

## Science Non-Negotiable Key Skills, Knowledge and Vocabulary YEAR 5

### National curriculum:

#### Working scientifically:

During year 5, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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 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.

#### All living things and their habitats:

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals

#### Animals including humans:

- describe the changes as humans develop to old age

#### Properties and changes of materials:

- 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
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- 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.

#### Earth and space:

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

**Forces:**

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

**Key Concepts:**

*Working Scientifically: Use practical scientific methods, processes and skills to understand how ideas and theories are investigated and how this improves scientific knowledge and skills*

*Living things and habitats: Animals can be classified into groups dependent on their physical characteristics. Animals are affected by their habitats and this may cause them to change.*

*Animals including humans: All animals, including humans, share life processes, which allows them to adapt and grow.*

*Properties and changes of materials: Materials can be classified using their properties, which affects their use, and that materials can be changed by different processes.*

*Earth and Space: The Earth is in orbit around the sun, along with other planets and that the moon orbits the Earth.*

*Forces: Forces and magnets: Forces, including gravity, affect the movement of objects by changing their speed and direction.*

Topic	Key Skills	Subject Knowledge	Key Vocabulary
Working scientifically	<ul style="list-style-type: none"> <li>• Plan enquiries, including recognising and controlling variables where necessary</li> <li>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision</li> <li>• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models</li> <li>• Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.</li> </ul>	<p>To know:</p> <ul style="list-style-type: none"> <li>• What an enquiry is</li> <li>• What to observe and measure in a fair test</li> <li>• How to control variable to conduct a fair test</li> <li>• How to use thermometers, timing devices, data loggers</li> <li>• How to use a variety of classification keys</li> <li>• How to record and present data in a table, diagram, bar chart, line graphs and models</li> <li>• How to predict</li> <li>• How to report finding in written and oral form</li> <li>• How to use scientific language to explain and describe</li> <li>• How to draw a conclusion based on aims</li> <li>• How to relate scientific knowledge to findings</li> </ul>	<p>Predict prediction aim purpose method apparatus equipment measure accurate reliable repeatable analyse diagram fair test control variable independent variable dependent variable relationship trend conclusion evaluation</p>

	<ul style="list-style-type: none"> <li>• Present findings in written form, displays and other presentations.</li> <li>• Use test results to make predictions to set up further comparative and fair tests.</li> <li>• Use simple models to describe scientific ideas</li> <li>• Identify scientific evidence that has been used to support or refute, ideas or arguments.</li> </ul>	<ul style="list-style-type: none"> <li>• How to begin to question results</li> <li>• How to form a hypothesis</li> <li>• How to evaluate the success of an investigation</li> <li>• How to suggest improvements</li> </ul>	
Living things and their habitats	<p><b>Investigate and describe</b> (differences in the life cycles of a mammal, an amphibian, an insect and a bird)</p> <p><b>Identify and describe</b> (the life process of reproduction in some plants and animals)</p>	<p>To know:</p> <ul style="list-style-type: none"> <li>• How their local environment changes during the year (life cycles in a variety of different things e.g. flower boarder)</li> <li>• How the work of scientists such as David Attenborough or Jane Goodall has influenced scientific thinking</li> <li>• Different types of reproduction in plants (sexual and asexual – growing seeds, cuttings, tubers, bulbs</li> <li>• How the life cycles of different animals have different stages</li> <li>• How animals develop over time</li> <li>• How different animals reproduce and grow</li> </ul>	<p>Bird fish amphibian reptile mammal invertebrate carnivore herbivore omnivore life cycle reproduction movement respiration sensitivity growth nutrition gestation birth fertilization germination pollination seed dispersal predator prey</p>
Animals including humans	<p><b>Identify and describe</b> (changes as humans develop to old age)</p>	<p>To know:</p> <ul style="list-style-type: none"> <li>• How humans experience different stages in their life</li> <li>• How the body changes during puberty</li> <li>• How the gestation periods of different animals varies.</li> </ul>	<p>Puberty life cycle gestation womb growth asexual reproduction reproduce Sexual reproduction sperm egg foetus baby birth fertilisation</p>
Properties and changes of materials	<p><b>Compare and group</b> (everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnet)s)</p>	<p>To know:</p> <ul style="list-style-type: none"> <li>• How materials have different properties that can be tested (hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnet)s)</li> </ul>	<p>Property transparent opaque soluble insoluble solute solution solvent conduct insulate thermal magnetic filter filtrate evaporate gas solid liquid distillation chromatography state burning oxygen particles</p>

	<p><b>Test and observe</b> (materials dissolving in liquid to form a solution)</p> <p><b>Test and describe</b> (how to recover a substance from a solution)</p> <p><b>Investigate and test</b> (how mixtures might be separated, including through filtering, sieving and evaporating using knowledge of solids, liquids and gasses)</p> <p><b>Use evidence</b> ( from comparative and fair tests, to give reasons for the particular uses of everyday materials, including metals, wood and plastic)</p> <p><b>Investigate and evaluate</b> (how dissolving, mixing and changes of state are reversible changes)</p> <p><b>Investigate</b> (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>	<ul style="list-style-type: none"> <li>• How materials can be grouped by their properties.</li> <li>• Materials can be changed by different processes</li> <li>• Changes can be reversible and can be used to separate mixtures (evaporating, filtering, sieving, melting and dissolving)</li> <li>• How melting and dissolving are different processes</li> <li>• That different materials are used for different uses based on their properties</li> <li>• Changes can be irreversible and result in the formation of a new material (burning, chemical)</li> </ul>	
Earth and space	<p><b>Use secondary research</b> (to find out about the movement within our solar system)</p> <p><b>Compare</b> (the works and different theories of influential scientists).</p>	<p>To know:</p> <ul style="list-style-type: none"> <li>• The movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>• The movement of the Moon relative to the Earth</li> <li>• The Sun, Earth and Moon as approximately spherical bodies</li> <li>• How to use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.</li> <li>• How to use models to represent the concept of space and movement of spherical bodies</li> </ul>	<p>Gravity star planet hemisphere attract attraction weight moon orbit revolve rotation axis equator season winter autumn mass solar system geocentric heliocentric sphere ellipse phases shadow temperature distance</p>

<p>Forces</p>	<p><b>Investigate and explain</b> (unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object)</p> <p><b>Predict, test and identify</b> (effects of air resistance, water resistance and friction, that act between moving surfaces)</p>	<p>To know:</p> <ul style="list-style-type: none"> <li>• Some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> <li>• Gravity pulls objects toward Earth</li> <li>• The difference between mass and weight</li> <li>• How the movement of objects is affected by air resistance, water resistance and friction</li> <li>• How to use timing devices effectively and accurately</li> <li>• About the work of Isaac Newton and Galileo</li> </ul>	<p>Force   newtons   gravity   friction   air          resistance   upthrust   balanced   unbalanced          Gear   lever   pulley   planet   contact          non-contact   drag   thrust   lift   opposite          weight   mass   acceleration   deceleration</p>
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