

Science

Curriculum Intent Document



Subject Leader: Mrs Mumford

Academic Year: 2024-2025

Our School Mission

We Believe, We Succeed and We Soar

Christ is at the centre of St. Mary's as we strive to nurture and care for our community and encourage them to Believe, Succeed and Soar. Through God's love, we support our pupils in recognizing their God-given gifts, strengthening their work as missionary disciples.

'Do little things with great love' St Therese of Lisieux

The mission of St Mary's Catholic Voluntary Academy is that of Jesus Christ; to build a teaching and learning community where we show due regard for the development and understanding of the uniqueness and dignity of each person. At St Mary's, each child is valued as a unique individual, a child of God, made in the image of the Father, Son and Holy Spirit.

Our Gospel Values

With God's love we show:

Love

'My command is this: Love one another as I have loved you.' John 15:12

We recognize God's unconditional love to be our source of love. A Christ-like love respects the talent of each person in our school.

Respect

'In everything, then do to others as you would have them do to you.' Matthew 7:12

We believe that, as children of God, we have a duty not only to respect our friends and teachers but also to show respect to our environment as we are stewards of the earth.

Honesty

'Dear children, let us not love with words or speech but with actions and in truth.' 1 John 3:18

We show honesty in all we say and do, in the pursuit of justice and fairness.

Forgiveness

'Do not judge, and you will not be judged. Do not condemn, and you will not be condemned. Forgive, and you will be forgiven.' Luke 6:37

We believe that mercy will be shown by the way we forgive others, finding God in all things.

Generosity

'It is more blessed to give than to receive.' Acts 20:35

Just as Jesus washed the feet of his disciples, we have a role to serve our neighbours and the wider community. Through fundraising and prayer, we will strive to help the people in our world, our common home.

Patience

'Jesus replied, 'You do not realise now what I am doing, but later you will understand.' John 13:7

We remember to be patient and trust in God as we know he has a much greater plan for us. He allows us to be tested so that we learn to walk in his ways and trust in him.

St Mary's Catholic Voluntary Academy, Grantham

Scripture Link:

(Genesis 1:27)

‘So God created humanity in his own image, in the image of God he created them; male and female he created them.’

At St. Mary's we ensure that science stimulates and excites pupils' curiosity about phenomena and events in the world around them. It also satisfies this curiosity with knowledge and progression of skills. Because science links direct practical experience with ideas, it can engage learners at many levels. Scientific method is about developing and evaluating explanations through experimental evidence and modelling. This is a spur to critical and creative thought.

Through science, pupils understand how major scientific ideas contribute to technological change – impacting on industry, business and medicine and improving quality of life. Pupils recognise the cultural significance of science and trace its world-wide development. They learn to question and discuss science-based issues that may affect their own lives, the direction of society and the future of the world.

The intent which we have based our curriculum upon is for our pupils to:

- Retain and develop their natural curiosity of the world around them;
- Develop positive attitudes towards science and the impact of science in the world today;
- Build on the progression of scientific knowledge and understanding relating to the programmes of study outlined in the National Curriculum;
- Develop their skills of scientific investigation including generating questions, planning fair tests, careful observation and interpreting and evaluating evidence;
- Effectively communicate scientific information through a variety of methods;
- Develop their understanding of how to work safely.

EYFS

<u>Advent 1</u> Growth and Change (Humans)	<u>Advent 2</u> Light and Dark	<u>Lent 1</u> Floating and Sinking	<u>Lent 2</u> Sounds and Senses	<u>Pentecost 1</u> Growth and Change (Animals)	<u>Pentecost 2</u> Growing Plants
<p>Children will:</p> <p>Know the lifecycle of a human. Know how to talk about how they have changed since they were a baby. Know how to talk about similarities/differences/pattern and change in relation to people. Know how to talk about changes in Autumn</p>	<p>Children will:</p> <p>Know how to talk about changes they can see in Winter. Know how make different shadows and colours with torches. Know and talk about why some animals hibernate or migrate in Winter. Know that they need to care for the natural environment and all living things.</p>	<p>Children will:</p> <p>Know what Floating and Sinking are and to sort objects accordingly. Know some properties of everyday materials and talk about their similarities and differences.</p>	<p>Children will:</p> <p>Know how to talk about the changes I see in Spring. Know how to talk about a famous scientist – linked to Sound and Technology, including their name. Know what the 5 senses are.</p>	<p>Children will:</p> <p>Know how to talk about similarities and differences in relation to some farm animals. Know about the life cycles of butterflies and chickens Know what animals needs to grow and stay healthy and how they can help with this. Know that they need to care for the natural environment and all living things. Know some features of our school environment and how they might differ from another environment.</p>	<p>Children will:</p> <p>Know the names of the basic parts of a plant (leaf, stem, petal, flower) Know what a plant needs to grow and how they can help with this Know some similarities and differences between plants. Know how to talk about the changes they see in summer.</p>

Year 1

<u>Advent 1</u> Seasonal Changes	<u>Advent 2</u> Everyday Materials	<u>Lent 1</u> Everyday Materials	<u>Lent 2</u> Animals Including Humans	<u>Pentecost 1</u> Animals Including Humans	<u>Pentecost 2</u> Plants
<p>Children will:</p> <p>Know the names of the 4 seasons; describe the similarities and differences</p> <p>Know the changes that take place in Autumn in trees, plants and animals</p> <p>Know what conditions are like in Winter; know how snow is formed</p> <p>Know some of the signs of Spring</p> <p>Know the conditions in Summer; the dangers of the sun</p> <p>Know how to compare the 4 seasons (e.g clothes, weather, trees)</p>	<p>Children will:</p> <p>Know the difference between an object and the material: know what a material is and be able to sort common materials including wood, plastic, glass, metal, water and rock.</p> <p>Know how to identify and classify different materials</p> <p>Know group and classify different materials based upon how they feel.</p> <p>Know what a property is and know the simple physical properties of a variety of everyday materials</p> <p>Know that you can't see through opaque materials but that you can see through transparent materials.</p> <p>Know that some materials are stretchy and that some are not</p>	<p>Children will:</p> <p>Know what the term 'waterproof' means and that some materials are waterproof and some are not.</p> <p>Know which materials to use to create a waterproof shelter with a roof and legs.</p> <p>Know what floating and sinking are: know how to test some everyday materials to see which float/sink.</p> <p>Know how to apply their learning to make a sail boat that holds a Lego character</p> <p>Know what a magnet is and does; know how magnets react with a range of everyday materials.</p> <p>Know how to apply their knowledge of materials and their properties to play 'The Materials Game'.</p>	<p>Children will:</p> <p>Know the basic parts of the human body</p> <p>Know the 5 senses and which body part is associated with which sense (taste, sight)</p> <p>Know the 5 senses and which body part is associated with which sense (smell, touch, hearing)</p> <p>Know how to sort and classify animals using simple characteristics (e.g. legs, no legs); know the names of some common animals (fish, amphibians, reptiles, birds and mammals)</p> <p>Know what a vertebrate and an invertebrate are and the similarities/ differences between them.</p> <p>Know what carnivores, herbivores and omnivores are and to sort some animals accordingly.</p> <p>.</p>	<p>Children will:</p> <p>Know how their body moves and that not all bodies move in the same way.</p> <p>Know how to use their 5 senses when exploring the outdoor environment and how to record their findings</p> <p>Know a variety of common mini-beasts</p> <p>Know some names of common birds and their characteristics</p> <p>Know what camouflage is and that some animals use this to protect themselves</p>	<p>Children will:</p> <p>Know what fruit and vegetables are and the differences between them.</p> <p>Know how to observe and record the structures of some common fruits and vegetables.</p> <p>Know what a seed is and that plants grow from seeds.</p> <p>Know the basic parts of a plant and their function</p> <p>Know how to use their knowledge of plant parts to dissect and label the parts of a pansy</p> <p>Know what deciduous and evergreen trees are and the difference between them; be able to identify them in the local environment.</p> <p>Know the basic structure of a tree and investigate why some leaves fall from some trees.</p>

Year 2

<u>Advent 1</u> Living Things and their Habitats	<u>Advent 2</u> Animals Including Humans	<u>Lent 1</u> Animals Including Humans	<u>Lent 2</u> Plants	<u>Pentecost 1</u> Plants	<u>Pentecost 2</u> Everyday Materials
<p>Children will:</p> <p>Know what it means to be alive and dead; know how to classify objects into living, dead and never been alive. Know what the word 'biome' means and that each biome has a variety of habitats within it. (Biomes- rainforest, desert, grassland, temperate forest, tundra, savannah)</p> <p>Know that animals and plants live in habitats that provide their basic need and that the animals and plants depend upon each other. Know what a 'micro-habitat' is.</p> <p>Know how to apply their knowledge of habitats to create a habitat for an imaginary creature</p> <p>Know what a food chain is and be able to create simple food chains.</p>	<p>Children will:</p> <p>Know what the word 'offspring' means; know that animals including humans have offspring which grow into adults. Know what the term 'lifecycle' refers to, know the basic lifecycles of Chicken, butterfly, human and frog</p> <p>Know what it means to be 'alive'. Know what animals, including humans, need to stay alive. Know how to use secondary sources to pose and answer questions. Know the features an animal may have that help it survive (eg whale-blubber)</p> <p>Know what humans need to do to stay healthy (eg. exercise, diet, hygiene). Know the impact of exercise on heart rate.</p> <p>Know some of the healthy foods that humans should have in their diet. Know what the food wheel shows us and some facts about the food groups represented.</p>	<p>Children will:</p> <p>Know what represents a 'balanced diet' (linked to the work of artist Guiseppe Archimboldo)</p> <p>Know the importance of good personal hygiene. Know how germs spread. Know why soap is important. Know what a microbe is. Know the difference between good and bad microbes.</p> <p>Know why hygiene is really important. Know how to evaluate a comparative test.</p>	<p>Children will:</p> <p>Know the parts of a plant</p> <p>Know the lifecycle of a common plant (sunflower/strawberry)</p> <p>Know how to sort and classify a variety of different seeds</p> <p>Know how to collect and identify some different seeds in the local area.</p> <p>Know what germination is and make predictions as to the growth rate of different seeds.</p> <p>Know that plants can grow in different conditions</p>	<p>Children will:</p> <p>Know the structure of a bulb and the purpose of each part</p> <p>Know that plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>Know what a climate is and some of the different climates to be found. Know that some plants adapt to living in different conditions.</p> <p>Know the common trees in our local area.</p>	<p>Children will:</p> <p>Know how to sort materials into metal, wood, plastic, paper, glass and fabric. Know the difference between natural and synthetic and be able to sort materials accordingly.</p> <p>Know that the shape of some solid objects can be changed by squashing, bending, stretching and twisting.</p> <p>Know how to apply their knowledge of materials to build a house which will be tested for strength, rigidity and its waterproofing.</p> <p>Know which materials best protect an egg from cracking</p> <p>Know that some materials bounce and others do not.</p>

Year 3

<u>Advent 1</u> Rocks	<u>Advent 2</u> Forces and Magnets	<u>Lent 1</u> Light	<u>Lent 2</u> Animals Including Humans	<u>Pentecost 1</u> Animals Including Humans	<u>Pentecost 2</u> Plants
<p>Children will:</p> <p>Know what a rock is and that they vary in appearance. Know how to classify rocks using appearance and simple physical properties. (igneous, metamorphic and sedimentary)</p> <p>Know that magnets attract or repel different materials; Know which rocks are magnetic and non-magnetic. Know what is a fossil is and how they are formed (link to Mary Anning Y1 History)</p> <p>Know what is a fossil is and how they are formed</p> <p>L6: Know that there is more than one type of soil and that it is made from rock and organic matter.</p>	<p>Children will:</p> <p>Know what a force is; know that friction and gravity are forces and what they do. Know how things move on different surfaces</p> <p>Know that magnets attract or repel each other and different materials and sort a range of objects accordingly</p> <p>Know that some forces need contact between 2 objects; know that magnetic forces can act from a distance</p> <p>Know that magnets have 2 poles</p> <p>Know how to predict whether 2 magnets will attract or repel each other depending upon which poles are facing</p>	<p>Children will:</p> <p>Know that we need light in order to see and that dark is the absence of light; know what a light source is. Know that our primary light source is the sun; that it can be dangerous and how we can protect ourselves (especially eyes)</p> <p>Know that light is made up of different colours; know what a reflection is and that light is reflected light from surfaces.</p> <p>Know that shadows are formed when the light source is blocked by a solid object</p> <p>Know what can cause the size of a shadow to change</p> <p>Know what type of shadows form when light is shone on transparent, translucent and opaque materials.</p>	<p>Children will:</p> <p>Know what a skeleton is and the names of some of the bones in the human body</p> <p>Know what the purpose of a skeleton is</p> <p>Know what a muscle is and what they do</p> <p>Know how to apply their knowledge of the skeleton and muscles to create a bionic hand.</p> <p>Know that some animals do not have a backbone and that they are called invertebrates and that some animals have no bones at all.</p>	<p>Children will:</p> <p>Know that skeletons and muscles provide protection and allow us to move.</p> <p>Know how muscles contract and relax</p> <p>Know that Humans and Animals cannot make their own food and have to get their nutrition from what they eat; Know what nutritional value is and how this helps us decide if a food choice is healthy or not.</p> <p>Know represent nutritional data in graph form</p> <p>Know how to apply their knowledge to play the Eatwell game.</p>	<p>Children will:</p> <p>Know the names of the reproductive parts of a flower (lily) and describe their functions</p> <p>Know that plants require light, water and the correct temperature for healthy growth</p> <p>Know how water is transported in plants</p> <p>Know what pollination is and how it works</p> <p>Know that seeds are dispersed by animals, wind, explosion and water.</p> <p>Know how to apply their knowledge to complete a knowledge quiz.</p>

Year 4

<u>Advent 1</u> Changing State	<u>Advent 2</u> Changing State	<u>Lent 1</u> Living Things and their Habitats	<u>Lent 2</u> Electricity	<u>Pentecost 1</u> Sound	<u>Pentecost 2</u> Animals Including Humans
<p>Children will:</p> <p>Know what 'matter' is and that there are 4 states of matter; solid, liquid, gas and plasma (Y4 do not do plasma). Know how to group materials according to whether they are solids, liquids or gases.</p> <p>Know the molecular structure of solids, liquids and gases. Know how they react when placed in a container.</p> <p>Know how to predict what will happen when vinegar is poured onto bicarbonate of soda, in a bottle, with a balloon on top.</p> <p>Know that some materials change when they are heated or cooled. Know the melting and boiling points of water.</p> <p>Know what happens when a liquid changes to a solid</p> <p>Know what evaporation and condensation are and how they work; know that the rate of evaporation changes with temperature</p> <p>Know the part played by evaporation and condensation in the Water cycle</p>	<p>Children will:</p> <p>Know how to predict what will happen to the contents of 3 balloons when emptied over a tray in relation to solids, liquids and gases (balloon containing 1 each of air, water and solid (e.g. Lego)</p> <p>Know that some liquids can contain gas and know what happens when raisins are added to lemonade and why</p> <p>Know what happens when heat is applied to chocolate and describe this in scientific terms.</p> <p>Know that adding salt lowers the freezing point of a liquid.</p> <p>Know that not all liquids freeze at 0 degrees.</p> <p>Know that the water cycle is continuous and has been in operation since the creation of the earth.</p>	<p>Children will:</p> <p>Know that living things can be grouped in a variety of ways</p> <p>Know what a classification is and to be able to use human classification keys</p> <p>Know how to classify mini-beasts using the appropriate classification keys</p> <p>Know how to classify leaves using an appropriate classification key</p> <p>Know the meaning of the word endangered and to know at least 3 of the top ten endangered species;</p> <p>Know why one of the endangered animals is in danger, how humans have impacted the environment and how they can support the environment for this animal.</p> <p>Know how environmental changes can cause dangers to living things; to include litter, pollution, oil spills, deforestation, development and global warming.</p>	<p>Children will:</p> <p>Know that many common appliances run on electricity and name some</p> <p>Know what electricity is, know that electricity travels around a circuit. Know how to create a simple circuit including a lamp and know the names of the components</p> <p>Know that a circuit has to be complete for it to work</p> <p>Know how to add a switch to a circuit and the effect it has on that circuit including a bulb</p> <p>Know what conductors and insulators are and which materials act as conductors and insulators.</p> <p>Know that Alessandro Volta, Michael Faraday were scientists involved in the early development of electricity; know that Henry Snith is a modern scientist involved in the development of solar electricity.</p>	<p>Children will:</p> <p>Know that sounds are made by something vibrating</p> <p>Know that vibrations travel through a medium to the ear. Know what sound waves are</p> <p>Know how the ear works</p> <p>Know that pitch of a sound varies upon the length of the object being blown and that the volume varies according to the strength of the vibrations that produce it</p> <p>Know that sounds get fainter the further away they are from the source</p> <p>Know how to explain, using scientific vocabulary, why a range of materials make different sounds when shaken in similar containers.</p>	<p>Children will:</p> <p>Know the names of the different teeth and their functions</p> <p>Know that different substances react with teeth and predict the outcome of an investigation into this</p> <p>Know the names and simple functions of the basic parts of the human digestive system</p> <p>Know what a producer, a predator and prey are and how they fit into a food chain.</p> <p>Know how to produce a variety of food chains; know what a food web is.</p> <p>Know how to identify which food chains belong to predators, producers and prey.</p>

Year 5

<u>Advent 1</u> Properties and Changes of Materials	<u>Advent 2</u> Properties and Changes of Materials	<u>Lent 1</u> Animals Including Humans	<u>Lent 2</u> Earth and Space	<u>Pentecost 1</u> Forces	<u>Pentecost 2</u> Living Things and their Habitats
<p>Children will:</p> <p>Know how to group together everyday materials of the basis of their properties. Know how to use your knowledge of solids, liquids and gases to decide how mixtures might be separated through filtering, magnetic attraction, sieving and evaporating. Know what dissolving is. Know that some solids will dissolve in liquid to form a solution. Know the difference between dissolving and melting. Know what soluble and insoluble means. Know how to use their knowledge to make predictions about materials and whether they are soluble or insoluble. Know that the original solid material is recoverable from some solutions through the process of evaporation. Know that the addition of heat increases the rate of evaporation</p>	<p>Children will:</p> <p>Know that dissolving, mixing and changes of state are reversible changes. Know that some changes result in the formation of new materials and that this kind of change is not usually reversible (burning, acid on bicarb). Know what a 'conductor' is. Know what a 'thermal insulator' is. Know which materials are thermal conductor and insulators. Know why thermal conductors and insulators are used. Know the reasons, based on evidence from comparative and fair tests, for the particular use of metal wire compared to wood and plastic in an electrical circuit. Know about a famous scientific discovery. Know how glue is made and its properties.</p>	<p>Children will:</p> <p>Know what a gestation period is and compare the gestation periods of different animals, including humans. (explain why animals have different gestation periods). Know how the human foetus develops. Know that there are 4 main stages of human life; know that babies under-go rapid development in the first year. Know what puberty is and be able to describe the changes that occur during this time (emotional and physical). Know some of the changes that take place in old age. Know what life expectancy is and know that there are many factors that can influence life expectancy.</p>	<p>Children will:</p> <p>Know what we mean by the Solar System. Know that it contains 8 planets and their moons orbiting the sun. Know the names of the planets. Know the relative size of each of the planets in relation to the sun. Know how the moon moves in relation to the earth. Know the 4 main moon phases. Know how the surface of the moon is created and changes. Know how we know that the earth, sun and moon are approximately spherical. Know how to explain day and night using Earth's rotation and the apparent movement of the sun across the sky.</p>	<p>Children will:</p> <p>Know what a force is. Know that unsupported objects fall towards the earth because of the force of gravity acting between the earth and the falling object. Know that there is a very small amount of gravity on the moon (but not air). Know the difference between air resistance and how it works. Know what water resistance is and how it works. Know what friction is and how it works. Know what a lever is, a pulley and gears are and how they work to allow a smaller force to have greater effect.</p>	<p>Children will:</p> <p>Know how to describe the lifecycles of an amphibian (frog), a bird and a mammal (human). Know how to describe the lifecycles an insect (butterfly and grasshopper). Know what metamorphosis is. Know how plants reproduce. Know how mammals reproduce. Know what conservation is and why it is necessary. Know some of the work of Jane Goodall. Know some of the work of Richard Attenborough.</p>

Year 6

<u>Advent 1</u> Animals Including Humans	<u>Advent 2</u> Living Things and their Habitats	<u>Lent 1</u> Electricity	<u>Lent 2</u> Light	<u>Pentecost 1</u> Evolution and Inheritance	<u>Pentecost 2</u> Whizz, Bang, Wallop! (Gorge's Marvellous Experiments)
<p>Children will:</p> <p>Know the names of the key organs in the circulatory system and their function. Know the structure of the heart and what heart rate is. Know how heart rate can be measured and affected. (heart dissection lesson available if required)</p> <p>Know about the structure of blood and the functions of the component parts. Know the ways in which nutrients and water are transported within animals and humans. Know the impact of diet, exercise, drugs and lifestyle on the way that their bodies function.</p>	<p>Children will:</p> <p>Know how living things are classified into broad groups; common observable features, similarities and differences. – specifically leaves and some animals</p> <p>Know how to use a classification key; know how to use a key to group mini-beasts</p> <p>Know why scientists classify things; know how to use the Linnaeus classification to classify some animals. Know how to research an animal so that it can be classified</p> <p>Know what a microorganism is and how some can be bad for us.</p> <p>Know what bacteria is and how it can link to food poisoning.</p>	<p>Children will:</p> <p>Know the link between the brightness of a lamp and the volume of a buzzer with the voltage being applied. Know the effects of 'overloading' a circuit.</p> <p>Know what a symbol is. Know how to draw a circuit diagram using component symbols.</p> <p>Know how to use their knowledge to repair a broken circuit. Know how to identify a problem in a faulty circuit.</p> <p>Know the impact of the length and thickness of the wires in a circuit. Know how to devise a fair test to answer a question.</p> <p>Know whether number & voltage of the cells in a simple circuit affect the brightness of bulbs, the loudness of buzzers or the speed of motors. Know how to present their findings.</p> <p>Know what 'series' and 'parallel' mean in relation to circuits.</p> <p>Know the differences between series and parallel circuits. Know how to build</p>	<p>Children will:</p> <p>Know that light appears to travel in straight lines. Know how to use the idea of light travelling in straight lines to explain that objects are seen because they give out, or reflect, light into the eye. Know what a periscope is.</p> <p>Know about the structure of the eye and the function of the constituent parts. Know that signals from the eye connect with the brain to enable us to see.</p> <p>Know how to explain why shadows have the same shape as the objects that cast them.</p> <p>Know what happens to light in water. Know what refraction is. Know that light changes direction when moving through different mediums. Know how rainbows are formed.</p>	<p>Children will:</p> <p>Know what extinction is and name some extinct species. Know that fossils provide information about living things. Know that animals and plants have changed over time.</p> <p>Know who Charles Darwin was and his significance. Know Darwin's theory of Evolution.</p> <p>Know what natural selection is and how this promotes adaptation.</p> <p>Know how some plants have adapted to a changing or different environment</p> <p>Know what genetic mutation is and how this affects future generations. Know how to explain the principle of 'survival of the fittest'.</p> <p>Know what inheritance means in regards to evolution. Know that characteristics are passed through genes which a segments of DNA.</p>	<p>Children will:</p> <p>Know how to make delicious crunchy candy crystals</p> <p>Know how to make worms wiggle</p> <p>Know how to find colours in cabbage</p> <p>Know how to make a simple magnetic car</p> <p>Know how to make a sonic blaster</p>

		simple series and parallel circuits to solve problems			
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