## The Science Curriculum at St Michael's – 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.

| NC Programme of Study | Year 3 | Year 3 Unit | Year 4 | Year 4 Unit |
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| **Plants** | <u>Pupils should be taught to:</u><br>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br>• 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<br>• investigate the way in which water is transported within plants<br>• explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal | • Make close observations of a variety of leaves, using magnifiers.<br>• Set up a fair test investigation to find out the effect of removing the leaves from a plant.<br>• Make observations over the next few weeks and summarise their findings.<br>• Make close observations of a variety of roots.<br>• Observe the transport of coloured water in carnations and celery and will set up an observation over time to investigate this in more detail<br>• Present the main stages in the life cycle of a flowering plant as a sequenced diagram.<br>• Dissect a flower in order to make a close observation of the different parts. They will also compare different flowers.<br>• Model the process of insect pollination.<br>• Use their observations of seeds to design model seeds suited to different methods of dispersal. | | |

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| **Living things and their habitats** | | | Pupils should be taught to:<br>• recognise that living things can be grouped in a variety of ways<br>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br>• recognise that environments can change and that this can sometimes pose dangers to living things | • Learn the characteristics of the five vertebrate groups.<br>• Be able to identify and explain why an animal is a fish, amphibian, reptile, bird or mammal.<br>• Use keys to identify pond or seashore animals<br>• Be able to identify an animal using a key and ask yes/no questions to distinguish between animals.<br>• Classify common land invertebrates into groups.<br>• Know the characteristics of six groups of invertebrates and be able to assign animals to those groups. |
| **Animals, including humans** | Pupils should be taught to:<br>• 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<br>• identify that humans and some other animals have skeletons and muscles for support, protection and movement | • Consider what humans need in order to survive. This will continue work started in KS1 on the basic needs of animals for survival, as well as the importance of exercise and nutrition.<br>• Explore different types of food, sorting them into different categories and planning meals. Begin to understand that different people may have different energy/nutritional requirements e.g. athletes or explorers.<br>• Research animals that have skeletons inside their bodies (vertebrates) and compare them to animals that don't (invertebrates).<br>• Learn about some of the muscles in the body and how these help to move our skeleton<br>• Plan an investigation to see whether features of a person's body affect their performance in certain activities. Plan how to answer some scientific questions of their choice.<br>• Carry out and analyse the results of an investigation into the correlation between a person's physical characteristics and their performance in a certain activity. | Pupils should be taught to:<br>• describe the simple functions of the basic parts of the digestive system in humans<br>• identify the different types of teeth in humans and their simple functions<br>• construct and interpret a variety of food chains, identifying producers, predators and prey | • Learn about the basic parts of the digestive system.<br>• Be able to say where the food goes as it travels though the body.<br>• Learn about the types of teeth that humans have and how these differ in children and adults.<br>• Be able to identify and name the types of teeth that they have.<br>• Learn about the functions of the different types of teeth.<br>• Identify that incisors are used for cutting, canines for tearing and molars for grinding.<br>• Learn about a range of ways to look after their teeth.<br>• Be able to give several different ways in which they can look after their teeth and explain why it is important to do so.<br>• Apply their understanding of food chains in the Human impact module lesson 'What happens when a food chain is broken?'<br>• -Create food chains and webs for different habitats.<br>• Be able to construct and interpret a variety of food chains.<br>• Use evidence from animal skulls to identify the correct position of an animal in a food chain.<br>• Understand about producers and consumers, and be able to identify which animals are predators, prey or both.<br>• Understand that a food chain shows what different animals eat in a habitat and that the arrows show the flow of energy. |

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| **Light** | <u>Pupils should be taught to:</u><br>• recognise that they need light in order to see things and that dark is the absence of light<br>• notice that light is reflected from surfaces<br>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>• recognise that shadows are formed when the light from a light source is blocked by an opaque object<br>• find patterns in the way that the size of shadows change | • Begin to understand that light is needed for us to see things and that some objects are easier to see than others.<br>• Develop their understanding of how light is reflected from surfaces and investigate how different surfaces reflect different amounts of light<br>• Carry out a number of different activities to investigate how light reflects off a mirror.<br>• Explore shadows by making shadows using different materials: classify the materials as opaque, translucent and transparent.<br>• Investigate how the size of a shadow can be altered by moving an object closer or further from a light source.<br>• Learn about the dangers associated with significant exposure to sunlight. Describe these dangers and the ways in which we can reduce or eliminate potential harm | | |
| **Electricity** | | | • Pupils should be taught to:<br>• identify common appliances that run on electricity<br>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers<br>• 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<br>• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit<br>• recognise some common conductors and insulators, and associate metals with being good conductors | • Learn about different sources and uses of electricity.<br>• Know that electrical items can be powered by mains electricity or batteries and that electricity can be used to produce light, sound, heat and movement.<br>• Explore making circuits using different components.<br>• know the names of common components and make and draw complete circuits.<br>• Learn more about how electricity flows in a complete circuit and how to use a model to explain observations.<br>• Be able to use a model to explain how a simple circuit works.<br>• Learn more about how electricity flows through components in a complete circuit and apply their knowledge to identify and correct circuits which will not work.<br>• Be able to recognise correct and incorrect circuits and identify some simple things to look for and try if a circuit does not work.<br>• Make and use toggle and press switches.<br>• Know that a switch is a controlled break which stops electricity flowing to all parts of the circuit. |

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| **States of Matter** | • | | • Pupils should be taught to:<br>• compare and group materials together, according to whether they are solids, liquids or gases<br>• 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)<br>• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature | • Explore the properties of solids and liquids, demonstrating what they already know.<br>• Be able to use key properties to distinguish between solids and liquids.<br>• Use ideas from observing melting ice to help them to plan a fair test investigation to answer a question.<br>• Carry out their investigation and draw conclusions.<br>• Plan a fair test and know that melting and freezing are changes of state.<br>• Interpret data.<br>• Be able to describe the effect of temperature, shape and size on how fast ice blocks melt.<br>• Consolidate understanding of the processes of melting and freezing and explore how materials behave when they are heated or cooled.<br>• Know that different materials melt at different temperatures and be able to define melting and freezing.<br>• Explore the properties of air.<br>• Know that gases are materials with substance and weight.<br>• Observe and measure water boiling, interpret temperature graphs.<br>• Know that liquids have characteristic boiling points, including water, which boils at 100°C, and will be able to identify the boiling point on a time and temperature graph.<br>• Investigate factors that affect how fast fabric dries and learn the term evaporation.<br>• Collect data and record it in a table.<br>• Draw conclusions from their data.<br>• Experience evaporation in a range of contexts and draw conclusions from the data collected in Lesson 7.<br>• Be able to describe what the data shows and use their developing understanding of evaporation to explain their findings.<br>• Explore the role of evaporation and condensation in the water cycle through an animation.<br>• Be able to label the processes on a diagram of the water cycle. |

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| **Rocks** | <u>Pupils should be taught to:</u><br>• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties<br>• describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>• recognise that soils are made from rocks and organic matter | • Explore first-hand a variety of rocks and identify some of their observable properties.<br>• Continue to identify and sort rocks according to their properties, using a branching key<br>• Identify where and how rocks are used in their local environment.<br>• Test the hardness of a variety of rocks and make comparisons between them.<br>• Explore a variety of soils, making the link between soils and the rocks they are made from.<br>• Explore a collection of fossils first-hand and begin to find out about the variety of fossils that have been found or can be found.<br>• Examine in more detail how fossils are formed and create storyboards to tell the story. | | |
| **Human Impact** | | | <u>Pupils should be taught to:</u><br>• Recognise that environments can change and that these changes can sometimes pose dangers to living things | • Consider the impact that humans have on the environment.<br>• Be able to identify some positive and negative ways that humans change the environment.<br>• Learn about the impact that different types of litter can have on wildlife.<br>• Understand why it is important to dispose of waste responsibly.<br>• Learn about what a food chain is and link changes in a food chain to their previous learning about human impact.<br>• Relate this to a real life situation for a new building project.<br>• Understand and appreciate the impact that humans can have on the stability of the food chain.<br>• Apply their recent learning about local food chain destruction to explore human impact further afield.<br>• Research different issues and present their findings.<br>• Be able to explain some of the implications of human impact on the location being studied. |

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| **Sound** | | | Pupils should be taught to:<br>• identify how sounds are made, associating some of them with something vibrating<br>• recognise that vibrations from sounds travel through a medium to the ear<br>• find patterns between the pitch of a sound and features of the object that produced it<br>• find patterns between the volume of a sound and the strength of the vibrations that produced it<br>• recognise that sounds get fainter as the distance from the sound source increases | • Gather questions to explore during the rest of the module.<br>• Explore how sounds are made.<br>• Notice that often there is something that visibly moves, or that we can feel moving when a sound is made (e.g. the skin of a drum moves when hit), but that sometimes these movements may be invisible (e.g. the movement of air) or so small that we can't feel them.<br>• Be able to start to associate some sounds with vibrations.<br>• Make ear gongs to explore how sounds travel from the source to our ears.<br>• Learn that sound needs a medium to travel through<br>• Explore and test how sounds travel through different materials.<br>• Explore different ways to change the pitch of a note produced by a plucked string/band.<br>• Understand that the pitch of the note is affected by the length, thickness and tautness of the string/ band.<br>• Explore how air can be used to make sounds with different pitches.<br>• Identify that it is the air in the instrument that is vibrating to make the sound and not the instrument itself.<br>• Be able to explain that the longer the pan pipe, the more air is vibrating, therefore the lower the note that is produced.<br>• Explore different instruments to compare the volume of sound that they produce.<br>• learn how to measure the loudness of the sound produced.<br>• Be able to explain what makes a sound louder or quieter.<br>• Carry out an investigation to explore how sounds get fainter as you move away from the source of the sound.<br>• Be able to justify their findings by giving examples to demonstrate that sounds get fainter as you move away from the source. |

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| **Forces and Magnets** | <u>Pupils should be taught to:</u><br>• compare how things move on different surfaces<br>• notice that some forces need contact between 2 objects, but magnetic forces can act at a distance<br>• observe how magnets attract or repel each other and attract some materials and not others<br>• 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<br>• describe magnets as having 2 poles<br>• predict whether 2 magnets will attract or repel each other, depending on which poles are facing | • Look at the different ways objects can be made to start moving.<br>• Investigate how different surfaces affect an object's movement.<br>• Explore a range of materials to identify which are magnetic and which are not<br>• Investigate how strong a magnet is using different methods. Evaluate which is the best method<br>• Choose a method to compare the strength of a bar magnet and a horse-shoe magnet<br>• Look at magnets in more detail, focusing on the fact that they have two poles, and investigate the effect of holding two magnets together | | |