



Milefield Primary School
Approach to teaching of
Science



Intent

At MFPS we encourage children to remain curious throughout their time with us and beyond. Our Science Curriculum encourages pupils to have a healthy curiosity about the world around them and to appreciate both living and non-living things.

Science teaching, through our approach, ensures the development of knowledge, key concepts, and scientific enquiry skills. Children will learn and develop key knowledge that has been identified within each unit and throughout each year group. At MFPS we ensure that children's Working Scientifically skills are reinforced and improved throughout their school careers so that they can apply their scientific knowledge when performing experiments, constructing hypotheses, and confidently expressing key concepts.

Science is taught discretely through weekly sessions. Opportunities for the teaching AT1 (Scientific enquiry) are interweaved throughout units of work which allows children to regularly test and explore scientific theories. We celebrate Science Week each year at MFPS and a whole school focus is given to developing specific skills and knowledge associated with this. The HCAT progressive documents support the progression of knowledge and skills a child should learn in science throughout their time at school. The progressive skills have been enhanced from the National Curriculum to ensure coverage is appropriate for each year group.

Implementation

The HCAT progressive document we use at MFPS ensures that appropriate coverage and progression is in place for Biology, Chemistry and Physics and that children are building on their knowledge and skills over time.

Science is taught discretely in three categories: biology, chemistry and physics. It is delivered to raise interest, self-esteem, creativity and aspirations of all our children. The science curriculum is rich and varied, which provides our pupils with the skills required for life in the 21st Century. The Accelerated Learning Cycle, based on the work of Alastair Smith, is applied in all lessons. It stems from the idea of a supportive and challenging learning environment. The cycle has active engagement through multi-sensory learning, encourages the demonstrating understanding of learning in a variety of ways and the consolidation of knowing. Our science knowledge organisers support the planning and delivery of lessons to ensure children develop a deep, sequential understanding of specific knowledge and are able to apply these in a range of situations.

A gather, skills, apply approach to planning and delivery of lessons is taken across school to ensure children develop a deep understanding of specific skills and are able to apply these in a range of scientific situations.

Ultimately, scientific knowledge and enquiry skills are at the heart of the learning process with the children exploring a wide range of topics, to prepare them for life. Science at MFPS is delivered through knowledge rich and practical skill-based units of work designed by Science and Curriculum Leaders to ensure that all children have the opportunity to study a range of concepts and applications of science which build upon their prior knowledge and understanding.

Impact

At Milefield Primary, formative assessment is ongoing throughout each lesson. It judges progress and enables teachers to make flexible adaptations to their planned teaching. Through this regular ongoing assessment, tasks are matched to the ability of each child through scaffolds, adult support and providing a level of challenge that is stimulating for pupils and questioning skills.

Alongside formative assessment, Insight is used as a summative assessment to assess foundation subjects. The analysis of data from insights, identifies any gaps or misconceptions to be addressed.

Adaptations

At MFPS our curriculum is ambitious for all pupils, including those children with SEND. Curriculum designers and teachers have high expectations of what SEND pupils can achieve and the curriculum is not diluted or unnecessarily reduced for SEND pupils. Every pupil is different and so what works for each

pupil varies. Pupil's individual needs are carefully considered and adaptations are planned to ensure the success of pupils. The way that our curriculum is designed ensures that chunks of learning are sequenced in a coherent way to enable all pupils, including those with SEND, to build on prior knowledge. Cognitive overload can be a barrier to learning which is one of the reason why we have chosen half termly curriculum drivers.

Where pupils are identified with having complex needs it may be appropriate to provide a personalised curriculum which will be based on individual needs and will retain ambition for the pupil. Where working memory is an issue for pupils, including those with SEND, we look to reduce extraneous load as much as possible as well as identifying key information when teaching. Adaptations to support individual pupils will be recorded on personal school support plans.

At MFPS we do not assume that pupils with SEND learn content better through practical work as this can cause distraction and cognitive overload rather than increase clarity or accessibility. The curriculum is not narrowed for any pupils. Knowledge is taught and then pupils are provided with opportunities for scientific enquiry to test and investigate the knowledge taught. Pupils' specific needs determine the types of adaptations which are required. These adaptations are in how the subject is taught rather than the content pupils are expected to learn. Where appropriate, learning will be chunked into smaller steps and pre learning and consolidation time is planned in to support need. Time is also planned to ensure pupils with SEND are pre taught vocabulary to support their understanding. Adaptations may include supporting pupils to pay attention to key aspects as well as reducing excessive or unhelpful demands on working memory.

Example Knowledge Organisers

Y4 AUTUMN TERM 1

SIGNIFICANT PERSON
WILLIAM BEAUMONT



BIOLOGY



KEY CONCEPT:
ANIMALS INCLUDING HUMANS

KEY TEXT



DEMON DENTIST

Making Connections: Retrieval Activity.

Week 1:
How do you identify a producer, a predator and prey?

Week 2:
What is a primary consumer in a food chain?

Week 3:
How do you construct a food chain?

Making Connections: Retrieval Activity.

Week 4:
What is the digestive system?

Week 5:
What are the functions of the digestive system?

Week 6:
What different types of teeth do we have? (Working Scientifically – Presenting Conclusions)

Making Connections: Retrieval Activity.

KEY TEXT



Curriculum Objectives & Key Knowledge:

Week 1: I know how to identify producers, predators and prey, and give examples of these.
Knowledge: I know that producers are plants that can make their own food from sunlight. I know that animals that are eaten by other animals are called prey. I know that a predator is an animal which eats other animals. I know that some animals can be both prey and predators.
Vocabulary: Producer, prey, predators.

Week 2: I know how to interpret food chains and gain information.
Knowledge: I know that all food chains begin with a producer. I know the order of a food chain will be producer – primary consumer – secondary consumer – tertiary consumer. I know that secondary consumers are both predators, and prey. I know the predator is at the top of a food chain.
Vocabulary: Primary/Secondary/Tertiary consumer, food chain.

Week 3: I know how to construct different food chains and label animals with their titles.
Knowledge: I know food chains are found in all habitats. I know different habitats have different food chains, but all will begin with a producer. I know how to order the living things within a food chain. I know how to give each part of a food chain the correct label, beginning with a producer and ending with a secondary or tertiary consumer.
Vocabulary: Producer, consumer, habitats, food chain.

Week 4: I understand what the digestive system does.
Knowledge: I know that animals need to eat food and drink to survive, stay healthy and have energy. I know the digestive system is the part of the body that digests and processes food, taking nutrients that the body needs and getting rid of waste. I know the digestive system begins with the mouth and teeth and ends with the anus.
Vocabulary: Survive, healthy, energy, processes, nutrients, digestive system.

Week 5: I know how to describe simple functions of each part of the digestive system.
Knowledge: I know we put food into our mouth; this is chewed by the teeth so that we can swallow it. I know this food travels down the oesophagus to the stomach. I know the acid in the stomach breaks the food down further. I know the food enters the large and then the small intestine, where the body absorbs the nutrients, it needs. I know waste matter is passed out through the anus when we go to the toilet.
Vocabulary: Oesophagus, stomach, waste, anus, absorbs.

Week 6: I know how to use my findings to draw simple conclusions. I know how to identify the different types of teeth in the human body. I know how to explain the functions of different types of teeth.
Knowledge: I know how to conclude my findings. I know that the human body has incisors, canines, premolars, molars, sometimes wisdom teeth. I know that these teeth are different in appearance and have different functions. I know that incisors cut food – so enable us to bite into foods, for example biting an apple. I know that canines tear food, helping us to eat meat and tougher foods. I know that premolars and molars grind food so that it is small enough to swallow.
Vocabulary: Molars, incisors, appearance, canines, cut.

Y6 AUTUMN TERM 1

SIGNIFICANT PERSON
KARL LANDSTEINER



BIOLOGY



KEY CONCEPT:
ANIMALS INCLUDING HUMANS

KEY TEXT



Making Connections: Retrieval Activity.

Week 1:
What are the purposes of your heart, lungs, and circulatory system?

Week 2:
What are the different structures within blood?

Week 3:
What is the purpose and function of blood?

Making Connections: Retrieval Activity.

Week 4:
How does exercise affect heart rate? (Working Scientifically – Framing Question & Testing)

Week 5:
What impact did exercise have on heart rate during your enquiry? (Working Scientifically: Gathering Observations & Presenting Conclusions)

Week 6:
How does diet, lifestyle and exercise impact the human body?

Making Connections: Retrieval Activity.

KEY TEXT



CURRICULUM OBJECTIVES & KEY KNOWLEDGE:

Week 1: I know how to explain the functions of the heart, lungs, and circulatory system.
Knowledge: I know that the heart performs important functions: Pumps blood throughout the body, it supplies oxygen and nutrients to the tissues and removes carbon dioxide and wastes from blood and it also helps maintain adequate blood pressure throughout the body. I know that the lungs absorb oxygen from the air you breathe in and transfer it into your bloodstream so that it can get to the rest of your body. I know that all the cells in your body work, they produce a waste gas (carbon dioxide) that is released into the bloodstream. I know that your lungs get rid of this carbon dioxide when you breathe out. I know that the circulatory system transports blood to all the different parts of the body.
Vocabulary: Nutrient, bloodstream, waste, absorb, carbon dioxide.

Week 2: I know how to identify the different structures within blood: red blood cells, white blood cells, plasma, and platelets.
Week 3: I know how to explain the purpose of blood in transporting nutrients within the body.
Knowledge: (Week 2 & 3) I know that there are four components – or parts of blood: red blood cells, white blood cells, plasma, and platelets. I know that blood carries things you need, such as oxygen, glucose, and waste products (carbon dioxide) around your body. I know that red blood cells carry oxygen from the lungs to the rest of the body. I know that white blood cells fight infection and stop disease. I know that plasma carries blood cells and platelets around the body. I know that platelets are broken down parts of cells that form scabs. I know that blood plays a large role in digestion and endocrine system functions. I know that digestive nutrients are absorbed into the bloodstream through capillaries that line the small intestine.
Vocabulary: Component, infection, digestion, platelets, endocrine system.

Week 4: I select appropriate apparatus to set-up an enquiry, cooperate and fair test. I select the most appropriate ways to answer science questions using different types of scientific enquiry.
Knowledge: Working Scientifically: Pulse investigation. Planning an enquiry into testing the effect that exercise has on heart rate. I know that some variables need to remain the same to ensure that my enquiry is a fair test.
Vocabulary: Pulse, variable, heart rate, exercise, fair test.

Week 5: I know how to select appropriate charts and tables to present my findings. I explain causal relationships and the degree of trust in my results.
Knowledge: Working Scientifically: Presenting findings from week 4. I know that charts and tables can be used to represent information. I know that results can be displayed to help identify trends and causal relationships. I know that my results must be accurate to draw accurate conclusions.
Vocabulary: Findings, trends, causal, relationships, tables.

Week 6: I know how diet, exercise, drugs, and lifestyle has on the human body. I know the ways in which diet, exercise, drugs, and lifestyle can affect how the body functions.
Knowledge: I know that good health means eating a balanced diet, getting regular exercise, avoiding tobacco/drugs, and getting plenty of rest. I know muscles require regular exercise and exercise helps you maintain a healthy attitude to problems and mental pressures. I know that there are many benefits of a balanced diet: a strong immune system; a lower risk illness; lower blood pressure; a healthy weight and having energy. I know that a balanced diet means eating a wide variety of foods in the right proportions. I know that medicines and drugs can be harmful if not taken as prescribed. I know that some drugs are illegal and can be addictive.
Vocabulary: Avoid, muscle, harmful, addictive, balanced, benefits.