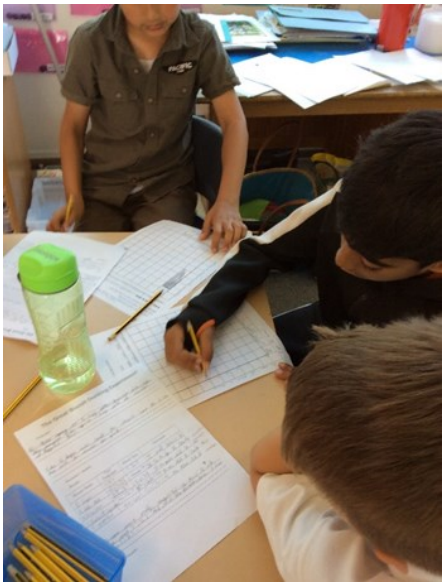
Our *Science* Approach

Our vision at Heymann Primary and Nursery School is for all children to 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 and to be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. Through identifying four key values that drive our whole school curriculum (Curriculum Drivers of Diversity, Emotional Intelligence, Creative Thinking and Community), we have designed our science curriculum to provide opportunities for our children to develop these values to enable them to take their place in the world around them.

Curriculum Design

Using the National Curriculum for science, we have identified precise and progressive disciplinary and substantive knowledge which are planned for each year group (see science planning overview for details of substantive and disciplinary knowledge). All of this builds cumulatively to allow our children to attain at least age-related expectations by the time children leave our school. This starts in our Early years and progresses throughout the school. Through our planned progressive curriculum, we aim to take the children on a journey of discovery about themselves and the world around them. All of this, we hope, will help our children to be prepared for secondary school science.

We realise the importance of how the content of the curriculum needs to be sequenced for children to build on previous learning. What children learn in the Early Year's settings is the foundation for future National Curriculum learning in the following school years. One of the seven areas in the Early Years curriculum is Understanding the World and within this the strand of The Natural World. Our children will explore the natural world around them, ensuring that they appreciate the living things around them and how to care for them. Children talk about changes in their environment, especially seasonal change, and learn about important processes, such as changing states of matter. Through direct teaching, linked provision and own investigations, children are encouraged to make observations and talk about their findings. Using stories, non-fiction texts, appropriate fiction texts and pictures, children have the opportunity to talk about similarities and differences between the natural world around them and contrasting environments.



In KS1, children develop their knowledge about themselves, other animals and plants, along with an understanding of some properties of materials. This includes working scientifically around the school grounds, investigating habitats, growing plants and learning about the use of materials. At KS2 children extend their knowledge about animals and plants, materials, light, forces, electricity, sound and the development of the world around us over time. Children develop their use of working scientifically skills to enhance their understanding and challenge misconceptions. Through visiting places of interest, and participating in relevant visits to school, our children will develop a growing knowledge about the world around them (and beyond). The children will learn how to scientifically question and develop appropriate investigations to answer those questions. They will collect, analyse and communicate data gathered from investigations and interpret a range of scientific information from observations, tables, diagrams, graphs and digital sources.

Science Curriculum- Heymann Primary School

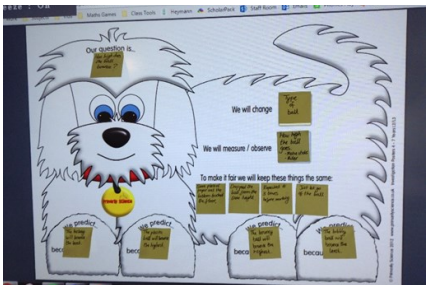
The Big Ideas of Science	
	Biology B1: Living things are special collections of matter that make copies of themselves, use energy and grow. B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago. B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.
	Chemistry C1: All matter (stuff) in the universe is made up of tiny building blocks. C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc). C3: Matter can change if the arrangement of these building blocks changes.
	Physics P1: The universe follows unbreakable rules that are all about forces, matter and energy. P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe. P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.
	Earth science E1: The Earth is one of eight planets that orbit the sun. E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate. E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)

Working Scientifically

Skills to be taught alongside other areas

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Can talk about some of the things they have observed such as plants, animals, natural and found objects. • Talks about why things happen and how things work. • Shows care and concern for living things and the environment. • Explore and make observations of the world around them • Ask questions about what they have observed • Suggest possible answers to questions • Looks closely at similarities, differences, patterns and change • Group together similar objects	• 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.		• 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.		• 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 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.	

We have adopted an enquiry-based approach to learning. Starting with our youngest children asking questions about their own environment and how it changes, then expanding their enquiries to living things and materials. For each science topic, learning is focused on an enquiry question which allows all children to access at an appropriate level. This approach allows both children and teachers to know the focus of the lesson without restricting children's responses and encouraging high expectations. All children, regardless of starting points, are supported to achieve their potential through a range of teaching strategies e.g. scaffolding, dual coding, high order questioning (use of Blooms taxonomy) to encourage elaboration of children's answers.



Our enquiry-based approach is underpinned by direct teaching of the substantive knowledge of key facts, vocabulary and procedures. Discrete science lessons may be taught in a block over a week or over a half term. Links are made where appropriate across subject areas and across lessons through a context for learning when appropriate. Planning includes opportunities for retrieval practice of substantive knowledge through a range of strategies e.g. drip teaching, Knowledge Organisers, quizzes, Learning by Questions and Spark. This allows teachers to identify and address any misconceptions, along with the use of concept cartoons. Once children are secure in this substantive knowledge, we want children to be able to apply this and enhance their understanding by way of their disciplinary knowledge.

At Heymann, we recognise the importance of promoting vocabulary as some of our children find understanding of tier 2 words difficult. In response to this, all staff place vocabulary and understanding of language at the heart of their teaching. We have identified key vocabulary the children will need each year and highlighted words that the children will revisit. The development of the use of Knowledge Organisers promotes understanding of tier 2 and 3 words both at home and school. Vocabulary we want all the children to know and understand is included on the Knowledge Organisers. Using symbols and definitions, children use retrieval activities to know and remember the vocabulary.en, motivating them to want to be life-long learners.

Finding out about the impact of both the intent and implementation of the science curriculum is timetabled. Monitoring of science planning and the impact of teaching is checked regularly according to our school monitoring timetable through planning, book scrutinies and pupil voice. We review our curriculum regularly to make sure that it meets the needs of our children, to check that it is relevant and challenging and still excites our children, motivating them to want to be life-long learners.