Fellgate Primary School
Together Everyone Achieves More

# Subject Overview with challenge

**BOLD** = National Curriculum Objectives
*Italics* = Concepts

| Year 5: expected | | | |
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| Working scientifically | Chemistry | Biology | Physics |
| **Planning Investigations**<br><br>*Pupils can plan an enquiry*<br>**With prompting, plan different types of scientific enquiries to answer questions**<br>• with support, can answer questions using evidence gathered from different types of scientific enquiry, e.g. comparing life cycles of different plants using change over time, surveys and secondary research.<br><br>*Pupils can identify and manage variables*<br>**With prompting, recognise and control variables where necessary**<br>• with prompting, identifies and manages variables, e.g. when exploring falling paper cones. | **Properties and changes of materials**<br><br>*Materials have physical properties which can be investigated and compared*<br>**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**<br>• Test and sort a range of materials based on their physical properties.<br><br>**Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution**<br>• Describe how some materials, e.g. sugar, will dissolve and can be retrieved.<br><br>**Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating**<br>• Justify separation techniques proposed, with reference to materials being separated.<br><br>**Demonstrate that dissolving, mixing and changes of state are reversible changes** | **Living things and their habitats**<br><br>*Life exists in a variety of forms and goes through cycles – Animals*<br>**Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird**<br>• Identify similarities and differences in two different life cycles, e.g. sparrow and butterfly, with reference to eggs and intermediate stages.<br><br>**Describe the life process of reproduction in some plants and animals**<br>• Describe in sequence the stages of reproduction in some plants and animals, e.g. dog and a thistle. | **Forces**<br><br>*There are contact and non-contact forces; these affect the motion of objects*<br>**Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object**<br>• Explain that gravity causes objects to fall towards Earth.<br><br>**Identify the effects of air resistance, water resistance and friction, that act between moving surfaces**<br>• Describe how motion may be resisted by air resistance, water resistance or friction.<br><br>**Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect**<br>• Describe how some devices may turn a smaller force into a larger one. |

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| **Conducting experiments**<br><br>*Pupils can use equipment to take measurements*<br>**Select, with prompting, and use appropriate equipment to take readings**<br>• following discussion of alternatives, selects appropriate equipment, e.g. using a shadow stick and measuring length and angle of shadow.<br><br>*Pupils explore how to improve the quality of data*<br>**Take precise measurements using standard units**<br>• can take measurements that are precise as well as accurate, e.g. measuring the force needed to pull different shapes of boat through the water.<br><br>*Pupils understand the role of repeat readings*<br>**Take and process repeat readings**<br>• know how to process repeat readings, e.g. when timing falling objects. | • Show how the original materials can be retrieved from each of these changes.<br><br>**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**<br>• Identify reactants and products of chemical changes and recognise these as being irreversible.<br><br>*The physical properties of materials determine their uses*<br>**Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic**<br>• Use evidence to justify the selection of a material for a purpose. | **Animals, including humans**<br><br>*The human body has a number of systems, each with its own function*<br>**Describe the changes as humans develop to old age**<br>• Describe the changes as humans develop to old age, e.g. trends in changes to size, weight, mobility etc | **Earth and Space**<br><br>*Day, night, month, seasonal change & year are caused by the position and movement of the Earth*<br>**Describe the movement of the Earth, and other planets, relative to the Sun in the solar system**<br>• Draw a diagram or use a model to describe planetary orbits.<br><br>**Describe the movement of the Moon relative to the Earth**<br>• Draw a diagram or use a model to describe the Moon's orbit around the Earth.<br><br>*Day, night, month, seasonal change & year are caused by the position and movement of the Earth*<br>**Describe the Sun, Earth and Moon as approximately spherical bodies**<br>• Describe the Sun, Earth & Moon as spheres.<br><br>**Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky**<br>• Use a diagram or model to explain why the Sun seems to travel across the sky, and what causes day and night. |

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| **Recording evidence**<br><br>*Pupils record work with diagrams and label them*<br>**Record data and results**<br>• start to use labelled diagrams to show more complex outcomes, e.g. comparing the time of day at different places on the earth.<br><br>*Pupils can display data using labelled diagrams, keys, tables and bar charts*<br>**Record data using labelled diagrams, keys, tables and charts**<br>• with prompting, use various ways to record complex evidence, e.g. when investigating how gears and levers enable a small force to have a larger effect.<br><br>*Pupils can display data using line graphs*<br>**Use line graphs to record data**<br>• use a line graph to record basic data, e.g. length and mass of a baby as it grows. | | | |
| **Reporting findings**<br><br>*Pupils process findings to develop conclusions and identify causal relationships*<br>**Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships** | | | |

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| • with prompting, write a conclusion using evidence and identifying causal links, e.g. investigating what makes a parachute fall quicker.<br><br>*Pupils use displays and presentations to report on findings*<br>**With support, present findings from enquiries orally and in writing**<br>• with support, display and present key findings from enquiries orally and in writing, e.g. suggesting reasons for similarities and differences between various animals.<br><br>*Pupils explain confidence in findings*<br>**With prompting, identify that not all results may be trustworthy**<br>• with support, indicate why some results may not be entirely trustworthy, e.g. when timing falling objects. | | | |
| **<u>Conclusions and predictions</u>**<br><br>*Pupils can analyse data*<br>**Suggest how evidence can support conclusions**<br>• show how evidence supports a conclusion, e.g. researching gestation periods of various mammals and relating them to adult mass.<br><br>**Suggest further comparative or fair tests**<br>• suggest further relevant comparative or fair tests, e.g. when testing | | | |

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<tr><td>materials for various properties to determine their suitability for an application.</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Year 5: challenging</td></tr>
<tr><td>Working scientifically</td><td>Chemistry</td><td>Biology</td><td>Physics</td></tr>
<tr><td><u>Planning Investigations</u><br><br>Pupils can plan an enquiry<br>With prompting, plan different types of scientific enquiries to answer questions<br>• answer questions using evidence gathered from different types of scientific enquiry.<br><br>Pupils can identify and manage variables<br>With prompting, recognise and control variables where necessary<br>• identify and manage variables.</td><td rowspan="2"><u>Properties and changes of materials</u><br><br>Materials have physical properties which can be investigated and compared<br>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<br>• Suggest why those properties might influence the selection of those materials for certain uses.<br><br>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>• Identify that some soluble materials are more soluble than others.<br><br>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating<br>• Explain why a particular separation method might be more effective.<br><br>Demonstrate that dissolving, mixing</td><td><u>Living things and their habitats</u><br><br>Life exists in a variety of forms and goes through cycles – Animals<br>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird<br>• Suggest similarities in the life cycles of a number of vertebrates, e.g. comparison of dog, human and bird embryos.<br><br>Describe the changes as humans develop to old age<br>• Suggest why some of the changes that take place in humans happen, e.g. suggest why babies have disproportionately large heads compared to adults.</td><td rowspan="2"><u>Forces</u><br><br>There are contact and non-contact forces; these affect the motion of objects<br>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object<br>• Recognise that gravity acts between all masses, e.g. the Sun and the Earth.<br><br>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces<br>• Identify ways in which forces that oppose motion may be useful (e.g. bicycle handlebar grips) or a nuisance (e.g. bicycle chain).<br><br>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect<br>• Explain, with reference to everyday contexts, why a force multiplier might be useful.</td></tr>
<tr><td><u>Conducting experiments</u><br><br>Pupils can use equipment to take measurements<br>Select, with prompting, and use appropriate equipment to take readings<br>• use appropriate equipment, such as meter rule, to take measurements, such as distance travelled.</td><td><u>Animals, including humans</u><br>The human body has a number of systems, each with its own function<br>Describe the life process of reproduction in some plants and animals<br>• Compare the process of reproduction in animals and plants,</td></tr>
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*Pupils explore how to improve the quality of data*
**Take precise measurements using standard units**
- consider how by modifying instrument or technique, measurements can be improved.

*Pupils understand the role of repeat readings*
**Take and process repeat readings**
- identify situations in which taking repeat readings will improve the quality of evidence.

**Recording evidence**

*Pupils record work with diagrams and label them*
**Record data and results**
- Independently use labelled diagrams to show complex outcomes.

*Pupils can display data using labelled diagrams, keys, tables and bar charts*
**Record data using labelled diagrams, keys, tables and charts**
- Independently use various ways, as appropriate, to record complex evidence.

*Pupils can display data using line graphs*
**Use line graphs to record data**
- Independently use line graphs to display complex data.

**and changes of state are reversible changes**
- Classify various processes relating to materials as reversible or irreversible.

**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**
- Provide examples of when changes being irreversible are a good thing, e.g. making bricks, or not, e.g. non-biodegradable plastic bags.

*The physical properties of materials determine their uses*
**Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic**
- Suggest limitations of the uses of selected materials based on test results.

e.g. compare and contrast fertilisation.

**Earth and Space**

*Day, night, month, seasonal change & year are caused by the position and movement of the Earth*
**Describe the movement of the Earth, and other planets, relative to the Sun in the solar system**
- Identify that the further out a planet is, the longer its orbit is around the Sun.

**Describe the movement of the Moon relative to the Earth**
- Relate the Moon's orbit of the Earth to the Earth's orbit of the Sun.

*Day, night, month, seasonal change & year are caused by the position and movement of the Earth*
**Describe the Sun, Earth and Moon as approximately spherical bodies**
- Recognise that many heavenly bodies are approximately spherical.

**Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky**
- Explain the effect of a planet in the solar system rotating at a different rate to Earth.

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| **Reporting findings**<br><br>*Pupils process findings to develop conclusions and identify causal relationships*<br>**Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships**<br>• Independently write a conclusion using evidence and identifying causal links.<br><br>*Pupils use displays and presentations to report on findings*<br>**With support, present findings from enquiries orally and in writing**<br>• Independently display and present key findings from enquiries orally and in writing.<br><br>*Pupils explain confidence in findings*<br>**With prompting, identify that not all results may be trustworthy**<br>• in conclusions, indicate how trustworthy they are. | | | |
| **Conclusions and predictions**<br><br>*Pupils can analyse data*<br>**Suggest how evidence can support conclusions**<br>• identify how an idea is supported or refuted by evidence.<br><br>**Suggest further comparative or fair tests** | | | |

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| • **use evidence to suggest further comparative or fair tests that would develop the investigation.** | | | |