

## LONG TERM PLAN SCIENCE KEY STAGE TWO - THREE YEAR CYCLE FOR– 3/4/5 MIXED AGE GROUPS

### NB:

1. Teachers should teach topics in the order that links well with other areas, or as stand-alone units if there is no suitable link. So you may want to move the units around within a year..... This is especially important within a three-year cycle.
2. One topic does not equal one half term - length of time should be adjusted to assessed need.  
Begin each unit with assessment using AFL resources - such as **Explore, Engage and Extend** or **Concept Cartoons** - to help you work out where to spend more or less time on a concept, your sequence of learning.
3. In brackets I have put the original year group where the descriptor occurs in National Curriculum so that you can search for supporting materials. A great starting point is to look at [www.planassessment.com](http://www.planassessment.com) / [www.stem.org.uk](http://www.stem.org.uk) / <https://explorify.wellcome.ac.uk/login>
4. Review this long-term plan regularly as it will need adjusting over time.

### WORKING SCIENTIFICALLY

Working Scientifically is at the heart of science and should be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. It should not be taught as a separate strand. There are five different types of scientific enquiry: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data.

As the class is a mixed aged group – teachers should use the following working scientifically guidance to help them differentiate or meet the needs of all learners; to give support where needed or provide challenge. The aim is that all learners become independent scientists with the necessary skills to follow an enquiry for themselves....

Every lesson should have an element of working scientifically and a key idea or concept which the children uncover and explore through one of the types of enquiry. The enquiry type is determined by the question. You will notice that there are five topics per year to work through... this also allows time for children to ask and answer their own questions, for teachers to return to previous learning and to explore things that your class becomes interested in e.g.: plastic pollution, new species of animals being discovered or science in the news.

		KS1		Lower KS2		Upper KS2	
		Y1	Y2	Y3	Y4	Y5	Y6
<b>Working Scientifically</b>	Approaches to enquiry	<i>Children should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including (1) observing changes over a period of time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out simple comparative tests and (5) finding things out using secondary sources of information.</i>		<i>Children should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including (1) observing changes over time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out simple fair tests and (5) finding things out using secondary sources of information.</i>		<i>Children should select the most appropriate ways to answer science questions using different types of scientific enquiry, including (1) observing changes over different periods of time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out fair tests and (5) finding things out using a wide range of secondary sources of information.</i>	
	Planning	<ul style="list-style-type: none"> <li>asking simple questions and recognising that they can be answered in different ways</li> </ul>		<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>setting up simple practical enquiries, comparative and fair tests</li> </ul>		<ul style="list-style-type: none"> <li>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> </ul>	
	Observing	<ul style="list-style-type: none"> <li>observing closely, using simple equipment</li> <li>performing simple tests</li> <li>identifying and classifying</li> </ul>		<ul style="list-style-type: none"> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>		<ul style="list-style-type: none"> <li>taking measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate</li> </ul>	
	Recording	<ul style="list-style-type: none"> <li>gathering and recording data to help in answering questions</li> </ul>		<ul style="list-style-type: none"> <li>gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> </ul>		<ul style="list-style-type: none"> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>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</li> </ul>	
	Concluding	<ul style="list-style-type: none"> <li>using their observations and ideas to suggest answers to questions</li> </ul>		<ul style="list-style-type: none"> <li>reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>using straightforward scientific evidence to answer questions or to support their findings</li> </ul>		<ul style="list-style-type: none"> <li>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</li> </ul>	
	Evaluating			<ul style="list-style-type: none"> <li>using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions.</li> </ul>		<ul style="list-style-type: none"> <li>using test results to make predictions to set up further comparative and fair tests.</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	

YEAR A	YEAR B	YEAR C
<b>AUTUMN TERM:</b>		
<p><b>MATERIALS: CLASSIFYING AND GROUPING</b></p> <ul style="list-style-type: none"> <li>☑ give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (5)</li> <li>☑ compare and group materials together, according to whether they are solids, liquids or gases (4)</li> <li>☑ 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. (5)</li> </ul>	<p><b>MATERIALS: WATER CYCLE</b></p> <ul style="list-style-type: none"> <li>☑ 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) (4)</li> <li>☑ identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (4)</li> </ul>	<p><b>MATERIALS: SEPARATING</b></p> <ul style="list-style-type: none"> <li>☑ know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (5)</li> <li>☑ demonstrate that dissolving, mixing and changes of state are reversible changes (5)</li> <li>☑ 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. (5)</li> <li>☑ use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (5)</li> </ul>
<p><b>ELECTRICITY: CIRCUITS &amp; SWITCHES</b></p> <ul style="list-style-type: none"> <li>☑ identify common appliances that run on electricity (4)</li> <li>☑ construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers (4)</li> <li>☑ 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 (4)</li> <li>☑ recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit (4)</li> <li>☑ recognise some common conductors and insulators, and associate metals with being good conductors (4)</li> </ul>	<p><b>EARTH &amp; SPACE</b></p> <ul style="list-style-type: none"> <li>☑ describe the movement of the Earth, and other planets, relative to the Sun in the solar system (5)</li> <li>☑ describe the movement of the Moon relative to the Earth (5)</li> <li>☑ describe the Sun, Earth and Moon as approximately spherical bodies (5)</li> <li>☑ use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. (5)</li> </ul>	<p><b>ROCKS</b></p> <ul style="list-style-type: none"> <li>☑ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (3)</li> <li>☑ describe in simple terms how fossils are formed when things that have lived are trapped within rock (3)</li> <li>☑ recognise that soils are made from rocks and organic matter. (3)</li> </ul>
<b>SPRING TERM:</b>		
<p><b>LIGHT: SHADOWS</b></p> <ul style="list-style-type: none"> <li>☑ recognise that they need light in order to see things and that dark is the absence of light (3)</li> <li>☑ notice that light is reflected from surfaces (3)</li> <li>☑ recognise that shadows are formed when the light from a light source is blocked by an opaque object (3)</li> </ul>	<p><b>CONTACT, NON-CONTACT FORCES &amp; MAGNETS</b></p> <ul style="list-style-type: none"> <li>☑ compare how things move on different surfaces (3)</li> <li>☑ notice that some forces need contact between two objects, but magnetic forces can act at a distance (3)</li> <li>☑ observe how magnets attract or repel each other and attract some materials and not others (3)</li> </ul>	<p><b>SOUND</b></p> <ul style="list-style-type: none"> <li>☑ identify how sounds are made, associating some of them with something vibrating (4)</li> <li>☑ recognise that vibrations from sounds travel through a medium to the ear (4)</li> <li>☑ find patterns between the pitch of a sound and features of the object that produced it (4)</li> </ul>

<ul style="list-style-type: none"> <li>☒ recognise that the light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>☒ find patterns in the way that the size of shadows change. (3)</li> </ul>	<ul style="list-style-type: none"> <li>☒ 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 (3)</li> <li>☒ describe magnets as having two poles (3)</li> <li>☒ predict whether two magnets will attract or repel each other, depending on which poles are facing. (3)</li> </ul>	<ul style="list-style-type: none"> <li>☒ find patterns between the volume of a sound and the strength of the vibrations that produced it (4)</li> <li>☒ recognise that sounds get fainter as the distance from the sound source increases. (4)</li> </ul>
<p><b>FORCES: GRAVITY, FRICTION &amp; MECHANISMS</b></p> <ul style="list-style-type: none"> <li>☒ explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (5)</li> <li>☒ identify the effects of air resistance, water resistance and friction, that act between moving surfaces (5)</li> <li>☒ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (5)</li> </ul>	<p><b>ANIMALS: TEETH, DIET &amp; DIGESTION</b></p> <ul style="list-style-type: none"> <li>☒ 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 (3)</li> <li>☒ describe the simple functions of the basic parts of the digestive system in humans (4)</li> <li>☒ identify the different types of teeth in humans and their simple functions (4)</li> </ul>	<p><b>ANIMALS: SKELETONS &amp; MUSCLES</b></p> <ul style="list-style-type: none"> <li>☒ identify that humans and some other animals have skeletons and muscles for support, protection and movement. (3)</li> </ul>
<b>SUMMER TERM:</b>		
<p><b>PLANTS: REPRODUCTION &amp; GROWTH</b></p> <ul style="list-style-type: none"> <li>☒ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (3)</li> <li>☒ 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 (3)</li> <li>☒ investigate the way in which water is transported within plants (3)</li> <li>☒ explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (3)</li> </ul>	<p><b>OUR LOCAL ENVIRONMENT *</b></p> <ul style="list-style-type: none"> <li>☒ recognise that living things can be grouped in a variety of ways (4)</li> <li>☒ explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (4)</li> <li>☒ construct and interpret a variety of food chains, identifying producers, predators and prey (4).</li> <li>☒ recognise that environments can change and that this can sometimes pose dangers to living things (4)</li> </ul>	<p><b>ANIMALS: LIFECYCLES &amp; REPRODUCTION</b></p> <ul style="list-style-type: none"> <li>☒ describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (5)</li> <li>☒ describe the life process of reproduction in some plants and animals. (5)</li> <li>☒ describe the changes as humans develop to old age. (5)</li> </ul>
<p>You will notice that there are five units per year.... This matches what is in the national curriculum. But remember some units will take longer than others. So use this time to follow children's interests etc.</p>		

YEAR SIX.....

AUTUMN TERM:		SPRING TERM:		SUMMER TERM:	
<p><b>CLASSIFICATION</b>                      ☒ 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 (6)                      ☒ give reasons for classifying plants and animals based on specific characteristics. (6)</p>	<p><b>ANIMALS: HEALTHY LIFESTYLE, EXERCISE AND CIRCULATION</b>                      ☒ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (6)                      ☒ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (6)                      ☒ describe the ways in which nutrients and water are transported within animals, including humans. (6)</p>	<p><b>ELECTRICITY: ADDING COMPONENTS</b>                      ☒ associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (6)                      ☒ 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 (6)                      ☒ use recognised symbols when representing a simple circuit in a diagram. (6)</p>	<p><b>EVOLUTION &amp; INHERITANCE</b>                      ☒ recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago (6)                      ☒ recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (6)                      ☒ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (6)</p>	<p><b>LIGHT: HOW DO WE SEE?</b>                      ☒ 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 (6)                      ☒ 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 (6)                      ☒ recognise that light from the sun can be dangerous and that there are ways to protect their eyes (6)                      ☒ use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (6)</p>	<p>You will notice that there are five units per year.... This matches what is in the national curriculum. But remember some units will take longer than others. So use this time to follow children's interests.....</p>