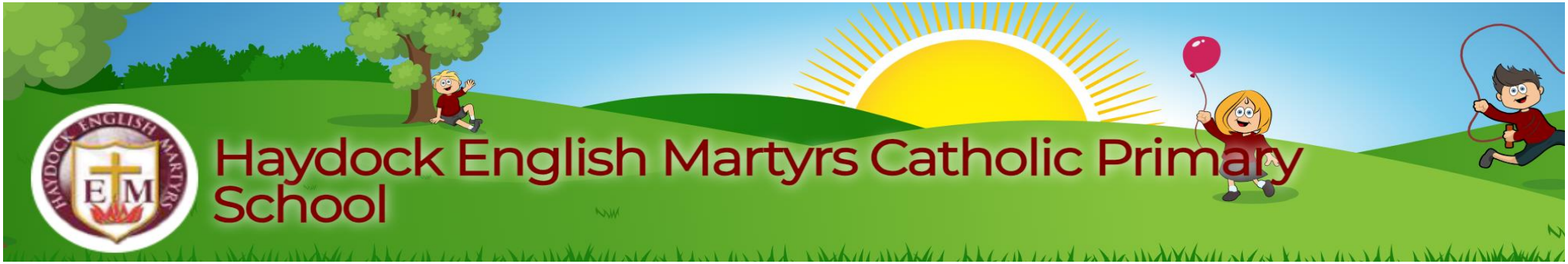

Haydock English Martyrs' Catholic Primary School Long Term Plan: SCIENCE

Nursery and Reception follow the Early Years Foundation Curriculum (Topics in Early Years are based on the themes taken from Come and See. Further information can also be found on the EYFS Memorable Learning documents)
Y1 to Y6 follow the National Curriculum

	AUTUMNN TERM	SPRING TERM	SUMMER TERM
Nursery Topic	Family- Myself Welcome- Baptism Advent/ Christmas-Loving	Local Church- Community Eucharist- Gathering Lent/Easter-Growing	Pentecost- Good News Reconciliation- Friends Universal Church- Our World
Understanding of the World	The children will look at and discuss the changes since they were a baby. To explore how some foods grow The children will be looking at changes of state including mixing ingredients to make and decorate cupcakes for a party.	Explore our school environment through seasonal walks. Talk about cold weather. Find out about self care and oral hygiene. Begin to know about animals and their young. Use their senses to explore natural materials with similar/ and or different properties. To observe seeds and changes over time.	Explore and describe different seasons. Begin to understand the need to look after our planet, focus on litter.
Reception Topics	God Made the World and God made me. Celebrations	Gather together and Grow in God's Love	Family and friends Moving on

Understanding of the World	Begin to ask and answer scientific questions including collecting data about eye and hair colour. Know their place in their wider family. Observe facial features in themselves and others. Consider how they have changed from a baby to now. Take part in seasonal walks, noting different plants, birds and insects. Begin to understand the effect of changing seasons on the natural world around them. Name and describe animals and how to care for them.	Explore what a shadow is and how it is made. They will create their own shadow puppets. Seasonal walks and exploring outdoors will take place as the weather changes. They will explore the natural world around them whilst describing what they see, hear and feel. Begin to understand the effect of changing seasons on the natural world around them. Begin to ask and answer scientific questions including about ice and snow. Explore changes to plants, insects and animals building onto their knowledge about a human lifecycle.	Take part in seasonal walks, noting different plants, birds and insects and any changes since spring. Explore wind and windmills. Begin to ask and answer scientific questions including about what a plant needs to grow. Consider how we can take care of God's world, saving water, saving electricity.
Y1/2 Cycle A	***Animals Including Humans*** **Memorable Knowledge** ○ Notice that animals, including humans, have offspring which grow into adults. ○ The young of some animals do not look like their parents e.g. tadpoles. ○ Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). ○ To grow into healthy adults, animals need the right amounts and types of food and exercise. ○ Good hygiene is also important in preventing infections and illnesses.	***Plants*** **Memorable knowledge** ○ Identify and name a variety of common wild and garden plants ○ Know that there are deciduous and ever green plants ○ Identify and compare deciduous and evergreen trees ○ Observe the growth of seeds and bulbs ○ Identify and describe the basic structure of common flowering plants ○ Identify the basic needs of a plant	***Use of Everyday Materials*** **Memorable knowledge** ○ Identify a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. ○ Classify a range of materials according to their properties ○ Compare the suitability of materials for purpose ○ Compare how a range of materials move on different surfaces ○ Investigate how some solid objects can change shape by squashing, bending, twisting and stretching.
Cycle A	***Seasonal Changes ongoing – Autumn1, summer to autumn. Autumn 2 Autumn to winter , Spring 1 Winter to spring, Summer 1 Spring to Summer*** ○ Name the four seasons ○ Observe changes in weather ○ Describe weather associated with the seasons ○ Observe how day length varies.		
Y1/2 Cycle	***Animals Including Humans***	***Everyday Materials***	***Living Things and their Habitats***

B	**Memorable knowledge** ○ Identify and name common animals including mammals, fish, reptiles, amphibians and birds ○ Compare the structure of common animals ○ Identify herbivores, carnivore and omnivores. ○ Identify basic parts of the human body ○ Identify which sense is associated with part of the body	**Memorable Knowledge** ○ Distinguish between an object and the material from which it is made. ○ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. ○ Describe the simple physical properties of a variety of everyday materials e.g. shiny, stretchy, rough etc ○ Compare and group together a variety of everyday materials on the basis of their simple physical properties.	**Memorable Knowledge** ○ Explore and compare the differences between things that are living, dead, and things that have never been alive. ○ Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. ○ Identify and name a variety of plants and animals in their habitats, including microhabitats. e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves etc. ○ Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.
Cycle B	***Plants – ongoing - Pupils should use the local environment throughout the year to observe how different plants grow.*** ○ Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. ○ Mature plants may have flowers which then develop into seeds, berries, fruits etc. ○ Plants need water, light and a suitable temperature to grow and stay healthy. ○ Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them		

Y3/4 Cycle A	***Rock*** **Memorable Knowledge** ○ Rock is a naturally occurring material. ○ Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ○ Describe in simple terms how fossils are formed when things that have lived are trapped within rock. ○ Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). ***Animals Including Humans*** **Memorable Knowledge** ○ 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. ○ Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. ○ Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	***Forces and Magnets*** **Memorable Knowledge** ○ A force is a push or a pull ○ Compare how things move on different surfaces. ○ Notice that some forces need contact between two objects (for example, opening a door, pushing a swing), but magnetic forces can act at a distance. ○ Observe how magnets attract or repel each other and attract some materials and not others. ○ Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. ○ Describe magnets as having two poles. ○ Predict whether two magnets will attract or repel each other, depending on which poles are facing.	***Light*** **Memorable Knowledge** ○ Recognise that they need light in order to see things and that dark is the absence of light. ○ Notice that light is reflected from surfaces. ○ Recognise that the light from the sun can be dangerous and damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. ○ Recognise that shadows are formed when the light from a light source is blocked by an opaque object. ○ The size of the shadow depends on the position of the source, object and surface. ***Sound*** **Memorable Knowledge** ○ A sound is made through vibrations which travel through a medium (solid, liquid or gas) from the source to our ears. ○ Recognise that vibrations from sounds travel through a medium to the ear. ○ Find patterns between the pitch of a sound and features of the object that produced it. ○ The volume (loudness) of the sound depends on the strength (size) of vibrations. ○ Recognise that sounds get fainter as the distance from the sound source increases. ○ Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds.

Y3/4 Cycle B	***States of Matter*** **Memorable Knowledge** ○ Compare and group materials together, according to whether they are solids, liquids or gases. ○ Know that a solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured ○ Some materials change state when they are heated or cooled. Water boils when it is heated to 100^{o}C and the freezing point of water is 0^{o}C ○ Know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. ***Animals including Humans*** **Memorable Knowledge** ○ Describe the simple functions of the basic parts of the digestive system in humans. ○ Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). ○ Living things can be classified as producers, predators and prey according to their place in the food chain.	***Plants*** **Memorable Knowledge** ○ Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ○ The roots absorb water and nutrients from the soil and anchor the plant in place. ○ The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. ○ The leaves use sunlight and water to produce the plant's food. ○ Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. ○ Investigate the way in which water is transported within plants. ○ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	***Electricity*** **Memorable Knowledge** ○ Name common appliances that run on electricity. ○ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ○ Know whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. ○ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. ○ Recognise some common conductors and insulators, and associate metals with being good conductors. ***Living Things and their Habitats*** **Memorable Knowledge** ○ Living things can be grouped (classified) in different ways according to their features. ○ Classification keys can be used to identify and name living things. ○ Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change.

Y5/6 Cycle A

Electricity

Memorable knowledge

- Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens.
- Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter.
- Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.
- Use recognised circuit symbols to draw simple circuit diagrams.

Animals Including Humans

Memorable knowledge

- When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills.
- At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.

Evolution and Inheritance

Memorable Knowledge

- All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.
- Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die.
- If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.
- Fossils give us evidence of what lived on the Earth millions of year ago and show that living things have changed over time.
- More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.

Forces

Memorable Knowledge

- A force causes an object to start moving, stop moving, speed up, slow down or change direction.
- Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.
- Air resistance, water resistance and friction are contact forces that act between moving surfaces.
- A mechanism is a device that allows a small force to be increased to a larger force. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover.
- Pulleys, levers and gears are all mechanisms.

Living Things and their Habitats

Memorable Knowledge

- Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms.
- Plants can make their own food whereas animals cannot.
- Animals can be divided into two main groups: vertebrates and invertebrates. Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics.
- Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.
- Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.

Y5/6 Cycle B	***Earth and Space*** **Memorable Knowledge** ○ The Sun is a star. It is at the centre of our solar system. ○ There are 8 planets in our solar system. These travel around the Sun in fixed orbits. ○ Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. ○ As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). ○ As the Earth rotates, the Sun appears to move across the sky. ○ The Moon orbits the Earth. It takes about 28 days to complete its orbit. ○ The Sun, Earth and Moon are approximately spherical. ***Living Things and Their Habitats*** **Memorable Knowledge** ○ As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. ○ Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. ○ In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. ○ Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent.	***Properties and Changes of Materials*** **Memorable Knowledge** ○ Materials have different uses depending on their properties and state (liquid, solid, gas) ○ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. ○ Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. ○ Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. ○ Mixtures can be separated by filtering, sieving and evaporation. ○ Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.	***Animals Including Humans*** **Memorable Knowledge** ○ The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. ○ Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. ○ Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. ○ Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. ***Light*** **Memorable Knowledge** ○ Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. ○ Light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. ○ Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.