English Martyrs Catholic Voluntary Academy

We grow and learn, with the gifts we have been given, following in the footsteps of Jesus.

WHOLE SCHOOL SCIENCE CURRICULUM PROGRESSION

Science Intent : Following the national curriculum for Science our intent is that all our children will leave primary school with the character traits, knowledge and skills to have a positive impact on the world through:

Head

- Learning scientific facts and theories.
- Having opportunities to create, through designing experiments and predicting results
- Having opportunities to observe, explain, record, enquire, test, evaluate and conclude.

Heart

- Fostering curiosity and creativity about what they are learning and about the world around them. to ask questions
- Fostering a love of learning new knowledge and skills, a love of building on existing knowledge and skills and a love of creating, planning and undertaking scientific experiments, methodically.
- Having resilience and determination by knowing that hard work will give us the answers and help us to succeed e.g. repeating experiments for fair testing.
- Knowing that it is OK to not get things right all of the time and we learn from mistakes.

Hand

- Beginning to answer their own questions about the world around them.
- Having the scientific knowledge required to understand the uses and implications of science, today and for the future.
- Understanding that science is essential to everyday life and the impact it can have on our planet

EYFS – Our Science curriculum learning journey begins in the EYFS understanding the World curriculum.
It will also occur in Communication and Language (through questioning, describing, new vocabulary and Personal and Social and Emotional Development (learning how to stay healthy)

ELG :

Communication and Language

ELG Make comments about what they have heard and ask questions to clarify their understanding

- Learn new scientific 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

PSED

ELG Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices

- Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - tooth brushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian

Understanding the World

ELG Explore the natural world around them, making observations and drawing pictures of animals and plants.

- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter
- 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.

Advent Term units			
YEAR	KEY KNOWLEDGE – see medium term plan which shows all knowledge as set out in NC for every topic KEY SKILLS to be used alongside the NC objectives as set out in 'Medium term planning' as stated above and to be used with 'Skills breakdown' document - showing how the skills progress through each year group.		KEY VOCABULARY
Year 1	**Topic - Materials** To be able to: Compare and group together a variety of everyday materials on the basis of their simple physical properties. Classify objects made of one material in different ways e.g. a group of objects made of metal. Classify one type of object made from a range of materials e.g. a collection of spoons made of different materials. Choose an appropriate method for testing an object for a particular property. Use test evidence to answer the questions about properties e.g. Which cloth is the most absorbent? Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.		Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth
	Topic - Seasonal change To be able to: Gather and record data about weather condition in different seasons, drawing on observation and using simple equipment (such as a container to measure rainfall) Use data to create a pictogram and use this to describe changes in day length over the seasons. Use their evidence to describe some other features of the weather, surroundings, themselves, animals, and plants found in autumn. Present information in tables and charts to compare the weather across the seasons. Collect information of features that change with the seasons e.g. plants, animals, humans Demonstrate their knowledge in different ways e.g. creating seasonal artwork, creating a pictogram (and use this to ask and answer related questions)		Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark
Year 2	**Topic - Materials** To be able to : Classify and sort materials by their properties e.g. manmade, natural. Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties. Investigate which materials are fit for a purpose e.g. What is the best material for an umbrella? Observe and explaining how materials change when a force is exerted on them by squashing, bending, twisting and stretching.		Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending,

	Investigate the transparency of objects, recording class data in a table and drawing simple conclusions from the findings. Ask and answer questions about everyday materials	Twisting, Stretching Elastic, Foil .
	Topic - Animals including humans To be able to: Ask questions and use secondary sources to find out about the life cycles of some animals Observe animals growing over a period of time e.g. chicks, caterpillars, a baby Ask questions of a parent about how they look after their baby Ask pet owners questions about how they look after their pet Investigate the effect of exercise on their bodies. Classify food in a range of ways, including use of the Eatwell guide. Investigate the effect of washing hands, e.g. using glitter gel. Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child. Measure/observing how animals, including humans, grow. Collate what they know about looking after a baby/animal by creating a parenting/pet owners' guide. Explain how development and health might be affected by differing conditions and needs being met/not met.	Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene
Year 3	**Topic - Rocks and Fossils** To be able to: Compare and group different kinds of rocks on the basis of their appearance and simple physical properties. Devise tests to explore the properties of rocks and use data to rank the rocks. Linking the changes of rocks over time with their properties e.g. soft rocks get worn away more easily. Present, in different ways, understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stopgo animation etc. Identify plant/animal matter and rocks in samples of soil. Devising a test to explore the water retention of soils.	Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent
	Topic - Animals Including humans To be able to: Classify food in a range of ways using food labels to explore the nutritional content of a range of food items. Use secondary sources to find out the types of food that contain different nutrients.	Movement, Muscles, Bones, Skull, Nutrition, Skeletons,

	Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Plan a daily diet which contains a good balance of nutrients and record and presenting findings. Explore the nutrients contained in fast food. Use secondary sources to research the parts and functions of the skeleton. Investigate pattern seeking questions such as; Can people with longer legs run faster? Can people with bigger hands catch a ball better? Compare, classify the skeletons of different animals.	
Year 4	**Topic - States of Matter** **To be able to:** Observe closely and classify a range of solids and liquids. Explore making gases visible Classify materials according to whether they are solids, liquids and gases. Observe a range of materials melting. Investigate how to melt ice more quickly. Observe the changes that are nonreversible relating (common ingredients). Investigate melting point of different materials. Explore freezing different liquids. Observe and measure temperature of icy water, tap water, hot water. Observe water evaporating and condensing. Set up investigations to explore the changing the rate of evaporation.* Use secondary sources to find out about the water cycle.* Use their data to explain what affects how quickly a solid melts. From their data, explain how to speed up or slow down evaporation. Present learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet	Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating
	Topic - Animals including humans To be able to: Construct and interpret a variety of food chains, identifying producers, predators and prey. Create food chains based on research. Identify differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore. Record the teeth in their mouth (making a dental record). Recreate the human stomach and observe representation of how food breaks down.	Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar

	Label the different parts of the digestive system.	
Year 5	**Topic - Space** To be able to : Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. Use secondary sources to help make a model to show why day and night occur. Make first-hand observations of how shadows caused by the Sun change through the day. Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. Research time zones. Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.	Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation
	Topic - Forces To be able to: Investigate the pull on different objects using a newton meter and record forces in Newtons (N). Report on conclusions relating to an object's mass and its weight in Newtons. Investigate the effect of friction in a range of contexts. Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. Explore how levers, pulleys and gears work. Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys
Year 6	**Topic - Animals including Humans** To be able to: Plan and conduct a scientific enquiry to identify different food groups. Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. Use information to identify the main components of the heart. Predict what will happen to the heart during exercise. Construct and analyse the variables that make a fair test. Conduct a fair investigation on the effects of exercise on the heart.	Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration

	Use scientific equipment to track results and record data using tables and graphs. ** Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. Use information acquired to write a scientific report on how the human circulatory system works.	
	Topic - Living things and their habitats To be able to: Classify plants and animals and record conclusions from the use of classification keys. Use information about the characteristics of an unknown animal or plant to assign it to a group. Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system	Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects
	Topic - Evolution and Inheritance To be able to: Follow lines of enquiry to support explanation of the process of evolution. Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth. Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. Compare the ideas of Charles Darwin and Alfred Wallace on evolution. Research the work of Mary Anning and understanding how this provided evidence of evolution. Refer to and use examples of fossil evidence that support the theory of evolution.	Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics
Lent Term Units		
YEAR	KEY KNOWLEDGE KEY SKILLS	KEY VOCABULARY
Year 1	**Topic – Animals including Humans** To be able to: Make first hand close observations of animals from each of the groups (city farm) Compare the structure of two animals from the same or different group e.g. wings, feathers, vertebrates/invertebrates. Classify animals, using a range of features e.g. lay eggs/give birth to live young. herbivore, omnivore (these terms do not have to be explicitly taught). Identify animals by matching statements to named images.* Take measurements of parts of the body and present results in a table to interpret.	Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak

	Conduct simple sense experiments. (eg Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?) **Topic – Plants** To be able to: Sort and group parts of plants using similarities and differences e.g. the shape of leaves, the colour of the flower/blossom. Use simple charts and Venn diagrams to identify and classify plants. Use photographs and their own observations to talk about how plants change over time (e.g. seed to sapling to tree) and over the year (deciduous and fruit bearing trees). * Plant seeds and observing how they grow and change by making simple observations. * Point to and naming the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green, the leaves are different shapes.	Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem
Year 2	**Topic – Animals inc humans** To be able to: See Advent Term **Topic – Plants** To be able to: Make close observations of seeds and bulbs. Classify seeds and bulbs. Research and plan when and how to plant a range of seeds and bulbs. Look after the plants as they grow – weeding, thinning, watering etc. Make close observations and measurements of their plants growing from seeds and bulbs. Make comparisons between plants as they grow. Identify and explain the similarities and difference between bulbs and seeds.	Plants Vocab: Seeds, Bulbs, Water, Light, Temperature, Growth

Year 3	**Topic – Light** To be able to: Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source. Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials. Observe how shadows are formed and affected by different circumstances. Relating the knowledge that light can be reflected off surfaces to investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light. Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences. Classify materials according to opaque, transparent and translucent Using oral and written explanations to report on why shadows are formed and how the length and size of a shadow can be changed. Investigate questions related to an object and the shadow it will cause.* * **Topic – magnets and Forces** To be able to: Record and report on findings from investigations, involving how things move on different surfaces. Compare and group materials following magnetic testing, recording findings and using the outcome to answer questions about which materials are magnetic. ** Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing.	Light, Shadows, Mirror, Reflective, Dark, Reflection Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pul
Year 4	**Topic – sound** To be able to: Experiment with at least three different instruments to observe and explore volume and pitch. Make predictions and drawing conclusions about the pitch and volume of sounds. * Note how vibrations make sounds of different volumes and travel to our ears. Identify and show how sound travels through particles and into the ear. Make own instruments that produce a range of pitches.	Volume, Vibration, Wave, Pitch, Tone, Speaker

	Topic – Electricity To be able to: Construct and investigate a range of circuits. Investigate which materials can be used instead of wires to make a circuit. Classify materials that conduct electricity and those that don't following investigation and record findings. * Investigate the effect of a switch and combinations of switches in simple circuits. Investigate switches and consider variations for specific uses, such as a pressure switch for a burglar alarm. Apply knowledge of conductors and insulators to design and make different types of switch.	Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators
Year 5	**Topic – Properties of Materials - Changes in Materials** To be able to: Investigate the properties of different materials in order to recommend materials for particular functions, depending on these properties e.g. testing waterproofness and thermal insulation to identify a suitable fabric for a coat. Explore the effect of adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. Investigate rates of dissolving by carrying out comparative and fair test and records findings. * * Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. Carry out comparative and fair tests involving nonreversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton).	Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing
Year 6	**Topic – Light** To be able to: Plan and conduct a test to investigate how light travels and explaining/presenting the findings. Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram.	Refraction, Reflection, Light, Spectrum, Rainbow, Colour,

Pentecost Term Units			
YEAR	KEY KNOWLEDGE KEY SKILLS		KEY VOCABULARY
Year 1	**Topic – Animal classification** To be able to: See LENT Term **Topic – animals and their structures** To be able to: See LENT Term		
Year 2	**Topic – Living things and their habitats** To be able to: Explore the outside environment regularly to find objects that are living, dead and have never lived Classify objects found in the local environment. Observe animals and plants carefully, drawing and labelling diagrams. Create simple food chains for a familiar local habitat from first hand observation and research. Create simple food chains from information given e.g. in picture books (Gruffalo etc.). Sort into living, dead and never lived. Explain key features that mean the animal or plant is suited to its micro-habitat. Use a food chain to explain what animals eat. Can explain in simple terms why an animal or plant is suited to a habitat		Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert
Year 3	**Topic – Plants** To be able to: Observe what happens to plants over time when the leaves or roots are removed. Observe the effect of putting cut white carnations or celery in coloured water. Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. Find flowers, seeds, berries and fruits outside throughout the year. Observe flowers carefully to identify the pollen. Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. Observe seeds being blown from the trees e.g. sycamore seeds. Research different types of seed dispersal. Classify seeds in a range of ways including by how they are dispersed. Create a new species of flowering plant. Explain observations made during investigations. Look at the features of seeds to decide on their method of dispersal.		Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower

	Draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal.	
Year 4	**Topic – Living things and their habitats** To be able to: Observe plants and animals in different habitats throughout the year and using recordings to compare and contrast the living things observed. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Classify living things found in different habitats based on their features. Create a simple identification key based on observable features. Use research to explore human impact on the local environment e.g. litter, tree planting. * Use secondary sources to find out about how environments may naturally change. Use secondary sources to find out about human impact, both positive and negative, on environments and write a report on this. *	Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats
Year 5	**Topic – Living things and their habitats** To be able to: Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes. Organise mammals into different groups - sea and land and marsupials and using scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). Draw and label appropriate scientific diagrams following use of secondary sources and first-hand observations relating to the life cycle of a range of animals. Compare and contrasting the life cycles of different living things and presenting findings. Identify which insects complete which type of metamorphosis and presenting findings. Identify the key differences between some amphibians – for example, toads and frogs, and presenting findings in different forms. Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Looking for patterns between the size of an animal and its expected life span).	Living things and their habitats Mammal, Reproduction, Insect, Amphibian, Bird, Offspring

	Topic – Human Life cycles To be able to: Describe the changes as humans develop to old age – compare to other life cycles as above? Draw and label appropriate scientific diagrams following use of secondary sources and first-hand observations relating to the life cycle of humans.	Animals including humans Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty
Year 6	**Topic – famous scientist study** To be able to: Research and collate information. Present **Topic – Electricity** To be able to: Draw circuit diagrams of a range of simple series circuits, using recognised symbols. Communicate structures of circuits using circuit diagrams with recognised symbols Make electric circuits and demonstrating, following investigation, how variation in the working of particular components can be changed. Plan and select resources for a fair scientific enquiry, deciding which variables to control. Record results from an experiment using tables and graphs Evaluate and explain investigations, results and conclusions.	Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell