St Cuthbert's
ROMAN CATHOLIC ACADEMY TRUST

St Peter's VC Academy

Science Curriculum

ST PETER'S
VC ACADEMY

Intent

Learning is a sacred endeavour.

The curriculum in a catholic school seeks to plummet the mysteries of the mind of God.

Science enables us to plummet the mysteries of the mind of the creator of the universe and inform our world view through a deeper understanding of the interconnectedness of all levels of creation. Scientific exploration and discovery helps students to recognise their potential and responsibility through the development of humility and the dependence on their ability to discern how to make the right choices. Science encourages students to respond to the big questions of the purpose and meaning of life as it works in collaboration with other disciplines within the curriculum.

Science plays a central role within the curriculum at St Peter's and is fundamental to our mission of creating aspirational and knowledge-rich pupils. Pupils are encouraged to be curious, ask questions about what they observe and will be helped to understand scientific ideas and phenomena by using different types of enquiries to answer their own questions. Our Science curriculum is ambitious and sequenced coherently so the interplay between substantive knowledge and disciplinary skills builds through the three discrete distinct disciplines of biology, chemistry and physics. As a result of the accumulation of essential knowledge and skills, pupils' science capital and scientific understanding will be substantial and provide a secure foundation that will enable them to succeed in the next stage of their education.

Our Science curriculum aims to ensure that all Pupils develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. It also allows them to understand the nature process and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them. In addition, our pupils are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future.

Our curriculum plan has been designed and built with clear schemes of work for each year group and each subject. The plan allows for spiral learning avoiding unnecessary repetition but recapping what has gone before and moving learning on. Rosenshine's Principles underpin the teaching and learning practices within planning, lesson design and delivery. Sequences of learning are also carefully planned for so that there is a natural flow between units of learning.

At the end of Foundation at St Peter's:	At the end of KS1 at St Peter's:	At the end of KS2 at St Peter's:
Pupils are taught - ●Pupils will gain a secure understanding of what science is, and to be introduced to the world around them through science. ●Pupils will develop scientific vocabulary and language. Furthermore, they will begin to explore investigations to ensure a strong foundation of science vocabulary and language.	Pupils are taught - ●Pupils will develop their understanding of scientific ideas by using different types of scientific enquiry to ask their own questions, observe changes over time, notice patterns, grouping and classifying and carrying out simple comparative tests. They will continue to build on their scientific language and communicate their ideas to a range of audiences in a variety of ways	Pupils are taught - ●Pupils will be able to develop a deeper understanding of a wide range of scientific ideas. They will do this through exploring and talking about their ideas, asking their own questions about scientific phenomena and analysing functions, relations and interactions more systematically. They will have encountered more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.

Implementation

- Science units are separated into **Biology, Chemistry, Physics** and **Earth Science** for each year, according to the National Curriculum.
- Subject specific vocabulary is selected and taught within lesson sequences.
- The Long-Term Plan ensures that pre-requisite knowledge and skills are considered and linked to new learning.
- Opportunities to revisit and retrieve prior learning are woven into sequencing and teaching and learning practice.
- Units of work are carefully sequenced, so prior knowledge and concepts are returned to and built upon from previous year groups and units. Knowledge Organisers are used to pre-load learners before lessons to support vocabulary and key concepts.

Within our Science curriculum there are three main elements:

Knowledge and conceptual understanding. This is sequenced and imparted via direct instruction, retrieval practice and explicit vocabulary teaching. It is vital that pupils gain a secure understanding of each block of learning to support progression, and a depth of understanding, as they progress through their learning.

Nature, process and methods of science **(working scientifically)** is not taught as a separate strand but instead, woven through every lesson. This enables pupils to develop their skills as a scientist through applying their knowledge and understanding to deepen their own scientific understanding.

Critical thinking around big questions that are current and relevant to pupils in today's society. Pupils explore the understanding that applications of science often have ethical, social, economic and political implications and are provided with opportunities to reflect and debate these issues.

Impact

Assessment:
We use a multi-faceted approach to assessment within Science.

- Quizzes are built within every unit to ascertain the knowledge the children have gained.
- Retrieval practice to take place at the beginning of every lesson linked to prior learning.
- Assessment for learning is used within each lesson through skilful use of questioning and in the moment feedback.
- Pupil voice is used to support the evidence that pupils know and remember more over time.
- Science experiments facilitate pupils to independently apply and explore the interplay between the appropriate substantive knowledge and disciplinary concepts. These begin in EYFS with teacher structured experiences and continue throughout every year group.

Culture Capital:

Enrichment is an essential part of the St Peter's Science curriculum which provides pupils with extended time to focus and deepen their learning.

- Celebrating STEM week
- STEM Ambassador workshops
- Beach schools
- Children's University
- RAF Road to Aviation Workshops/ The Future of Aerospace (RIAT)

- I'm a Scientists live chat with scientists
- Visits to Danby Moors centre
- Scarborough engineering Week

Career Professional Development:
To engage and empower staff and develop their confidence within science, we are actively seeking out new experiences and opportunities to develop our subject knowledge. This is ongoing and has been done in a variety of ways, such as:

- Through observing STEM professionals and building relationships with them
- Emailing out STEM training opportunities and providing these when possible
- Encouraging ECTs to observe more experienced teachers
- Encouraging teachers to have an awareness of where their classes learning is going (the next year group)

Study Overview

	Autumn		Spring		Summer	
	1	2	1	2	1	2
Foundation	Biology This is Me	Biology, Earth Science & Physics Autumn (Harvest)	Chemistry, Biology & Earth Science Winter	Biology & Earth Science Spring (New life)	Biology Farm Life	Biology Green Fingers
Y1	Chemistry Materials	Chemistry Materials	Biology Animals Including Humans	Biology Animals Including Humans	Biology Plants	Biology Plants
	Earth Science – seasonal changes is taught throughout the year.					
Y2	Chemistry Use of everyday materials	Chemistry Use of everyday materials	Biology Living Things and Their Habitats	Biology Plants	Biology Animals Including Humans	Biology Animals Including Humans
Y3	Physics Light	Physics Light	Chemistry Rocks, fossils and soils	Physics Forces and Magnets	Biology Plants	Biology Animals Including Humans
Y4	Biology Animals, Including Humans	Physics Electricity	Physics Sound	Chemistry States of Matter	Biology Living Things and Their habitats	Biology Living Things and Their habitats
Y5	Physics Earth and Space	Physics Forces	Chemistry Properties and changes of materials	Chemistry Properties and changes of materials	Biology Animals Including Humans	Biology Living Things and Their Habitats
Y6	Physics Light	Physics Electricity	Biology Evolution and Inheritance	Biology Living Things and Their Habitats	Biology Animals Including Humans	Biology Animals Including Humans

Progression

Working Scientifically						
EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Understanding the World Explore the natural world around them. Describe what they see, hear and feel whilst outside ELG: The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants;	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.		Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries, comparative and fair tests Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identifying differences, similarities or changes related to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings.		Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Identifying scientific evidence that has been used to support or refute ideas or arguments.	

Biology

EYFS

PSED - Manage their own needs. (Personal hygiene) Know and talk about the different factors that support their overall health and wellbeing:
ELG: Managing Self - Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
Understanding the World - Explore the natural world around them. Describe what they see, hear and feel whilst outside
ELG: The Natural World 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;

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers; • 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.			
Vocabulary Progression	• Names of common plants: **wild plant, garden plant, evergreen** tree, **deciduous** tree, common flowering plant, **weed,** grass. • Name some features of plants: e.g. **flower**, vegetable, **fruit**, berry, **leaf/leaves**, blossom, **petal**, **stem**, trunk, branch, **root**, **seed, bulb,** soil. • Name some common types of plant e.g. sunflower, daffodil.	• Growth of plants: **germination**, **shoot, seed dispersal,** grow, food store, life cycle, die, wilt, seedling, sapling. • Needs of plants: **sunlight, nutrition,** light, healthy, space, air. • Name different types of plant: e.g. bean plant, cactus. • Names of different habitats: e.g. rainforest, desert. Previously introduced vocabulary: **water**, **temperature**, warm, hot, cold, habitat.	• Water transportation: transport, **evaporation, evaporate, nutrients,** absorb, anchor. • Life cycle of flowering plants: **pollination** (insect/wind), pollen, nectar, pollinator, seed formation, **seed dispersal** (animal/wind/water), reproduce, **fertilisation,** fertilise, **stamen,** anther, filament, **carpel (pistil),** stigma, style, ovary, ovule, **sepal**, carbon dioxide. Previously introduced vocabulary: life cycle.			

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals Including Humans	**Pupils should be taught to:** • 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 is associated with each sense.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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; • identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • describe the changes as humans develop to old age.	**Pupils should be taught to:** • 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.
Vocabulary Progression	• Names of animal groups: **fish, amphibians, reptiles, birds, mammals.** • Animal diets: **carnivore, herbivore, omnivore.** • Human and animal body parts: e.g. body, head, neck, arms, elbows, legs, knees, face, ears, eyes, nose, hair, mouth, teeth, hands, feet, tail, wings, feathers, fur, beak, fins, gills. • Human senses: **sight, hearing, touch, smell, taste.** • Exploring senses: loud, quiet, soft, rough. • Other: human, animal, pet.	• Being born and growing: **Young, offspring, live young**, grow, **develop**, change, hatch, lay, fly, crawl, talk. • Young and adult names: e.g. lamb and sheep, kitten and cat, duckling and duck. • **Life cycle** stages: e.g. baby, toddler, child, teenager, **adult;** frogspawn, tadpole, froglet, frog. • Survival and staying healthy: basic needs, survive, food, air, **exercise, diet, nutrition**, healthy, balanced diet, **hygiene, germs.** • Food groups: fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar. Previously introduced vocabulary: **water**.	• Food groups and **nutrients**: fibre, fats **(saturated and unsaturated**), vitamins, minerals. • Skeletons and muscles: skeleton, **muscles, tendons, joints,** protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, **vertebrate, invertebrate,** endoskeleton, exoskeleton, hydrostatic skeleton. • Names of human bones: e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula. • Other: **energy**. Previously introduced vocabulary: movement.	• Digestive system: **digest**, digestion, tongue, teeth, saliva, salivary glands, **oesophagus, stomach,** liver, pancreas, gall bladder, **small intestine,** duodenum, **large intestine, rectum,** anus, faeces, organ. • Types of teeth and dental care: **molar**, **premolar**, **incisor**, **canine**, wisdom teeth, tooth decay, plaque, enamel, baby (milk) teeth. • Food chains and animal diets: decomposer, food web. Previously introduced vocabulary: **producer,** consumer**, prey, predator,** excretion**,** habitat.	• Process of reproduction: **gestation, asexual reproduction, sexual reproduction,** sperm, egg, cells, clone. • Changes and **life cycle:** embryo, foetus, uterus, **prenatal, adolescence, puberty, menstruation, adulthood,** menopause**, life expectancy,** old age, hormones, sweat. • Changing body parts: e.g. breasts, penis, larynx, ovaries, genitalia, pubic hair. Previously introduced vocabulary: reproduction, **reproduce,** types of animals and animal groups, **fertilisation.**	• **Circulatory system**: circulation, **heart**, pulse, heartbeat, heart rate, lungs, breathing, **blood vessels**, blood, pump, transported, **oxygenated blood, deoxygenated blood,** oxygen, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells. • Lifestyle: **drug, alcohol,** smoking, disease, calorie, energy input, energy output. • Other: water transportation, nutrient transportation, waste products. Previously introduced vocabulary: carbon dioxide.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living Things and Their Habitats		**Pupils should be taught to:** • 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; • 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.		**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • 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.	**Pupils should be taught to:** • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals; • give reasons for classifying plants and animals based on specific characteristics.
Vocabulary Progression		• Living or dead: **living, dead, never living,** not living, alive, never been alive, healthy. • **Habitats** including **microhabitats**: **depend,** shelter, safety, **survive,** suited, space, minibeast, air. • **Life processes:** movement, sensitivity, growth, reproduction, nutrition, excretion, respiration. • **Food chains: food sources,** food, producer, consumer, predator, prey. • Names of habitats and microhabitats: e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat. Previously introduced vocabulary: senses, **carnivore**, **herbivore**, **omnivore**, **seed**, **water**, names of materials.		• Living things: **organisms, specimen,** species. • Grouping living things: **classification,** classification keys, classify, **characteristics**. • Names of invertebrate animals: snails and slugs, worms, spiders, insects. • Invertebrate body parts: e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs. • Environmental changes: **environment,** environmental dangers, adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, **endangered species, extinct.** Previously introduced vocabulary: carbon dioxide, **fish, bird, mammal, amphibian, reptile**, skeleton, bone, **vertebrate, invertebrate,** backbone, names for animal body parts, names of common plants, photosynthesis.	• **Reproduction**: **asexual reproduction, sexual reproduction, gestation, metamorphosis,** gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation. Previously introduced vocabulary: **life cycle, pollination,** offspring, **fertilise,** fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma, style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young.	• Classifying: Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation. • **Microorganisms**: **bacteria,** single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, **microscope**, decompose.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Evolution and Inheritance						**Pupils should be taught to:** • 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.
Vocabulary Progression						• **Evolution** and **inheritance:** evolve, **adaptation,** inherit, **natural selection, adaptive traits, inherited traits,** mutations, theory of evolution, ancestors, biological parent, chromosomes, genes, Charles Darwin. • Other: selective breeding, artificial selection, breed, cross breeding, genetically modified food, cloning, DNA. Previously introduced vocabulary: classification, **offspring, characteristics, habitat, environment,** adapt, **variations**, human, **fossil,** suited, cells, names of different habitats, names of animals and their body parts, species, **sedimentary rock**, lava, **igneous rock**, **metamorphic rock**, **magma**, heat. **fossilisation**.

Earth Science

EYFS

Understanding the World - Understand the effect of changing seasons on the natural world around them

ELG: The Natural World - 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.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal Changes	**Pupils should be taught to:** • observe changes across the 4 seasons; • observe and describe weather associated with the seasons and how day length varies.					
Vocabulary Progression	• **Seasons**: **spring, summer, autumn, winter**, seasonal change. • **Weather**: e.g. sun, rain, snow, sleet, frost, ice, fog, cloud, hot/warm, cold, storm, wind, thunder, weather forecast. • Measuring weather: temperature, rainfall, wind direction, thermometer, rain gauge. • Day length: night, day, **daylight.**					

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth and Space					**Pupils should be taught to:** • 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.	
Vocabulary Progression					• Solar system: **star, planet.** • Names of planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. • Shape: **spherical bodies, sphere.** • Movement: **rotate, axis, orbit, satellite.** • Theories: **geocentric model, heliocentric model, astronomer.** • Day length: sunrise, sunset, midday, time zone. Previously introduced vocabulary: **Sun, moon, shadow**, day, night, heat, **light**, **reflect**.	

Physics

EYFS

Understanding the World - Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them.
ELG: The Natural World - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Light			**Pupils should be taught to:** • 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.			**Pupils should be taught to:** • 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.
Vocabulary Progression			• **Light** and seeing: **dark,** absence of light, **light source,** illuminate, visible, **shadow, translucent,** energy, block. • **Light sources:** e.g. candle, torch, fire, lantern, lightning. • **Reflective light: reflect, reflection,** surface, **ray,** scatter, reverse, beam, angle, mirror, moon. • Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct. Previously introduced vocabulary: **opaque, transparent,** sunlight, sun.			• Reflection: periscope. • Seeing light: **visible spectrum, prism.** • How light travels: light waves, wavelength, straight line, **refraction.** Previously introduced vocabulary: names and properties of materials, absorb.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces			Forces and Magnets **Pupils should be taught to:** • compare how things move on different surfaces; • notice that some forces need contact between 2 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 2 poles; • predict whether 2 magnets will attract or repel each other, depending on which poles are facing.		Forces **Pupils should be taught to:** • 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.	
Vocabulary Progression			• How things move: move, movement, **surface**, distance, strength. • Types of **forces**: push, pull, contact force, non-contact force, **friction**. • **Magnets: magnetic, magnetic field,** magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic **poles** (north pole, south pole), **attract, repel,** compass. • Magnetic and non-magnetic materials: e.g. iron, nickel, cobalt. Previously introduced vocabulary: metal, names of materials.		• Types of forces: **air resistance, water resistance, buoyancy, upthrust,** Earth's **gravitational pull, gravity**, opposing forces, driving force. • **Mechanisms:** levers, pulleys, gears/cogs. • Measurements: **weight, mass,** kilograms (kg), Newtons (N), scales, speed, fast, slow. • Other: **streamlined**, Earth. Previously introduced vocabulary: air, heat, moon.	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound				**Pupils should be taught to:** • 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.		
Vocabulary Progression				• Parts of the **ear**: **eardrum.** • Making sound: **vibration,** vocal cords, **particles.** • Measuring sound: **pitch, volume, amplitude, sound wave,** quiet, loud, high, low, travel**, distance.** • Other: **soundproof, absorb sound.**		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity				**Pupils should be taught to:** • 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.		**Pupils should be taught to:** • 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.
Vocabulary Progression				• **Electricity:** mains-powered, battery-powered, **mains electricity,** plug, **appliances**, devices. • Circuits: **circuit,** simple series circuit, complete circuit, incomplete circuit. • Circuit parts: bulb, cell, wire, buzzer, switch, motor, **battery.** • Materials: **electrical conductor, electrical insulator.** • Other: safety. Previously introduced vocabulary: names of materials.		• Flow and measure of electricity: **voltage, amps, resistance, electrons**, volts (V), **current.** • Circuits**: symbol,** circuit diagram, component, function, filament. • Variations: dimmer, brighter, louder, quieter. • Types of electricity: natural electricity, human-made electricity, solar panels, power station. • Other: positive, negative.

Chemistry

EYFS

Understanding the World - Describe what they see, hear and feel whilst outside.

ELG: The Natural World • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Materials	Everyday Materials **Pupils should be taught to:** • 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.	Use of Everyday Materials **Pupils should be taught to:** • 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.	Rocks **Pupils should be taught to:** • 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.	States of Matter **Pupils should be taught to:** • 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.	Properties and Changes of Materials **Pupils should be taught to:** • 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.	
Vocabulary Progression	• Names of **materials**: wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric. • Properties of materials: **hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent,** sharp, stiff. • Other: **object.**	• Changing shape: squash, bend, twist, stretch. • **Properties** of **materials:** e.g. strong, flexible, light, hard-wearing, elastic. • Other: **suitability**, recycle, pollution.	• Types of rock: **sedimentary rock, igneous rock, metamorphic rock.** • **Properties of rocks: permeable,** semi-permeable, **impermeable,** durable. • Names of rocks: e.g. marble, chalk, granite, sandstone, slate. • Formation of rocks and fossils: natural, human-made, **magma, lava,** molten rock, **sediment, erosion, fossilisation,** layers, bone, fossil. • Soil: sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost. • Other: **palaeontology.** Previously introduced vocabulary: soil, **water**, air.	• **States of matter: solids, liquids, gases,** particles. • State change: **evaporate, condense, melt, freeze,** heat, cool, melting point, freezing point, boiling point, **water vapour**. • Water cycle: **precipitation,** evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail. • Other: atmosphere. Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide.	• Properties of **materials**: thermal **conductor/insulator,** magnetism, electrical resistance, **transparency**. • Mixtures and solutions: dissolving, substance, soluble, insoluble. • Changes of materials: reversible change, physical change, irreversible change, chemical change, burning, new material, product. • Separating: sieving, filtering, magnetic attraction. Previously introduced vocabulary: electrical **conductor/insulator,** bulb, **translucent**.	

Lesson Sequence

Year 1

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Materials</u> L1 – I can identify and name different materials. L2- I can tell the difference between an object and the materials it is made from. L3- I can describe the properties of everyday materials. L4- I can identify which materials have certain properties. L5- I can watch closely. I can test different materials. I can use what I have learnt to make a decision. – waterproof test **L6 – Seasonal changes - Autumn**	<u>Materials</u> L7- I can watch closely. I can test different materials. I can use what I have learnt to make a decision. – floating test L8 - I can sort objects by their properties. L9- I can watch closely. I can test different materials. I can use what I have learnt to make a decision – bridge test L10 – Quiz **L11 – Seasonal changes - Winter**	<u>Animals Including Humans</u> L1 - I can draw my body and label my body parts. L2 - I know which parts of my body I use to see, hear, taste, smell and feel. L3 – I can use my senses to do tests. - smell L4 – I can use my senses to do tests. - touch L5 - I can use my senses to do tests. - hear	<u>Animals Including Humans</u> L6 - I can identify common animals. I can identify common animals. L7 - I can describe common animals. I can compare common animals. L8 - I can name some animals that are carnivores, herbivores and omnivores. I can name some animals that are carnivores, herbivores and omnivores. L9 – End of unit quiz **L10 – Seasonal changes – Spring**	<u>Plants</u> L1 –To describe and compare plants, seeds and bulbs. L2- To name and compare the parts of plants. L3- To identify and name some common garden and wild plants **L4 – Seasonal changes - Summer**	<u>Plants</u> L5- To identify and name some common trees. L6- To name, sort and compare some common fruit and vegetable plants. L7- To name and compare some common plants and trees. L8 – End of unit quiz

CP - Throughout the year the pupils make observations of the school grounds and how they change during different seasons. They record different weather on calendar each day and talk about what types of weather occur in the different seasons.

Year 2					
Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
<u>Materials</u> L1 - Can I show that objects are made from variety of different materials? L2 - Can I describe properties of materials? L3 – Can I identify the use of everyday materials? L4 – Can I identify and group the uses of everyday materials? L5 - Can I explain how being waterproof is useful? L6 - Can I explain how the properties of flexibility and rigidity are useful giving examples?	<u>Materials</u> L1 – Can I recognise that applying forces to objects can change their shape, by squeezing, stretching, bending, and twisting? L2 – Can I explain the process of recycling? L3 – Which materials would make the best raincoat? L4 - Quiz	<u>Living Things & Their Habitats</u> L1 – Can I compare the differences between things that are living, dead and have never been alive? L2 - Can I map a habitat and identify what is in it? L3 - Can I identify animals in their habitats? L4 – Can I describe a habitat and identify animals live in it? L5 – Can I identify how an animal is suited to its habitat? Can I explain how living things in a habitat depend on each other? L6 - Can I show the direction energy travels on a food chain? L7 – Quiz	<u>Plants</u> L1 – Can I design and set up a test to find out what plants need to stay healthy. L2 – Can I look closely at the parts of a seed that will grow into a plant and explain how it will germinate? L3 – Can I describe the life cycle of a plant? L4 – Can I explain what plants need to grow and stay healthy? L5 – Can I explain how plants are suited to their habitats? L6 - Quiz	<u>Animals Including Humans</u> L1 – Can I match, sort and group young animals and their adults? L2 – Can I find out how animals change as they grow into adults? L3 – Can I compare the stages of the human life cycle? L4 – Can I research and describe what animals, including humans, need to survive? L5 – Do all animals start off small?	<u>Animals Including Humans</u> L1 – Can I test the effects of exercise on the human body? L2 – Can I investigate the importance of healthy eating and hygiene? L3 – Is all food good for us? L4 - Quiz

Year 3					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Light</u> L1 - Can I explain that light is a form of energy and comes in different forms that can neither be created or destroyed? L2 - Can I understand that we need light to see things and that darkness is the absence of light? L3 - Can I observe and explain that light travels in straight lines? L4 - Can I show how light is reflected when it travels from a light source and then 'bounces' off an object? L5 - Can I identify that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes?	<u>Light</u> L1 - Can I explain that the Sun is a light source and many light sources give off light and heat? L2 - Can I show how light is affected by opacity and transparency? L3 - Can I investigate the size of shadows as an object moves towards a light source? L4 - Can I use a data logger to show changes in light throughout the day? L5 - Quiz	<u>Rocks & Fossils</u> L1 – Can I compare the different types of rock? L2 - Can I explain the uses of igneous, sedimentary and metamorphic rock? L3 - Can I explain how fossils are formed and how they help us learn about the past? L4 – Can I explain Mary Anning's contribution to palaeontology? L5 - Can I explain how soil is formed? L6 – Can I investigate the permeability of different types of soil? L7 - Quiz	<u>Forces & magnets</u> L1 – Can I identify the forces acting upon different objects? L2 – Can I investigate how a toy car moves over different surfaces? L3 – Can I sort magnetic and not magnetic materials? L4 – Can I investigate the strength of different magnets? L5 – Can I explore magnetic poles? L6 – Can I observe that magnets attract some materials? L7 - Quiz	<u>Plants</u> L1 – Can I name the different parts of flowering plants and explain their job? L2 – Can I set up an investigation to find out what plants need to grow well? L3 – Can I investigate how water is transported in plants? L4 – Can I name the different parts of a flower and explain their role in pollination and fertilisation? L5 – Can I understand and order the different stages of the life cycle of a flowering plant? L6 - Quiz	<u>Animals Including Humans</u> L1 – Can I sort different foods into food groups and find out about the different nutrients they provide? L2 – Can I explore the nutritional value of different foods? L3 – Can I compare and sort different animal skeletons? L4 – Can I investigate how the human skeleton supports movement? L5 – Can I explain how bones and muscles work together to create movement? L6 - Quiz

Year 4					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
AIH L1 – Can I identify and examine different types of teeth? L2 – Can I plan and set up an investigation into tooth decay? L3 – Can I identify parts of the digestive system and their function? L4 – Can I demonstrate and explain the process of digestion? L5 – Can I explain similarities and differences between human and animal teeth? L6 - Quiz	Electricity L1 – Can I identify common appliances that run on electricity? L2 – Can I identify components of a circuit and build a working one? L3 – Can I investigate if a circuit is complete or incomplete? L4 – Can I investigate which materials are electrical conductors or insulators? L5 – Can I explain how a switch works within a circuit, build switches and record my findings? L6 - Quiz	Sound L1 – Can I describe and explain sound sources? L2 – Can I explain how different sounds travel? L3 – Can I explore ways to change the pitch of a sound? L4 – I can investigate how sounds change over distance? L5 – Can I investigate the best material for absorbing sound? L6 - Quiz	States of Matter L1 – Can I sort and describe materials? Solid, liquid or gas? L2 – Can I investigate gases and explain their properties? L3 – Can I investigate heating and cooling and how this changes the state of a material? L4 – Can I explore how water changes state? L5 – Can I investigate how water evaporates? L6 – Can I identify and describe the different stages of the water cycle? Quiz	LTATH L1 – Can I explain how living things have adapted to their environment? L2 – Can I group living things in a range of ways? L3 - Can I use a classification key? L4 – Can I classify vertebrates by comparing similarities and differences? L5 – I can use a key to identify invertebrates?	LTATH L1 – Can I create a classification key? L2 - Can I identify positive and negative changes to the local environment? L3 – I can describe environmental changes to endangered species? L4 - Can I explain why Carl Linnaeus is a famous scientist? L5 - Quiz

Year 5					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Earth and Space</u> L1 – Can I explain why we know the Sun, Earth and Moon are spherical? L2 – Can I name and describe features of the planets in our solar system? Can I order the planets in our solar system? L3 – Can I explain how planets move in our solar system? Can I identify scientific evidence which does or does not provide evidence for an idea or argument? L4 – Can I explain day and night and the apparent movement of the sun across the sky? L5 – Can I investigate night and day in different parts of the Earth? L6 – Can I explain the movement of the Moon? Quiz	<u>Forces</u> L1 – Can I identify forces acting on objects? L2 – Can I explore the effect gravity has on objects and how gravity was discovered? L3 – Can I investigate the effects of air resistance? L4 – Can I explore the effects of water resistance? L5 – Can I to investigate the effects of friction? L6 – To explore and design mechanisms. Quiz	<u>Properties & Changes of Materials</u> L1 –Can I compare materials according to their properties? L2 – Can I explain the process by which a solid dissolves in a solvent resulting in a solution? L3 - Can I explain that when a solvent evaporates, the solute is left behind? L4 – Can I know the difference between reversable and irreversible changes? L5 – Can I explain what happens to salt in water?	<u>Properties & Changes of Materials</u> L1 – Can I show that solids and liquids can be separated by filtering and solids of different sizes can be separated by sieving? L2 - Can I investigate thermal conductors and insulators? L3 – Can I investigate which electrical conductors make a bulb shine brightest? L3 – Can I give reasons why materials are suited or unsuited to a function? L4 - Can I explain why Marie Curie was a brilliant physicist? Quiz	<u>Animals Including Humans</u> L1 – Can I describe the stages of human development? L2 – Can I explain how babies grow and develop? L3 – Can I describe and explain the main changes that occur during puberty? L4 – Can I identify the changes that take place in old age? L5 – Can I report findings from enquiries? L6 –Can I record complex data using graphs and model? I can identify the relationship between variables? Quiz	<u>Living Things & Their Habitats</u> L1 – Can I describe how some plants reproduce? L2 – Can I describe how some plants reproduce? L3 – Can I describe the life cycles of different mammal? L4 – Can I explain what Jane Goodall discovered about chimpanzees? L5 – Can I compare the life cycles of amphibians and insects. L6 – Can I compare the life cycles of plants, mammals, amphibians, insects, and birds? Quiz

Year 6					
Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Light</u> L1 – Can I explain that light travels in straight lines from light sources to our eyes, and from light sources to objects and then to our eyes? L2 – Can I understand how mirrors reflect light, and how they can help us see objects? L3 – Can I investigate how refraction changes the direction in which light travels? L4 – Can I investigate how a prism changes a ray of light? L5 – Can I investigate how light enables us to see colours? L6 – Can I explain why shadows have the same shape as the object that casts them? Quiz	<u>Electricity</u> L1 – Can I explain the importance of the major discoveries in electricity? L2 – Can I observe and explain the effects of differing volts in a circuit? L3 – Can I observe and explain the effects of differing volts in a circuit L4 – Can I plan an investigation. I can understand variations in how components function? L5 – Can I conduct an investigation. I can record my data and report my findings? L6 – Can I investigate my results further. Quiz	<u>Evolution & Inheritance</u> L1 – Can I explain the scientific concept of inheritance? L2 – Can I demonstrate understanding of the scientific meaning of adaptation? L3 – Can I identify the key ideas of the theory of evolution? L4 – Can I identify evidence for evolution from fossil records? L5 – Can I understand how human beings have evolved? L6 – Can I explain how adaptations can result in both advantages and disadvantages? Can I explain how human intervention affects evolution? Quiz	<u>Living Things & Their Habitats</u> L1 –Can I give reasons for classifying animals based on their similarities and differences? L2 – Can I describe how living things are classified into groups? L3 – Can I identify the characteristics of different types of animals? Can I classify a creature based on its characteristics? L4 – Can I describe and investigate helpful and harmful microorganisms? L5 -Can I identify the characteristics of different types of microorganisms? L6 – Can I classify organisms found in my local habitat? Can I explain the classification of organisms found in my local habitat? Quiz	<u>Animals Including Humans</u> L1 –Can I know the three main parts of the circulatory system and describe the job of the heart? L2 – Can I describe the important jobs of the blood vessels and blood? L3 – Can I label and explain the function of bones in the body? L4 - Can I describe the importance of exercise and how it affects the heart? To be able to plan a scientific enquiry. To be able to record, report and present results appropriately.	<u>Animals Including Humans</u> L1– Can I understand that regular exercise is important for a healthy body? L2 – Can I explain how diet and exercise affect the body? L3 – Can I recognise the impact of drugs and alcohol on the way bodies function? L4 - Quiz