Science Curriculum Intent
Progression of Skills and Knowledge

Our Vision for Science

In Science, we aim to foster children's natural curiosity about the world around them, encouraging them to be inquisitive, independent and active in their learning. We aim to provide as many opportunities to explore and investigate as possible, to develop a sense of wonder and a caring and responsible attitude towards the natural world. Our aim is to make 'learning stick' by providing opportunities for children to revisit key concepts and scientific vocabulary in their learning at every opportunity.

Spirituality Statement

Psalm 96: 11-12
Let the heavens be glad, and let the earth rejoice;
let the sea roar, and all that fills it;
let the field exult, and everything in it!
Then shall all the trees of the forest sing for joy

Cultural Capital

(Experiences that every child should have)

- Observing a range of plants and animals first-hand, in the local environment, parks, garden centres, zoos and other animal centres
- Growing their own fruits and vegetables all the way through from seed to the plate
- Be surprised by what happens and excited about what they discover when working practically
- Make discoveries through trial and error - and not being afraid to get things wrong
- Ask 'big questions' about life and our world.

Cross Curricular Links

- Use of ICT to collect data, analyse results and
- Present findings
- History - the lives and impact of famous scientists
- from the past
- Geography - animal habitats from around the world,
- Weather systems, rock formation
- Maths - Data handling
- English - posing and writing questions, presenting
- Findings both verbally and through written

	• observations and conclusions • Art - using plants and animals in the local and wider • Environment as a starting point for art • DT building structures using a variety of materials, • selected for their properties and effectiveness.
Composite objectives in Science in the Early Years Foundation Stage (Reception) **Understanding of the world** • Express views and answer why questions about why things happen. • Make observations of animals and plants and explain why some things occur and talk about changes. • Looks closely at similarities, differences, patterns and change • Solve real problems • Sort materials • Realise that their actions influence the world, so they want to keep repeating them. • Plan and think ahead about how they will explore or play with objects.	**Composite objectives for working scientifically for KS1 are taken from the National Curriculum 2014 and they are;** • 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.

RECEPTION Science knowledge map (preparing for Y1)

Term	Key Knowledge by end of Reception	Key Vocabulary	Key Questioning	How?
Autumn 1 (All about me)	Children know their body has many different parts and know what these can do Recognising different growth stages within the life cycle of a human. Families grow and change over time There are four seasons; spring, summer, autumn and winter. Trees lose their leaves in autumn	**Spring** **Summer** **Autumn** **Winter** **Body parts vocab** **Face vocab -**	**How have you changed since you were a baby?** **Why do you we wear different clothes at different times of the year?** **What happens to trees in autumn?** **What can you do now that you couldn't do then?**	**Through adult – directed sessions as set out in PKC.** **We look at weather and seasons throughout the year and the effect on the environment.** **We learn how to look after the world during awareness days e.g Earth Day, Turtle Day, Bird Watch, recycling day** **We grow things in the garden and plant seeds to go home – observe happens, identify parts of a plant, find out what plants need to grow.** **We learn about healthy eating, looking after our teeth and keeping healthy through PE, PSHE as well as dedicated topic**

Autumn 2 (Transport)	Children will know that some things will float and some will sink. Children will know about the properties of ice	**Float** **Sink** **Predict** **Melt** **Freeze / frozen**	**What do you notice about …?** **What do you think ?** **Why has?** **What do you think will happen?** **Why did that happen?**	**Investigations during grow time e.g in water play, floating and sinking etc** **Investigating magnets during grow time** **Investigating minibeasts during grow time** **Investigations as they arise in grow time or through children's interests** **Children's curiosity heightened in dedicated investigation area**
Spring 1 (Space) **Spring 2 (Growing and Changing)**	We live on Earth. Children will know that people look into space Children will know gravity is a force People who travel in space are called astronauts We have four seasons on earth; spring, summer, autumn and winter. Living things, such as plants, grow and change throughout the year. Plants need water and light to grow	**Earth** **Space** **Astronaut** **Orbit** **The moon** **Planet** **Land** **Ocean** **Gravity** **Sun** **Daylight** **Night time** **Orbit** **Life cycle** **Change** **Grow** **Animal mother and baby vocab** **Plant**	**How do you get to the moon?** **Why do people want to explore the moon?** **How could we get there?** **What would you need to wear to go to the moon? Why?** **What do you think it is like on the moon?** **What does explore mean?** **What does it look like?**	

	Animals grow and change (Animal lifecycle) Caterpillars change into Butterflies. (Change as appropriate) We grow food to eat (planting activity)		**What has happened to …? Why?** **What do you think will happen next?** **What do you think will happen if…?** **What does it feel like?** **What does it taste like?** **What does it smell like?**	

		Year 1	Year 2
Working Scientifically - Ideas, questions and planning		Ask simple questions and begin to recognise that they can be answered in different ways. Perform simple tests following the teacher's instructions. Use simple measurements and equipment eg tape measure, measuring cylinder.	Ask simple questions and begin to recognise that they can be answered in different ways. With guidance, suggest what they will do to find something out. With guidance, identify what they will observe or measure. Use resources provided or selected from a limited range. Perform simple tests following the teacher's instructions. Use simple measurements and equipment eg tape measure, measuring cylinder.
Working Scientifically – Observing and Presenting evidence		Observe closely (including over time) using simple equipment eg magnifying glasses, bug capture pots. Gather and record simple data.	Observe closely (including over time) using simple equipment eg magnifying glasses, bug capture pots. Gather and record simple data. Make measurements using non-standard units eg cubes, hands. With support, talk about their findings using everyday language, text scaffolds or simple scientific language. Use simple secondary sources eg books, video clips, photos, people to find answers.

Working Scientifically- Considering and evaluating evidence		Decide how to sort and classify objects. Use their observations to suggest answers to simple questions eg I think that this material is the most waterproof because I saw all the water drip off.	Decide how to sort and group objects. Use their observations to suggest answers to simple questions eg I think that this material is the most absorbent because I noticed that there was less water left. Compare objects, materials and living things by using simple observable features eg size, colour, texture. Talk about what they have found out and how they found it out.

Autumn 1		<u>The Human Body: The Senses</u>
		
		To know our body has five senses.
		• We have five senses: sight, hearing, touch, (feeling), taste, smell.
		• We use:
		  ○ Our eyes to see
		  ○ Our ears to hear
		  ○ Our tongues to taste
		  ○ Our nose to smell
		  ○ Our skin to feel and
		  ○ hands to touch (feel)
		
		To know that we use our eyes to see.
		• Our eyes use light that enters the eye to enable us to see. Light does not come out of the eye.
		• Parts of the eye and what their purpose is. (e.g. the eyelashes, eyelids and cornea protect the rest of the eye).
		• Sometimes people need help to see and can use glasses, contact lenses, telescopes, microscopes.
		
		To know that sounds travel through our ears to send messages to our brain.
		• Sounds travel through our ears to send messages to our brain.
		• Sounds can be very different, some loud and some quiet.
			<u>The Human Body</u>
			To know that animals, including humans, need air, food and water to survive.
			• Animals need water, food and air to survive.
			• When water, food or air is scarce, humans and animals suffer.
			• When animals, including humans, have water, food and air,
			• They can have offspring that grow into adults.
			
			To know that our skeleton and our muscles help us to move.
			• Animals need water, food and air to survive
			• Our skeleton is made up of bones inside our body.
			• Our muscles help us to move.
			• Exercise is an important way of keeping our body healthy.
			
			To understand that our bodies digest our food.
			• Digestion means breaking down the food we eat.
			• Our bodies take things we need out of the food we eat.
			• It is important to feed our bodies with healthy foods.
			
			To know that our heart pumps blood around our body
			• The heart is a muscle inside our body.
			• The heart pumps blood around our body.
			• Our blood circulates around our body, which means it goes around and around.
			To understand that scientists have found ways to keep us healthy.
			• We need to take care of our bodies through exercising, keeping clean, eating a balanced diet and resting. Germs can make us unwell.
			I can collect data to answer this question:

		• Some people need help to hear and some people cannot hear at all. To know that our senses help us to understand the world around us. • Our senses help us to understand the world around us. • Our senses can warn us of danger. • Our senses send messages to our brains. To understand that some people have problems with their senses, such as blindness or deafness. • Some people have problems with their senses. • Helen Keller was taught to read, write and speak even though she was deaf and blind. • Helen Keller helped other people who were also deaf and blind. I know my senses help me to understand the world around me. • To identify, name, label and draw the basic parts of the human body. • To identify and label parts of our body relating to our senses.	• Scientific knowledge and understanding: • Our bodies, including our muscles and bones, need exercise to stay healthy. Our digestive system takes nutrients from food to help us stay healthy. Keeping clean stops germs from spreading and keeps us healthy
		Key Vocabulary Hearing, touch, taste, smell, sight, eye, iris, eyelid, eyelash, pupil, vision, reflection, glasses, contact lenses, telescope, microscope, ear, eardrum, deaf, hearing aid, vibration, sound, wave, touch, taste, smell, skin, tongue, taste, buds, nose, scent, sweet, salt, bitter, sour, Helen Keller, deaf, blind, illness, speak, read, write, courage, perseverance, resilience Recap from EYFS: Head, neck, skull, Face, ears, eyes, nose, mouth, hair, teeth, Arms, legs, elbows, knees, fingers, toes,	**Key Vocabulary** Survive Scarce Offspring Drought Pollution, skeleton bones skull backbone rib finger bone hip bone toe bone kneecap muscle organs protect joint, digestion stomach oesophagus small intestine large intestine mouth tongue chew blood energy waste process, circulate circulation blood cells heart lungs veins arteries oxygen pump, germs exercise balanced diet healthy rest bacteria wash medicine injection

		feet, hands	
Autumn 2		<u>Animals and their Needs</u> To name and describe common animals. • There are many different types of animals. • Some animals live in water, some live on land, some fly in the sky. • Scientists group animals according to their features. Scientists group animals according to their features. • Animals can be grouped according to • their features. • Amphibians are cold blooded animals that live in water and also on land. They lay eggs underwater. • Mammals are warm blooded animals give birth to live young. To understand that we can group animals according to what they eat. • Animals that eat other animals are called carnivores. • Animals that eat plants are called herbivores. • Animals that eat both plants and other animals are called omnivores. To describe the needs of a pet. • Pets need food, space, shelter, medicine and company. • Some animals are suitable for keeping aspects but some are not. • Animals that are not pets are known as wild animals. To describe an animal using scientific words.	<u>Living things and their environments</u> To know the differences between living, dead and never been alive. • Living things move, grow, need air and reproduce. • Dead things were once alive, but are no longer alive. • Inanimate things have never lived; for example a rock. To know that a habitat is the name given to a place where plants or animals live. • A habitat is the name given to a place where plants or animals live. • In a woodland habitat we might see: oak trees, ferns, mosses, beetles, foxes and squirrels. • In a desert habitat we might see: camels, scorpions, rattlesnakes, cacti and tumbleweed. To describe rainforests are hot and moist, and deserts as dry and hot or cold. To know that each habitat has plants and animals adapted to survive. • Some animals and plants that might be found in rainforests are banana trees, orchids, monkeys and parrots. • Deserts are very dry, whether hot or cold, and plants and animals have adapted to survive To name and describe animals who live in underground habitats. • Some animals live in underground habitats. • Animals that live in underground habitats include badgers, moles, foxes, rabbits and worms. • These animals have adapted to living underground. To know that a food chain describes 'who eats what' within a habitat • A food chain describes 'who eats what' within a habitat. • Green plants make their own food; we call these plants producers. • Animals who eat plants, or other animals, are called consumers. To know what a habitat is, and give examples of different habitats and how animals and plants are adapted to living in them • name and identify a number of plants and animals, and their habitats • understand that habitats provide for the basic needs of the plants and animals that live there

		• We can use scientific words to describe animals. • Scientists observe carefully and draw detailed diagrams • Fish have gills to help them breathe, fins to help them swim and scales to protect their bodies.	• understand that animals and plants are well suited to their habit. To be able to describe a meadow habitat. • Meadows are grassy fields that are not managed by people. • There are very few, or no trees growing in meadows. • Plants and animals that can be found in meadows include: tall grass, dandelions, nettles, buttercups, butterflies, worms, beetles and ants.
		Key Vocabulary Animal names including: Birds: blackbird, seagull, pigeon Fish: salmon, tuna, mackerel, goldfish Amphibians: Frog, toad, salamander, newt Reptiles: crocodile, turtle, alligator, snake Mammals: mouse, lion, dog, deer, human Invertebrates: worm, jellyfish, spider, lobster sorting, grouping, features, legs, wings, fur, tail, underwater, air, amphibian, mammal, teeth (incisors, canine, molars), sharp, carnivore, herbivore, omnivore, diet, suitable, pets, domestic, wild, tame, food, space, shelter, medicine, water, care, responsibility, scientific, describe, Fish: gills, fins, scales, Birds: beaks, wings, claws, feathers, fur, mane, snout, paw, hoof, tail, whiskers, claw, beak, wing, feathers, scales, horn, tentacles	**Key Vocabulary** alive dead inanimate breathe move reproduce eat, habitat microhabitat animals: beetle, fox, squirrel, owl, badger, robin, hedgehog, camel, scorpion, cobra, horned lizard, rattlesnake, ostrich plants: fern, moss, oak tree, cacti, tumbleweed, rainforest tropical desert Sahara Desert Gobi Desert camels cacti survive adapt, underground badger fox mole worm adapt damp tunnel burrow, food energy producer consumer food chain, meadow field dandelion nettle buttercup butterfly worm beetle ant
Spring 1		<u>Seasons and Weather</u> To name and describe the four seasons. • Our four seasons are spring, summer, autumn and winter. • Colder weather comes in autumn and winter. Warmer weather comes in spring and summer. • Our days of sunlight are longest in the summer and shortest in the winter. To know that tools are used to gather information about the weather.	<u>Electricity</u> To identify things that use electricity. • Many things around us use electricity to make them work. • Electricity is an energy that we can store or use to make things work. • Electricity can be very useful but can also be dangerous. To know that electricity is useful, but it can also be dangerous • Electricity can be very dangerous. • We must use electricity safely to make sure it is not a danger to us.

		• A rain gauge measures how much rain has fallen. • A weather vane shows which way the wind is blowing. • A thermometer measures the temperature. To present data using a graph. • Data is a collection of facts. • We can present data using a graph. • We can gather information from a graph which helps us to understand the weather. To know there are different types of cloud. • Clouds are made of tiny droplets of water that float in the air. • Dark clouds are carrying more water. • Cirrus clouds are white, thin and wispy. Cumulus clouds are white and fluffy like cotton wool. Stratus clouds are grey and cover the whole sky. To understand that weather forecasts help people to prepare for different kinds of weather. • A weather forecast tells us what the weather will be in the next few days. • Scientists study the weather and use computers to make forecasts. (A scientist who studies the weather is called a meteorologist.) • Weather forecasts help people to be prepared for different kinds of weather. To understand that certain types of weather can be dangerous. • Some weather can be very dangerous. • A flood is an overflow of water. A hurricane is a storm with very strong winds.	• We can use electricity safely by; not putting fingers in plug sockets, not using electrical items with wet hands and checking that wires are not frayed To construct an electrical circuit. • An electrical circuit is a loop that allows electricity to travel around it. • An electrical circuit must have wires and a battery. • If a circuit is broken, electricity will not be able to flow around it. To identify materials that conduct electricity. To identify materials that conduct electricity. • Materials that allow electricity to pass through them are conductors. • Materials that do not allow electricity to pass through them are insulators. • Many, but not all metals conduct electricity.

		Key Vocabulary season, seasonal, spring, summer, autumn, winter, wind, rain, sun, snow, axis, orbit, tilt, rain gauge, wind vane, thermometer, tools, measure, observe, record, precipitation graph, measure, information, record, data, rainfall, accurate, cirrus (curl), stratus (layers), cumulus (pile), cloud, droplet, float, dark, fluffy, storm, forecast, predict, future, scientist, meteorologist, prepare, extreme, danger, flood, hurricane, Hurricane Katrina	**Key Vocabulary** Electricity, energy, appliance, mains battery, store, useful, dangerous, safety, caution, danger, electric shock, frayed, plug socket, wire Circuit, electricity, flow , battery, wire bulb, buzzer, current, conduct, insulate, pass through, plastic, wood, wire, rubber,
Spring B		<u>Taking Care of the Earth</u> To describe different ways we can take care of the Earth. • Humans do things that can damage the Earth. • People are causing pollution that is damaging our earth. • When forests are cut down the wild animals' environment is lost. • Resources are the things in the world we can make use of To know that there are natural and manufactured resources that people on Earth use. • A natural resource is something that is found in nature that people can use. • A manufactured resource is something people have created to use. • Some natural resources cannot be easily replaced, they are non-renewable. To identify logging as a way of harvesting the Earth's natural resources. • Trees are a natural resource that people can use for paper, furniture and other uses. • Logging means cutting down trees.	<u>Plants</u> To know there are many different kinds of plants. Seeds and bulbs grow into mature plants • A seed can grow into a flowering plant. • When a seed germinates, it changes from a seed into a seedling. • Some plants create bulbs that live underground, and their leaves grow up through the soil. Healthy plants need light and water to grow. • When a plant has no water, it cannot grow well. • When a plant has no light, it cannot grow well. • Plants often grow well in the Spring as the temperatures get warmer and there is often rain. To understand that plants are grown for food. • Some plants are grown for food. • Farmers grow crops for food. • Crops are harvested, packaged and transported for people to buy and eat

		• Sometimes logging can cause damage to the environment To know that people create pollution which can harm the environment. • Pollution occurs when an environment is damaged by waste. • Pollution is caused by things that people do, for example driving a car. • We can reduce the amount of pollution we create To know that recycling means turning used things into something new. • When something used is reused for a new purpose, it is recycled. • We recycle items to reduce waste. The following things that we may find in our homes can be recycled: newspapers, letters, magazines, plastic bottles, drinks cans, food tins, cardboard boxes, glass jars.	
		Key Vocabulary care, Earth, world, resources, natural, logging, flooding, pollution, Natural, Manufactures, Resources, Renewable, Non-renewable, logging, deforestation, construction, extinction, erosion, flooding, recycle, Pollution, Contamination, Chemicals, Air, Water, Land, Rubbish, Waste, fumes, conservation, recycle, materials, old, new, purpose	**Key Vocabulary** ash tree, aspen tree, silver birch, oak tree, sweet chestnut tree, daisy, bramble, ivy cow parsley (Adapt for local plants and trees), seed bulb, germinate, sprout, tulip, onion, daffodil, comparative test, cress, observe, record, predict, crops, pests, harvest, package, transport
Summer A		<u>Plants</u> To know what plants need in order to grow. • Plants need warmth, light and water to grow. • Plants grow from seeds. • If seeds do not have warmth, light and water, they may not grow into healthy plants.	<u>Materials and Matter</u> To know that materials have specific uses based on their properties To know that everyday materials include plastic, fabric, wood, paper, metal and glass. To know that every material has its own properties, these can include being hard, soft, opaque, shiny, bendy.

		To name and describe the parts of a plant. • The roots of a plant act as an anchor, fixing the plant into the ground. • The stem of a plant grows above the ground. The leaves and flowers grow from it. • A plant's leaves absorb sunlight and turn it into energy that the plant uses to grow. To understand that plants spread their seeds to make new plants. • Plants spread their seeds in order to make new plants. • When plants make seeds to make new plants, we call this reproducing. • Plants must spread their seeds to help them grow into new plants. To understand that some trees are evergreen, and some are deciduous. • Evergreen trees keep their leaves all year around. • Deciduous trees drop their leaves during autumn time and grow fresh leaves in spring time. • Oak trees are deciduous and fir trees are evergreen. To recognise which parts of plants we eat. • We eat different parts of plants including the roots, stem, leaves and sometimes the flowers. • Some plants are dangerous to eat and would make us ill. We need a variety of fruit and vegetables in our diet.	To understand that materials are used for a purpose depending on their properties. To know that scientists use microscopes to see very small things around us. • Sometimes, materials look very different when we look at them using a microscope. • Everything around us is made from tiny building blocks we cannot see called atoms. To know that the shapes of solid objects made from some materials can be changed • Solids have a definite shape. • The shape of some solids can be changed by squashing, bending, twisting and stretching • The atoms in a solid are tightly packed together and have a strong bond To understand that water can be a solid and can also be a liquid. To understand that liquids can be poured. To know that the shape of a liquid depends on the container is being held in.
		Key Vocabulary Plants, warmth, light, grow, water, germinate, seeds, healthy, roots, anchor, absorb, stem, leaves, flower, reproduce, disperse, survive, gravity, rely, pepper pot, evergreen, deciduous, Autumn, Spring, annual,	**Key vocabulary** Materials, properties, purpose, soft, hard, shiny, dull, opaque, transparent, strong, flimsy, engineer, inventor, scientists, magnify, microscope, solid, liquid, shape, atoms, container, pour, bonds, atoms

		oak, fir, roots, stem, leaves, flower, poisonous, variety, diet, nutrients	
Summer B		<u>Materials and Magnets</u> To recognise everyday materials. • Objects all around us are made from types of materials. • Some everyday materials that objects are made from include: wood, plastic, glass and metal. • Each material can be used to make many different things, for example plastic can be made into cups, plates, toys, chairs. To identify the properties of materials • Properties of materials are things we can measure, see or feel. • We can describe and compare properties of different materials. • Materials have different properties that make them useful for different tasks. To explain why materials are chosen for specific tasks. • Materials have different properties that make them useful for different tasks. • When designing or making objects, materials are chosen for their properties. • Some materials will be better suited to certain purposes than others To understand that materials can be sorted according to whether they are or are not attracted to magnets. • Certain materials are attracted to magnets. • We cannot see the force of magnetism. • Magnets can be useful, for example in toys or around the home.	<u>Astronomy</u> To know there are eight planets in our solar system • The Sun is a star at the centre of our solar system. • There are eight planets in our solar system. • The planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune To know that Earth travels around the sun. • Planets travel around the Sun and we call this journey an orbit. • As the planets orbit the Sun, they also spin around. We call this rotation. • Night and day occur due to the Earth rotating To know that the moon orbits the earth. • The Moon orbits the earth. • The moon reflects the light of the sun. • As the Moon's position changes, we can see different parts of it. To know that groups of stars are called constellations. • A constellation is a group of stars that, when seen from Earth, form a pattern. • People have given constellations names and have told stories that imagine how the constellations were formed. • Astronomers have studied the stars for many years, learning from each other and making new discoveries Scientists, including astronomers, learn from each other to make new discoveries about space. • Scientists, including astronomers, study space to find out more about what lies beyond our planet. • The International Space Station orbits earth and allows scientists to find out more about space. • Scientists have sent a rover to Mars to look for signs of life long ago.

		To investigate which material would be most suitable for (insert purpose). • An investigation helps us to find out the best answer. • When we investigate something, we need to make sure our investigation is fair. Scientists investigate things carefully and fairly to find answers to their questions.	
		Key Vocabulary everyday, material, wood, plastic, glass, metal, rock, soft/hard, dark/bright, transparent/ opaque, rough/smooth, waterproof/ absorbent, thick/thin, bendy/stiff, shiny/dull, purpose, select, properties, suited, use, magnet, attract, repel, force, invisible, plan, investigate, predict, record, conclusion	**Key vocabulary** Planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto (dwarf planet), solar system, planet, orbit, sun, rotate, day, night, axis, seasons, moon, orbit, rotate, waxing, waning, new moon, crescent, constellation, star, pattern, The Great Bear, Plough, Orion, Perseverance, Robot, Mission, Space Exploration, Astronaut, Rover

Science Curriculum Implementation

We are using the 'Primary Knowledge Curriculum' for science. Our science curriculum builds knowledge incrementally. Pupils have multiple opportunities to secure and build on their knowledge and understanding as subject content is revisited at points throughout the curriculum. This helps children to master the knowledge and concepts whilst building up an extended specialist vocabulary. This incremental approach helps teachers to identify knowledge gaps and look back at previous content if they need to close gaps in knowledge or understanding. Our curriculum enables children to understand the important role that science plays in the sustainability of life on earth. We want children following this curriculum to be equipped to go forth into their junior school education with curiosity, passion and a desire for discovery.

We adapt the curriculum to meet the needs of our learners through our St Mary's implementation approaches e.g. reading widely, talk partners and vocabulary acquisition.