HOLY TRINITY CATHOLIC ACADEMY
SCIENCE CURRICULUM MEDIUM TERM PLAN

INTENT:

- to develop enquiring minds through practical investigation and working scientifically
- to be confident in enquiring and explaining reasoning
- to be able to retain and recall key scientific knowledge and vocabulary
- to be able to make connections between their learning in science and the wider curriculum

EYFS – Our Science curriculum learning journey begins in the Early Years' Foundation Stage's 'Understanding the World' curriculum and all subsequent learning is built upon these foundations. (Please refer to EYFS Medium Term plans for further detail)

During Nursery, children will be able to:

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.
Show interest in different occupations.
Explore how things work.
Plant seeds and care for growing plants.
Understand the key features of the life cycle of a plant and an animal.
Begin to understand the need to respect and care for the natural environment and all living things. Explore and talk about different forces they can feel.
Talk about the differences between materials and changes they notice

During F2, children will be able to:

- Explore the natural world around them
- Describe what they see, hear and feel outside
- Recognise that some environments are different to the ones in which they live
- Make observations and drawings of animals and plants
- Describe their immediate environment, using knowledge from observation, discussion, stories, non-fiction texts and maps

ELG: The Natural World

Children at the expected level of development will: - 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.

Links are also made to the Physical Development aspects of the EYFS curriculum, particularly:

- Knowing about the different factors that support their mental health & well being:
- Regular physical activity, eating healthily, tooth brushing, having a good sleep

The children will have explored this through a variety of means – weekly Forest School sessions, different learning themes, stories and links to the Book of the Week, outdoor learning opportunities, continuous provision, visits etc. Links also will have been made to other aspects of the EYFS curriculum. Refer to the separate EYFS section on the website for further information.

ADVENT TERM UNITS - PHYSICS – LIGHT, SOUND, FORCES & MAGNETS, SEASONAL CHANGES, EARTH & SPACE, ELECTRICITY LENT TERM – EYFS EARTH & SPACE			
PHYSICS – SEASONAL CHANGES			
YEAR	**KEY KNOWLEDGE**	**KEY VOCABULARY**	**WORKING SCIENTIFICALLY**
EYFS F1 **YEAR A and B** **BY THE END OF THE ADVENT 2 UNIT**	1. I know that in autumn leaves change colour and fall from trees	Autumn Leaves Colours – yellow, orange, red, brown, green	• I can notice features of objects in the environment
EYFS **F2** **YEAR A and B** **BY THE END OF THE ADVENT 2 UNIT**	1. I know that autumn is a time of change 2. I know that leaves change colour and fall from trees 3. I know that some animals prepare for winter and that some animals hibernate	Autumn Change Winter Hibernate	• I can ask questions about aspects of my familiar world such as the place where I live or the natural world • I can talk about some of the things I have observed such as plants, animals, natural and found objects. • I can talk about growth, decay and changes over time.
Y1/2 **YEAR B** BEGINNING ADVENT TERM, TO BE CONSOLIDATED DURING THE LENT AND PENTECOST TERM UNITS as the seasons change	**ADVENT TERM:** 1. To know the name of the 4 seasons – spring, summer, autumn and winter To know that: **AUTUMN is** September, October and November. Harvest time is in this season. Temperatures drop. Leaves change colour and fall from deciduous trees. **LENT 1:** 2. To know that: **WINTER is in** December, January and February. It is the coldest time of year. We sometimes see snow, frost in the morning, sleet, blizzards, and hail. Water freezes to ice. Many plants stop growing. Some animals including hedgehogs and tortoises	**Sun** **Cloud** **Wind** **Snow** **Freeze** **Sleet** **Blizzard** **Winter** **Spring**. **Summer** **Autumn**	**What season are we in and what is the weather like today?** 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.

	hibernate. **Winter solstice**—The shortest day of the year. In the UK it falls on December 21st. **LENT 2:** 3. **SPRING is** March, April and May. It starts to get warmer - flowers begin to grow, leaves begin to grow on trees. Some baby animals are born (lambs, chicks) **Spring and Autumn equinox**—There is an equal amount of daylight and night. **PENTECOST 1:** 4. **SUMMER is in** June, July and August. It is the hottest time of the year. There is usually sunshine, generally dry, hot weather. Flowers and trees are in bloom. **Summer solstice**—The longest day of the year. In the UK it falls on June 21st. The days are longer in the summer and shorter in the winter. The weather changes through the year. It gets hotter in the summer and colder in the winter.		

PHYSICS – SOUND			
YEAR	**KEY KNOWLEDGE**	**KEY VOCABULARY**	**WORKING SCIENTIFICALLY**
Year 3/4 **YEAR A** **BY THE END OF THE ADVENT TERM UNITS**	1. To know that we hear sounds when vibrating air hits our ear drum To know how sound travels from a source to our ears 2. To know that pitch is how high or low a sound / note is To know that the tighter the string on an instrument, the higher the pitch of the note 3. To know that vibrations with lots of energy make a louder sound – the harder you hit something, the louder the sound it makes To know that sounds get fainter as the distance from the sound increases **Investigation**	**ear –** part of the body used for hearing **eardrum –** a part of the ear which is thin, tough layer of tissue that stretched out like a drum. Sound waves make the eardrum vibrate **distance –** a measurement of length between two points **vibration –** a movement backwards and forwards **sound waves –** Vibrations travelling from a sound source **volume** – the loudness of a noise **pitch** – How high or low a sound is **amplitude** – the size of vibration. A larger amplitude = a louder sound **soundproof** – to prevent sound from passing.	**SCIENCE INVESTIGATION:** **What makes volume change?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons

PHYSICS – LIGHT			
YEAR	**KEY KNOWLEDGE**	**KEY VOCABULARY**	**WORKING SCIENTIFICALLY**
Y3/4 **YEAR B** **BY THE END OF THE ADVENT TERM UNIT**	1. To know light sources - sun, stars, candle flame, electric light. - To know that the light from the sun can be dangerous and you must always protect your eyes 2. To know that you need light in order to see things and dark is the absence of light - To know that we see things when light enters our eyes 3. To know that light travels in straight lines 4. To know that light is reflected from shiny surfaces and bounces off shiny materials better non shiny materials 5. To know that shadows are formed when the light from a light source is blocked by an opaque object 6. To know that the size of shadows change the closer or further away the object is from the light source **Investigation**	**Light** **Dark** **Source** **Reflects** **Opaque** **Translucent** **Transparent** **Surface** **Shadows** **Mirror** **Bright** **Shiny**	**SCIENCE INVESTIGATION:** **How does a shadow change?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons

Y5/6 **YEAR B** **BY THE END OF THE ADVENT TERM UNIT** **QUERY INVESTIGATION DOESN'T LINK?**	1. To know that a light source is something that emits light by burning, electricity or chemical reactions. 2. To know that light appears to travel in straight lines. To know that objects are seen because they give out or reflect light into our eyes. To explain that we see things because light travels from light sources to our eyes or light from light sources to objects and then to our eyes. **3.** To know how to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them **Investigation**	**Light source** **Reflection** **Angle of incidence** **Angle of reflection** **Incidence ray** **Reflected ray** **Mirror** **Shadows** **Light**	**SCIENCE INVESTIGATION:** **How can I change the shape of a shadow?** Plan a fair test, controlling variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)** Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns
PHYSICS – FORCES & MAGNETS			
Y3/4 **YEAR B** **BY THE END OF THE ADVENT TERM UNIT**	1. To know how to compare how things move on different surfaces. -To know that forces are pushes and pulls which can make things move, stop or change shape 2. To know that magnets have two poles – North and South, that similar poles repel and opposite poles attract To know that forces do not always require contact between two objects – for example, magnetic forces can act without direct contact. 3. To know how to compare everyday materials, whether they are magnetic or not -To know that some metals are magnetic – iron, nickel and that other metals such as aluminium are not magnetic 4. To know how to **investigate** 'which is the strongest magnet?'	**Force** **Friction** **Motion** **Magnet** **Magnetic** **Pole** **Attract** **Repel**	**SCIENCE INVESTIGATION:** **Which is the strongest magnet?** Conduct a fair test and record measurements. Set up a fair test that will answer a question and interpret results and draw conclusions. To record data in a table and plot it in a bar graph.
Y5/6 **YEAR A** **BY THE END OF THE ADVENT TERM UNIT**	1. To know and explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.	**Air resistance** – A force that is caused by air with the force acting in the opposite direction to an object moving through the air **Force** – A push or pull upon an object resulting from its interaction with another object	**SCIENCE INVESTIGATION:** **Which is the best surface to travel quickly on?** Plan a fair test, controlling

	2. To know the effects of air-resistance, water resistance and friction, that act between two moving surfaces – see vocabulary section and definition knowledge **3.** To know some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect – see vocabulary section and definition knowledge **4.** To know how to **investigate** 'which is the best surface to travel quickly on?'	**Friction** – The resistance that one surface or object encounters when moving over another **Gears** – A toothed wheel that works with others to alter the relation between the speed of a driving mechanism (e.g. engine) and the speed of the driven parts (e.g. the wheels) **Gravity** – The force that attracts a body towards the centre of the earth **Levers** – A rigid bar resting on a pivot that is used to move a heavy or firmly fixed load **Mass** – The weight measured by an objects acceleration under a given force or by the force exerted on it by gravity **Pull force** – To draw or haul towards oneself or itself, in a particular direction **Pulleys** – A wheel with a grooved rim around that changes the direction of a force applied to the cord **Push force** – To move something in a specific way by exerting force **Water resistance** - A force that is caused by water with the force acting in the opposite direction to an object moving through the water	variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)** Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns

PHYSICS – EARTH & SPACE

YEAR	KEY KNOWLEDGE	KEY VOCABULARY	WORKING SCIENTIFICALLY
EYFS F1 **LENT TERM 1**	I know what a star is I know that we live on Earth I know that we have a moon I know that we have a sun I know that the moon and the sun is in space and that astronauts go into space	**Star** **Earth** **Moon** **Sun** **Space**	• I can notice features of objects in the environment
EYFS F2 **LENT TERM 1**	I know that the sun is a star in our solar system I know that the sun keeps us warm and gives us light I know that Earth is a planet in our solar system I know that it takes a whole year for the Earth to move around the sun I know that we have a moon I know that astronauts have landed on the moon I know the difference between day and night	**Sun** **Star** **Solar System** **Planet** **Earth** **Moon** **Day** **Night**	• I can ask questions about aspects of my familiar world such as the place where I live or the natural world.
YEAR 5/6 YEAR B **BY THE END OF THE ADVENT TERM UNIT**	1. To know that the Sun, Earth and Moon are approximately spherical bodies. - To know the names of the planets in the solar system and the place of the Earth in relation to the Sun – Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune	**Asteroid—**A small rocky body orbiting the sun. Axis—An imaginary line about which a body rotates. **Celestial**—Positioned in or relating to the sky, or outer space as observed in the astronomy. **Day**—A twenty-four hour period, from one midnight to the next, corresponding to a rotation of the earth on its axis. **Dwarf planet**—A celestial body resembling a small planet but lacking certain technical criteria to be classed as a planet. EG: Pluto.	Plan a fair test, controlling variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)**

	2. To know that the Earth rotates on its axis and it takes 24 hours, 1 day for the Earth to rotate - To know that the planets orbit the Sun - To know that it takes 364.25 days for the Earth to orbit the Sun 3. To know that the moon has no light of its own, and we see it because it reflects the light of the sun To know that the moon orbits the Earth once in approx. 28 days 4. To know how to describe the movement of the Moon relative to the Earth. 5. To be know how the Earth's rotation can be used to explain day and night and the apparent movement of the sun across the sky.	**Geocentric**—Where people believed the earth was at the centre of the solar system. Heliocentric—Representing the sun as the centre of the solar system, the modern view of the solar system. **Moon**—A natural satellite of any planet. **Night**—The period from sunset to sunrise in each twenty-four hours. **Orbit**—The regularly repeated oval course of a celestial object around a star or planet. **Planet**—A celestial body moving in orbit round a star. **Rotation**—The action of rotating about an axis or centre. **Solar system**—The collection of eight planets and their moons in orbit round the sun. **Star**—A fixed luminous point in the night sky which is a large, remote body like the sun. **Sun**—The star which planets orbit	Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns

PHYSICS – ELECTRICITY

YEAR	KEY KNOWLEDGE	KEY VOCABULARY	WORKING SCIENTIFICALLY
Y3/4 **YEAR A** **BY THE END OF THE ADVENT TERM UNIT**	1. To know that there are electrical items in our homes and that some are powered by mains and others by batteries. To know that electricity can be dangerous 2. To know how to create a simple series circuit, identifying and naming parts – cells, wires, bulbs, switches and buzzers - To know whether or not a lamp will light up in a circuit based on if it is a complete circuit or not 3. To know that a switch open and closes a circuit and the impact this has on the bulb. **Investigation**	**Electricity:** The flow of an electric current or charge through a material, e.g. from a power source through wires to an appliance. **Bulb—**A glass bulb which provides light by passing an electrical current through a filament. **Circuit:** A pathway that electricity can flow around. It includes wires and a power supply and may include bulbs, switches or buzzers. **Conductor:** a material that is made up of free electrons which can be made to move in one direction, creating an electric current. Metals are good conductors. **Current:** the amount of electricity flowing through the circuit **Insulator:** materials which do not conduct electricity very well. **Battery:** a source of energy which provides a push - a voltage - of energy to get the current flowing in a circuit. It	**SCIENCE INVESTIGATION:** **How does a switch work in a circuit?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons

	4. To know that electrical conductors are materials which allow electricity to pass through them. Metal is a good conductor To know that an insulator is a material such as plastic and wood which does not allow electricity to pass through them.	is also one or more cells connected. **Mains electricity:** a big circuit so when you plug something in at home, you complete the circuit from your house to the **power** station and back again **Cell:** a device used to generate **electricity**. **Energy:** how things change and move **Generate:** to make or produce.	
Y5/6 **YEAR A** **BY THE END OF THE ADVENT TERM UNIT**	1. To know how to use recognised symbols when representing a simple series circuit in a diagram. Cell, two cells, bulb, buzzer, motor, switch (off), switch (on) 2. To know that the more batteries added to a circuit – the brighter the bulb or louder the buzzer To know that the higher the voltage of batteries – the brighter the bulb, or louder the buzzer 3. To know how to **investigate** how different components function in a circuit changing the brightness of bulbs, the loudness of buzzers and the on/off positions on switches eg. The more bulbs in a series, the dimmer the bulb etc	**Battery—**A container consisting of one or more cells that is used for generating current. **Bulb—**A glass bulb which provides light by passing an electrical current through a filament. **Buzzer—**An electrical device that makes a buzzing noise and is used for signalling (for example, in a burglar alarm) **Circuit—**A complete and closed path around which a circulating cur-rent can flow. **Conductor—**A material or device which allows heat or electricity to carry through. **Current**—A flow of electricity which results from the ordered directional movement of electrically charged particles. **Electricity—**A form of energy resulting from the existence of charged particles. **Filament—**A conducting wire or thread with a high melting point which forms part of an electrical bulb**.** **Switch—**A device for marking and breaking the connection in a circuit. **Voltage—**The force that makes electricity move through a wire	**SCIENCE INVESTIGATION:** **How can bulbs be made dimmer or brighter?** Plan a fair test, controlling variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)** Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns

LENT TERM UNITS - CHEMISTRY – ROCKS, EVERYDAY MATERIALS, PROPERTIES & CHANGES OF MATERIALS, STATES OF MATTER **ADVENT TERM – EYFS MATERIALS / DT LINK** **CHEMISTRY – EVERYDAY MATERIALS**			
SUBJECT	**KEY KNOWLEDGE**	**KEY VOCABULARY**	**WORKING SCIENTIFICALLY**
EYFS **YEAR B** **BY THE END OF THE ADVENT 2 UNIT**	1. I know what different types of houses are made from – thatch, wood, stone, glass, cement, brick 2. I know that roofs need to be waterproof	Thatch Wood Stone Glass Cement Brick Waterproof	• I can ask questions about aspects of my familiar world such as the place where I live or the natural world. • I can talk about some of the things I have observed such as natural and found objects.
Y1/2 **YEAR B** **BY THE END OF THE LENT TERM UNIT**	1. To know the names of a variety of different materials - Wood, plastic, glass, metal, water, fabric and rock - To know that objects that are made from these materials 2. To know the properties of everyday materials: hard, soft, flexible, mouldable, transparent, opaque, absorbent, waterproof, heavy, light, float, sink 3. To know how to compare and group a variety of everyday materials based on their properties 4. To know how to identify and compare the suitability of every day materials for their uses – wood, meta, plastic, glass, brick, rock, paper and cardboard 5. To know that the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	**Material** What something is made out of e.g. wood, plastic, metal etc. **Properties** Words that describe what a material is like e.g. it's look and it's feel **Transparent** A property of a material; something that you can see through clearly **Opaque** A property of a material; something that you cannot see through clearly **Absorbent** A word used to describe a material that holds water **Waterproof** A word used to describe a material that does not absorb water **Hard, soft, flexible, bendy, stretchy. Mouldable, heavy, light, float, sink** **Compare** To notice things that are the same and things that are different (about materials) **Identify** To recognise something **Observe** To look at something closely	**SCIENTIFIC INVESTIGATION** **Which is the most waterproof material for a boat?** • Plan simple test • Say what might happen • Begin to choose simple equipment • Follow simple instructions • Use drawings and labels • Make simple observations • Say what happened • Say if anything was difficult • Say what observations they might need • Spot when a plan might be unfair • Choose equipment • Follow instructions • Make observations and non standard measurements • Make drawings / labellings, fill in charts • Say what happened and compare • Notice simple patterns

CHEMISTRY – ROCKS YEAR			
F2 **YEAR B** **BY THE END OF THE LENT TERM**	1. To know what compost is, and that it is a type of fertilizer that is made from rotting plants.	**Compost** **Rotting** **Vegetable waster** **Bacteria Germs**	
Y 3/4 **YEAR B** **BY THE END OF THE LENT TERM UNIT**	1. To know three different types of rocks, their appearance and simple physical properties – Sedimentary, Igneous and Metamorphic (see vocabulary section) 2. I know that some rocks can be grouped based on properties of hardness and softness and permeable and some are impermeable 3. To know which rock is the hardest through **investigation** 4. To know that fossils are formed when something living dies and are buried in sediment. The shell and bones remain over time and harden into rock. 5. To know that soils are made from rocks and organic matter.	**Sedimentary rock**- rock that has formed through the deposition and solidification of sediment, often transported by water (sea, rivers and lakes). **Igneous rock**- rock that is formed when magma cools and solidifies, it may do this above or below the Earth's surface. **Metamorphic rock**- rock that have been changed over time by extreme pressure and heat. **Fossil**- the remains or impression of a prehistoric plant or animal embedded in rock and preserved in petrified form. **Soil**- the upper layer of earth in which plants grow, a black or dark brown material typically consisting of a mixture of organic remains, clay, and rock particles **Permeable –** lets water soak through **Impermeable** – does not let water soak through **Durable** – not easily broken	**SCIENTIFIC INVESTIGATION:** **Which rock is the hardest?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons

CHEMISTRY – STATES OF MATTER

Y3/4
YEAR A

BY THE END OF THE LENT TERM UNIT

1. To know that all materials can be put into 3 groups.

Solids, Liquids and Gasses.
Solids – can be cut, shaped ad held. The volume doesn't change unless you brake some off.
Liquids – are runny and flow downwards. The shape can change depending n the shape of the container it's in. The volume doesn't change.
Gases – are all around us and mostly invisible. Air is made of a mixture of different gasses. A gas completely fills a container and takes its shape. A gas that is not in a container spreads out further and further – the volume keeps increasing.

2. To know that a material will change state at certain temperatures:

To know that water boils when it's heated to 100°C and freezes at 0°C.
To know that Freezing is turning a liquid into a solid by cooling.
To know that melting is turning a solid into a liquid by heating.
To know that temperature refers to how hot or cold something is.

3. **Investigation** linked to above knowledge – To know which is the best temperature to melt chocolate

4. To know that evaporation – turning a liquid into a gas by heating.

To know that condensation – turning gas into a liquid by cooling.
To know that temperature affects evaporation. The rate (speed) of evaporation depends on the temperature. To know that evaporation is slow when it is cold and fast when it is hot.

5. To know that water on Earth is constantly recycling – this is called the Water Cycle

To know that heat from the sun makes water from the sea, lakes and rivers evaporate into water vapour.

To know that as the water vapour rises, it cools and condenses to form clouds, then falls as rain.
Clouds are condensed water vapour – tiny droplets of water hanging around in the air.

Solid
Liquid
Gas
State
Change
Heating
Cooling
Temperature
Evaporation
Condensation
Water Cycle

SCIENTIFIC INVESTIGATION:

Which is the best temperature to melt chocolate?

Plan a fair test – say what to change and keep the same
Make predictions and say why
Select from a range of equipment
Use equipment safely, correctly and begin to be accurate
Make observations
Use standard measurements
Create own tables and charts to record results
Make simple conclusions
Begin to explain reasons

CHEMISTRY – PROPERTIES & CHANGES OF MATERIALS

Y5/6 **YEAR A** **BY THE END OF THE LENT TERM UNIT**	1. To know that different materials have different properties, and to compare and group them: Hardness – difficult to scratch and bend, e.g. diamond and steel Softness – foam used to make mattress and cushions Solubility – soluble materials dissolve in water. If a material will not dissolve it is insoluble – like a metal teaspoon. Transparency – materials that you can see through e.g. glass Conductivity (electrical and thermal) - Response to magnets Only metals are attracted to magnets. But not all metals. Iron and steel are magnetic Aluminium, brass and copper are not magnetic. 2. To know that some materials such as sugar and salt dissolve in water and this forms a solution. Sand is insoluble in water. Dissolving, mixing and changes of state are reversible. Evaporation and condensation are reversible. (Set up experiment, and ongoing) To know that evaporation separates soluble solids from water. The liquid must be heated so that it evaporates into the air, leaving the solid behind. 3. To know that solids can be mixed up with other solids. Mixtures of solids can be separated by sieving, separating big bits from smaller bits. To know that mixtures of a solid and a liquid can be separated by filtering. To know that filtering and sieving can be used to separate an insoluble solid from a liquid. **Investigation** 4. To know that some changes are reversible. The materials change back to how they were before. To know that heating a solid can make it change into liquid (melt). To know that cooling the liquid turns it back into a solid (freeze). 5. To know that an irreversible change lasts forever. You can't change the materials back to how they were before. Cooking and burning are irreversible changes To know that acid reacts with bicarbonate of soda to form a gas	Hardness Soluble, insoluble Transparent, opaque, translucent Conductor, insulator, electrical, thermal Dissolve Solution Solid, liquid, gas Materials Mixing Reversible change Irreversible change Burning Acid Bicarbonate of soda	**SCIENTIFIC INVESTIGATION:** **What is the best way of separating different materials?** Plan a fair test, controlling variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)** Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns

PENTECOST TERM UNITS - BIOLOGY – PLANTS, ANIMALS INCLUDING HUMANS, LIVING THINGS & HABITATS, EVOLUTION & INHERITANCE – links to the CST Principle of Stewardship			
BIOLOGY – PLANTS			
SUBJECT	**KEY KNOWLEDGE**	**KEY VOCABULARY**	**WORKING SCIENTIFICALLY**
EYFS F2 **YEAR B** **BY THE END OF THE LENT TERM UNIT**	To know that a plant starts its life as a seed, the seed grows into a plant and before the plant dies it scatters new seeds to grow into new plants To begin to know that seeds need light, water, warmth and air to grow	**Seed** **Soil** **Roots** **Stem** **Grow** **Light** **Water** **Warmth** **Air**	
Y1/2 **YEAR A** **BY THE END OF THE PENTECOST TERM UNIT**	1. To know the name of a variety of common and wild garden plants. - To know that evergreen trees keep their leaves all year. - To know that deciduous trees drop their leaves during autumn and grow them again during spring. 2. To know that roots, stems, leaves and flowers are common parts of plants but that these look different in different plants and trees – to compare different plants and trees 3. To know that plants may grow from either seeds or bulbs. These grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. 4. To know that plants need water, light and a suitable temperature to grow and stay healthy. **Investigation**	**Seed** **Bulb** **Seedling** **Root** **Stem** **Leaf** **Flower** **Tree** **Water** **Light** **Warmth** **Temperature** **Deciduous: A deciduous tree loses its leaves each year.** **Evergreen: A tree which keeps its leaves all year round**	**SCIENTIFIC INVESTIGATION** **What does a plant need to grow?** • Plan simple test • Say what might happen • Begin to choose simple equipment • Follow simple instructions • Use drawings and labels • Make simple observations • Say what happened • Say if anything was difficult • Say what observations they might need • Spot when a plan might be unfair • Choose equipment • Follow instructions • Make observations and non standard measurements • Make drawings / labellings, fill in charts • Say what happened and compare • Notice simple patterns
Y3/4	1. To know the functions of different parts of flowering plants:	**Flowering plant**	**SCIENTIFIC INVESTIGATION:**

YEAR B **BY THE END OF THE PENTECOST TERM UNIT**	**Roots** – needed to support and anchor the plant to the ground. Needed for nutrition to soak up the water and minerals from the soil. **Stem/trunk** – needed to support the plant. Needed for nutrition to carry water and minerals to the rest of the plant. **Leaves** – needed for nutrition. The leaves use sunlight to change carbon dioxide gas and water into food. **Flowers** – needed for reproduction. They often have colour and smell to attract insects. They also make the pollen and eggs that are needed for producing seeds. 2. To know that to grow, plants need air, light, water, nutrients from soil, and room to grow. Some plants need more or less of these of these things. 3. To know that water travels up a plant from the roots, up the stem and into the leaves and flowers. 4. To know that flowers play an important role in the life cycle of a flowering plant: - Its Petals are colourful and attracts insects to the flower - The insects take pollen from one flower to another – this is called Pollination - Then the flower turns into a seed - Then the **seed disperses** from the plant so that a new plant can grow – this can take place by the wind, by animals, or by plants – burrs 5. To **investigate** what happens if a plant does not get enough water	**Root, Stem, trunk, leaf, flower** **Air, light, water, nutrients, soil, growth** **Transport** **Life cycle** **Pollination** **Seed formation** **Seed dispersal – wind, animal, plants - burrs**	**What happens if a plant does not get enough light?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons
BIOLOGY – ANIMALS INCLUDING HUMANS			

EYFS F1 **YEAR B** **BY THE END OF THE PENTECOST TERM**	To know what being healthy means To know some types of healthy food To know how to keep ourselves safe crossing the road To know that we wash to keep ourselves clean To know that we brush our teeth to keep them healthy		
Y1/2 **YEAR B** **BY THE END OF THE PENTECOST TERM 1 UNIT**	1-2. To know a variety of common animals and to know how to compare and describe their structure including: Fish – live in water, have fins and gills Frogs are amphibians, have a wet skin, can live on land and in water Snakes are reptiles, have a dry, scaly skin, lays eggs Birds have feathers, beaks, wings, can fly and lay eggs Mammals have fur, has a backbone, gives birth to live young not eggs, such as lions, elephants and cats, dogs which are pets 2. To know a variety of common animals that are: - carnivores only eat meat - tigers, lions, bears - herbivores only eat plants - like rabbits, cows, sheep, goats, elephants, gorillas - Omnivores eat both meat/other animals and plants like birds, bears, foxes, humans etc 3. To know and draw/label parts of the human body and know which parts are associated with each sense 4. To **investigate** which fruit tastes the sweetest?	**Fish** **Amphibian** **Reptile** **Bird** **Mammal** **Carnivore** **Herbivore** **Omnivore** **Human body parts** terminology (link to RSHE Lent Term) **Smell Touch Taste Hearing** **Sight**	**SCIENTIFIC INVESTIGATION** **Which fruit tastes the sweetest?** • Plan simple test • Say what might happen • Begin to choose simple equipment • Follow simple instructions • Use drawings and labels • Make simple observations • Say what happened • Say if anything was difficult • Say what observations they might need • Spot when a plan might be unfair • Choose equipment • Follow instructions • Make observations and non standard measurements • Make drawings / labellings, fill in charts • Say what happened and compare • Notice simple patterns
Y1/2 B **BY THE END OF THE PENTECOST TERM 2 UNIT**	1. To know that animals including humans have offspring which grow into adults 2. To know that humans and animals need water, food and air for survival 3. To know that humans need exercise, good hygiene and to eat the right amounts and different types of food to be healthy 4. To **investigate** 'does exercise make you feel?'	**Offspring** **Water Food Air** **Food including healthy foods** **Exercise** **Hygiene** **Healthy**	**How does exercise make you feel?** • Plan simple test • Say what might happen • Begin to choose simple equipment • Follow simple instructions • Use drawings and labels • Make simple observations • Say what happened • Say if anything was difficult • Say what observations they might need • Spot when a plan might be unfair • Choose equipment • Follow instructions

			• Make observations and non standard measurements • Make drawings / labellings, fill in charts • Say what happened and compare Notice simple patterns
Y 3/4 YEAR A **BY THE END OF THE PENTECOST TERM UNIT**	1. To know that animals including humans need the right types and amount of food for a healthy body, and they cannot make their own food; they get nutrition from what they eat – **see vocabulary and definition section…** 2. To know simple functions of the basic parts of the digestive system in humans: - Digestion means breaking food down - Mouth – where we take food and water in and use our teeth to chew. The tongue helps to swallow food - The oesophagus is the pipe which takes food to our stomach - The Stomach breaks food down - The small intestine breaks food down even more and nutrients are absorbed into the blood - The large intestine absorbs water into the body 3. To know the different types of teeth in humans and their simple functions: Molars for crushing and grinding food, Canines for gripping and tearing food, incisors for snipping and cutting food 4. To **investigate** what is the best drink to maintain healthy teeth and gums?	• **Carbohydrates-** Carbohydrates are an important source of energy in a healthy diet. Starchy and sugary foods are high in carbohydrates. • **Proteins** - Your body uses proteins to make new cells for **growth**, and **repair** damaged tissues. • **Dairy-** diary products contain milk • **Nutrition-** the process of providing or obtaining the food necessary for health and growth. • **Digestive system parts** • **Teeth – incisors, molars, canines**	**SCIENTIFIC INVESTIGATION:** **What is the best drink to maintain healthy teeth and gums?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions Begin to explain reasons
Y3/4 YEAR B **BY THE END OF THE PENTECOST TERM UNIT**	1. To know how to construct and interpret a food chain: - To know that food chains start with a green plant – producer - To know that animals including humans are consumers - Too know that some animals are predators – the kill and eat other animals and these are called their prey - To know that if one part of the food chain changes, it all changes 2. To know that humans and some other animals have **skeletons and muscles** for **support, protection and**	• **Food Chain** • **Producer** • **Consumer** • **Predator** • **Prey** • **Vertebrat**e- an animal of a large group distinguished by the possession of a backbone or spinal column, including mammals, birds, reptiles,	**SCIENTIFIC INVESTIGATION:** **Can people with longer legs jump further?** Plan a fair test – say what to change and keep the same Make predictions and say why Select from a range of equipment Use equipment safely, correctly and begin to be accurate Make observations Use standard measurements Create own tables and charts to record results Make simple conclusions

	movement – these are called vertebrates. Invertebrates do not have bones – eg snails, jellyfish - To know that the skull protects the brain - To know that the ribs protect the heart and lungs - To know that the backbone protects the spinal nerve - To know that muscles and joints allow movement - To know that muscles work in pairs – one muscles gets shorter (contracts) and pulls the bone, while the other muscles gets longer and relaxes (children can fell this when moving their arm) 3. To i**nvestigate** whether people with longer legs can jump further.	amphibians, and fishes • **Invertebrate**- an animal lacking a backbone • **Muscles** • **Support, protection, movement**	Begin to explain reasons
Y5/6 **YEAR A** **BY THE END OF THE PENTECOST TERM UNIT**	1. To know that all living things go through changes in their lifetime, and this is known as a life cycle: Fertilized egg, foetus, baby, child, adolescent, adult, old age To know that puberty is when the body develops and the different changes at puberty (RSHE link) 2. To know the impact of **diet, exercise**, drugs and **lifestyle** on the way their bodies function: - To know that a healthy lifestyle includes a balanced diet, exercise, enough sleep, being physically healthy, being mentally healthy and how to achieve this 3. To know that tobacco and alcohol are legal drugs To know that smoking can cause cancer, breathing problems and that tobacco contains nicotine which causes addiction - To know that alcohol slows reactions and heavy drinking damages the liver, heart and stomach. It can also cause blood pressure to rise 4. To know that medicines are drugs and are dangerous if mis-used; but can make people well when used correctly, these are legal drugs - To know that some drugs are illegal and that these cause damage to the brain and can cause cancers - To know that solvents are glues and paints and that sniffing these can damage the brain and be addictive	**Human development** **Baby and animal gestation** **Puberty** **Diet** **Exercise** **Drugs** **Alcohol** **Tobacco** **Addiction** **Live** **Heart Stomach**	

Y5/6 **YEAR B** **BY THE END OF THE PENTECOST TERM UNIT**	1. To know ways in which nutrients and water are transported within animals including humans: To know that the body does **four** basic things: – takes in oxygen, food and water -Blood carries food, water and oxygen to the rest of the body -Our bodies use the food we eat, the oxygen we breathe to get energy, and waste substances are given back to the blood -Blood carries waste to the lungs and kidneys to be removed 2. To know that our organs are important for keeping the body working: - The lungs take in oxygen, and give out carbon dioxide - The stomach takes in food which is broken down in the intestines - The kidneys take water and waste products out of the body 3. To know main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood: -The blood and the heart make up the circulatory system -The heart pumps blood around the body through the blood vessels – capillaries, veins and arteries -Blood moves food, water and oxygen waste products around the body -Arteries carry blood away from the heart to the body -Veins carry blood back to the heart from the body -Capillaries allow substances to move in and out of the blood -One artery takes blood to the lungs where it picks up oxygen -Carbon dioxide from the blood goes into the lungs where it is breathed out -Veins take oxygenated blood back from the lungs to the heart -The other artery then takes the blood with oxygen to all parts of the body The veins then return the blood from the body to the heart and it starts again – this is why it is called the 'circulatory' system 4. To **investigate** the impact that exercise has on heart rate	**Nutrients** **Transportation** **Circulation** **Heart** **Blood vessels** **Artery** **Vein** **Oxygen**	**SCIENTIFIC INVESTIGATION:** **What impact does exercise have on heart rate?** Plan a fair test, controlling variables to change and stay the same, knows why **Plans what to repeat if needed (Y6)** Predicts outcomes **Sketches graph to show prediction (Y6)** Selects and uses equipment safely, correctly and accurately Deals with difficulties before asking **(Y6)** Selects best way to show results Creates own range of tables/charts/graphs Compares variables and explains conclusions and patterns

BIOLOGY – LIVING THINGS & HABITATS			
F1 **YEAR B** **BY THE END OF THE PENTECOST TERM UNIT**	To know about the life cycle of a butterfly: 7. That a caterpillar eats a lot 8. That a caterpillar turns into a butterfly 9. That caterpillars and butterflies are both insects 10. Butterflies have 6 legs and three parts to their body	**Life cycle** **Caterpillar** **Butterfly**	
EYFS F1 **YEAR B** **BY THE END OF THE PENTECOST TERM**	To know that deer, hedgehogs and rabbits etc live in a wood To know that tigers, elephants and monkeys etc live in the jungle To know the names of some creatures that live in the sea – fish, crabs, sharks, whales etc To know about some creatures that live in rockpools – small fish, crabs, snails, and plants such as seaweed	**Woodland – deer, rabbit, hedgehog, bird** **Jungle – tiger, elephant, monkey** **Sea Creatures – fish, crabs, sharks, whales**	
EYFS F2 **YEAR B** **BY THE END OF THE PENTECOST TERM UNIT**	**Rainforest topic – linked to Geography** To know that Sherwood Forest is home to lots of different woodland animals and plants – birds, owls, woodpeckers, bats, insects, spiders, foxes, rabbits etc To know that the rainforest in Brazil and is home to lots of different animals and plants – jaguar, vampire bat etc and that some animals that live in the rainforest are dangerous To know that big cats are carnivores – a creature who eats meat. They have excellent hearing and sight. They are an endangered species. A dinosaur was a reptile that lived on Earth long ago.	**Rain Forest** **Woodland** **Habitat** **Oak tree** **Rainforest** **Dangerous** **Carnivore – meat eater** **Hearing, sight** **Endangered species** **Dinosaur**	

	Fossils are the remains of a dead animal or plant in stone To know that whales are the largest sea creatures on Earth. That there are two types – baleen and toothed, groups are called herds and they breathe through a blowhole. The shark is one of the fastest fish in the sea and it has a bendy skeleton. To begin to know what a food chain is	**Reptile** **Fossil** **Ocean – fish** **Whale – herd, blow hole** **Shark – skeleton** **Food chain**	
Y1/2 **YEAR A** **BY THE END OF THE ADVENT TERM UNIT**	1. To know the differences between things that are living, dead and never been alive 2. To know that most things live in habitats to which they are suited; and that the habitats provide the basic needs for each creature living there -**woodlice** live in dark and damp conditions and can be found under logs (micro-habitat) -a **frog** is suited to living in a pond because it has slugs and flies to eat, water for frog spawn and damp air so that the frog does not dry out -a **bird** is suited to living in woodland habitat – there is plenty of twigs to build nests, their feathers are camouflage, they can build nests high in trees so that predators cannot eat them, there are worms in the ground that they can eat and berries on trees 3. To know (and sort) a variety of plants and animals in their habitats including micro-habitats: - Cacti and camels live in the desert - Fir / pine / evergreen trees grow near the mountains - A golden eagle, a mountain goat live in the mountains - A polar bear lives in the North Polar regions - Penguins live in the South Pole - Lions, giraffes, elephants and zebras live in grasslands 4. To know how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name sources of food: Plant – woodlouse – bird Plant – worm – blackbird – owl Plant – slug – frog – fox	**Living** **Dead** **Never been alive** **Habitat** **Animal** **Plant** **Woodlice** **Damp, dark habitat** **Micro-habitat** **Food chain** **Food source**	**SCIENTIFIC INVESTIGATION:** **Where do woodlice like to live?** • Plan simple test • Say what might happen • Begin to choose simple equipment • Follow simple instructions • Use drawings and labels • Make simple observations • Say what happened • Say if anything was difficult • Say what observations they might need • Spot when a plan might be unfair • Choose equipment • Follow instructions • Make observations and non standard measurements • Make drawings / labellings, fill in charts • Say what happened and compare • Notice simple patterns

	5. To **investigate** where to woodlice live to live?		
Y3/4 YEAR A **BY THE END OF THE PENTECOST TERM UNIT**	1. To know that living things can be grouped in a variety of ways To know that there are vertebrates and invertebrates and be able to classify them • Vertebrates have a spine and invertebrates do not 2. To know that there are plants groups – flowering and non flowering plants and be able to classify: Flowering Plants: grasses, garden shrugs, cereals/crops, deciduous trees Non-Flowering Plants – algae, mosses, conifers/pines, ferns 3. To know that classification keys can be used to group, identify and name living things in the locality and wider environment - Use classification keys to identify leaves /trees – **investigate** 4. To know that environments can change and that this can sometimes pose dangers to living things: - Plastic pollution and its impact on wildlife - To know some of the names of endangered animals and why they are becoming endangered	• **Environment-** An environment contains many habitats and these include areas where there are both living and non-living things. • · **Endangered species-** A plant or animal where there are not many of their species left and scientists are concerned that the species may become extinct.	**SCIENTIFIC INVESTIGATION:** **How can we use classification keys to help identify leaves/plants/trees?**
Y5/6 YEAR A **BY THE END OF THE PENTECOST TERM UNIT**	1. To know differences in the life cycles of a mammal (pig), an amphibian (frog), an insect (butterfly) and a bird (chicken/hen) 2. To know the life process of reproduction in some plants and animals: To know that new plants can be made by sexual or asexual reproduction -sexual reproduction: -The Stamen is the male part of the plant – the anther containing the pollen and the filament holding the anther up The Carpel – the Female part of the plant – containing the stigma, the style which holds the stigma up and the ovary containing eggs/ovules Pollen (male part) from one plant lands on/sticks to the stigma of	**Life cycle** **Mammal, amphibian, insect bird – features of** **Eggs, live young** **Sexual Reproduction – pollen, pollination** **Stamen - pollen filament** **Carpel – stigma, style, ovary – eggs/ovules** **Germination** **Asexual reproduction – cutting, bulb**	

	another -the pollen travels down the stamen to the ovule which contains eggs (female part) -when the pollen and the egg join, a seed is made -the seed germinates and grows into a seedling, then a plant 3. To know how to observe and identify the reproductive parts of a flowering plant 4. To know that asexual reproduction is when a cutting is made from a plant eg spider plant To know that daffodils, tulips etc grow from bulbs and this is also asexual reproduction 5. To know that reproduction produces babies and this happens when an egg form the mother is fertilized by a sperm from the father animal The fertilized egg grows into an embryo which develops into a baby animal – eg life cycle of a pig		
Y5/6 YEAR B BY THE END OF THE PENTECOST TERM UNIT	1. To know and describe how living things are classified into broad groups according to common observable characteristics, based on similarities and differences -vertebrates / invertebrates and their sub groups: - vertebrates have a backbone and invertebrates do not -V**ertebrates** are – birds / amphibians/reptiles/fish/mammals **Fish** – live in water, have fins and gills **Amphibians** – eg frogs, toads have a wet skin, can live on land and in water **Reptiles** – eg snakes and lizards have a dry, scaly skin, lays eggs **Birds** have feathers, beaks, wings, can fly and lay eggs **Mammals** have fur, has a backbone, gives birth to live young not eggs, such as lions, elephants and cats, dogs which are pets 2.To know and describe how living things are classified into broad groups according to common observable characteristics, based on similarities and differences -**Invertebrates** – insects, spiders, molluscs/crustaceans - **insects** – eg ants, bees, flies have six legs, some can fly – have two sets of wings, their bodies are separated into three parts, they have antennae	☐ **Organisms-** This is another word that can be used to mean 'living things'. **Movement, Reproduction, Sensitivity, Nutrition, Excretion, Respiration, Growth** **Micro-organisms and specific feature vocabulary** **Characteristics, similarities, differences** **Features of vertebrates and invertebrates and their sub-groups**	**How can we use classification keys to identify animals and plants within broad groups?**

	-**Spiders** have 8 legs, two main body part, 8 eyes and spin webs -**molluscs** eg. Snails and slugs– soft body 'foot' to help it move around, may have a shell (snail), tentacles – holding the eyes and lower tentacles for feeling and tasting -**crustaceans** – crabs, lobsters – hard outer shell, jointed limbs, two pairs of antennae 3.To know and describe how living things are classified into broad groups according to common observable characteristics, based on similarities and differences **- Flowering plants** (plants with flowers) - **Non flowering plants –** fern, moss, fungi, conifers -**micro-organisms – bacteria/viruses -** tiny, can only be seen under a microscope, reproduce very quickly 4.To know how to give reasons for classifying plants and animals based on specific characteristics - Use classification keys to identify plants and animals from the categories above, explaining and giving reasons for identification **Investigation**		
BIOLOGY – EVOLUTION & INHERITANCE			
Y5/6 **YEAR B** **BY THE END OF THE LENT TERM UNIT**	1. To know that living things reproduce and produce offspring of the same kind; they inherit features from their parents but they vary and are not identical to their parents; 2. To recognize that living things have changed over time – we call this evolution; eg evolution of ape to human 3. To know that fossils provide information about living things that inhabited the Earth millions of years ago 4. To know how to animals and plants are adapted and suited to their environment in different ways -Adaptation examples – camel, penguin, polar bear, giraffe, cactus 5. To know that adaptation may lead to evolution	**Fossil and related vocabulary** **Inhabited** **Offspring** **Identical and non-identical** **Adaptation** **Evolution**	