



Curriculum and Progression in Science

Intent:

The identified knowledge of the science curriculum at Rothbury First School follows the progression outlined in the National Curriculum. The skills that children will develop throughout the programme of study are also progressive and are informed by the National Curriculum for Science. The curriculum at Rothbury First School aims to develop a curiosity and enquiry-led approach in pupils who will develop their learning in more formal scientific strands in Upper Key Stage 2 and beyond. Where possible science is taught in a hands-on lesson with a strong focus on working outdoors and using the school grounds and local area.

The children build on vocabulary, skills and knowledge in each unit as they move through school. The curriculum is designed to increase depth of knowledge and challenge at each stage and learning is differentiated where necessary to support or challenge. The sequence of learning helps to build in assessment and embed learning with misconceptions addressed at each stage.

Where there is a natural fit some topics are linked to other parts of the curriculum and some topics are taught for seasonal reasons at certain points of the year, in particular the themes Plants and Seasonal Changes and some parts of States of Matter.

Early Years Unit will record much of their learning by outdoor investigation work linked to the seasons and natural enquiry opportunities. They will also participate in school-wide RHE planning such as safety in the sun or near water and healthy eating and exercise some of which link to the Science curriculum strands.

Year A/B	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Early years	Seasonal Change and introducing experiments	Light and dark-	Investigating change	Planting Seasonal change	Investigations	Life cycles
Suggested activities	<p>Pumpkin smash or roll</p> <p>What makes porridge tasty experiment</p> <p>Outdoor autumn walks</p> <p>Autumn colours in creative area</p> <p>Autumn sensory tray</p> <p>Autumn objects in loose parts</p>	<p>Space (A)</p> <p>Investigating shadows (B)</p> <p>Shadow tent Shadow puppets</p> <p>Tim Peake, Neil Armstrong, Felix space jump (A)</p> <p>Colour mixing-light and dark</p> <p>Exploring tools which make light</p> <p>Activities during day and night</p>	<p>Melting/freezing</p> <p>Chocolate/ice</p> <p>Adding water to sand or clay</p> <p>Magic potion investigation</p> <p>Magnets</p>	<p>Growing-Cress heads (N)</p> <p>Bean in a bag/sunflower pots (R)</p> <p>Spring walk</p> <p>Animals and their young</p> <p>Colour hunt outdoors</p>	<p>How much can a boat hold? (A)</p> <p>Which vehicle travels farther? (B)</p> <p>Exploring floating and sinking</p> <p>Ramps and cars in the small world area</p> <p>Guttering and water travel</p>	<p>Butterflies and tadpoles (A)</p> <p>Beanstalk and sunflowers (B)</p> <p>Mini beasts</p> <p>Dissection of flowers</p> <p>Planting seeds</p> <p>Time lapse of animal life cycles</p> <p>Photos of people at different points in life in home corner</p> <p>Minibeast hunt</p> <p>Sunflower challenge</p>

Year A	Y1/2 Scientific enquiry	Y1/2 Everyday materials	Y1/2 Uses everyday material	Y1/2 Plant parts types of plants and trees, fruit and vegetables	Y1/2 Plants What do plants need? Seeds, lifecycles, plant habitats.	Y1/2 Scientists and Inventors
	Y3/4 Rocks	Y3/4 Sound	Y3/4 Forces and magnets	Y3/4 Light	Y3/4 Scientists and inventors	Y3/4 States of matter
Year B	Y1/2 Scientific enquiry	Y1/2 Animals including humans. Animal groups, diets, human body, senses.	Y1/2 Animals including humans. Animal offspring, lifecycles, exercise, healthy eating.	Y1/2 Living things and their habitats.	Y1/2 Biodiversity	Y1/2 Scientists and inventors
	Y3/4 Working Scientifically	Yr 3/4 Living things and habitats	Y3/4 Animals including humans	Y3/4 Plants	Y3/4 Electricity	Y3/4 Animals inc humans

	What will a Rothbury First School Scientist look like?		
	At the end of Reception they will have the following knowledge:	At the end of Year 2 they will have the following knowledge:	At the end of Year 4 they will have the following knowledge:
Being a Scientist	The principal focus of science teaching in Early Years is to enable pupils to develop emerging science skills required as precursors to the statutory	The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this

	<p>requirements of Working Scientifically in Science for Key Stage One. Children should;</p> <ul style="list-style-type: none"> ● be encouraged to show curiosity about objects and people. ● know how to take risks, engage in new experiences and learn by trial and error. ● find ways to solve problems, find new ways to do things and test their ideas. ● develop ideas of grouping, sequences, cause and effect ● know about similarities and differences in relation to objects, materials and living things ● comment and ask questions about aspects of the natural world ● observe and make links in their experiences ● answer how and why questions about their experiences ● make observations of animals and plants, explain why some things occur and talk about changes ● build up scientific vocabulary that reflects the breadth of their experiences 	<p>humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.</p> <p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.</p> <p><u>Working scientifically:</u> During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p>	<p>through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.</p> <p>Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.</p> <p><u>Working scientifically:</u> During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> ● asking relevant questions and using different types of scientific
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Progression of Skills

	EYFS	Year 1 and Year 2	Year 3 and Year 4
Plants	<p>Understand that plants including trees are alive and that we should respect them where they grow.</p> <p>To know that plants can be harmful and should not put any parts of them in our mouth whilst at school and wash our hands when we come in from exploring.</p> <p>Explain that plants need water and sunshine to live and grow.</p> <p>Plant a seed and observe it growing.</p> <p>Explain what happens to some trees in the Autumn and Winter and notice that not all trees lose their leaves.</p>	<p>Name some wild plants and garden plants and identify them in the school grounds.</p> <p>Identify evergreen trees and deciduous trees and say what is different.</p> <p>Draw and label a diagram to show the main parts of a flowering plant or tree.</p> <p>Plant a seed and watch it growing and make observations and measurements.</p> <p>Explain what conditions are needed for a seed and plant to grow.</p> <p>Observe the differences between deciduous and evergreen trees in the Autumn and Winter.</p> <p>Find examples of seeds from plants and trees in the school grounds.</p>	<p>Identify and explain the functions of different parts of flowering plants.</p> <p>Explain how pollination works.</p> <p>Give examples of different methods of seed dispersal and find examples in the school grounds.</p> <p>Explore the requirements for plants to grow and conduct a simple experiment to test this recording data.</p> <p>Observe a demonstration of water transportation in a plant and explain the process.</p> <p>Observe a variety of habitats in the school grounds and explore the types of plants found there and relate them to their needs and the food chains of mini-beasts and animals.</p>
Animals including humans	<p>To know that many baby animals are born in the Spring and that some animals hibernate in the Autumn and Winter.</p> <p>Name most parts of the body and the 5 senses.</p> <p>Name some types of fruit and vegetables and know that they are</p>	<p>Identify a variety of common animals and explain which category they are classified in.</p> <p>Give an example of each type of an animal categorised by their diet.</p> <p>Explain how the structures of some animals vary with reference to how and where they live.</p>	<p>Identify and label main skeleton and muscle groups in humans and compare with animal structures.</p> <p>Explain why eating healthily is important and give some examples of healthy meal choices.</p> <p>Compare and contrast animals with and without backbones.</p>

	<p>healthy snacks. To understand that we should wash our hands to keep my body free from germs and how to wash them properly. Say why we brush my teeth and which snacks are better for our teeth.</p>	<p>Draw and name the human body main parts and the senses and conduct a simple experiment to test the senses. Explain that animals grow by reference to an animal life-cycle and link this to humans growing from gestation to adulthood. Understand the basic needs of animals and humans to live healthily and say some ways to stay healthy including a healthy eating plate. Take part in an experiment to feel my heart rate rise and understand how exercise keeps me healthy. Explain why we wash our hands and how to do it properly and why we brush our teeth and how to do it properly.</p>	<p>Label the different types of teeth and say what their roles are in eating. Explain how to take care of our teeth including making good choices for snacks and drinks and what kinds of substances can harm them. Explain the basic working of the digestive system in humans. Give examples of carnivores, herbivores and omnivores and show how their teeth are related to their diet. Make a food chain to show the relationships between species in a habitat or environment.</p>
<p>Living things and their habitats</p>	<p>Name some animals around a common theme such as farm, rainforest, woodland, polar. Explain what these animals like to eat and see their environment as a whole ecosystem eg: cold, hot, salt water. Look at minibeasts and plants and other creatures in the school grounds respecting their right to live peacefully and observing them without damage.</p>	<p>Say whether something is alive or dead or never alive and give some reasons. Say what a habitat is and give an example with some understanding of how the plants and creatures are interrelated. Show a simple food chain and how each part of the food chain relies on another part for food. Identify a habitat in the school grounds and explore creatures living their and show a simple food chain, eg: nettle, caterpillar, blackbird. Say how to take care of my local environment eg: not to leave litter,</p>	<p>Use categorisations to group animals or invertebrates and see how some of the categories overlap. Study a habitat in the school grounds and carry out a simple survey to identify plants and animals with simple categorisations. Study my local area or school grounds to find ways of improving the environment and eco-diversity. Study how human development is impacting the environment and some ways we can help, eg: recycling, avoiding single use plastic.</p>

		re-cycling. Respect nature in my school grounds and observe it carefully with no damage.	
Materials and states of matter	Experiment with things floating and sinking. Observe how water moves and can be transferred. Experiment with ice and melting. Experiment with sand that is dry or wet and see differences in how it behaves. Experience squishy and dry textures, soft and rough textures and record them with artistic responses.	Explore a range of everyday objects and find out what they are made from. Identify and describe the properties of a range of everyday materials. Conduct a simple experiment to test the properties of everyday materials and record findings. Think about and talk about why certain materials have been chosen for those objects and design my own object using appropriate materials. Learn about an inventor of a material in everyday use.	Compare and group together different types of rocks. Explain in simple terms how each type of rock is made and their properties. Explain how a fossil is made in simple terms. Explain how soil is made in simple terms and investigate different soils around the school grounds. Explain the properties of a solid, liquid and gas. Group everyday materials into these categories. Observe changes of state in materials in particular water. Explain the water cycle in simple terms. Conduct a simple experiment to explore evaporation.
Light, forces and magnets, sound, electricity	Understand how shadows change depending on the light and time of day. Explore magnets and things that are magnetic. Explore making sounds with objects or instruments. Use on/off switches and know that things plug into sockets or use batteries to gain power. To know that electricity is dangerous and not be used without a grown-up to	Observe shadows as part of seasonal changes. Observe my shadow change depending on the time of day and time of year. Make sounds of different pitch and volume depending on how an instrument is used. Use sense of hearing to detect different kinds of noises. To know that electricity can be	Observe that dark is the absence of light. Name sources of light. Observe that a shadow is made when light is blocked by an opaque object. Change the size of shadows with experimentation. To know to wear sunglasses to protect our eyes and not to look at the sun. Name and observe some basic forces

	<p>supervise. To know to wear sunglasses to protect our eyes and not to look at the sun.</p>	<p>dangerous and to only use it with an adult's permission or supervision. To know to wear sunglasses to protect our eyes and not to look at the sun.</p>	<p>around me. Identify that magnets have two poles and whether they will attract or repel each other. Explore a variety of everyday materials and discover whether they are attracted to a magnet or not presenting data in a table. Make a simple game or model using the power of magnets to push or pull. Observe the force of magnets operating at a distance.</p> <p>Explain that sound is caused by something vibrating and give an example. Give a simple explanation of how sound is received in the ear. Experiment with pitch and volume and distance to show how they can be altered. Make an instrument and change pitch and volume to achieve different effects by conducting experiments.</p> <p>Identify common appliances that run on electricity both battery and mains power.</p> <p>Construct and draw a simple circuit using the relevant symbols. Test circuits and change items in or out. To know that a circuit must be a complete loop and that a switch can break and make a circuit.</p>
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Vocabulary

EYFS	Year 1	Year 2	Year 3	Year 4
herbivore face carnivore hair omnivore leg human knee animal arm fish elbow birds back head toes ear hands eye fingers mouth nose tree petals trunk fruit branch roots leaves bulb flowers seed stem material metal wood rock plastic hard glass soft paper fabric material smooth shiny rough Summer day Spring dark Autumn light Winter night Season Moon sun Earth Moon Planet space Sun star loud quiet volume sound Scientist experiment	Working Scientifically question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart amphibians, fish, reptiles, mammals, birds (+ 1 example of each) herbivore, omnivore, carnivore head, nose, ear, neck, shoulder, arm, elbow, wrist, hand, back, chest, hip, leg, knee, ankle, foot wing, beak,	Working Scientifically question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart survival, water, air, food reproduce, adult, baby, offspring, kitten, calf, puppy food chain, prey, predator, camouflage, protection exercise, hygiene, balanced diet growth, germinate, light, temperature reproduce,	Working Scientifically oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labeled diagrams, keys, bar charts, tables skeleton, skull, bones, muscles, movement, support, protection,	Working Scientifically oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labeled diagrams, keys, bar charts, tables mouth, tongue, teeth, esophagus, stomach, small intestine, large

	<p>tail, fin sight, smell, touch, taste, hearing deciduous, evergreen, tree, leaf, flower (blossom), petals, fruit, bulb, seed, roots, stem, trunk, branches wood, plastic, glass, paper, metal, rock hard, soft, rough, smooth, shiny, dull, bendy, stiff season, spring, summer, autumn, winter, month, year, day, night, sun, moon, light, dark</p>	<p>lifecycle brick, fabric, elastic, foil property, solid, waterproof, absorbent, opaque, transparent, squash, bend, flexible, twist, stretch push, pull, roll, slide, bounce living, dead, habitat, microhabitat, woodland, meadow, hedgerow, pond light source, mirror, reflect, reflective, reflection shadow, blocked transparent, translucent, opaque, living, dead, habitat, microhabitat, woodland, meadow, hedgerow, pond force, contact, surface, magnetic, attract, repel, poles</p>	<p>nutrition air, water, transportation, nutrients, soil, reproduction, seed formation, seed dispersal, pollination soils, organic matter, fossil, crystal sandstone, granite, marble, pumice absorbent, crumble sedimentary, layer, sediment igneous, magma, lava, gas bubbles (tiny holes/spaces) metamorphic, change, squeeze, pressure light source, mirror, reflect, reflective, reflection shadow, blocked transparent, translucent, opaque</p>	<p>intestine, nutrients, absorb, canine, incisor, molar producer, consumer, apex predator vertebrates, invertebrates (+ 1 example of each) environment, habitat, classification key solid, liquid, gas, evaporation, condensation, particle, temperature, freezing, heating vibration, wave, volume, pitch, tone, insulation appliance, battery power, main power, circuit, series, cell, battery, wire, bulb, switch, break in circuit conductor, insulator</p>
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