

Stonelow Junior School Science Progression Map

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- **Working Scientifically**
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 - b) Living things and their habitats:
 - c) Animals, including humans:
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 - e) Electricity:
 - f) Earth & Space:
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	Lower KS2	Upper KS2
Working Scientifically	<p>During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them; • setting up simple practical enquiries, comparative and fair tests; • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers; • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions; • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables; • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions; • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions; • identifying differences, similarities or changes related to simple scientific ideas and processes; • using straightforward scientific evidence to answer questions or to support their findings. 	<p>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:</p> <ul style="list-style-type: none"> • 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.

	Lower KS2	Upper KS2
Asking questions and carrying out fair and comparative tests	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> • start to raise their own relevant questions about the world around them in response to a range of scientific experiences; • start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; • recognise when a fair test is necessary; • help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used; • set up and carry out simple comparative and fair tests. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Using test results to make predictions to set up further comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> • with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; • with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; • explore and talk about their ideas, raising different kinds of scientific questions; • ask their own questions about scientific phenomena; • select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; • make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; • plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary; • use their test results to identify when further tests and observations may be needed;
Observing and Measuring Changes	<p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Children can:</p> <ul style="list-style-type: none"> • make systematic and careful observations; • observe changes over time; • use a range of equipment, including thermometers and data loggers; • ask their own questions about what they observe; • where appropriate, take accurate measurements using standard units using a range of equipment. 	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Children can:</p> <ul style="list-style-type: none"> • choose the most appropriate equipment to make measurements and explain how to use it accurately; • take measurements using a range of scientific equipment with increasing accuracy and precision; • make careful and focused observations; know the importance of taking repeat readings and take repeat readings where appropriate.

	Lower KS2	Upper KS2
Identifying, Classifying, Recording and Presenting Data	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Children can:</p> <ul style="list-style-type: none"> • talk about criteria for grouping, sorting and classifying; • group and classify things; • collect data from their own observations and measurements; • present data in a variety of ways to help in answering questions; • use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; • record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables. 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children can:</p> <ul style="list-style-type: none"> • independently group, classify and describe living things and materials; • use and develop keys and other information records to identify, classify and describe living things and materials; • decide how to record data from a choice of familiar approaches; • record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.
Drawing Conclusions, Noticing Patterns and Presenting Findings	<p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Children can:</p> <ul style="list-style-type: none"> • draw simple conclusions from their results; • make predictions; • suggest improvements to investigations; • raise further questions which could be investigated; • first talk about, and then go on to write about, what they have found out; • report and present their results and conclusions to others in written and oral forms with increasing confidence. 	<p>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.</p> <p>Children can:</p> <ul style="list-style-type: none"> • notice patterns; • draw conclusions based in their data and observations; • use their scientific knowledge and understanding to explain their findings; • read, spell and pronounce scientific vocabulary correctly; • identify patterns that might be found in the natural environment; • look for different causal relationships in their data; • discuss the degree of trust they can have in a set of results; • independently report and present their conclusions to others in oral and written forms.

	Lower KS2	Upper KS2
Using Scientific Evidence and Secondary Sources of Information	<p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children can:</p> <ul style="list-style-type: none"> • make links between their own science results and other scientific evidence; • use straightforward scientific evidence to answer questions or support their findings; • identify similarities, differences, patterns and changes relating to simple scientific ideas and processes; • recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children can:</p> <ul style="list-style-type: none"> • use primary and secondary sources evidence to justify ideas; • identify evidence that refutes or supports their ideas; • recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; • use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; • talk about how scientific ideas have developed over time.

	Lower KS2	Upper KS2
Biology: Plants	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>investigate the way in which water is transported within plants</p> <p>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>Describe the life process of reproduction in some plants (and Animals, including humans)</p>

	Lower KS2	Upper KS2
Biology: Living Things and their Habitats	<p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants, and animals</p> <p>Give reasons for classifying plants and animals based on special characteristics</p> <p>Describe the life process of reproduction in some plants and animals</p>

	Lower KS2	Upper KS2
Biology: Animals including Humans	<p>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 that humans and some other animals have skeletons and muscles for support, protection and movement</p> <p>Find out about and describe the basic needs of Animals, including humans, including humans, for survival (water, food and air)</p> <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify that Animals, including humans, 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</p> <p>describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p>	<p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within Animals, including humans,</p> <p>Identify and name the main parts of the circulatory system, and explain the functions of the heart, blood vessels and blood.</p> <ul style="list-style-type: none"> • Describe the life processes of reproduction in some Animals, including humans • Describe the changes as humans develop from birth to old age • Describe the differences in the life cycles of mammal, amphibian, insect & bird

	Lower KS2	Upper KS2
Biology: Evolution and Inheritance	<p>From 'The Earth (Rocks, Atmosphere):</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p>	<p>Evolution and inheritance Pupils should be taught to:</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how Animals, including humans and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p>

	Lower KS2	Upper KS2
Chemistry: Materials	<p>compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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),</p> <p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>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</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>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</p>

	Lower KS2	Upper KS2
Chemistry: The Earth (rocks and atmosphere)	<p>Recognise that that soils are made from rocks and organic matter</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Compare and group together different kinds of rocks on the basis of their simple physical properties</p>	

	Lower KS2	Upper KS2
Physics: Forces and Motion	<p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Compare how things move on different surfaces</p>	<p>explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including gears, pulleys, levers and springs, allow a smaller force to have a greater effect</p>

	Lower KS2	Upper KS2
Waves: Light	<p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Recognise that they need light in order to see things and that dark is the absence of light</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object</p> <p>Find patterns that determine the size of shadows.</p>	<p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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> <p>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>

	Lower KS2	Upper KS2
Waves: Sound	<p>Sound: Identify how sounds are made, associating some of them with something vibrating</p> <p>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</p> <p>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>	

	Lower KS2	Upper KS2
Magnetism	<p>notice that some forces need contact between two objects and some forces act at a distance</p> <p>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. observe how magnets attract or repel each other and attract some materials and not others</p> <p>Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	

	Lower KS2	Upper KS2
Electricity	<p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<p>Use recognised symbols when representing a simple circuit in a diagram</p> <p>associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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.</p>

	Lower KS2	Upper KS2
Earth and Space		<p>describe the movement of the Earth and other planets relative to the Sun in the solar system</p> <p>describe the movement of the Moon relative to the Earth</p> <p>describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>

	Lower KS2	Upper KS2
Energy		<p>understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs</p>