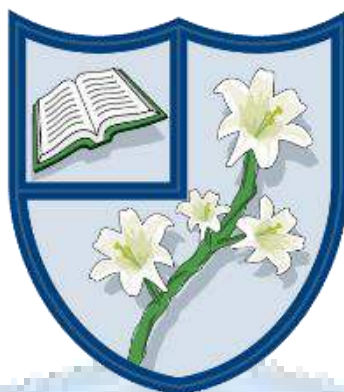




SCIENCE CURRICULUM AIMS

By the time children leave St. Mary's Catholic Primary School, they will be:

Successful Learners

Through the enjoyment of learning, develop enquiring minds in order to process information, reason, question and evaluate, enabling all children to achieve the best they can now and in the future.

Confident Individuals

Become increasingly independent, are able to take the initiative and organise themselves, showing a willingness to try new things and making the most of opportunities.

Responsible Citizens

Are enterprising, well prepared for life and able to work co-operatively in a diverse, multi-faith/ cultural society.

They take account of and respect the needs of present and future generations in the choices they make and know that they can change things for the better.

To achieve this the school helps pupils: -

- Attain a high standard of achievement, satisfaction and enjoyment in all areas of the curriculum.
- Grow in self-confidence, have a sense of personal worth and be able to adapt to the changing world in which they live.
- Mix with their peers and adults, to communicate feelings and share experiences, building a better understanding and mutual respect for each other.
- Apply themselves to tasks individually and as contributing members of a team.
- Develop a set of moral values, understand the world in which they live and respect the views of others, tolerating different opinions and beliefs whether racial, religious or political.
- Develop lively, enquiring minds with the ability to communicate their findings.
- Be aware of and take an interest in the beauty and wonder of the world around them and recognise the need for conservation.

Our aim is that all pupils have access to a broad, balanced, engaging and enjoyable curriculum. Teachers set high expectations for every pupil, whatever their prior attainment. Assessment is used to set targets which are deliberately ambitious; but which enable pupils to experience success as learners. Potential areas of difficulty are identified and these areas are addressed at the outset through intervention, differentiated resources and targeted teaching to remove barriers to pupil achievement. This results in our Curriculum being accessible to all.

At St. Mary's Catholic Primary School, we offer a curriculum which is broad and balanced, engages and inspires children, yet builds on the knowledge, understanding and skills of all: regardless of their starting points, as they progress through each Key Stage. The curriculum incorporates the statutory requirements of the National Curriculum and other experiences and opportunities which best meet the learning and developmental needs of the pupils in our school. It ensures that academic success, creativity and problem solving, respect, responsibility and resilience, as well as physical development, well-being and mental health are key elements that support the development of the whole child and promote a positive attitude to learning. The curriculum celebrates diversity and utilises the skills and knowledge of the whole school and wider community while supporting the pupils' spiritual, moral, social and cultural development.

The aim of our curriculum is for pupils to have the requisite skills to be successful, independent and motivated lifelong learners in readiness for their next stage of education. To best meet the needs of all of our pupils, a knowledge-rich yet skills based curriculum is delivered.

Across the EYFS the curriculum is delivered through broad topic work and also through the interests of the children and current themes. In Nursery, planning in the moment can also have an impact on learning and the environment. Staff support children in their choices and provide them with a rich and well-resourced environment. Children across the Foundation Stage are encouraged to become independent learners. Staff challenge children through questioning, specific tasks and independent learning. In Nursery, we build on the foundations to give our children the skills they need when transitioning into Reception. In our Reception class, activities are planned with a variety of adult directed, adult support and independent work. We tailor our curriculum to meet the needs of our children. Where children are ready for a more formal approach, staff will plan for this through directed teaching. Those who still need a play based approach will be supported by all staff through scaffolding and modelling.

If needed, pupils may still work on the Early Learning Goals of the Early Years Foundation Stage Curriculum as they enter Year 1. However, the Year 1 National Curriculum is taught from the outset. Throughout this period and beyond, all children are developing their phonic knowledge using SoundsWrite phonics programme.

The RE curriculum is provided as part of each child's entitlement to a broad and balanced education contributing to their spiritual, moral and cultural development.

RE within our curriculum promotes:

- religious literacy
- the chance to think and ask questions
- the development of empathy skills
- a broader understanding of different values
- an awareness of diversity through looking at major religions and beliefs in the UK and beyond

The curriculum is delivered through discretely taught subjects, where possible, the subjects may overlap. The more able are challenged further in their learning and children who find aspects of their learning more difficult are appropriately supported so that they too are enabled to experience success. National requirements and school requirements are mapped out as a whole school and then individual year groups plan the curriculum for their pupils accordingly.

At St. Mary's, we have a highly effective, carefully planned and tightly structured program for phonics teaching. This enables our children to learn phonic knowledge and skills with the expectation that they will become fluent readers, having secured word building and recognition skills. Our children are also taught high frequency words that do not conform to regular phonic patterns.

Reading is a vital life skill that will support children's learning across the whole curriculum. We strive to ensure that our children are taught to read with fluency, accuracy and understanding through a variety of high quality English lessons

and learning opportunities across all subject areas. We want children at St. Mary's to become enthusiastic, independent and reflective readers.

Mathematics curriculum is delivered using a range of resources which are developed around the CPA approach (concrete, pictorial and abstract). In all year groups there are small group interventions to support pupils in gaining the key skills to become successful readers, writers and mathematicians.

Specialist teachers and instructors support some music, physical education and the teaching of MFL. All subject leaders are given training and opportunity to develop their subject knowledge, skills and understanding to ensure curriculum development provides progression and sequencing of concepts across the school. This also enables them to provide high quality support to colleagues to improve pupil outcomes. Enrichment events, whole school activities and opportunities within and outside school all enrich and develop the children's learning.

Our aim is that all pupils have access to a broad, balanced, engaging and enjoyable curriculum. Teachers set high expectations for every pupil, whatever their prior attainment. Children are encouraged to apply skills learned, particularly in English and Mathematics, across the curriculum. Assessment is used to set targets which are deliberately ambitious; but which enable pupils to experience success as learners. Potential areas of difficulty are identified and these areas are addressed at the outset through intervention, differentiated resources and targeted teaching to remove barriers to pupil achievement. This results in our curriculum being accessible to all. Provision for the Most Able pupils is a mixture of depth and mastery with opportunities for independent working and reflection. Where appropriate, children working within the greater depth area of the curriculum are provided with an individual activity or challenge which reflects a greater depth of understanding and higher level of attainment.

After school clubs and events extend these opportunities further. Additional whole school programmes and approaches support quality teaching and learning and the school is well resourced in terms of learning materials, books and technology.

The outdoor environment and the local community are considered an opportunity for active learning for all our pupils. The school grounds have been developed so they can enrich different curriculum areas, particularly science.

Pupils have opportunities to share their learning with each other, their parents, carers and other learners through school-based and external exhibitions, performances, competitions and events involving other schools. Developing their independence and motivation as learners and their sense of responsibility as future citizens is at the heart of all our teaching and learning.

National Curriculum Programme of Study:

This document demonstrates which statements from the 2020 Development Matters are prerequisite skills for science within the national curriculum. The table below outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four-Year-Olds and Reception to match the programme of study for science.

The most relevant statements for science are taken from the following areas of learning:

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

Purpose of study

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

Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider Science 145 school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry

should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

School curriculum

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Science - End of Year Expectations - Nursery

Communication and Language	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
Personal, Social and Emotional Development	• Make healthy choices about food, drink, activity and toothbrushing.
Understanding the World	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.

Science - End of Year Expectations – Reception

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 well-formed 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.

Science - End of Year Expectations - Year 1

Biology	• 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. • 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.
Chemistry	• 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
Physics	• observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.
Working Scientifically	• asking simple questions and recognising that they can be answered in different ways • make relevant observations to note key features • conduct simple tests, with support • with prompting, suggest how findings could be recorded • identify key findings from an enquiry • gather and record data • use observations to suggest answers to questions

Science - End of Year Expectations - Year 2

Biology	• 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 microhabitats • 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. • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
Chemistry	• 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.
Physics	
Working Scientifically	• asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying key outcomes from an enquiry • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions.

Science - End of Year Expectations - Year 3

Biology	• identify and describe the 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 the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.
Chemistry	• 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.
Physics	• recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change. • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic 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.
Working Scientifically	• with support, asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations, using a range of equipment as instructed, using standard units of measurements • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • with prompting, recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions, with prompting • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Science - End of Year Expectations - Year 4

Biology	• 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; this can sometimes pose dangers to living things. • 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.
Chemistry	• compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Physics	• identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations producing it • recognise that sounds get fainter as the distance from the sound source increases. • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise 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.
Working Scientifically	• developing relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers, repeatedly and with care • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

Science - End of Year Expectations - Year 5

Biology	• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals • describe the changes as humans develop to old age.
Chemistry	• 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	• 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 • 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.
Working Scientifically	• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary, with support • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs • with prompting, write a conclusion using evidence and identifying casual links • reporting and presenting findings from enquiries, including conclusions, explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • suggest further comparative or fair tests

Science - End of Year Expectations - Year 6

Biology	- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals - give reasons for classifying plants and animals based on specific characteristics. - 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. - 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	
Physics	- 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 - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. - associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit - compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches - use recognised symbols when representing a simple circuit in a diagram.
Working Scientifically	- planning different types of scientific enquiries to answer questions using evidence gathered from different types of scientific enquiry - identifying and managing variables - taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate and modifying the equipment or technique - recording complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - using test results to make predictions to set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments. - using test results to make predictions to set up further comparative and fair tests to develop the investigation

