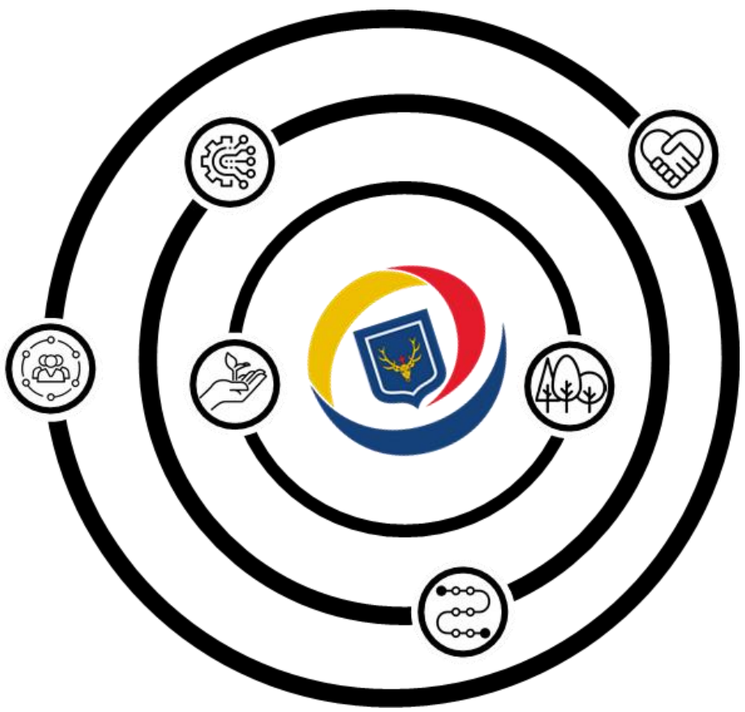
OUR LADY AND ST. HUBERT'S PRIMARY

Science Knowledge and Skills Progression



At Our Lady and
St. Hubert's, home, school and
parish work together, knowing
that God is with us in all we do.

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Science Curriculum Intent

At Our Lady and St Hubert's, students will gain a strong understanding of the world around them, whilst acquiring specific skills and knowledge to help them to think scientifically.

Children will acquire an understanding of scientific processes and an understanding of the uses and implications of Science, today and for the future. They will be encouraged to think about how they can use their scientific understanding to assist them in finding solutions to real world problems, using a range of skills including critical thinking, creativity, and citizenship.

Implementation of the Science Curriculum

Children will learn fundamental knowledge and skills within Science, in line with the National Curriculum. Many Science topics are built on throughout a child's school journey at OLSH, allowing children to build upon their prior knowledge and embed this deep understanding into their long-term memory.

Through following Rosenshein's principles, we are allowing our children to know more and remember more. All children are encouraged to develop and use a range of 'Working Scientifically Skills' including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Subject specific vocabulary will be delivered thought lessons and topics and will be built upon as a topic progresses throughout year groups.

Through the use of modelling, targeted questioning, and continuous review, children will develop confidence and competence to use these skills appropriately, independently, and in a range of contexts. Children will learn scientific knowledge and skills in relation to other subjects, with cross-curricular links being highlighted where appropriate. This will allow for children to see connections in their learning. When this is not possible, children will learn explicit topics and discuss the necessary learning taking place.

Impact of the Science Curriculum

We want our children to become inquisitive about the world around them- and we feel that Science is the key to this. They will develop an understanding as to why things happen, how things happen and the effect they can have on the people and the environment around them.

Science will be evident in other areas of learning, like DT; choosing materials based on their properties, Computing; investigating electrical components and being Critical Thinkers; explaining and justifying their decisions, using their Science knowledge to back them up.

When children leave OLSH, we want them to be competent and confident in their knowledge and be able to face real-world problems head on, funding new and inquisitive solutions to solve them.

Whole School Science Overview

OUR LADY AND ST. HUBERT'S PRIMARY Whole School Science Overview						
	Autumn		Spring		Summer	
	Wonderful World	A Moment in Time	Peace and Conflict	Nurturing Nature	We are Engineers	Our Place in the World
Year 1	Plants / Seasons		Animals including Humans	Animals including Humans / Seasons	Materials	Seasons
Year 2	Animals including Humans		Materials	Habitats	Plants	
Year 3	Light	Rocks. Fossils, Soil		Plants and Nutrition	Forces and Magnets	Animals including Humans
Year 4	Animals including Humans	Sound	Animals including Humans	Solids, Liquids, Gases	Electricity	
Year 5	Changing States / Gases Around Us	Forces		Life Cycles	Earth, Sun, Moon	Living Things
Year 6	Animals including Humans	Evolution and Inheritance	Electricity	Habitats	Light	

Animals including Humans

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge		• Identify and name a variety of common animals including fish, amphibians, reptiles, birds, and mammals. • Identify and name a variety of common animals that are carnivores, herbivores, and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds, and mammals, including pets) • Identify, name, draw and label the basic parts of the human body and say which part of the body links with each sense.	• Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food, and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • Construct and interpret a variety of food chains, identifying producers, predators, and prey.	• Identify those animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food. • Know they get nutrition from what they eat. • Identify that humans and some other animals have skeletons and muscles for support, protection, and movement.	• Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct and interpret a variety of food chains, identifying producers, predators, and prey.	• Describe the changes as humans develop to old age.	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs, and lifestyle on the way their bodies function. • Describe the ways in which nutrients and water are transported within animals, including humans.
Disciplinary Knowledge		• Use observations to compare and contrast animals at first hand or through videos and photographs. • Describe how they identify and group animals. • Group animals according to what they eat. • Use their senses to compare different textures, sounds and smells. • Observe, through video or first-hand observation and measurement, how different animals, including humans, grow. • Ask questions about what things animals need for survival and what humans need to stay healthy. • Suggest ways to find answers to their questions.	• Use observations to compare and contrast animals at first hand or through videos and photographs. • Describe how they identify and group animals. • Group animals according to what they eat. • Use their senses to compare different textures, sounds and smells. • Observe, through video or first-hand observation and measurement, how different animals, including humans, grow. • Ask questions about what things animals need for survival and what humans need to stay healthy. Suggest ways to find answers to their questions.	• Identify and group animals with and without skeletons and observe and compare their movement. • Explore ideas about what would happen if humans did not have skeletons. • Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. • Research different food groups and how they keep us healthy and design meals based on what they find out. • Compare the teeth of carnivores and herbivores and suggest reasons for differences. • Find out what damages teeth and how to look after them. • Draw and discuss their ideas about the digestive system and compare them with models or images.	• Identify and group animals with and without skeletons and observe and compare their movement. • Explore ideas about what would happen if humans did not have skeletons. • Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. • Research different food groups and how they keep us healthy and design meals based on what they find out. • Compare the teeth of carnivores and herbivores and suggest reasons for differences. • Find out what damages teeth and how to look after them. draw and discuss their ideas about the digestive system and compare them with models or images.	• Research the gestation periods of other animals and compare them with humans. • Find out and record the length and mass of a baby as it grows. • Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle, and health.	• Research the gestation periods of other animals and compare them with humans. • Find out and record the length and mass of a baby as it grows. explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle, and health.
Vocabulary		Reptiles, Mammals, Amphibians (+ examples of each), Herbivore, Omnivore, Carnivore, Survival, Offspring, Calf, Exercise, Hygiene	Reptiles, Mammals, Amphibians (+ examples of each), Herbivore, Omnivore, Carnivore, Survival, Offspring, Calf, Exercise, Hygiene	Muscles, Contract, Relax, Joints, Nutrition, Nutrients, Carbohydrates, Protein, Fats, Fibre, Vitamins, Minerals, Invertebrates, Vertebrates, Digestive System, Small Intestine, Large Intestine, Colon, Saliva, Canine, Incisor, Molar, Procedures	Muscles, Contract, Relax, Joints, Nutrition, Nutrients, Carbohydrates, Protein, Fats, Fibre, Vitamins, Minerals, Invertebrates, Vertebrates, Digestive System, Small Intestine, Large Intestine, Colon, Saliva, Canine, Incisor, Molar, Procedures	Foetus, Embryo, Womb, Gestation, Development, Puberty, Life Cycle, Fertilisation, Reproduce, Life Expectancy, Skeletal, Muscle, Digest, Circulatory System, Blood Vessels, Lifestyle, Nutrients, Substances	Foetus, Embryo, Womb, Gestation, Development, Puberty, Life Cycle, Fertilisation, Reproduce, Life Expectancy, Skeletal, Muscle, Digest, Circulatory System, Blood Vessels, Lifestyle, Nutrients, Substances

Plants

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge		• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees.	• Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • Know 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. • Observe and know the way in which water is transported within plants. • Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
Disciplinary Knowledge		• Observe closely, perhaps using magnifying glasses, and compare and contrast familiar plants. • Describe how they were able to identify and group them and draw diagrams showing the parts of different plants including trees. • Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants. • Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb or observing similar plants at different stages of growth. • Set up a comparative test to show that plants need light and water to stay healthy.	• Observe closely, perhaps using magnifying glasses, and compare and contrast familiar plants. • Describe how they were able to identify and group them and draw diagrams showing the parts of different plants including trees. • Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants. • Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb or observing similar plants at different stages of growth. set up a comparative test to show that plants need light and water to stay healthy.	• Compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser. • Discover how seeds are formed by observing the different stages of plant life cycles over a period of time. • Look for patterns in the structure of fruits that relate to how the seeds are dispersed. • Observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.			
Vocabulary		Bulb, Stem, Temperature, Growth, Deciduous, Evergreen, Blossom, Petals, Roots	Bulb, Stem, Temperature, Growth, Deciduous, Evergreen, Blossom, Petals, Roots	Nutrients, Reproduction, Transportation, Transpiration, Dispersal, Pollination			

Living Things and their Habitats

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge			• The difference between living, dead and that which was never alive. • What a habitat is, how these can be the same or different, and how some animals and plants suit one habitat better than another. • The names of key plants and animals from a variety of habitats. • The adaptations these plants and animals have to survive these habitats. • Know how these animals and plant depend on each other for survival. • What a food chain is and why they are important. • Understand interdependency and food chains, explained thorough diagrams, written, and spoken presentations. • Understand what a food source is.		• Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things.	• Describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird. • Describe the life process of reproduction in some plants and animals.	• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants, and animals. • Give reasons for classifying plants and animals based on specific characteristics.
Disciplinary Knowledge			• Sort and classify things according to whether they are living, dead or were never alive, and recording their findings using charts. • Describe how they decided where to place things, exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. • Construct a simple food chain that includes humans (e.g., grass, cow, human). • Describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.		• Use and make simple guides or keys to explore and identify local plants and animals. • Make a guide to local living things. • Raise and answer questions based on their observations of animals and what they have found out about other animals that they have researched.	• Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), • Ask pertinent questions and suggest reasons for similarities and differences. -grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulb. • Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. • Use classification systems and keys to identify some animals and plants in the immediate environment. • Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.	• Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), • Ask pertinent questions and suggest reasons for similarities and differences. -grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulb. • Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. • Use classification systems and keys to identify some animals and plants in the immediate environment. Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.
Vocabulary			Living, Habitat, Energy, Food Chain, Predator, Prey, Woodland, Desert, Source, Adapt		Vertebrates, Invertebrates, Environment, Human Impact	Life Cycle, Mammal, Reproduction, Amphibian, Offspring, Classify, Classification Domain, Kingdom Phylum, Class, Family Genus, Species, Characteristics, Micro-Organisms, Organism, Flowering, Non-Flowering	Life Cycle, Mammal, Reproduction, Amphibian, Offspring, Classify, Classification Domain, Kingdom Phylum, Class, Family Genus, Species, Characteristics, Micro-Organisms, Organism, Flowering, Non-Flowering

Evolution and Inheritance

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge							**Link to Year 3 (rocks and soils)** • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Disciplinary Knowledge							• Observe and raising questions about local animals and how they are adapted to their environment. • Compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins, and camels. • Analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.
Vocabulary							Evolution, Adaption, Inherited Traits, Adaptive Traits, Natural Selection, Inheritance, Charles Darwin, Alfred Wallace, DNA, Variation, Offspring, Fossil

Materials

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive 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. • Compare and group together a variety of everyday materials on the basis of their simple physical properties.	• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching.	Link to Year 6 (evolution) • 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. • Recognise that soils are made from rocks and organic matter.	• Compare and group materials together, according to whether they are solids, liquids, or gases. • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• 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. • Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood, and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Disciplinary Knowledge		• Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?' • Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes, and songs) • Observe closely, identifying and classifying the uses of different materials, and recording their observations.	• Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?' • Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes, and songs) Observe closely, identifying and classifying the uses of different materials, and recording their observations.	• Observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time. • Use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. • Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. • Explore different soils, identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. • Raise and answer questions about the way soils are formed. compare and group materials together, according to whether they are solids, liquids, or gases. • Grouping and classifying a variety of different materials. • Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). • Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line and investigate the effect of temperature on washing drying or snowmen melting.	• Observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time. • Use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. • Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. • Explore different soils, identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. • Raise and answer questions about the way soils are formed. compare and group materials together, according to whether they are solids, liquids, or gases. • Grouping and classifying a variety of different materials. • Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). • Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line and investigate the effect of temperature on washing drying or snowmen melting.	• Carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' • Compare materials in order to make a switch in a circuit. • Observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. • Research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such	
Vocabulary		Rough, Smooth, Stretchy, Stiff, Bending, Twisting, Stretching, Elastic, Foil, Dull, Waterproof, Absorbent, Fabrics	Rough, Smooth, Stretchy, Stiff, Bending, Twisting, Stretching, Elastic, Foil, Dull, Waterproof, Absorbent, Fabrics	Fossils, Sandstone, Granite, Marble, Rock, Pumice, Crystals, Absorbent, Sedimentary, Organic Matter, Grains, Solid, Liquid, Gas, Evaporation, Condensation, Particles, Freezing, Solidify, Changing State, Degrees Celsius, Water Cycle, Water Vapour	Fossils, Sandstone, Granite, Marble, Rock, Pumice, Crystals, Absorbent, Sedimentary, Organic Matter, Grains, Solid, Liquid, Gas, Evaporation, Condensation, Particles, Freezing, Solidify, Changing State, Degrees Celsius, Water Cycle, Water Vapour	Properties, Solubility, Transparency, Electrical-Conductor, Thermal Conductor, Magnets, Dissolve, Solution, Sperate, Separating, Reversible Changes, Dissolving, Evaporation, Filtering, Sieving, Melting, Irreversible, New Material, Quantitative, Measurements, Conductivity, Insulation, Chemical	

Forces (Physics)

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge				• Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract. some materials and not others • Compare and group together a variety of everyday materials. 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.		• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • Recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect.	
Disciplinary Knowledge				• Compare how different things move and group them. • Raise questions and carry out tests to find out how far things move on different surfaces and gathering and recording. data to find answers their questions. • Explore the strengths of different magnets and find a fair way to compare them. • Sort materials into those that are magnetic and those that are not. • Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another. • Identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.		• Explore falling paper cones or cup-cake cases, and design and make a variety of parachutes and carry out fair tests to determine which designs are the most effective. • Explore resistance in water by making and testing boats of different shapes. • Design and make products that use levers, pulleys, gears and/or springs and explore their effects.	
Vocabulary				Magnetic, Force, Attract, Repel, Friction, Poles, Magnetic Poles		Gravity, Air Resistance, Water Resistance, Friction, Surface Force, Effect, Accelerate, Decelerate, Mechanism, Pulley, Gear, Spring, Theory of Gravitation, Galileo Galilei, Isaac Newton	

Light (Physics)

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge		• Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.		• 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 light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change.			• Recognise that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Disciplinary Knowledge		• Make tables and charts about the weather; and make displays of what happens in the world around them, including day length, as the seasons change.		• Looking for patterns in what happens to shadows when the light source moves or the distance between the light sources and the object changes.			• Decide where to place rear-view mirrors on cars. • Design and making a periscope and use the idea that light appears to travel in straight lines to explain how it works. • Investigate the relationship between light sources, objects, and shadows by using shadow puppets. • Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).
Vocabulary		Seasons, Weather, Spring, Summer, Autumn, Winter		Reflective, Reflection, Natural, Artificial			Refraction, Reflection, Spectrum, Rainbow, Travels, Straight, Reflect, Light Source, Object, Shadows, Mirrors, Periscope, Filters

Electricity (Physics)

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge					• Identify 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 • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • 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.		• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram.
Disciplinary Knowledge					• Observing patterns, for example, that bulbs get brighter if more cells are added that metals tend to be conductors of electricity, and that some materials can, and some cannot be used to connect across a gap in a circuit.		• Systematically identify the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.
Vocabulary					Cells, Switches, Buzzers, Motor, Circuit, Series, Conductors, Insulators, Complete Circuit		Amps, Volts, Voltage, Cell, Circuit Diagram, Symbols

Sounds (Physics)

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge					• Identify how sounds are made, associating some of them with something vibrating. • 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. • Find patterns between the volume of a sound and the strength of the vibrations that produced it. • Recognise that sounds get fainter as the distance from the sound source increases.		
Disciplinary Knowledge					• Finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. • Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. • Make and play their own instruments by using what they have found out about pitch and volume.		
Vocabulary					Vibration, Wave, Pitch, Tone, Percussion, Wood Wind, Brass, Insulate		

Earth and Space (Physics)

Knowledge Progression							
Year	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge						• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately. spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
Disciplinary Knowledge						• Compare the time of day at different places on the Earth through internet Links and direct communication, creating simple models of the solar system. • Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. • Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	
Vocabulary						Earth, Sun, Moon, Orbit, Axis, Rotation, Spherical, Day, Night, Hemisphere, Season, Tilt, Phases of the Moon, Star, Constellation, Solar System, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto	

Scientific Enquiry

The 5 main types of Scientific Enquiry include Comparative/Fair Testing, Research, Observation Over Time, Pattern-Seeking, and Identifying, Grouping and Classifying. Once children have had experience with these enquiry types, and a competent in their knowledge of them, they may encounter Problem Solving, which allows children to use their knowledge of scientific enquiry to choose the most appropriate action.

Over the course of each academic year, pupils will carry out several investigations which involve different types of enquiries.

Scientific Enquiry

Comparative / Fair Testing	Research	Observation Over Time
Some questions can be answered by looking for casual relationships between two variables i.e., when one variable is changes and its effect on something else is observed and measured.	Some questions cannot be answered by the pupils using first-hand experiences, for ethical or practical reasons, and therefore need to be answered using secondary sources.	Some questions can be answered by observing how living things, materials and physical processes change over time. These observations many take place over different time spans from minutes or hours, to several weeks or months.
Pattern-Seeking	**Identifying, Grouping and Classifying**	**Problem-Solving**
Some questions can be answered by looking for links between variables where there is no casual relationship. This can involve looking for patterns when making observations/measurements or within data from secondary sources.	Some questions can be answered by naming things and/or sorting them into groups. To do this, it may be necessary to carry out a simple test or use secondary sources.	To help children develop independence in scientific enquiry, pupils should be encouraged to use their own initiative in problem solving.

Working Scientifically Skills

This part of the curriculum is the area in which children will develop their disciplinary knowledge. Children will have opportunities to carry out practical investigations in science that help them to develop their scientific skills. The ways in which these skills are used will progress throughout year groups and become more independent. The use of each of these skills will be taught to children explicitly where necessary, before being used as part of a scientific investigation so that children can develop their understanding behind the use of each skill and how to use them appropriately.

Working Scientifically

Asking Questions

Asking scientific questions is a skill needed at the beginning and at the end of the scientific process where children should be encouraged to raise further questions and the process begins again. Good questioning is a key skill in working scientifically, without a good question there is no investigation. A good scientific question needs to be testable either by experimenting, measuring, or observing.

Making Predictions

Making a prediction involves children being able to draw simple conclusions of what they think will happen, make predictions for the results of further testing, and suggest improvements and changes that could be made to affect the results of a test.

Setting Up Tests

Having the knowledge of how to set up and structure tests appropriately is a key skill, in order to be able to answer scientific questions. Children should be able to identify the method and equipment needed in order to carry out an enquiry. To set up a test, children need to demonstrate that they can handle equipment with appropriate care and be able to use data collected from tests to influence their thinking and questioning.

Observing and Measuring

Children need to be able to observes using a range of equipment and make careful observations about what they see. This can include similarities and differences, and what has changes as a result of a different variable. Children need to have opportunities to practise taking measurements using a range of equipment and to repeat recording of measurements.

Recording Data

Children need to be able to resent data in a clear and organised way in order to help them identify patterns and answer questions. Children need to be able to gather data in order to record it and be able to use a variety of ways to show results, including drawings, labelled diagrams, key bar charts and tables.

Interpreting and Communicating Results

Children need to be able to identify and classify the appropriate scientific language needed to communicate their finding effectively. They will need to be able to report their finding using oral and written explanations, communicating their results and the conclusions draw from these results.

Evaluate

Pupils may evaluate their practical investigations orally or in written forms, including though informal discussion, class discussion or a written paragraph. Children need to be able to reflection the techniques and equipment they used within the investigation, any improvements that could be made if it were to be repeated, the quality of the data recorded and the accuracy of their results.

The 6Cs and Science

At Our Lady and St Hubert's, our lessons are underpinned by our 6Cs- '21st Century skills for effective learning'. These skills will support our children in being prepared for whatever they encounter when they leave education and enter society and the workforce.

The 6Cs and Science

How our 6Cs will be evident through our computing curriculum

Character	Citizenship	Communication
Children will develop perseverance and resilience, solving real-world problems and debugging their solutions.	Children will learn to use technology safely and responsibly. They will use technology to learn about issues affecting their community and the wider world. They will design technological solutions to real-world problems.	Children will use IT to present and communicate their learning. They will use internet technologies to communicate, adapting their modes of communication appropriately.
Collaboration	**Creativity**	**Critical thinking**
Children will work collaboratively to solve problems and design digital artefacts. They will make use of communications technologies to collaborate more effectively.	Children will be given lots of opportunities to identify problems, and then have chances to design and make programs and digital artefacts that solve them, incorporating their knowledge of algorithms and programming.	Children will use the processes of Computational thinking to logically analyse and solve real-world problems. They will learn to evaluate the reliability of information they find online and analyse it critically.