Our vision for Science

Intent: In Science we aim to build a deep understanding of the body of knowledge and skills built up through experimental testing of ideas. Science is also a methodology, a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. We encourage children to be curious and ask scientific questions beginning to appreciate the way science will affect their future on a personal, national and global level. We enable children to pan and carry out scientific investigations, using equipment, including new technologies. We develop scientific knowledge and conceptual understanding. We help children to evaluate evidence and present their conclusions clearly and accurately.

In planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately. The three Characteristics of Effective Teaching and Learning are: **playing and exploring** - children investigate and experience things, and 'have a go'; **active learning** - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements; **creating and thinking critically** - children have and develop their own ideas, make links between ideas, and develop strategies for doing things. In Addition, the prime areas of learning **(PSE, CL, PD)** underpin and are an integral part of children's learning in all areas.

EYFS Science Skills

Working scientifically	Plants	Animals (Including humans) PSHE link	Everyday materials
Comments and asks questions about aspects of their familiar world such as the natural world, making observations and drawing pictures of animals and plants. Talks about why things happen and how things work Looks closely at similarities, differences, patterns and change Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter Explore and talk about different forces I can feel – gravity, push and pull toys	Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant Developing an understanding of growth, decay and changes over time Identify similarities and differences in relation to living things	Understand the life cycle of a human Begin to understand the need to respect and care for the natural environment and all living things. Talk about the features of their own immediate environment and how environments might vary from one another. Identify which dinosaurs are meat or plant eaters	Identify similarities and differences in relation to materials

Seasons - see Geography knowledge and skills progression map

EYFS Science Knowledge

Autumn – Changing state – ice (seasons – see EYFS Geography knowledge and skills)

<u>Working scientifically</u>

- I know how to ask questions about the world the world through using my senses - feeling, hearing, seeing
- I know some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Spring – Space – forces (Gravity) Push and pull toys, habitats (farm), lifecycles , growing plants

Working scientifically	Animals	Plants
• I know about aspects of my familiar world such as the natural world, making observations and drawing pictures • I know and can talk about forces I can feel	• I know how to care for animals (trip) • I know some of the features of my own immediate environment and how they might vary from one another (farm/zoo)	• I know how to care for growing plants. • I know about the life cycle of a plant • I know about growth, decay and changes over time • I know some similarities and differences in relation to living things.

Summer – Floating and sinking - which material will create the best boat? (Everyday materials), growing - lifecycles and body parts (PSHE link)

Working scientifically	Animals	Everyday materials
• I know why things happen and how things work • I know some similarities, differences, patterns and change in relation to people	• I know about life cycle of an human • I know I need to respect and care for the natural environment and all living things. • I know which dinosaurs are meat or plant eaters	I know some similarities and differences in relation to materials

Key Vocabulary

Science, experiment, test, fair, why, senses, world, plants – leaf, stem, root, flower, animals, humans, materials - waterproof, natural, change, growth, decay, environment

Year Group	National Curriculum Reference	End of Year Intended Knowledge What will the children know?	End of Year Intended Skills What will the children be able to do?
Year 1	**Autumn** Animals including humans	The names of parts of the body. **Head, body, eyes, ears, mouth, tongues, eyebrows, nose, neck, shoulders, arms, elbows, hands, legs, knees, feet.** We have 5 senses. What are vertebrates? What are mammals? What are fish? What are birds? What are reptiles? What are amphibians? What are carnivores, herbivores and omnivores?	**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: 1. asking simple **questions** and recognising that they can be answered in different ways 2. observing closely, using simple equipment 3. performing simple tests 4. identifying and classifying 5. using their observations and ideas to suggest answers to questions 6. gathering and recording data to help in answering questions.
	Plants	The names of some common garden plants? The names of some common wild plants? What are deciduous and evergreen trees? What are the parts of common trees and plants? .	
	Spring Everyday materials	Identify and name a variety of everyday materials. Which materials are some objects made from? Describe the properties of a variety of everyday materials. Which materials are natural and which are man-made?	
	Summer Seasonal changes	What is a season? What happens in spring, summer, autumn and winter?	
Year 2	**Autumn** Animals including humans	How do animals including humans reproduce, change and grow? What do all animals need to survive? What do humans need to be healthy? How can I find out about animals and humans?	
	Living things and their habitats	What is a habitat? What is a microhabitat? How do animals and plants depend on each other?	

	Spring Plants **Summer** Everyday materials	 Plants are living things and require things to grow? Which plants do we eat? What are the parts of common trees and plants? How do seeds and bulbs grow into mature plants? What are materials used for? What properties of materials make them suitable for a particular use? How can you change the shape of materials? How to compare and group materials using more complex diagrams? Know the names of these inventors – Charles Macintosh – invented the waterproof rain mac. John Dunlop – Made tyres John McAdam – Invented tar	
Year 3	**Autumn** Animals including humans Rocks **Spring** Light Plants	 What are the different types of skeletons? - Endoskeleton and exoskeleton. What does an endoskeleton do? How do we move? Names of parts of the skeleton – **Skull, ribs, humerus, pelvis, carpal bones, metacarpals, knee, sternum, scapula, radius, ulna, femur, tibia, fibula, tarsal bones.** Names of muscles in the arms – **biceps and triceps.** What are the different types of rocks? **Igneous, Sedimentary, Metamorphic.** What are fossils? What is soil? What is a light source? Why do we need light? How does light travel? How are shadows formed? The functions of the different parts of flowering plants. What do different plants need to grow? How is water transported within plants? How do flowers help the lifecycle of flowering plants?	**Working scientifically** 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: 1. asking relevant **questions and using different types of scientific enquiries t**o answer them 2. setting up simple practical enquiries, comparative and fair tests 3. making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 4. gathering, recording, classifying and presenting data in a variety of

	Summer Forces and Magnets	What are forces? How do different surfaces affect the motion of an object? How do magnets work? Which materials are magnetic? How do magnetic poles work?	ways to help in answering questions 5. recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 6. reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 7. using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 8. identifying differences, similarities or changes related to simple scientific ideas and processes 9. using straightforward scientific evidence to answer questions or to support their findings.
Year 4	**Autumn** Animals including humans	What is the role of our teeth and how do we look after them? What are the different names and functions of human teeth? How the digestive system works. Construct and interpret a variety of food chains. What is a food web?	
	Living things and their habitats	All living things have to do certain things to stay alive – **movement, respiration, sensitivity, growth, reproduction, excretion and nutrition.** Recognise that living things can be grouped in a variety of ways. Hat is a classification key? How can environments change?	
	Spring Sound	What is a sound? How is sound made? Does sound travel? How can we hear sounds? How do sounds change? How do we measure sound?	
	States of matter	What is a particle? What is a solid? What is a liquid? What is a gas? What happens to the particles in water when it is heated or cooled? What is the water cycle?	
	Summer Electricity	Where does electricity come from? Which appliances run on electricity? How does a circuit work? What are electrical conductors and insulators?	
Year 5	**Autumn** Animals including humans	What are the main stages of the human life cycle? What is puberty?	**Working scientifically** During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills

	Living things and their habitats **<u>Spring</u>** Earth and Space Properties and Changes **<u>Summer</u>** Forces	What is reproduction in animals and plants? How do plants reproduce? What causes day and night? Year length and the seasons. About the moon and how it orbits. What is the solar system? How to group materials based on their properties using more complex language. What are thermal insulators and conductors? What electrical insulators and conductors are? What is dissolving? Can materials be separated once they have been mixed? What are forces? What is gravity and air resistance? What is water resistance? What are examples of mechanisms?	through the teaching of the programme of study content: 1. planning different types of **scientific enquiries to answer questions, including recognising and controlling variables** where necessary 2. taking measurements, using a range of scientific equipment, with increasing accuracy and precision taking repeat readings when appropriate 3. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs 4. using test results to make predictions to set up further comparative and fair tests. 5. 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 6. identifying scientific evidence that has been used to support or refute ideas or arguments.
Year 6	**<u>Autumn</u>** Animals including humans Living things and their habitats **<u>Spring</u>** Light Electricity	How my **pulse** changes with exercise and the most efficient way of presenting this data. The four parts of my **blood** and the job of each of these parts. The names of the four **chambers** of the **heart**. How my heart works. How blood travels around my body. The effect **exercise** has on my **heart**. The effect food, drugs and alcohol have on my body. The way in which water and nutrients are transported around my body. What are microorganisms? How do we see? How does light travel?	

	<u>Summer</u> Evolution and Inheritance	How adding more cells affects the brightness of a bulb or the sound of a buzzer. How to draw circuit diagrams. How to explain why circuits do or don't work. Examples of animal adaptations. Who Charles Darwin and Alfred Wallace are and why they are important. What inheritance is and how it works. What is meant by the term natural selection and evolution? An example of an animal affected by natural selection.	