****

**Succeeding together - fostering a love of learning, within a nurturing Christian community, to bring out ‘the best in everyone’.**

**SCIENCE PROGRESSION OF KNOWLEDGE & SKILLS**

This document aims to track expectations for Science at Marsh Gibbon CE School

**Early Years**

Understanding the world: The Natural World (Science)

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension.

**What the National Curriculum says:**

**KS1**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

**LKS2**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

UKS2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Significant scientists have been added where appropriate (further detail can be found on knowledge organisers). Sharing these scientists and allowing children to research them not only brings science to life but also shows children how important and exciting science can be.

Investigation/experiment ideas

Teachers should plan in at least 2 investigations or experiments for each term.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Animals including humans | 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 thing  Identify and name the basic parts of the human body.  Understand that we need to brush our teeth to look after them.  Understand that humans should make healthy choices with food, drink and exercise.  Understand what exercise does to our bodies.  Explore animals and insects in our local environment and around the world. | Identify, name and remember a variety of common animals that are birds, fish, amphibians, reptiles and mammals such as goldfish, snakes, owls, frogs and sheep.  Identify and name a variety of common animals that are carnivores, herbivores and omnivores such as lions, rabbits and mice.  Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets).  Identify, name draw and label the basic parts of the human body and know which parts of the body is associated with each sense such as the nose with smell and eyes for sight. | Know that animals, including humans, have offspring which grow into adults such as lamb to sheep and tadpoles to frogs.  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. | Identify that animals, including humans, need the right typesand amount of nutrition, and that they cannot make their ownfood; they get nutrition from what they eat.  Identify that humans and some animals have skeletons and muscles for support, protection and movement. | Describe the simple functions of the basic parts of the digestive system in humans such as the large intestine and how water is removed at this stage of digestion.  Identify the different types of teeth (incisor, canine, molar and premolar) in humans and know their simple functions.  Construct and interpret a variety of food chains, identifying producers, predators and prey. | Describe the changes as humans develop from birth to old age.  Know some of the stages such as baby, toddler, child and teenager.  Understand the basic changes during puberty. | Identify and name the main parts of the human circulatory system such as heart and lungs, and explain the functions of the heart, blood vessels and blood  Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function such as the effects of smoking and alcohol.  Describe the ways in which nutrients and water are transported within animals, including humans. |
| Significant Scientists |  |  | Dr Ernest Madu | Wilhelm Conrad Rontgen | William Beaumont | Sarah Fowler | William Harvey |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Electricity |  |  |  | Identify common appliances that run on electricity such as kettles and computers.  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.  Know 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 (iron, copper, steel) and insulators (wood, rubber and glass), and associate metals with being good conductors. | . | 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.  Know and use recognised symbols such as cell, bulb and motor) when representing a simple circuit in a diagram**.** |
| Significant Scientists |  |  |  | Thomas Edison |  | Nicholas Tesla  Peter Rawlinson |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Forces | Explore and talk about different forces they can feel.  Floating and Sinking  Predict whether objects will float or sink.    Understand that some objects sink and some objects float.  Recognise that objects that float push against the water.  Huff and puff  Predict which objects will blow over.  Understand that some objects will blow over and some will stay upright when a force (wind) is applied. |  |  | Recognise and compare how things (shoes, balls) 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 (scissors, pencils, hangers) on the basis of whether they are attracted to a magnet, and identify some magnetic materials.  Understand and describe magnets as having two poles.  Predict whether two magnets will attract or repel each other, depending on which poles are facing.  Know that some simple objects such as iron nails and steel cutlery are magnetic.  Know that a magnet does not need to touch an object to attract it. |  | 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. |  |
| Significant Scientists |  |  |  | Michael Farady |  | Galileo Galilei  Sir Issac Newton |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Light |  |  | 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.  Know that light from the sun can be dangerous and that there are ways to protect their eyes such as by wearing sunglasses.    Recognise that shadows are formed when the light from a light source is blocked by a solid object.  Find patterns in the way that the sizes of shadows change.  Know that we need light to see things. |  |  | 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.  Know that light travels in straight lines. |
| Significant Scientists |  |  | Justus von Liebig |  |  | Abu Ali al-Hasan  Ben Jensen |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Living things and their habitats | Recognise some environments that are different from the one in which they live.  Explore minibeasts and their habitats.  Understand that animals need different habitats to survive. |  | 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. Examples include hedgehogs in woodlands and crabs on the seashore.  Identify and name a variety of plants and animals (such as trees, spiders, grass and worms). in their habitats, including micro-habitats.  Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.  Know that a habitat is where living things live. |  | 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. Link to farming, new housing and cliff erosion.  Know that humans can have both negative and positive impacts on the environment. | Describe the differences in the life cycles of a mammal such as a cat, an amphibian such as a frog, an insect such as a butterfly and a bird such as an owl.  Describe the life process of reproduction in some plants and animals.  Know that plants reproduce both sexually and asexually. | Describe how living things are classified into broad groups such as flowering or non-flowering plants, 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. |
| Significant Scientists |  |  |  |  | Jane Goodall  Seirian Summer | David Attenborough  Lucy Evelyn Cheesman | Carl Linnaeus  Chris Nelson |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Sound |  |  |  |  | Identify how sounds are made, associating some of them with something vibrating  Know that vibrations from a sound 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.  Know that sounds get fainter or louder as the distance from the sound source increases or decreases. |  |  |
| Significant Scientists |  |  |  |  | Christian Doppler |  |  |
| **Strand** | **EYFS** | **Year1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Materials | 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.  Talk about the differences between materials and changes they notice  Recognise that water freezing and melting is a reversible process.  Understand that temperature affects the change of state. | Distinguish between the object and the material from which it is made.    Identify and name a variety of everyday materials, including wood, plastic, glass, water and rock.  Describe the simple physical properties (e.g. soft, hard, waterproof) of a variety of everyday materials.  Know that waterproof means that water does not pass through.  Compare and group together a variety of everyday materials on the basis of their physical properties.  Know that some items, such as spoons, can be made from a variety of materials (wood, metal, plastic) | 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. | 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.  Understand and recognise that soils are made from rocks and organic matter. | Compare and group materials together, according to whether they are solids, liquids or gases.  Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).  Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.  Know the temperatures needed to melt, freeze and boil liquids | 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.  Understand 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. |  |
| Significant Scientists |  | Charles Macintosh  Martin Brock | John Loudon McAdam  Julie Brusaw | Mary Anning | Bernard Palissy | Spencer Silver  Joe Keddie |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Seasonal Changes |  | Observe changes across the four seasons  Observe and describe weather associated with the seasons and how day length varies. |  |  |  |  |  |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Plants | 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 the natural world around them, making observations and drawing pictures of animals and plants. | Identify and name a variety of common plants such as holly and daffodils, including garden plants, wild plants and trees, and those classified as deciduous and evergreen.    Identify and describe the basic structure of a variety of common plants including roots, stem/trunk, leaves and flowers. | 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.  Know that some plants grow quickly and that some more slowly. | Identify and describe the functions of different parts of plants; roots, stem, 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 ways in which water is transported within plants.  Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.  Know that plants need certain things to grow: air, water, light, space, nutrients/food. |  |  |  |
| Significant Scientists |  | Wangari Maathai | David Douglas | Joseph Hooker  Professor Monique Simmonds |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| Evolution and inheritance |  |  |  |  |  |  | Know 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 such as a camel and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. |
| Significant Scientists |  |  |  |  |  |  | Charles Darwin  Alfred Wallace |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strand** | **EYFS** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** | |
| Earth and Space |  |  |  |  |  | Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.  Describe the movement of the Moon relative to the Earth.  Describe the Sun, Earth and Moon as approximately spherical bodies  Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.  Know that the sun is a star at the centre of our solar system.  Know that there are 8 planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. |  | |
| Significant Scientists |  |  |  |  |  | Nicholaus Copernicus  Maggie Aderin-Pocock |  | |
| Progression of skills | | | | | | | | |
| EYFS | Working Scientifically  ● Ask Why questions, ask questions to find out more  ● Choose the right resources to carry out their own plan  ● Talk about what they see using a wide vocabulary  ● Use new vocabulary  ● Talk about what they see using a wide vocabulary  ● Compare quantities using language ‘more than, fewer than  ● Develop their small motor skills so that they can use a range of tools competently, safely and confidently  ● Make comparisons between objects relating to size, length, weight and capacity  ● Write short sentences with words with known sound letter correspondence  ● Begin to describe a sequence of events, real or fictional using words such as first  ● Draw information from a single map  ● Articulate their ideas and thoughts in well – formed sentences | | | | | | | |
| 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 2 | 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 3 | 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 4 | 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 5 | 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 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 6 | 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 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. | | | | | | |

**Years 1-6 History - Progression of Skills**