

## FJS Science Long Term Plan

### **Key Stage 2**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Pupils should read, spell and pronounce scientific vocabulary correctly.

<b>Working Scientifically - Lower KS2 Years 3 &amp; 4 Cycle 1 &amp; 2</b>	<b>Working Scientifically - Upper KS2 Years 5 &amp; 6</b>
<p>Planning:</p> <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> <p>Observing:</p> <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> <p>Recording:</p> <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> <p>Concluding:</p> <ul style="list-style-type: none"> <li>§ reporting on findings from enquiries, including oral and written</li> </ul>	<p><b>Statutory Guidance:</b></p> <ul style="list-style-type: none"> <li>§ planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>§ taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>§ recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>§ using test results to make predictions to set up further comparative and fair tests</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> <p><b>Non Statutory Guidance:</b></p> <p>By the end of KS2 pupils select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should 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; choose the most appropriate equipment to make measurements and explain how to use it accurately.</p>

explanations, displays or presentations of results and conclusions

§ identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

Evaluating:

§ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas.

They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.

## Programmes of Study

	Year 3/4 Cycle 1	Year 3/4 Cycle 2	Year 5	Year 6
AUTUMN 1	<p><b><u>Rocks (chemistry)</u></b></p> <p>Pupils should be taught to (Y3):</p> <p>§ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>§ describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>- recognise that soils are made from rocks and organic matter.</p>	<p><b><u>Living Things and their Habitats (biology)</u></b></p> <p>Pupils should be taught to (Y4):</p> <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><b><u>Earth and Space</u></b></p> <p>Ptolemy, Alhazen, Copernicus, Brian Cox and Patrick Moore.</p> <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>	<p><b><u>Light</u></b></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>
A U TUMN		<p><b><u>Animals, including Humans (biology)</u></b></p> <p>§ identify that animals,</p>		<p><b><u>Electricity</u></b></p> <p>§ associate the brightness of a lamp or the volume of a buzzer with</p>

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SPRING  1		<p><b><u>Plants (biology)</u></b> Botanist: David Bellamy</p> <p>Pupils should be taught to (Y3):</p> <p>§ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>§ explore the requirements of</p>	<p><b><u>Properties and changes</u></b> Spencer Silver and Ruth Benerito</p> <p>-compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and responses to magnets.</p> <p>-know that some materials will dissolve in liquids to form a solution, and describe how to recover a</p>	<p><b><u>Evolution and inheritance</u></b></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>

		<p>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>substance from a solution.</p> <p>-use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>-give reasons, based in evidence from comparative and fair tests, for the particular uses everyday materials, including metals, wood and plastic.</p> <p>-demonstrate that dissolving, mixing and changes of state are reversible changes.</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>	<p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>
<p>SPRING</p> <p>2</p>	<p><b><u>Light</u></b></p> <p>§ recognise that they need light in order to see things and that dark is the absence of light</p> <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 shadows are formed when the light from a light source is</p>	<p><b><u>States of Matter (chemistry)</u></b></p> <p>Pupils should be taught to (Y4):</p> <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</p>	<p><b><u>Living things and their habitats</u></b> <b>David Attenborough and Jane Goodall</b></p> <p>-describe the differences in the life cycles of mammal, an amphibian, an insect and a bird.</p> <p>-describe the life process of reproduction in some plants and animals.</p>	<p><b><u>Living Things and Their Habitats</u></b></p> <p>§ 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</p> <p>give reasons for classifying plants and animals based on specific characteristics.</p>

	<p>blocked by a solid object</p> <p>find patterns in the way that the size of shadows change.</p>	<p>evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>		
<p>SUMMER</p> <p>1</p>	<p><b><u>Forces and Magnets (physics)</u></b></p> <p>Pupils should be taught to (Y3):</p> <p>§ compare how things move on different surfaces</p> <p>§ notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>§ observe how magnets attract or repel each other and attract some materials and not others</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</p> <p>§ describe magnets as having two poles</p> <p>- predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p><b><u>Sound (physics)</u></b></p> <p>Alexander Graham Bell</p> <p>Pupils should be taught to (Y4):</p> <p>§ 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</p> <p>§ 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</p> <p>- recognise that sounds get fainter as the distance from the sound source increases.</p>	<p><b><u>Animals, including humans.</u></b></p> <p>-describe the changes as humans develop to old age</p>	<p><b><u>Animals inc Humans</u></b> circulatory system,</p> <p>§ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</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>SUMMER</p> <p>2</p>		<p><b><u>Electricity (physics)</u></b></p> <p>Pupils should be taught to (Y4):</p> <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><b><u>Forces</u></b></p> <p>Galileo, Issac Newton</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 levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	