St. Mary's Church of England Primary School, Fownhope

The Teaching of Science

A rich education is more than simply learning reading, writing and maths. It is about helping a child grow into their full potential as inquisitive, well balanced and cheerful adults. As a Christian school we nurture children to display the 'fruit of the Spirit', which is "love, joy, peace, patience, kindness, goodness, faithfulness, gentleness and self-control" (Galatians 5:22-23). At St Mary's you will find children growing in mind, body and spirit as they form good relationships with each other, the staff and discover a faith which will sustain them in a rapidly changing world. As our motto has it: "what we nurture today flourishes tomorrow".

Our philosophy for teaching Science:
At St. Mary's we provide the opportunity for every child to reach their full potential through a positive and caring environment. We embrace Christian values and ensure all children are ready for their next steps. Science will provide a variety of activities to engage children about the world around them. They will learn through exploration and investigation, using the children's understanding as a starting point.

Year Group	Intent – what we want to achieve (National Curriculum objective)	Implementation - what it looks like in the classroom	Impact – how we measure success and what we will see
Early Years	**Understanding the World** **Early Learning Goal 14 – The World** Children in Reception will be learning to:- • explore the natural world around them • describe what they see, hear and feel whilst 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 teaching linked to half-termly topics, e.g. Our Planet. Emphasis on practical learning whenever possible. Use of the school's outdoor areas whenever possible, e.g. woodland area, pond and forest school area. Promotion of practical activities within the classroom to support the science curriculum. Science-based 'play' activities set up to encourage children to further their scientific enjoyment and learning through play.	Observations during play linked to Tapestry. Teacher assessments used to inform progress against Early Learning Goals and data is collected 3 times per year. Confident and enthusiastic learners. An enjoyment of science-based activities. Children independently choosing to engage in science-based activities. Inquisitive children with a thirst for knowledge about the world around them.

		Use of a wide range of practical scientific resources to support learning, both independent and focussed.	Children achieving the Early Learning Goals is in line with national average.
Key Stage 1 **Year 1**	**Working Scientifically** During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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 **Year 1 – Plants** Pupils should be taught to: • 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 **Year 1 – Animals, including Humans** Pupils should be taught to: • 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	Science teaching at St Mary's C of E Primary involves adapting and extending the curriculum to match all pupils' needs and to show progression across all key stages. Where possible, science is linked to class topics but also taught as units of lessons to ensure coverage. Teachers plan to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available. **What does it look like in our KS1 classrooms?** • Class and group discussions before and after an investigation • Carrying out experiments and observations in the classroom • Using objects and knowledge gained to identify and classify other items • Looking at and discussing results. Recording in science books	Progress is measured through the child's ability to know more, remember more and explain more. The impact of this is to ensure children not only acquire the appropriate age related knowledge linked to the science curriculum, but also skills which equip them to progress from their starting points, and within their everyday lives. **This is what you will see in KS1:** • engaged learners • open and closed questioning • children posing their own questions • paired/group work • varied activities • practical investigations • children discussing, reflecting and sharing their learning **This is how we know how well our pupils are doing in KS1 :**

Year 2	**Year 1 – Everyday Materials** Pupils should be taught to: • 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 **Year 1 – Seasonal Changes** • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies **Year 2 – Living Things** Pupils should be taught to: • explore and compare the differences between things that are living, dead, and things that have never been alive • 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 **Year 2 – Plants** Pupils should be taught to: • 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 **Year 2 – Animals, including Humans** Pupils should be taught to: • notice that animals, including humans, have offspring which grow into adults		• marking and feedback • formative assessment through questioning during lessons and investigations • observations of children during investigation and exploration • photographic evidence • assessment tracked at the end of each block of work and recorded on end of year report

	• 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 **Year 2 – Everyday Materials** Pupils should be taught to: • 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.		
Lower Key Stage 2	**Working Scientifically** During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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 and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • 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. **Year 3 – Plants** Pupils should be taught to:	**What does it look like in our KS2 classrooms?** • Class and small group discussions – adapting investigations to answer or using previous knowledge. • Teacher set up and children's set ups to ensure tests are comparative and fair. • Observations may take longer than a lesson e.g. Water cycle with cress seeds in Year 4 will be observed over one week and recorded. • Gathering and recording data could be in the form of surveys, presentations to the class, written work or labelled diagrams.	**This is what you will see in KS2:** • engaged learners • open and closed questioning • children posing their own questions • paired/group work • varied activities • practical investigations • children discussing, reflecting and sharing their learning **This is how we know how well our pupils are doing in KS2:** • Marking and feedback • Lessons planned based on work done in previous year groups using our Progression of Skills

Year 3	• 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. **Year 3 – Animals, including Humans** Pupils should be taught to: • 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. **Year 3 - Rocks** Pupils should be taught to: • 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. **Year 3 – Light** Pupils should be taught to: • 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. **Year 3 - Forces and Magnets** Pupils should be taught to:	• Findings will be shown in a variety of ways depending on the topic and investigation. These will be recorded in books. • End of lesson plenaries, group discussions, class discussions and written conclusions will be used to show differences, similarities in results and reports on findings, including those which were unexpected. Why do we think that happened?	guidance to ensure children are moving forward • Formative assessment through questioning during lessons and investigations • Observations of children during investigation and exploration • Photographic evidence • Assessment tracked at the end of each block of work and recorded on end of year report

Year 4	• compare how things move on different surfaces • notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing. **Year 4 – Living Things and Their Habitats** Pupils should be taught to: • 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. **Year 4 – Animals, including Humans** Pupils should be taught to: • 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. **Year 4 – States of Matter** Pupils should be taught to: • 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. **Year 4 – Sound** Pupils should be taught to:		

Upper Key Stage 2	• 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 that produced it • recognise that sounds get fainter as the distance from the sound source increases. **Year 4 – Electricity** Pupils should be taught to: • 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** During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • 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, 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 a 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 **Year 5 - Living Things and their Habitats**	**All Key Stages:** We ensure that all children are provided with rich learning experiences that aim to : • prepare our children for life in an increasingly scientific and technological world today and in the future • help our children acquire a growing understanding of the nature, processes and methods of scientific ideas	

Year 5	Pupils should be taught to: • 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 **Year 5 – Animals, including Humans** Pupils should be taught to: • describe the changes as humans develop to old age **Year 5 – Properties and Changes of Materials** Pupils should be taught to: • 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. **Year 5 – Earth and Space** Pupils should be taught to: • 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. **Year 5 – Forces** Pupils should be taught to: • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	• help develop and extend our children's scientific concept of their world • Build on our children's natural curiosity and developing a scientific approach to problems • Encouraging open mindedness, self-assessment, perseverance and developing skills of investigation – observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating • Develop the use of scientific language, recording and techniques • Develop the use of computing in investigating and recording • Make links between science and other subjects • Reflect and build on previous learning , linking ideas together and enabling them to question and become enquiry based learners	

Year 6	• 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. **Year 6 – Living Things and their Habitats** Pupils should be taught to: • 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 • give reasons for classifying plants and animals based on specific characteristics. **Year 6 – Animals, including Humans** Pupils should be taught to: • 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. **Year 6 – Evolution and Inheritance** Pupils should be taught to: • 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. **Year 6 - Light** Pupils should be taught to: • 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. **Year 6 – Electricity** Pupils should be taught to:		**By the time children leave St Mary's, they will have :** • the ability to question ideas and reflect on knowledge • the ability to work collaboratively and practically to investigate and experiment • A wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry / investigative skills • A richer vocabulary which will enable children to articulate their understanding of taught concepts • High aspirations, which will see them through to further study, work and a successful adult life.

	• 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.		