dashboard and time work.</i> • Observe changes across the four seasons (daily dashboard) • Observe and describe weather associated with the seasons and how day length varies (daily dashboard) 	<ul style="list-style-type: none"> • <i>Describe the movement of the Earth relative to the Sun in the solar system.</i> • <i>Describe the movement of the Moon relative to the Earth.</i> 	<ul style="list-style-type: none"> • 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.

Children working below these milestones or preparing to access them will develop the following generic knowledge and skills:

P4	P5	P6	P7	P8	Early Years
<ul style="list-style-type: none"> • Explore objects and materials provided, changing some materials by physical means and observing the outcomes. • Communicate awareness of changes in light, sound or movement. • Imitate actions involving main body parts. • Make sounds using their own bodies, and imitate or copy sounds. • Cause intentional movement by a pushing or pulling action. 	<ul style="list-style-type: none"> • Take part in activities focused on the anticipation of and enquiry into specific environments. • Match objects and materials with single features or properties. • Indicate the before and after of material changes. • Try out a range of equipment in familiar and relevant situations. 	<ul style="list-style-type: none"> • Recognise distinctive features of objects. • Begin to make generalisations, connections and predictions from regular experience. • Sort materials according to a single criterion when the contrast is obvious. • Observe closely changes that occur. • Identify some appliances that use electricity. • Show knowledge of some sources of sound and light. 	<ul style="list-style-type: none"> • Understand the scientific use of some simple vocabulary, such as before, after, bumpy, grow, eat and move, and communicate related ideas and observations using simple phrases. • Demonstrate simple properties of light, sound and movement. • Make simple records of findings. • Begin to make suggestions for planning and evaluating work. 	<ul style="list-style-type: none"> • Observe patterns or regular changes in features of objects, living things and events. • Make some contribution to planning and evaluation and to recording findings. • Identify a range of common materials and know about some of their properties. • Sort materials using simple criteria and communicate observations of materials in terms of these properties. • Make observations of changes of light, sound or movement that result from actions and describe the changes when questioned. 	<ul style="list-style-type: none"> • Know about similarities in relation to places, objects, materials and living things. • Make observations of animals and plants and explain why some things occur. • Talk about changes.