



Curriculum Planning

Intent

- Our Science curriculum has been carefully planned and designed to encompass the content of the National Curriculum and the North Yorkshire Scheme of Learning (NySoL).
- Pupils' science education begins in the early years and builds year on year, developing pupils' expertise.
- Curriculum plans have been constructed effectively in line with the NySoL Scheme to ensure that pupils know more, remember more and are able to do more.
- Key knowledge has been mapped out from the early years to the end of KS2 to ensure that the curriculum is coherently sequenced and there is clear progression.
- The organisation of the curriculum builds both knowledge and skills of enquiry so that pupils can draw on it in future learning.
- Each of the 5 types of enquiry (Research, Comparative and Fair Tests, Pattern Seeking, Grouping and Classifying, Observing Over Time) is taught at least once every term.
- Working scientifically skills are embedded into every lesson to ensure these skills are being developed throughout the curriculum.
- Vocabulary has been identified and outlined clearly so that this can be taught explicitly within lessons.
- Clearly defined end points have been identified to ensure that pupils build upon prior learning and develop their knowledge of key concepts.
- Pupils commit knowledge to their long-term memory through recalling and repeated practice outlined in plans.

Implementation

Within and beyond our classrooms we provide a range of opportunities and implement a range of teaching methods to ensure that over the course of study, teaching is designed to help learners to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts.

- Knowledge organisers which outline knowledge (including vocabulary) all children must master and apply in lessons are introduced at the start and referred to throughout a unit of study.
- A well sequenced cycle of lessons carefully plans for progression and depth concentrating on the scientific knowledge and skills suited to the age group.
- Lessons follow a consistent structure of retrieval, explanation, application and assessment which may include such features as questioning, modelling, individual, partner, group or whole class activities.
- Regular practical experiments are carried out focusing on scientific enquiry
- Enrichment activities, including visits and visitors to school
- Working walls reflect what is being taught, vocabulary, relevant diagrams, photos and display the 5 types of science enquiry characters
- Our inclusive approach is demonstrated through the way in which tasks and activities are adapted to ensure that all pupils are able to access the curriculum.
- Through retrieval, teachers make sure that pupils can draw on what they already know so that they can remember more.
- Key vocabulary is explicitly taught to enable pupils to develop their range of geographical vocabulary and understanding.
- Assessment for learning strategies are used at the start, during and at the end of lessons to assess pupils' learning and identify any gaps or misconceptions.

Impact

- Our Science Curriculum is high quality, well thought out and is planned to demonstrate progression. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:
 - Pre and post unit assessments
 - Assessment against end of year expectations detailed on Pupil Progress Records with clearly identified end points. These are then passed to the receiving teacher to ensure any gaps can be addressed when a key concept is revisited.



Progression of Working Scientifically vocabulary

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
What...? How? Why ...? Similar different best and worst Change Plan look biggest and smallest compare sort group	observe change slowly quickly Describe name identify label record measure bigger and smaller pattern notice cycle predict	gradually identify observe Recognise investigate record units table fair evidence research Length observations prediction	similarities differences research and source scientists discovery process cycle Measurements conclude evaluate rank plan vary keep the same/constant bar graph table tally	classify interpret pattern relationship prediction analyse interpret conclude evaluate rank variable constants control repeat key relationship line graph	hypothesis variable constants evaluate plan conclude interpret classify categorise database enquiry control repeat support refute degree of trust scatter graph



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KS2 Medium Term Plans	Autumn Term		Spring Term			Summer Term							
Prior Knowledge (Retrieval)	<p>Year 4 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 evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Year 3 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 based on 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>Year 1 Observe changes across the four seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p>	<p>Year 2 Notice that animals, including humans, have offspring which grow into adults</p>	<p>Year 3 Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>		Working Scientifically (Skills to be taught throughout the year)	<p style="text-align: center;">PLAN</p> <p>Ask relevant questions (containing scientific knowledge and understanding) and with help recognise which type of enquiry is</p> <p>Decide what observations and measurements to make (controlling variables with help where necessary) and what equipment to use to</p>	<p>Use a range of equipment independently.</p> <p>Take a series of observations and measurements</p>	<p style="text-align: center;">DO</p> <p>Gather and record non-complex results (data and observations)</p>	<p>Present results (data and observations) in a range of formats e.g., bar and line graphs, simple scatter graphs,</p>	<p style="text-align: center;">REVIEW</p> <p>Draw conclusions from data and observations.</p> <p>Begin to use basic scientific evidence to</p>	<p>Look at results and decide if any observations or measurements are unsuitable.</p> <p>Use what has been found out to suggest improvements to work, giving reasons.</p>



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	best to answer a question.	make measurements and observations.	that are adequate for the task Use information sources provided to find things out. Identify possible risks to themselves and others.	using e.g., tables and scientific diagrams.	key and frequency charts	support or refute the ideas or arguments for a conclusion.		Set up further questions to investigate
Y5	Knowledge and Skills to be developed:		Knowledge and Skills to be developed:		Knowledge and Skills to be developed:			
	<p>Material</p> <p>L1 – <u>Classifying and grouping</u> Properties of materials</p> <p>L2- <u>Observing over time</u> Identify materials that dissolve to form a solution and describe how to recover a substance from solution.</p> <p>L3 - <u>Fair Testing</u> How to separate a mixture (sieving, filtering, evaporating).</p> <p>L4 Use of everyday materials (plastics, wood and metal)</p> <p>L5 Explain what Irreversible and reversible change is</p> <p>L6 Exploring new made materials as a result for irreversible changes</p>	<p>Forces</p> <p>L1- <u>Pattern seeking</u> Explore the effects of gravity</p> <p>L2- <u>Comparative and fair testing</u> Investigation friction and moving objects on different objects</p> <p>L3- <u>Comparative and fair test</u> Explain the effect of air resistant</p> <p>L4 – <u>Comparative and fair test</u> Explain the effects of water resistance</p> <p>L5 – <u>Grouping and classifying.</u> Introduction to gears, levers and pulleys.</p>	<p>Space</p> <p>L1 - <u>Grouping and classifying</u> describe the movement of the earth and other planets in the solar system</p> <p>L2 - <u>Research</u> Describe the sun earth and moon as approximately spherical bodies.</p> <p>L3 - <u>Research</u> Earth rotation to explain day and night and the apparent movement of the sun across the sky.</p> <p>L4 Geography times zones</p> <p>L5 - <u>Research</u> Describe the movement of the moon relative to the earth</p> <p>L6 – <u>Observing overtime</u> The apparent movement of the sun across the sky and how this causes shadows.</p>	<p>Animals including Humans</p> <p>L1 - <u>Research</u> Describe the changes as humans develop to old age</p> <p>L2 Gestation periods.</p> <p>L3 - <u>Pattern Seeking</u> Is there a relationship between the mammal size and their gestation period.</p> <p>L4/L5 Changes to male and female bodies during puberty.</p>	<p>Living things and their Habitats</p> <p>L1- <u>Grouping and classifying</u> Categorise living and non-living things</p> <p>L2 - <u>Research</u> Describe and compare the life cycle of a mammal and a bird.</p> <p>L3 - <u>Research</u> Describe and compare the life cycle of an amphibian and an insect</p> <p>L4 The reproduction in flowering plants sexual and Asexual</p> <p>Time to review content of Year 5 learning building in Comparative and Fair Test, observing overtime and Pattern Seeking activities.</p>			



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<p>Future Learning</p>	<p>KS3 Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving</p> <p>Similarities and differences, including density differences, between solids, liquids and gases</p> <p>Brownian motion in gases</p> <p>Diffusion in liquids and gases driven by differences in concentration</p> <p>Difference between chemical and physical changes.</p> <p>Differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition</p> <p>Atoms and molecules as particles.</p>	<p>KS3 Forces as pushes or pulls, arising from the interaction between two objects * using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces</p> <p>Moment as the turning effect of a force</p> <p>Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water</p> <p>Forces measured in newtons, measurements of stretch or compression as force is changed * force-extension linear relation; Hooke's Law as a special case</p>	<p>KS3 Space physics</p> <p>Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10 \text{ N/kg}$, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)</p> <p>Our Sun as a star, other stars in our galaxy, other galaxies</p> <p>The seasons and the Earth's tilt, day length at different times of year, in different hemispheres</p> <p>The light year as a unit of astronomical distance.</p>	<p>Year 6 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>Year 6 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>Vocabulary</p>	<p>All</p> <p>Hardness, solubility, transparency, solid, liquid, gas, insoluble, soluble, dissolve, solution, substance, separation, filtering, sieving, evaporating, burning, melting, reversible, irreversible, conductors</p>	<p>Force, gravity, earth, moon, sun, air resistance, water resistance, mass, weight, newtons, friction, levers, pulleys, gears, newton metre, force metre, stream-lined</p>	<p>Earth, sun, moon, solar system, times zones, axis, rotation, spherical bodies, night, day, orbit, star,</p>	<p>Puberty, gestation, pregnancy, period, sexual reproduction, menstruation, penis, vagina, breasts, nipples, fertilisation, infancy, childhood, early adult, middle age, old age, sperm, testicle, bladder, urethra, cervix, ovary, fallopian tube, uterus</p>	<p>Life cycle, reproduce, sperm, sexual, fertilise, egg, live young, asexual, plantlets, runners, bulbs, cuttings,</p>



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	Most	Electrical insulators, conductors, thermal conductors	mechanisms	Waxing, waning	internal and external fertilisation (animals not humans)	
	Some	Venn, carol diagram		Gibbous, crescent		Metamorphosis
Quality Texts		Sir Isaac Newton (Information text)		The Moon (Literacy Shed)		Animals and their Habitats
Enrichment Activities (e.g. visitors/visits)		Fieldtrip to Flamborough- materials (rock etc)		Space Dome Visit		Visitor- botanist
National Curriculum		<p>Compare and group together everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a 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 on evidence from comparative and fair tests, for the uses of everyday materials, including metals, wood and plastic</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>	<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>Describe the changes as humans develop to old age</p>	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</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>				
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