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Eccleston Primary School

Science Curriculum

Whole school definition: Science is understanding the world around us through the disciplines biology, chemistry and physics.

Science is the study of the physical and natural world through observation, questioning and experimentation.

Science Curriculum Intent

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| National Curriculum Science - Purpose of study  A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. |
| Aims  The national curriculum for science aims to ensure that all pupils:   * develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics * develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them * are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future |

Intent

At Eccleston Primary School we promote the teaching and learning of Science in order to provide the foundations for understanding the world around us. We will strive to create opportunities for children to gain an understanding of how science has changed our lives, and the uses and implications of science in the future. Further to this, children will be encouraged to identify scientific possibilities within a range of careers and job opportunities. We aim to develop a child’s excitement and curiosity about natural phenomena, asking questions about what they observe and drawing relevant conclusions as to what they have witnessed. Learning is designed to inspire the children to raise their own questions such as “Why...?”, “How...?” and “What happens if…?”

We will provide opportunities for children to work scientifically, both collaboratively and independently, exploring different ways to answer their questions and challenging them to think about how science can be used to explain what is happening. It is our intention to ensure that children develop scientific knowledge and conceptual understanding through the teaching of physics, biology and chemistry. Particular emphasis will be placed on the teaching of the scientific vocabulary needed to be able to explain and reason within a scientific context. Cross curricular links will promote the application of a child’s mathematical knowledge and help with “sticky learning”.

Implementation: How is Science taught at Eccleston Primary School?

Science teaching will be ongoing throughout the year with science lessons being taught for two hours on a weekly basis.

“Working scientifically” will be embedded within the content of each science block to enable children to develop and make progress with those skills. At the start of a science block, the teacher will assess prior learning using a range of different techniques. This will help to gauge where the starting point for the learning needs to be. It will also identify any misconceptions that need to be addressed. The plan for the block will show progression in knowledge and working scientifically. We will instil in our children a passion for discovery and learning through a range of challenging and motivating activities designed to extend pupils’ learning which will develop life-long skills. Lessons will be practical allowing first-hand observation wherever possible. Activities that record the child’s learning will be open-ended and include a range of different methods to allow children to demonstrate their own scientific understanding regardless of their reading and writing ability. The use of ICT will be used regularly in science lessons for example using quizzes to gauge prior learning; data handling apps to help record data and plot graphs; and apps to present information discovered through research on a topic. Showbie will also be used. Relevant links to other subjects will be made eg history, computing and maths. Links will also be drawn to current affairs such as global warming which will improve their cultural capital. Regular assessment will take place through discussion, quizzes, questioning and written work, and at the end of the block the teacher will complete an assessment activity asking a key question based on the work covered.

Impact:

Pupils enjoy Science and understand what Science is. They are proud of their work and keen to discuss it using scientific vocabulary. Pupils are able to ask questions on a scientific topic and are inquisitive. Pupils remember previous learning from past years and build upon it to develop learning. Regular Science teaching is thorough for Physics, Biology and Chemistry exposing pupils to a range of topics to develop understanding and knowledge from Y1 to Y6, and K&U for EYFS. See Whole School Overview and year group coverage. Evidence is in the form of photographs, charts, text, experiments, questioning, webs, comparison tables, graphs, labelled diagrams, grids etc in books, Twitter, website, Showbie and displays. Pupils are able to observe, identify, classify and group objects. Pupils use the correct vocabulary in written and verbal work and show great detail using labelled illustrations. Pupils are able to name scientific equipment and be able to choose the correct apparatus for the measurement needed. Measurements are accurate. Science equipment is accessible to all teachers/pupils and monitored by the subject leader. It is kept tidy and replenished when needed. Pupils are able to use a variety of recording methods and be able to choose a suitable method of recording. Displays show topics being studied in class with good pieces of work, key vocabulary and questions asked/answered· Pupils are able to make predictions and understand why they may have been wrong. Evidence in books. Pupils are able to interpret information from a range of sources to produce a conclusion. Evidence in books. Pupils are honest about their results, being good scientists, and discuss inconsistencies and any errors made. Evidence of research in Science is apparent. Pupils use technology, books and visitors to research topics. SEND, pupil premium and G&T are listed in the subject leader file for each year group and teachers are aware of and plan for/support those pupils. Marking provides positive support and directs the pupil on any errors/misconceptions. Pupils respond to feedback addressing any misunderstanding. The homework menu supports topics taught in class and informs parents. Pupils are aware of Scientists in the community and what career opportunities are available. Pupils understand the importance of Science and the impact on society.

Each topic is assessed using a key overarching question. Teacher assessments are then added to Arbor at the end of each topic, using working towards, expected and greater depth.

The subject leader provides an action plan for Science and addresses areas for development and improvement annually. This is available for the respective link Governor. Subject leader conducts learning walks, lesson pop ins, pupil interviews and book monitoring throughout the year. These inform future areas for improvement and the impact of new initiatives. Each term the Science data is analysed and any areas for improvement identified and addressed in the form of inset.

Progression Overview

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| EYFS –see Development Matters 2021 for detailed examples of how to support learning in EYFS  Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension. |

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| 0 – 3 years  Understanding of the world – Development Matters | 3-4 years  Understanding of the World – Development Matters | Reception  Understanding of the World – Development Matters |
| Autumn  Development Matters   * Explore and respond to different natural phenomena in their setting and on trips. * Explore natural materials, indoors and outside.   Key Knowledge  Explore autumn changes through sensory experiences  Key Vocabulary  Autumn.   Brown  yellow.  Red.  Orange.   Conker.   Acorn.  Prin cone  Spring  Development Matters   * Explore materials with different properties * In pretend play imitate actions through small world play * Explore and respond to different natural phenomena in their setting and on trips. * Explore natural materials, indoors and outside   Key Knowledge  To explore melting through sensory experiences  To explore cars, boats, trains and aeroplanes through play experiences  Explore spring through sensory experiences.  Key Vocabulary  Winter.  Cold. Ice.  Melt.  Water.   Hard.  Wet  Move.  Fast.  Slow.  Car.  Train.   Boat.  Aeroplane.  Fly. Flower.   Grow.  Summer  Development Matters   * Explore and respond to different natural phenomena in their setting and on trips * Notice and comment on features in the outdoor environment   Key Knowledge  Name natural objects found outdoors  Comment on findings ‘look’  Key Vocabulary  Flower.  Tree.   Plant.   Colour.   Grow | Autumn  Development Matters   * Use all their senses in hands-on exploration of natural materials. * Explore collections of materials with similar and/or different properties. * Talk about what they see, using a wide vocabulary.   Key Knowledge  To investigate Autumn by collecting seasonal items.  To begin to use vocabulary correctly in relation to autumn  Key Vocabulary  Autumn, leaves, colours, conkers pinecone, acorn  Spring  Development Matters   * Talk about the differences between materials and changes they notice * Explore how things work. * Explore and talk about different forces they can feel   Key Knowledge  To understand the word melt  To use and explore melting  To know how vehicles move  To describe different vehicles  To know that in spring things change  To name the season spring  Key vocabulary  Snow    Ice.  Winter.  Melt.  Ice   Wheels.   Sail.  Wings.  Engine    Spring  Summer  Development Matters   * Plant seeds and care for growing plants. * Understand the key features of the life cycle of a plant and an animal. * Begin to understand the need to respect and care for the natural environment and all living things   Key Knowledge  To be able to identify a seed and bulb  Key Vocabulary  Change.  Plant.  Seed.  Bulb.  Grow. | Autumn Term 1 -  Development Matters   * Describe what they see, hear, feel when outdoors   Key Knowledge  To explore the senses - hearing, sight and touch  Key Vocabulary  Senses   hearing   sight   touch  Assessment  To be able to identify things they can see, hear and touch through a senses walk.   * Autumn – Term 2 - Understand the effect of changing seasons on the natural world around them.   Key Knowledge  To name the season Autumn  To know in Autumn the leaves fall from the trees  The leaves change colour  Key Vocabulary  Season       Autumn       Change      leaves    colours  Assessment  To create an autumn tree picture using the correct colours.   * Spring Term 1 - Understand changes in matter - water - ice   ice - water   Key Knowledge  To know ice melts. To understand water can be frozen.  Key Vocabulary  Ice, cold, frozen, melt, water, warm,  hot, change, Winter  Assessment  Explore ice - adult to prompt open ended questions - note children’s responses.  Spring Term 2   * Explore forces, pushing and pulling * Understand the effect of changing seasons on the natural world around them.   Key Knowledge  To be able to push and pull an object to make it move.  In Spring plants begin to grow  Key Vocabulary  Push   pull    move   Spring.   Season.  Grow  Assessment  To be able to sort pictures into push and pull to make them move   * Summer Term 1   Key Knowledge  To know plants grow from seeds  To be able to talk about the life cycle of a butterfly  Key Vocabulary  grow   change   plant    seed    lifecycle    butterfly   egg   chrysalis    caterpillar  Assessment  To create a life cycle of a butterfly. |

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| **Working Scientifically**  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:   * asking simple questions and recognising that they can be answered in different ways * observing closely, using simple equipment * performing simple tests * identifying and classifying * using their observations and ideas to suggest answers to questions * gathering and recording data to help in answering questions   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:   * asking relevant questions and using different types of scientific enquiries to answer them * setting up simple practical enquiries, comparative and fair tests * making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers * gathering, recording, classifying and presenting data in a variety of ways to help in answering questions * recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables * reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions * using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions * identifying differences, similarities or changes related to simple scientific ideas and processes * using straightforward scientific evidence to answer questions or to support their findings.   During years 5 and 6, 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 a 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 | | | | | |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Humans  Senses-Autumn Walk  What would happen if you didn’t have certain body parts? | Health  Animals including humans *-health*  Does what you eat and the exercise you do affect your body? | Light – Shadows and reflections  What is a shadow and how can it be changed? | Sound  Alexander Bell  How can we make a sound change? | Space and Earth  Galileo  Sun, moon and Earth-what is moving and how do we know? | Electricity  Michael Faraday  How can we vary the effects of electricity? |
| Everyday Materials  How can we sort materials? | Living things and their habitats  *(Animal/plant survival and growth)*  Sir Ernest Shackleton  Why do different animals/plants live in different places? | Rocks and fossils  Mary Anning  How are rocks different? | Living things and their habitats  Greta Thunsberg  What impact does the destruction of a habitat have? | Forces  Einstein  How can we slow down the movement of objects? | Animals including humans  Marie Curie  What can you do to be able to dance/play football for 24 hours? |
| Seasonal changes  Winter  Is the weather always the same throughout the year? | Animals including humans – Nutrition and diet  Can you plan swaps for an unhealthy child? | Electricity  Hertha Ayrton  How has electricity changed the way we live? | Properties and changes of materials  Properties, thermal insulation testing  --------------  Changes-reversible  Changes-Irreversible  How can we change materials? | Evolution and inheritance  Charles Darwin  What is evolution and what evidence do we have for it? |
| Animals  Beatrix Potter  How can we classify zoo animals? |
| Use of everyday materials  What is the best material for different parts of my model? | Animals including humans – Movement and skeletons  What would happen if we didn’t have a backbone/skull/ elbow etc? | Animals including humans – Teeth and the digestive system  What do our bodies do with the food we eat? | Light  Thomas Edison  Can you create quiz questions about light and provide answers? |
| Plants  Inc Wk1 Spring  What plants would you expect to see in our school grounds. How do they differ? |  | Plants  Why do plants have flowers? | Living things and their habitats including plants  David Attenborough  Do all plants and animals reproduce in the same way? | Living things and their habitats including plants and micro-organisms  Plants  Animals  How can we sort living things? |
| Plants *(Growing plants)*  Jane Colden  What should I do to grow a healthy plant? | States of matter  Solids ,Liquids, gases  Changes-heat/cool  Evaporation, condensation, water cycle  DG Fahrenheit  How can water change? |
| Forces and magnets  Isaac Newton  How can you move a paper clip through a maze with a push and pull-without touching it? | Animals including humans  Dr Elizabeth Blackwell  *(Y5 human life cycles) teach through PSHE lessons plus ideas incorporated into “Living things and their habitats”*  What would happen if you didn’t change after the age of 10? |
| Seasonal changes  Summer. Day length.  George James Symons- meteorologist  How do the seasons change? |