



## Science – Progression in Knowledge, Scientific Enquiry and Vocabulary

Year Five	Autumn One Physics  Space presenters!	Autumn Two Physics  May the forces be with you	Spring One Chemistry  Music festival materials	Spring Two Chemistry  Changing materials	Summer One Biology  The art of living	Summer Two Biology  Life explorers
Key prior knowledge	EYFS	Year 3	Year 1 and 2	Year 1 and 2	Year 2 & Year 4	❖ See note below
Unit objectives	i. describe the movement of the Earth, and other planets, relative to the Sun in the solar system ii. describe the movement of the Moon relative to the Earth iii. describe the Sun, Earth and Moon as approximately spherical bodies iv. use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	i. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ii. identify the effects of air resistance, water resistance and friction, that act between moving surfaces iii. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	i. compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal) ii. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic	i. compare and group together everyday materials on the basis of their properties, including their solubility and response to magnets ii. know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution iii. use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating iv. demonstrate that dissolving, mixing and changes of state are reversible changes v. 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	i. describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ii. describe the life process of reproduction in some plants and animals	i. describe the changes as humans develop to old age
Key enquiries	Session 1 <b>Coming up with the intergalactic goods - developing scientific enquiry</b> Session 2 <b>Planetary scales - modelling the solar system</b> Session 3 <b>The minor matter of how the solar system works...</b> Session 4	Session 1: <b>Forces Mission Training Camp</b> Session 2 <b>Parachuting in</b> Session 3 <b>The Lever and Pulley Challenge</b> Session 4 <b>The Bike Gears Challenge</b> Session 5 <b>The Goldilocks Path Challenge</b> Session 6	Session 1 <b>Food prep materials challenge</b> Session 2 <b>Keeping it hot... keeping it cold</b> Session 3 <b>Food packaging challenge</b> Session 4 <b>Cleaning team challenge</b> Session 5 <b>Electrical health and safety</b> Session 6	Session 1 <b>Soluble Solutions</b> Session 2 <b>Separation Solutions</b> Session 3 <b>The Chemistry of Cooking: mixing, heating and burning</b> Session 4 <b>Oxidation sensation</b> Session 5 <b>The Chemistry Kitchen</b>	Session 1 <b>Sexual Reproduction in Flowering Plants</b> Session 2 <b>Asexual reproduction in plants</b> Session 3 <b>Insect and Amphibian Life Cycles</b> Session 4 <b>Mammalian and Bird Life Cycles</b>	Session 1 <b>Gestation Gurus</b> Session 2 <b>Foetal Development</b> <b>Detectives</b> Session 3 <b>Growth and Change: Baby &amp; Child</b> Session 4 <b>Growth and Changes: Adolescence &amp; Puberty</b>



	<b>Day &amp; Night: Changing Shadows</b> Session 5 <b>Sundial designers and time zones detectives</b> Session 6 <b>A Moon Month</b>	<b>The Boat challenge</b>	<b>Keeping the sound contained</b>	Session 6 <b>Science Fair: audience testing</b>	Session 5 <b>Life Cycles from Around the World</b> Session 6 <b>Meeting and Becoming Natural Scientists</b>	Session 5 <b>Growth and Change: Adults &amp; Old Age</b> Session 6 <b>Human timeline</b>
<b>Sticky Knowledge</b>	<p>Know that the Sun is a star at the centre of our Solar System and that the Earth and other planets revolve round it in the same plane.</p> <p>Know that the Earth spins around its axis at the same time as revolving around the Sun, but we do not feel the Earth spinning because everything around us is moving in the same way.</p> <p>Know that the Moon moves round the Earth and that it takes approximately one month to do so.</p> <p>Know that the movement of the Moon explains why the shape of the Moon appears to change over a month.</p> <p>Know that we see the Moon because it reflects light from the Sun.</p> <p>Know that the Earth's rotation on its axis explains day and night and explains the apparent movement of the Sun across the sky during the day (the Earth is moving, not the Sun), which itself affects the length and position of a shadow.</p> <p>Know that the Earth experiences seasons and that</p>	<p>Understand that forces act in particular directions and can make an object start moving, stop moving, change shape or change direction.</p> <p>The greater the force, the greater the movement or change in shape.</p> <p>Know that pushes and pulls are examples of forces.</p> <p>Understand that gravity is an attractive force between any two objects. Know that the effect of Earth's gravity is to make unsupported objects fall to do so.</p> <p>Understand that air resistance, water resistance and friction act to slow a moving object down. For a falling object, gravity is constant and the time it takes for an object to fall to the ground depends on the resistance the object offers to the air not on the object's mass.</p> <p>Know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	<p>Know that materials can be grouped on the basis of their properties and that some of these properties cannot be directly seen – for example, conductivity and response to magnets.</p> <p>Know that some materials can change their state, for example from a solid to a liquid or a liquid to a gas.</p> <p>Know that when a material changes its state, this is a reversible change because the material has changed physically but not chemically.</p> <p>Know that some changes of materials are irreversible and that this is because there have been chemical changes to the materials, resulting in the formation of new materials.</p> <p>Know that when a solid dissolves, it forms a solution in which it remains as a solid and has simply mixed with the liquid.</p> <p>Know therefore that dissolving and melting are different processes.</p>	<p>Know that materials can be grouped on the basis of their properties and that some of these properties cannot be directly seen – for example, conductivity and response to magnets.</p> <p>Know that some materials can change their state, for example from a solid to a liquid or a liquid to a gas.</p> <p>Know that when a material changes its state, this is a reversible change because the material has changed physically but not chemically.</p> <p>Know that some changes of materials are irreversible and that this is because there have been chemical changes to the materials, resulting in the formation of new materials.</p> <p>Know that when a solid dissolves, it forms a solution in which it remains as a solid and has simply mixed with the liquid.</p> <p>Know therefore that dissolving and melting are different processes.</p>	<p>Know that all animals and plants undergo life cycles involving birth, growth, and reproduction and that these differ between living organisms.</p> <p>Describe the life cycles of some plants and animals.</p> <p>Know that there are two types of reproduction, sexual and asexual.</p>	<p>See links to SRE</p>



	the reason for the seasons is the difference in the hours of sunlight and in the position of the Sun in the sky throughout the year.					
<b>Scientific Enquiry</b>	<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>	<p>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>recording results using scientific diagrams and labels</p> <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>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>identifying scientific evidence that has been used to support or refute ideas or arguments</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 data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</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>	<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 data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</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>	<p>i. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>ii. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>iii. 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>iv. identifying scientific evidence that has been used to support or refute ideas or arguments</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 data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</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>
<b>Vocabulary</b>	Earth, planets, Sun, solar system, Moon, celestial body, sphere/spherical, rotate/rotation, spin, night & day, orbit, opinion/fact, support/refute, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto,	support, fall, Earth, gravity, air resistance, friction, balancing force, weight, newtons, resistance force variables, support, fall, Earth, gravity, moving surfaces, variables, accuracy, precision, causal relationships, mechanisms,	opinion/fact, variables, accuracy, precision, scatter graphs, material names, property names, enquiry, line graphs, causal relationship, degree of trust, thermal insulator/conductor, bar chart, support/refute	variables, accuracy, precision, enquiry, solid, liquid, gas, dissolve, soluble, solute, solution, line graph, insoluble, filter, sieve, magnet/ism, evaporation, new material, not usually reversible, gas given off, degree of trust,	gamete, stamen, stigma, carpel, pistil, pollination, germination, flowering, sexual reproduction, life cycle, seed, pollen, anther, filament, style, ovary, botanical illustration, dissection, corm, bulb, spores, cutting, fern, moss, liverwort,	Scatter & line graphs, bar charts, causal relationships, support/refute, gestation, life cycle, sperm, egg, foetus, development, nutrition, uterus, baby, child, growth, line graph, comparison, development, centile, healthy, causal



	'dwarf' planet, orbit, opinion/fact, accuracy, precision, scatter graphs, line graphs, orbit, geocentric & heliocentric models, opinion/fact, accuracy, orrery night and day, shadow clocks, sundials, astronomical clocks time-zone, Greenwich Meantime, gnomon eclipse, light, reflection, telescope, satellite, tide, mass, gravity	levers, pulleys, transfers, gears, support/refute, water resistance		material names, property names, opinion, fact, gives off gas, mixture, reversible, irreversible, evaporation, sieving, filtering, magnets, heating, burning, cooking, reaction	tubers, asexual, non-flowering, propagation, artificial, natural, life cycle, asexual & sexual reproduction, metamorphosis, amphibian, insect, mammal, bird, sexual reproduction, life cycle, gestation, foetus, sperm, egg, uterus, chick, egg, baby, adult, natural scientist, naturalist, observation, conservation, endangered	relationship, adolescence, adolescent, puberty, teenager, reproduction, aging, old age, elderly, adult, causal relationship, growth, change, death
<b>Where Next?</b>					Year 6	Year 6

- ❖ You may wish to teach this block alongside your school's SRE programme. This block covers the science behind puberty and touches on issues that may raise questions among your pupils. Ensure you consult your school's PSHE/SRE coordinator and/or leadership team before teaching to ensure you are following school policy.