

## Year 5

## Science

Block	Key NC Science Objectives	Key Science Activities and <b>Extended Writing Opportunities</b>
<p style="text-align: center;"><b>Autumn 1 – Earth &amp; Space Space!</b></p> <p><i>Prof Brian Cox is in the process of commissioning a new series of Stargazing programmes aimed at young children and he's hoping you are willing to help him out. He needs three episodes that cover the planets and solar system; night and day; and the lunar month. You will need to come up with a title for each episode and include practical and clear explanations and demonstrations of the science behind each phenomenon. Are you up for the challenge and do you have what it takes to be a Space Presenter?</i></p>	<p><b>Earth &amp; Space</b></p> <ol style="list-style-type: none"> <li>i. Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>ii. Describe the movement of the Moon relative to the Earth</li> <li>iii. Describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>iv. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li> </ol> <p><b>Working Scientifically (UKS2)</b></p> <ol style="list-style-type: none"> <li>i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>iii. Recording results using scientific diagrams and labels</li> <li>iv. Using test results to make predictions to set up further comparative and fair tests</li> <li>v. 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> <li>vi. Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ol>	<ul style="list-style-type: none"> <li>• Develop enquiry questions (<b>planning</b>)</li> <li>• Create a scale model of the solar system (<b>exploring/analysing secondary sources</b>)</li> <li>• Create an orrery to explore heliocentricity (<b>exploring/analysing secondary sources</b>)</li> <li>• Create a shadow clock to explore day and night (<b>observing over time</b>)</li> <li>• Create a sundial and explore time zones (<b>exploring/analysing secondary sources</b>)</li> <li>• Investigate moon phases (<b>exploring/analysing secondary sources</b>)</li> </ul> <p><b>Extended writing opportunity</b></p> <p><b>Information text:</b> Write a leaflet or poster giving facts and figures about your favourite planet/s.</p> <p><b>Journalistic writing:</b> Write your own stargazing column for a local paper based on daily observations.</p>

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<p style="text-align: center;"><b>Autumn 2 - Forces</b></p> <p style="text-align: center;"><b>May the forces be with you</b></p> <p><i>A rare and valuable meteorite has just landed on Earth and the Natural History Museum is sending in a recovery team to retrieve it. As the remote part of this retrieval team you need to overcome an array of challenges that will require you to put your knowledge and understanding of forces into action. May the forces be with you...</i></p>	<p><b>Forces</b></p> <ol style="list-style-type: none"> <li>i. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>ii. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>iii. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> </ol> <p><b>Working Scientifically (UKS2)</b></p> <ol style="list-style-type: none"> <li>i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>iii. Recording results using scientific diagrams and labels</li> <li>iv. Using test results to make predictions to set up further comparative and fair tests</li> <li>v. 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> <li>vi. Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ol>	<ul style="list-style-type: none"> <li>• Investigate parachutes and air resistance (<b>problem solving/fair testing</b>)</li> <li>• Investigate and create levers (<b>problem solving/fair testing</b>)</li> <li>• Investigate and create pulleys (<b>problem solving/fair testing</b>)</li> <li>• Investigate gears (<b>problem solving/fair testing</b>) Investigate friction (<b>problem solving/fair testing</b>)</li> <li>• Investigate boats and water resistance (<b>problem solving/fair testing</b>)</li> </ul> <p><b>Extended writing opportunity</b></p> <p><b>Biography:</b> Research key facts about Isaac Newton and write a brief biography for a science hall of fame.</p> <p><b>Journalistic reports:</b> Write an article, for a cycling magazine, based on your investigation of bike gears and tell them the best gear combinations for specific terrains.</p> <p><b>Explanation:</b> Based on your scientific investigation, explain clearly to the recovery team leader which shape of boat is best for crossing safely across a water way and why, giving scientific reasons.</p>

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<p>Spring 1 – Properties and changes of materials</p> <p><b>Music festival materials</b></p> <p><i>The annual Spring Music Festival launches in just over 2 months and you have been selected to form the ‘materials committee’. Do you know your thermal insulators from your thermal conductors? Can you find the best materials for take-out bags and drinks bottles? You will need to carry out an impressive array of tests to identify which materials are up to the job for a variety of festival needs. Roll your festival sleeves up... you’re going to need to get your hands dirty!</i></p>	<p><b>Properties and changes of materials</b></p> <ol style="list-style-type: none"> <li>Compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal)</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> </ol> <p><b>Working Scientifically (UKS2)</b></p> <ol 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 results using scientific diagrams and labels</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> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ol>	<ul style="list-style-type: none"> <li>Investigate hard materials suitable for food prep (<b>exploring</b>)</li> <li>Investigate thermal insulating properties of materials to keep refreshments hot or cold (<b>exploring/fair testing</b>). Investigate possible food packaging materials (<b>exploring/fair testing</b>)</li> <li>Investigate the absorbency of materials suitable for cleaning with (<b>exploring/fair testing</b>)</li> <li>Investigate electrical insulators/conductors for health and safety purposes (<b>exploring/pattern seeking/fair testing</b>)</li> <li>Investigate materials that combine soundproofing with comfort (<b>exploring/fair testing</b>).</li> </ul> <p><b>Extended writing opportunity</b></p> <p><b>Recount:</b> Write to stall holders and explain your investigation into the insulating properties of a range of materials and make recommendations of materials to store hot drinks and ice cream.</p> <p><b>Non-chronological writing:</b> Create and write a report that identifies the best materials for ear defenders, based on your data and understanding of materials.</p>

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<p>Spring 2 – Properties and changes of materials</p> <p><b>Changing materials education pack</b></p> <p><i>The Science Museum wants to expand its Science Kitchen education resource to include more exciting materials investigations. You have been selected to devise and write the materials to be included. You will need to carry out a range of investigations into the changes that occur to certain materials when they are heated, cooled and mixed with other materials to ensure your content is accurate and inspiring. Get your lab coats on - it's going to get messy!</i></p>	<p><b>Properties and changes of materials</b></p> <ul style="list-style-type: none"> <li>ii. Compare and group together everyday materials on the basis of their properties, including their solubility and response to magnets</li> <li>ii. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>iii. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>v. Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>vi. 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</li> </ul> <p><b>Working Scientifically (UKS2)</b></p> <ul style="list-style-type: none"> <li>i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>iii. Recording results using scientific diagrams and labels</li> <li>iv. Using test results to make predictions to set up further comparative and fair tests</li> <li>v. 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> <li>vi. Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	<ul style="list-style-type: none"> <li>• Compare properties of solids, liquids and gases (<b>exploring</b>)</li> <li>• Investigate mixing materials (<b>exploring</b>) Investigate separating materials (<b>exploring</b>)</li> <li>• Make new materials (<b>exploring</b>) Investigate irreversible changes (<b>exploring</b>)</li> <li>• Present findings in the form of an education pack for the Science Museum (<b>pattern seeking</b>)</li> </ul> <p><b>Extended writing opportunity</b></p> <p><b>Information text:</b> write a report of your methods and findings for the Science Museum.</p> <p><b>Biography:</b> Research key information about some chemists who have invented very useful new materials and write short biographies for a class hall of fame.</p> <p><b>Argument and debate:</b> Take part in a balloon debate and argue why your particular materials chemist should survive the trip.</p>

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<p>Summer 1 – Living Things and their Habitats</p> <p><b>The art of living</b></p> <p><i>You have been commissioned to create an inspirational and informative collection of scientific illustrations on the theme of animal and plant life cycles. Develop your mastery of key art skills as you create accurate and eye catching illustrations that tell the life cycle story of a range of nature's wonders. Select your best work to be entered into the 'Excellence in Scientific Illustration' awards. Along the way hone your skills as a natural scientist and top off your work with an audience with David Attenborough, Jane Goodall and their natural scientist colleagues.</i></p>	<p><b>Living things and their habitats</b></p> <ol style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>Describe the life process of reproduction in some plants and animals</li> </ol> <p><b>Working Scientifically (UKS2)</b></p> <ol 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 results using scientific diagrams and labels</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> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ol>	<ul style="list-style-type: none"> <li>Observe and sketch insect and amphibian lifecycles for comparison (<b>observing over time</b>)</li> <li>Research and sketch mammalian and bird life cycles for comparison (<b>analysing secondary sources</b>)</li> <li>Compare the lifecycles of mammals, amphibians, insects and birds (<b>pattern seeking</b>)</li> <li>Research reproduction in plants and animals (<b>analysing secondary sources/pattern seeking</b>). Create computer animations that explain plant reproduction (<b>analysing secondary sources</b>)</li> <li>Create computer animations that explain animal reproduction (<b>analysing secondary sources</b>)</li> </ul> <p><b>Extended writing opportunity</b></p> <p><b>Chronological report:</b> write up the life cycle of an insect, amphibian, mammal, bird or plant for a class information book.</p> <p><b>Biography:</b> research a significant naturalist or animal behaviourist and create a poster that showcases their life, achievements and significance.</p>

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<p style="text-align: center;"><b>Summer 2 – Animals (including humans) Life Explorers</b></p> <p><i>One of the big publishing houses in the UK has approached you to write a children’s non-fiction book about the human lifecycle. Can you research and collate information on growth, development, puberty and old age, and present it in a sensitive and logical way that is suited to children aged 8-12? Are you up for the challenge of creating a visually appealing and marketable book that will fly off the shelves? You have 6 weeks until the deadline...</i></p>	<p>Animals (including humans)</p> <p>i. Describe the changes as humans develop to old age</p> <p>Working Scientifically (UKS2)</p> <p>i. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>ii. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>iii. Recording results using scientific diagrams and labels</p> <p>iv. Using test results to make predictions to set up further comparative and fair tests</p> <p>v. 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>vi. Identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<ul style="list-style-type: none"> <li>• Create a human timeline (<b>analysing secondary sources</b>)</li> <li>• Create a human growth quiz (<b>analysing secondary sources/pattern seeking</b>)</li> <li>• Research and create an infographic on baby growth (<b>analysing secondary sources</b>)</li> <li>• Compare ‘red books’ and predict growth patterns (<b>pattern seeking/observing over time</b>)</li> <li>• Create gestation period graphs for a range of animals (<b>analysing secondary sources</b>)</li> <li>• Explain gestation through graphic novel style (<b>analysing secondary sources</b>)</li> </ul> <p><b>Extended writing opportunities</b>  <b>Non-fiction various:</b> write sections for their non-fiction book on the human lifecycle e.g. ‘things to expect in old age’, ‘key physical and emotional changes during puberty’ etc.</p>

Hamilton Science; Types of Investigations

'Working Scientifically' is the continuous area of study in the National Curriculum for Science in England. This aims to ensure that children have greater exposure to a range of enquiry types and that they recognize when the various forms of enquiry are taking place. This is to enable them to decide for themselves which type to use in order to tackle the question they are investigating. The following types of enquiry are included in Hamilton Science planning.

**Exploring:**

Discovering what happens through play and exploration, e.g. what happens when you add water to fabric?

**Observing over time:**

Often linked to exploring but with a time variable included, e.g. using a thermometer to observe temperature changes of water.

**Sorting, classifying and identifying:**

Putting things into groups based on their characteristics, e.g. in how many ways can you sort these materials?

**Fair test:**

Used when we can control all the variables except the one we are changing, e.g. which 'towel' material will absorb the most water?

**Pattern seeking:**

Used when there are too many variables to control and so a true fair test is not possible, e.g. do some people have stronger muscles because they use them more?

**Problem solving:**

Using the science we know to solve a problem, e.g. Using what you have learned about how sounds are made and the loudness of sounds made by different materials, design an effective bird scarer that uses wind chimes or similar.

**Researching and analysing secondary sources**

Using secondary sources to help answer scientific questions that cannot be answered through practical investigations, e.g. which materials are biodegradable?