Bunbury Aldersey CE Primary School
Science curriculum map:
Reception to Year 6

Let Your Light Shine - Matthew v5:16

Article 29: Children's education should develop each child's personality, talents and abilities to the fullest. It should encourage children to respect others, human rights and their own and other cultures. It should also help them learn to live peacefully, protect the environment and respect other people.
Our Curriculum Policy details our intent behind our curriculum, how we implement it and our desired impact. At RCSAT, the school curriculum consists of all those activities designed or encouraged within its organisational framework to provide the intellectual, emotional, personal, social, spiritual and physical development of all its pupils. It includes not only the subject specific curriculum but also the 'informal' programme of enrichment and extra-curricular activities.

The curriculum at RCSAT, developed over a number of years, is firmly rooted in and stems directly from our Vision, Mission and Core Values;

Our Vision – 'Let your Light shine' Matthew v5:16

Our Mission – 'A Caring Christian Family Where We Grow Together'

Our Core Values –
WE aim to create an enjoyable, inclusive, safe and nurturing environment that allows all children to develop spiritually, morally and socially.
– *every child is a child of God, made to contribute to our world*.
WE aim to create an inspiring environment, which encourages enthusiasm for lifelong learning and establishes an expectation of high standards.
– k*nowing the way, showing the way and going the way*.
WE aim to encourage caring, sensitive and inclusive attitudes where individuals feel secure, valued and respected by others.
– like Jesus showed us through his teachings
WE aim to provide a broad and connected curriculum which challenges and develops the potential of each child.
– as Jesus needed his disciples to support and guide, so we look to others with more knowledge
WE aim to develop a positive relationship between home, school and our wider community
- *as a family – as brothers and sisters*

Science curriculum intent

Our high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We want children to learn how science has changed and influenced our lives and is vital to the world's future prosperity. All pupils are taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, children are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

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Through our study of Science, we aim to ensure 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.

Implementation

Curriculum structure & sequencing

We structure our Science curriculum by using the National Curriculum. This allows all our children, in every year group, to have a full and in depth understanding of the biology, chemistry and physics strands. In each year group, all children have the opportunity to study a scientist who links with a taught topic that year.

Content & concepts

Our aim is to ensure that our Science curriculum consists of more than simply learning scientific concepts and factual information. In each unit, teachers plan for multiple opportunities for children to actively participate within their learning, through a range of individual activities and investigations. At the start of each unit, teachers make sure that pupils are confident with prior learning to ensure all learning is progressive.

Enrichment and personal development:

At Bunbury Aldersey, children have a range of enrichment opportunities. Pupils from KS1 and KS2 have the opportunity to attend STEM club and learn further about science, technology, engineering and maths. Each year, every class partakes in Science Week and engages with a school-wide theme.

Assessment and next steps

We assess Science in a variety of ways, giving pupils the opportunity to explain their reasoning and metacognition of a topic as well as their accumulation of knowledge. This may be done through practical exercises, group tasks, quizzes or discussion. We value developing scientific oracy and place great emphasis on children being able to explain how, and why; understanding the knowledge and skills within scientific learning.

Science in the Early Years Foundation Stage

Whilst not a standalone area of learning within the Early Years Foundation Stage, Science forms important parts of various aspects of the EYFS framework. The very nature of scientific inquiry, trial and error and investigation; lend themselves perfectly to the way children in early years engage with and explore the environment around them, and science can be seen within the teaching and learning of the following areas of EYFS:

- Communication and Language,
- Personal, Social and Emotional Development,
- Understanding the World

Through the study of science in early years, children will not only learn about the world around them and the associated processes that occur naturally and via through stimulation; they will also learn important self care skills and ways in which they can use and look after their bodies. Effective teaching of science within the early years establishes not only a solid foundation on which to build further scientific learning, it also develops critical thinking, questioning skills and a thirst for knowledge and enquiry which will serve children well as we strive to develop a love of learning which will stay with them throughout their school years and beyond.

Links to Development Matters

Communication and Language

Learn new vocabulary.

-Ask questions to find out more and to check what has been said to them. -Articulate their ideas and thoughts in wellformed sentences. -Describe events in some detail.

-Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. -Use new vocabulary in different contexts.

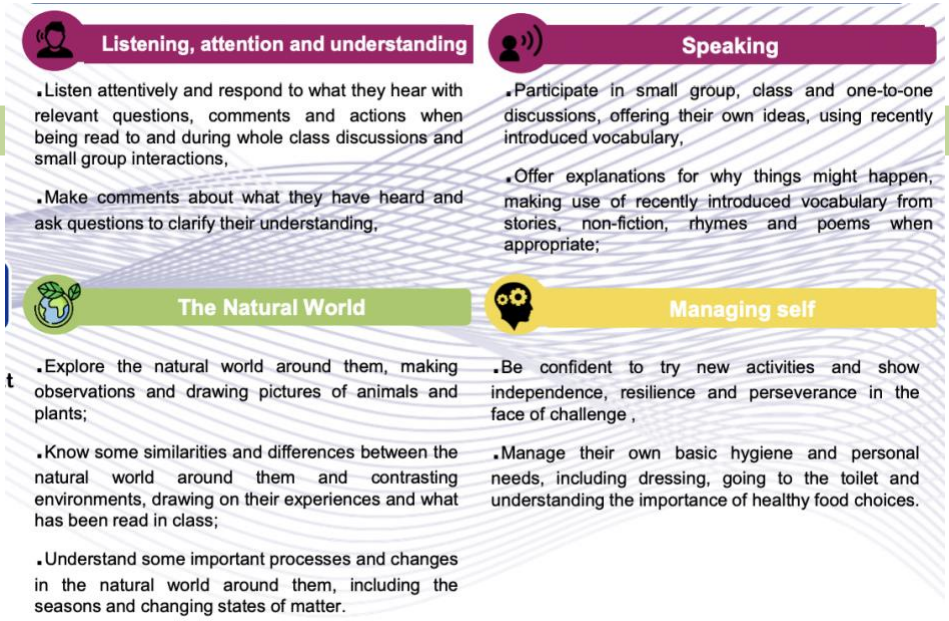
Personal, Social and Emotional Development

Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian

Understanding the World

- Explore the natural world around them. - Describe what they see, hear and feel while they are outside. - Recognise some environments that are different to the one in which they live. -Understand the effect of changing seasons on the natural world around them

Early Learning Goals Links



Inclusion within Science

We are an inclusive school and as such, do not believe in narrowing the curriculum for any learner. Our curriculum is designed with inclusion of all at heart, and our curriculum intent is therefore the same for all children.

However, we are mindful that there are an abundance of factors which need to be considered in order for all learners to be able to access learning according to their individual needs; perhaps none more so than for those learners with Special Educational Needs and Disabilities (SEND).

Therefore, whilst our curriculum intent is the same for all learners; our implementation of the curriculum may well look different for different groups of pupils. Teachers will plan, scaffold, challenge and embed learning through activities which are adapted to meet children's needs – we call this adapted implementation. This is to ensure that our curriculum can be met by all within an inclusive environment, mindful and responsive to children's needs.

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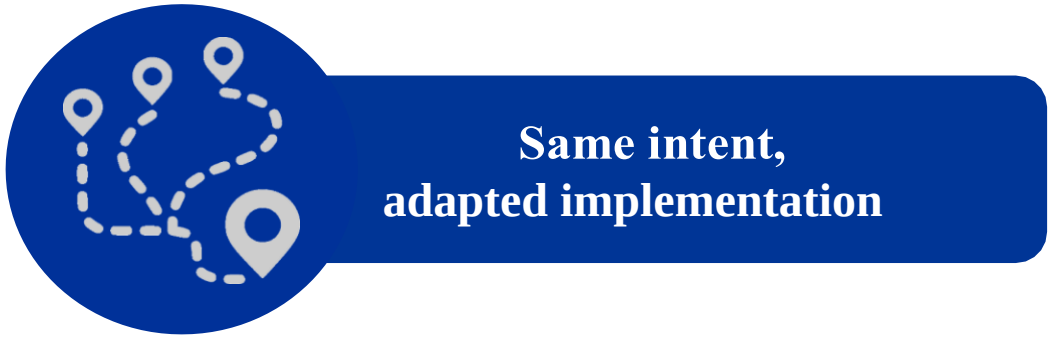


Word banks and picture resources may be supplied to assist learners with scientific language and processes.

Staff may scribe for children to ensure a child's explanations and articulation is not limited by writing competence.

Make regular references to relevant language throughout the lesson and school day using tools such as working and display walls.

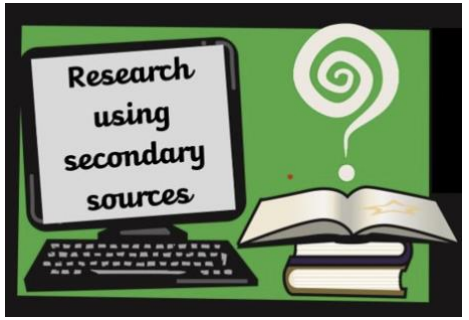
Use small group teaching opportunities to dedicate more time and support to provide additional learning opportunities to learners working towards a planned objective.
Provide learners with targeted resources to support their learning and understanding such as concept cartoons and visual aids.

Science Golden Threads

Our high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. We want children to learn how science has changed and influenced our lives and is vital to the world's future prosperity. All pupils are taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, children are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena.
They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.
Through our study of Science, we aim to ensure 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

Over the course of an academic year, pupils should carry out different types of investigations that involve different types of enquiry approaches.
These approaches provide the opportunity for children to develop a multitude of scientific knowledge through the use of enquiry skills.
Teachers and pupils also focus on recording specific enquiry skills during practical lessons. For example, pupils could record their data in a table or write a short paragraph to say what they found out
following an observation.

Approaches



Bunbury Aldersey CE Primary - Science End Points

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	**Living things and their Habitats**	**Plants**	**Living things and their Habitats**	**Animals, including humans**	**Electricity**
Identify, name and describe the basic structure of a variety of common wild and garden plants, including deciduous and evergreen trees and common flowering plants	I can explore the differences between living, dead and non-living things. Identify how things are adapted to their habitats and their dependence on each other, recognise various plants and animals in their habitats. Describe how animals acquire food through a simple food chain and name different sources of food.	Identify and describe the functions of different parts of flowering plants, explore their requirements for life and growth, investigate water transportation within plants and explore the role of flowers in the life cycle of flowering plants.	Learn to group and identify living things using classification keys and understand the impact of changing environments/habitats on living organisms. I can group and classify animals and plants by knowing that vertebrates have spines and include mammals, birds, fish, amphibians and reptiles. While invertebrates don't have spines. I can use classification keys with closed questions to do this accurately.	Describe the changes as humans develop to old age. Understand the differences in life cycles among mammals, amphibians, insects, and birds and describe the process of reproduction in certain plants and animals.	I can connect the brightness of a lamp or the loudness of a buzzer to the number and power of batteries in the circuit. I can explain why the components like bulbs and buzzers work differently. I can draw simple circuit diagrams using symbols.
Seasonal Change	**Materials**	**Rocks and Fossils**	**Human Body**	**Forces**	**Living things and their habitats**
I can observe and describe changes across the four seasons, including weather patterns associated with each season and variations in day length.	I can learn which everyday materials, like wood, metal, plastic, glass, brick, rock, paper and cardboard are good for different tasks. I can see how we can change the shape of some things made from these materials by squashing, bending, twisting or stretching them.	I can discover that rocks come in different types, like those with grains or crystals. Some have layers and they can be heavy or light and people use them to build structures. Some rocks change as they get older. I can recognise that soils are made from rocks and organic matter. I can describe in simple terms how fossils are formed when things that have lived are trapped within the rock.	Understand the basic functions of the human digestive system. Identify types of human teeth and their functions.	I can explain that objects fall to Earth because of the force of gravity. Recognise the effects of forces like air resistance, water resistance and friction on moving objects and understand that some tools, such as levers, pulleys and gears, make it easier to apply forces to objects.	I can explain how we group together things like plants, animals and micro-organisms into different categories by looking at what makes them alike and different. I can tell why we do this based on their special features.
Animals	**Animals**	**Forces and Magnets**	**Food chains**	**Space**	**Humans**
Identify, name and describe a variety of common animals including fish, amphibians, reptiles, birds and mammals, including pets, their diets and common structures	I can learn about living things, understand where they live, what they eat and how they depend on each other in different habitats.	Compare and classify the movement of objects on different surfaces and explore the effects of contact and magnetic forces. Including how magnets have two poles and can attract or repel each other and certain materials.	I can construct/interpret food chains by identifying producers, predators and prey.	I can describe how the Earth and other planets move around the Sun. Explain how the Moon moves around the Earth and understand that the Sun, Earth and Moon are roughly round. Use the Earths rotation to explain day and night, and the Sun's movement in the sky.	I can identify the parts of the human circulatory system and their functions. I can understand how diet, exercise, drugs and lifestyle impact bodily functions and describe how nutrients and water are transported in animals including humans.
Human Body	**Humans**	**Nutrition and diet**	**States of Matter**	**Properties of materials**	**Evolution**

I can identify, name, draw, label the basic parts of the human body and associate each sense with the corresponding part of the body.	I can understand the life cycle of animals, including humans and their basic survival needs fir water, food and air. Whilst recognising the significance of exercise, proper nutrition and hygiene for human well being.	I can learn that humans and animals need different types of food to stay healthy, like fruits and veggies for vitamins. Carbs for energy, protein for muscles and dairy for teeth and bones. We should eat a balanced diet. Animals eat what they need, which maybe plants or other animals.	I can understand the three states of matter and how we can interchange between them. Understanding also how this can be seen in the water cycle.	Understand and group everyday materials based on their properties, knowledge of their solubility and recovery from a solution. Separate mixtures through filtering, sieving and evaporation. Determine the articular uses of everyday materials based on evidence.	I can recognise the changes of living things over time through fossils, the variation of offspring from parents, and the adaption of animal and plants to their environment, which may lead to evolution.
Everyday Materials	**Plants**	**Humans**	**Sound**		**Light**
I can distinguish between objects and the materials they are made from identify and name various everyday materials such as wood, plastic, glass, metal, water and rock. Describe their simple physical properties and compare and group them based on these properties.	Observe and describe the growth process of seeds and bulbs into mature plants and find out how plants require water, light and appropriate temperature to sustain their growth and health.	I can recognise that humans have skeletons made up of many bones serving different functions, and that similar variations exist in skeletons other animals. Understand that joints, muscles and bones work together to enable movement.	I can understand how sounds are made through vibrations, how they travel through a medium to the ear and find patterns between the pitch/volume of a sounds and the strength/features of the object that produced it. Understand that sound gets fainter as distance from the source increases.		Recognise that light travels in straight lines, an use this concept to explain why objects are seen when they give out of reflect light into the eye. Understand how we see things and why shadows have the same shape as the objects that cast them.
		Light	**Electricity**		
		Recognise and understand the properties of light, including its necessity for vision, reflection from surfaces potential danger to our eyes, formation of shadows by opaque objects and patterns in the changing size of shadows.	Identify electric appliances, construct and identify parts of a simple series circuit. Predict if a lamp will light in a complete loop with a battery. Understand the function of switches in circuits and identify conductors/insulators and their properties such as metals being good conductors.		

Progression of disciplinary knowledge

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Biology	**Animals including humans**
	• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
	• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
	• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
	• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
	
	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.
	
	Seasonal Changes
	• Observe changes across the four seasons
	Observe and describe weather associated with the seasons and how day length varies.
		Animals including humans
		Notice that animals, including humans, have offspring which grow in to adult
		Find out about and describe the basic needs of animals, including humans, for survival (food, water, air).
		Describe the importance of exercise to humans, eating the right amounts of different types of foods, and hygiene.
		
		Living things and their habitats
		Explore and compare the differences between living, dead and non-living things.
		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.
		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.
		
		Plants
		Observe and describe how bulbs and seeds grow into mature plants.
		Find out and describe how plants need water, light and a suitable temperature to grow
			Animals including humans
			• Identify that animals need the right types and amount of nutrition and that they can't make their own food.
			• Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
			
			Plants
			• Identify and describe functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
			  • 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.
			  • Investigate how 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.
				Animals including humans
				• 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.
				• Construct and interpret a variety of food chains, identifying producers, predators and prey.
				
				Living things
				• 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.
				• Recognise that environments can change and that this can sometimes pose dangers to living things
					Animals including humans
					Describe the changes as humans develop to old age (including during gestation).
					
					Living things
					• 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.
						Animals including humans
						• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
						• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
						Describe the ways in which nutrients and water are transported within animals, including humans.
						
						Living things and their habitats
						• 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.
						• Identification and classification.
						• Give reasons for classifying plants and animals based on specific characteristics.
						• Identification and classification-pattern seeking.
						
						Evolution and inheritance
						• 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.

Chemistry	**Everyday materials** • 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. • 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.	**Uses of everyday materials** 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.	**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.	**States of Matter** • 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 (oC). • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Properties and changes of materials** • 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. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • 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.	
Physics			**Light** • Recognise that they need light in order to see things and darkness is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when light from a light source is blocked by a solid object. • Find patterns in the way the size of shadows change.	**Sound** • 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 produce it.		**Light** • 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. • 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 research. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

			Forces and magnets • Compare how things move on different surfaces. • Notice that some forces need contact between two objects but magnet forces can act at a distance. • 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. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing.	**Electricity** • 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 buzzes. • 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 that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators and associate metals with being good conductors.	**Forces** • 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. **Earth and Space** • Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	**Electricity** • Planning different types of scientific enquires to answer questions including recognising and controlling variables where necessary.
Working Scientifically	• Asks a few simple questions about what they notice. • Observes things closely. • Performs a simple test. • Identifies things in the natural and humanly-constructed world. • Uses one or two basic observations and ideas to suggest an answer to a question. • Gathers and records some simple data.	• Ask a range of simple questions about what is noticed. • Observe things closely using simple equipment. • Perform a range of simple tests. • Identify and classify things in the natural and humanly constructed world. • Use a range of observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.	• Asks questions about what they notice. • Observes things closely using simple equipment. • Sets up simple practical enquiries and tests. • Identifies differences, similarities or changes relating to things in the natural and humanly-constructed world. • Uses test results to draw simple conclusions and make simple predictions. • Gathers, records and classifies data to help in answering questions.	• Ask relevant questions about what they notice. • Makes systematic and careful observations using a range of equipment. • Sets up simple practical enquiries, comparative and fair tests. • Identifies differences, similarities or changes related to simple scientific ideas and processes. • Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Gathers, records and classifies data in a variety of ways to help in answering questions.	• Ask relevant questions about what they notice. • Makes systematic and careful observations using a range of equipment. • Uses test results to ask further questions. • Identifies differences, similarities or changes related to simple scientific ideas and processes. • Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Gathers, records and classifies data in a variety of ways to help in answering questions.	• Ask relevant questions about what they notice. • Makes systematic and careful observations using a range of equipment. • Uses test results to set up further enquiries, comparative and fair tests. • Identifies differences, similarities or changes related to simple scientific ideas and processes. • Uses test results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Gathers, records and classifies data in a variety of ways to help in answering questions

Assessment in Science

We place great emphasis on the importance of assessing children's knowledge, understanding and skillset within Science.

When assessing Science, it is first essential to clearly articulate two important areas:

1. The specific endpoint for the unit being delivered,
2. The substantive and disciplinary knowledge to be taught to reach this endpoint.

At Bunbury Aldersey, we have mapped out all endpoints for all the Science units to be delivered, before specifying what substantive and disciplinary knowledge is to be taught within each unit to reach this endpoint. It is this knowledge and understanding that we assess children upon, believing accurate assessment can only be a reflection of what is taught to children.

When delivering lessons; teachers record notes, comments and reflections they feel pertinent to the formative assessment of their teaching and learning of Science. Feedback is delivered at the start of the following lesson, in order for children to recap prior learning undertaken before building on this. It also provides an opportunity to address any misconceptions and develop a greater understanding of what has been taught.

With the unit endpoint in mind, teachers will form a summative assessment for each child within a particular unit. This will be either, working towards / working at / working above the expected standard.

We define what the expected standard is by listing the essential substantive and disciplinary knowledge children should know in order to achieve this, also articulating what would classify a pupil who may be working below / above this. Teachers record this on a single page at the end of each unit, creating this summative judgement through a culmination of their formative assessments and evidenced work within children's books; against this framework of what is to be taught.