Hade Edge Junior, Infant & Nursery School

Science Progression Map

Government Guidance

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. (DFE Science Programme of Study: Key stages 1 & 2 2013).

Aims in the Science curriculum

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.

Progression in Key Stages:

Early Years and Foundation Stage

Science in the Foundation Stage (nursery and reception) is mainly covered in the 'Understanding the World' and 'Physical Development' areas of the EYFS Curriculum, however there are elements in other areas such as Expressive Arts and Design. It is introduced indirectly through activities that encourage children to explore, problem solve, observe, predict, think, make decisions and talk about the world around them.

Below are the Key Early Learning Goals that relate to the Science National Curriculum:

Understanding the World

The World:

Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

People and Communities:

Children talk about past and present events in their own lives and in the lives of family members. They know that other children don't always enjoy the same things, and are sensitive to this. They know about similarities and differences between themselves and others, and among families, communities and traditions.

Physical Development:

Health and Self-care:

Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe. They manage their own basic hygiene and personal needs successfully, including dressing and going to the toilet independently.

Key Stages 1 & 2

The table below shows progression of coverage in science (statutory). As we have mixed aged classes at Hade Edge School, children in other year groups are also exposed to some of the areas (non-statutory)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living Things and Their Habitats	✓	✓	✓	✓	✓	✓
Plants	✓	✓	✓	✓		
Animals including Humans	✓	✓	✓	✓	✓	✓
States of Matter			✓	✓		
Evolution and Inheritance					✓	✓
Sound			✓	✓		
Electricity			✓	✓		✓
Rocks			✓	✓		
Light			✓	✓		✓
Forces and Magnets			✓	✓	✓	✓
Earth and Space					✓	✓
Everyday Materials (KS1) Properties and changes of materials (KS2)	✓	✓			✓	✓
Seasonal Changes	✓	✓				

Working Scientifically

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Key Stage 1	Lower Key Stage 2 (Yr 3 & 4)	Upper Key Stage 2 (Yr 5 & 6)
Ask simple questions and recognising that they can be answered in different ways.	Asking relevant questions and using different types of scientific enquiries to answer them.	Planning different types of scientific enquiries, including recognising and controlling variables where necessary.
Observe closely, using simple equipment.	Setting up simple practical enquiries, comparative and fair tests.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate.
Perform simple 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.	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Identify and classify.	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.	Using test results to make predications to set up further comparative and fair tests.
Use their observations and ideas to suggest answers to questions.	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.	Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of an degree of trust in results, in oral and written forms such as displays and other presentations.
Gather and record data in answering questions.	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Identifying scientific evidence that has been used to support or refute ideas of arguments.
	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions using straightforward scientific evidence to answer or to support their findings.	

Skills Progression by Year Group / Class

The Statutory Programmes of Study for each year group are highlighted in yellow. As we have mixed age classes we teach programmes of study to 2 year groups in each class and progression of skills is clearly mapped and tracked. Science is taught in a 2 year cycle.

Living Things and Their Habitats

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Living Things and their habitats	Understand that most living things live in a 'habitat'. Know that not all habitats are the same.	Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Identify and name a variety of plants and animals in their habitats, including micro-habitats	Be able to name and describe different animals and their habitats. Begin to understand simple food chains.	Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey. Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics.

Plants

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Plants	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees.	Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Explain how people, weather and the environment can affect plant growth.		

Animals Including Humans

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Animals Including Humans	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify and name a variety of common animals that are carnivores, herbivores and omnivores Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	Explore and compare the differences between things that are living, dead, and things that have never been alive Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the changes as humans develop to old age. Describe the life process of reproduction in some plants and animals.	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Describe the ways in which nutrients and water are transported within animals, including humans. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function

Rocks

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Rocks			Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter.	Be able to name different kinds of rock.		

Everyday Materials

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Everyday Materials	Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties. Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.				

Properties and changes of materials

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Properties and changes of materials					Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from solution Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets	describe methods for separating mixtures, for example, filtration, distillation

States of Matter

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
States of Matter			Identify the difference between a solid, liquid and a gas.	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.		

Evolution and Inheritance

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Evolution and Inheritance					Describe some simple life cycles. Describe the life process of reproduction in some plants and animals.	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Sound

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Sound			Understand key vocab: Vibrate, pitch, volume. Know that sounds can be made. Experiment with volume and pitch and begin to draw their own conclusions.	Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases.		

Electricity

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Electricity			Know that electricity is used to power some items. Be able to name the simple equipment used to create a circuit. Begin to experiment with and make simple circuits, drawing their own conclusions.	Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise some common conductors and insulators, and associate metals with being good conductors. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	Recognise if all metals are conductors of electricity Work out which metals can be used to connect across a gap in a circuit	Use recognised symbols when representing a simple circuit in a diagram. Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches

Forces and magnets

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Forces and magnets			Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing. Observe how magnets attract or repel each other and attract some materials and not others Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	Investigate the strengths of different magnets and find fair ways to compare them Explain why lights need to be brighter or dimmer according to need Explain why their shadow changes when the light source is moved closer or further from the object	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Identifying scientific evidence that has been used to support or refute ideas or arguments.	Describe and explain how motion is affected by forces, for example, including gravitational attractions, magnetic attraction and friction Work out how water can cause resistance to floating objects Compare the time of day at different places on earth

Earth and Space

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Earth and Space					Describe the Sun, Earth and Moon as approximately spherical bodies Describe the movement of the Earth, and other planets, relative to the Sun in the solar system Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Describe the movement of the Moon relative to the Earth	Compare the time of day at different places on earth Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

Seasonal Changes

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Seasonal Changes	Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.	Name the different seasons and identify the characteristics of each season.				

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Marvellous Meerkats		Wonderful Wolves		Excellent Eagles	
Light			Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that shadows are formed when the light from a light source is blocked by a solid object Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Find patterns in the way that the size of shadows change.	Explain why their shadow changes when the light source is moved closer or further from the object Explain why lights need to be brighter or dimmer according to need		Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.