Whole School Science Overview

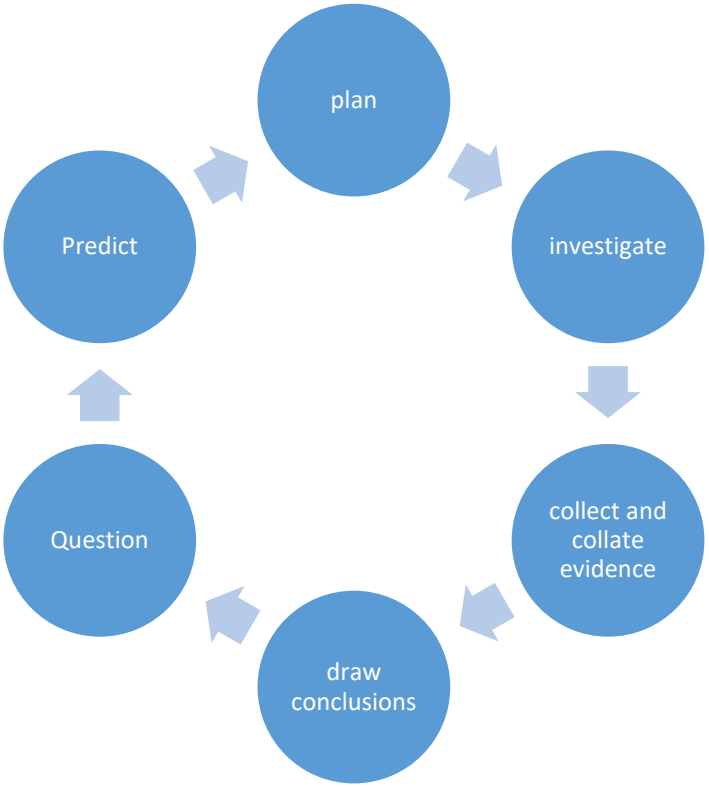
Intent

We intend to build on children's understanding of the world at the end of Reception by extending their knowledge of biology, physics and chemistry through key stages 1 and 2 to enable pupils to be ready for science at secondary school. Pupils will be taught essential aspects of the knowledge, methods, processes and uses of science and key scientists from the past. Through building up a body of key foundational knowledge and concepts, pupils will be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They will be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. They will develop understanding through different types of science enquiries that help them to answer scientific questions about the world around them.

The programmes of study describe a sequence of knowledge and concepts. It is important that pupils make progress but the focus is also important to develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Pupils will be familiar with, and use, technical terminology accurately and precisely. The programmes of study will link to their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. Over the course of six year, pupils will develop greater understanding of how to working scientifically. This includes observing over time; seeking patterns; identifying, classifying

Investigations

It is essential that children experience and understand the full cycle of experimental science. This cycle is outlined below. Specific skill elements of investigations are to be covered discretely across the curriculum however all children should have the opportunity to work through the full process at least once a term this could be as part of the lessons mapped out or as a distinct separate block. The investigation should link closely with the lesson plans. There are numerous examples of fair tests in the scheme and these can be used as a starting point. Use Appendix A to see skills progressions being taught.



Implementation

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception Theme: why things happen	Autumn – how trees, flowers, bushes change in autumn	Light and dark. Change over time.	Hot and cold. Liquids and solids.	Spring. Growing plants form seeds.	Similarities and differences between animals.	Know about the impact of heat and warmth in summer on materials. Difference and similarities in trees.
Year 1 Theme: different animals and their habitats. Scientific observation.	Parts of the human body	Sense of smell, touch, sight, taste, hearing	Antarctic animals and their habitats	Materials and their properties linked to their function	The features and habitats of invertebrates	know the features of a bird, a human and shellfish
Year 2 Theme: sorting and classifying	Healthy eating and drinking. The effect of food and exercise on the body.	Materials – opaque and transparent. Properties of materials.	Invertebrates – molluscs, sponges, arachnids and insects.	Forces – push and pull. How forces make things move and change shape.	Definition and types of vegetable, fruit and herb. Germination. Parts of plant.	Reversible and irreversible change in cookery
Year 3 Theme: predicting and setting up an investigation to test the prediction	Rocks and minerals. Types of rock and what makes up soil. Fossils.	The human body: joints, skeleton and how to care for the body. Sugars, starches and carbohydrates.	Light – how shadows are formed. Opaque, translucent, transparent. Mirrors. How light travels.	Trees and plants. The functions of leaves and roots. Parts of flowers.	The force of magnetism. What is attracted to magnets? Poles.	Know how humans have gone into space
Year 4 Theme: fair tests	Sound and decibels. Vibration, how sound travels.	Echoes. Sound in animals. Pitch.	States of matter: solid, liquid and gases. How gases expand.	Teeth – names, functions, tooth care, the process of digestion.	Electrical circuits, conductors and insulators. Bell, Faraday, and scientists.	Bubbles and solutions. Marie Curie.
Year 5 Theme: variables	The origin of species. Space – why we have a day, a year and tides in the Oceans.	Separating solids. Dissolving. Absorbency and hydrophobia.	Life cycles of butterflies; humans, mammals. The concept of becoming extinct.	The characteristics of gravity, water resistance and friction. Viscosity and air resistance.	DNA testing. Uniqueness of fingerprints. Eliminating possibilities through science testing.	Life cycle of a humans
Year 6	Fungi and bacteria. The role of leaves in plants. Types of plant.	Nutrition. Vitamins. Circulatory systems of the body.	Evolution. Natural selection in species. Humbolt, Darwin and Goodall.	How light forms a rainbow. Rays of light and the idea of reflection and refraction.	Electricity: volts, amps, electrical symbols. Solving problems in circuits.	Know the process of human reproduction and development

Science Skills Progression						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Planning and Communication and Sources	draw simple pictures talk about what they see and do use simple charts to communicate findings identify key features ask questions	describe their observations using some scientific vocabulary use a range of simple texts to find information suggest how to find things out identify key features ask questions	use pictures, writing, diagrams and tables as directed by their teacher use simple texts, directed by the teacher, to find information suggest how to find things out identify key features ask questions record their observations in written, pictorial and diagrammatic forms select the appropriate format to record their observations	record observations, comparisons and measurements using tables and bar charts begin to plot points to form a simple graph use graphs to point out and interpret patterns in their data select information from a range of sources provided for them	record observations systematically use appropriate scientific language and conventions to communicate quantitative and qualitative data select a range of appropriate sources of information including books,	choose scales for graphs which show data and features effectively identify measurements and observations which do not fit into the main pattern begin to explain anomalous data use appropriate ways to communicate quantitative data using scientific language
Enquiring and Testing and Obtaining and Presenting Evidence	test ideas suggested to them say what they think will happen use first hand experiences to answer questions begin to compare some living things	use simple equipment provided to aid observation compare objects, living things or events make observations relevant to their task begin to recognise when a test or comparison is unfair use first hand experiences to answer questions	put forward own ideas about how to find the answers to questions recognise the need to collect data to answer questions carry out a fair test with support recognise and explain why it is a fair test with help, pupils begin to realise that scientific ideas are based on evidence	with help, pupils begin to realise that scientific ideas are based on evidence show in the way they perform their tasks how to vary one factor while keeping others the same decide on an appropriate approach in their own investigations to answer questions describe which factors they are varying and which will remain the same and say why	use previous knowledge and experience combined with experimental evidence to provide scientific explanations recognise the key factors to be considered in carrying out a fair test	describe evidence for a scientific idea use scientific knowledge to identify an approach for an investigation explain how the interpretation leads to new ideas
Observing and Recording	make observations using appropriate senses record observations communicate observations orally, in drawing, labelling, simple writing and using ICT	respond to questions asked by the teacher ask questions collect and record data (supported by the teacher) suggest how they could collect data to answer questions begin to select equipment from a limited range	make relevant observations measure using given equipment select equipment from a limited range	carry out measurement accurately make a series of observations, comparisons and measurements select and use suitable equipment make a series of observations and measurements adequate for the task	make a series of observations, comparisons and measurements with increasing precision select apparatus for a range of tasks plan to use apparatus effectively begin to make repeat observations and measurements systematically	measure quantities with precision using fine scale divisions select and use information effectively make enough measurements or observations for the required task

Considering Evidence and Evaluating	make simple comparisons and groupings say what has happened say whether what has happened was what they expected	say what has happened say what their observations show and whether it was what they expected begin to draw simple conclusions and explain what they did begin to suggest improvements in their work	begin to offer explanations for what they see and communicate in a scientific way what they have found out begin to identify patterns in recorded measurements suggest improvements in their work evaluate their findings	predict outcomes using previous experience and knowledge and compare with actual results begin to relate their conclusions to scientific knowledge and understanding suggest improvements in their work, giving reasons	make predictions based on their scientific knowledge and understanding draw conclusions that are consistent with the evidence relate evidence to scientific knowledge and understanding offer simple explanations for any differences in their results make practical suggestions about how their working methods could be improved	make reasoned suggestions on how to improve working methods show how interpretation of evidence leads to new ideas explain conclusions, showing understanding of scientific ideas