



LONG TERM PLAN: SCIENCE

Key stage 2

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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.

		<u>Autumn 1</u>	<u>Spring 1</u>	<u>Summer 1</u>
Year 3	Topic/ No of lessons	Autumn 1 Plants	Spring 1 Light and Shadows	Summer 1 & 2 Animals including Humans
	Key vocabulary	Life cycle, leaf, mid-rib, leaf-veins, petiole, stem, xylem vessels, flower, bud, petal, sepal, anther, filament, stigma, pollen, style, ovary, ovule, shoot, root, tap root, lateral root, root hairs, seed, seed coat (testa), bulb, grow, radicle, plumule, cotyledon, seedling, adult, water, light, temperature, survive, reproduction, absorb (absorbed), transported, healthy, nutrients, carbon dioxide, oxygen, germinate (germination), pollen, pollination, fertilise (fertilisation), dispersal, variable, cause, effect, prediction, pattern, comparative test, fair test, method, relationship, trend, data range, data interval.	Light, dark, energy, quantity, transfer, source, eye, reflected, reflection, reflective, shiny, dull, transmitted, transparent, translucent, opaque, blocked, shadow, absorbed, variable, cause, effect, prediction, fair test, method, relationship, trend, data range, data interval.	Nutrition, photosynthesis, energy, transfer, diet, carbohydrate (sugar), protein, fat, vitamins, minerals, fibre, balanced, unbalanced, obesity, starvation, skeleton, bones (various, humerus, ulna, radius), joint (hinge), vertebrate, invertebrate, muscles (triceps, biceps), tendon, antagonistic, pull force, push force, number line, division, table of results, cause, effect, pictogram, block, block chart, bar, bar chart, axes, coordinate.
	Key knowledge and skills	National Curriculum- Identify and describe the functions of different parts of flowering plants. / Explore the requirements of plants for life and growth 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. (Notes – Relationship between structure and function – every part has a job to do. / Explore the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.) WS- Comparing the effect of different factors on plant growth. E.g. the	National Curriculum - 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 our 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. Key Knowledge <ul style="list-style-type: none">We need light to see things. Dark is the absence of light.	National Curriculum – 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. Key Knowledge <ul style="list-style-type: none">Animals (including humans) need the right types and amounts of food (nutrition). <i>Unlike plants, animals can't make their own food – they need to transfer energy in through food.</i>

		<p>amount of light or fertiliser; discover how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed; observe how water is transported.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> Identify & describe the functions of parts of flowering plants (roots, stem, leaves, etc) and the flower in detail. Plants need air, light, water, nutrients from soil, and room to grow to survive and grow well. Water is moved within plants from the roots to the leaves through tubes called xylem vessels. Flowers support reproduction through pollination, seed formation and seed dispersal (link to the life cycle). 	<ul style="list-style-type: none"> There are natural and artificial sources of light energy Light from the sun can be dangerous. We protect our eyes Light can be reflected from surfaces (reflected light energy) Shadows are formed when light energy is blocked by an object (shadow = absence of transmitted light energy) Know how to change the size of a shadow. <p>(Notes – What happens when light reflects off a mirror or other reflective surfaces e.g. mirror games. / Why it is important to protect their eyes from bright lights. / Look for and measure shadows and find out how they are formed and how they might change. / Pupils shouldn't look directly at the sun, even when wearing dark glasses.)</p>	<ul style="list-style-type: none"> Humans (and some other animals) have skeletons and muscles for support, protection and movement <p>(Notes- Continue to learn about the importance of nutrition. / Main body parts associated with the skeleton and muscles. / Find out how different parts of the body have special functions.)</p>
	<p>Working as a Scientist</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Sorting & classifying Finding patterns Observing / measuring over time Comparative and fair testing <p>In this topic you will describe, explain, explore, investigate, observe, measure, predict and begin to design experiments.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Finding patterns Observing over time Comparative and fair testing <p>In this topic you will also predict change using a science model, explore light sources and see how materials affect light.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Sorting and classifying Finding patterns Observing over time Comparative and fair testing <p>In this topic you will also use a science model to compare to your own eating and exercise habits. Try to make change for the better.</p>
	<p>POP tasks/ pre and post assessment</p>	<p>APJS Pre and post assessments task</p>	<p>APJS Pre and post assessments task</p>	<p>APJS Pre and post assessments task</p>

	Links with other subjects			
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/
		<u>Autumn 2</u>	<u>Spring 2</u>	<u>Summer 2</u>
	Topic/ No of lessons	Autumn 2 Rocks	Spring 2 Forces and Magnets	
	Key vocabulary	Rocks (e.g. sandstone, limestone, chalk, shale, coal, conglomerate, granite, slate, marble, basalt, obsidian, pumice, etc), texture, crystals, minerals, sedimentary, layers / bands, metamorphic, heat, pressure, igneous, magma, larva, fossil (body, trace, cast, mould), petrification, soil, clay, silt, sand, organic matter, key, spider key, criteria, classify (classification), sort, group, material, property, application.	Force, force arrow, contact force, push force, pull force, twist force, friction force, non-contact force, gravity force, movement, magnet (types), attract, repel, poles (north and south), magnetic, non-magnetic, magnetism, variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.	
	Key knowledge and skills	National Curriculum 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. Key Knowledge <ul style="list-style-type: none"> Identify & describe different kinds of rocks using appearance and physical properties. 	National Curriculum - 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. (Notes- Magnetic forces can act without direct	

		<ul style="list-style-type: none"> • <i>Sedimentary rock is laid down in layers in lakes, seas and deserts. Metamorphic rock is formed deep within the earth. Igneous rock is formed when volcanoes erupt.</i> • <i>Rocks have lots of uses in our everyday lives.</i> • Fossils are formed when things that have lived are trapped within rock over millions of years. • Soils are made from rocks and organic matter. 	<p>contact, unlike most forces, where direct contact is necessary. / Explore the behaviour and everyday uses of different magnets.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Be able to describe a force using a <i>Force Arrow Model</i>. • Some forces need contact (contact forces) between two objects and some forces act at a distance (non-contact forces). • Magnets attract or repel each other. Magnets have two poles. • Materials can be grouped together based upon whether they are attracted to a magnet (magnetic) or not 	
	Working as a Scientist	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Sorting & classifying • Finding patterns • Comparative and fair testing <p>In this topic you will describe, explain, explore, investigate, observe, sort, measure, predict and classify. Scientists – Mary Anning, Holly Betts</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Sorting & classifying • Finding patterns • Comparative and fair testing <p>In this topic you will describe, explain, explore, investigate, observe, sort, measure, predict and classify.</p>	
	POP tasks/ pre and post assessment	APJS Pre and post assessments task	APJS Pre and post assessments task	
	Links with other subjects	<p>Geography: rocks, soils, volcanoes.</p> <p>P4C</p>	<p>Geography: poles</p> <p>Maths: compass directions</p>	

			P4C	
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	

		<u>Autumn</u>	<u>Spring</u>	<u>Summer</u>
Year 4	Topic/ No of lessons	Autumn 1 Materials States of Matter	Spring 1 Sound	Summer 1 Classifying Vertebrates and Invertebrates
	Key vocabulary	Material, substance, solid, liquid, gas, flow, compressed, volume, density, state, particle, energy, movement, collision, attraction, heat, temperature (° Celcius), ice, water, water vapour, melting, boiling, freezing, condensation, evaporation, speed (rate), melting point, boiling point, water cycle, run-off, rainfall (precipitation), variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.	Sound, energy, transfer, source, ear, particles, solid, liquid, gas, vibration, volume, decibels, frequency, pitch, Hertz, reflected, transmitted, absorbed, fainter / louder, lower / higher, variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.	Habitat, environment, micro-habitat, abiotic, plants (habitat specific examples), animals (habitat specific examples), vertebrates, invertebrates, predator, prey, adapted (adaptation), competition, pollution, toxic, conservation, species, diversity, richness, abundance, biodiversity, sample (sampling), transect (line/belt), quadrat, pit-fall trap, sweep net, pooter, key, spider key, number key, classify (classification), feature, table of results, cause, effect, repeats (repetition), bar chart, bar, graph, axes, data point, coordinate.
	Key knowledge and skills	National Curriculum - Compare and group materials together according to whether they are solids, liquids or gases. / Observe that some materials change state when they NC- Identify how sounds are made, associating some of them with something vibrating. / Recognise that vibrations from sounds travel through a medium to the are heated or	National Curriculum - 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	National Curriculum - 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 environment can change and

		<p>cooled, and measure or research the temperature at which this happens in Celsius. / Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Notes- Explore a variety of materials and develop simple descriptions of the states of matter. / Observe water as a solid, liquid and a gas. / Note the changes to water when it is heated or cooled. / Avoid materials where heating is associated with chemical change. E.g. baking and burning.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Groups materials as solids, liquids or gases. Know the features (criteria) that make them different. • Can describe, <i>using the particle model</i>, how substances change from a gas, into a liquid, then into a solid (and back again) as they are heated or cooled. • Temperature affects the speed (rate) of evaporation. • Describe the water cycle (evaporation and condensation). 	<p>strength of the vibrations that produced it. / Recognise that sounds get fainter as the distance from the sound source increases. (Notes- Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world. / Find out how the pitch and volume of sounds can be changed in a variety of ways.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Identify how sounds are made (sound energy, vibrations) • Sound energy/vibrations travel from a source, through a medium (solid, liquid or gas), to your ear. • The volume of a sound is linked to the strength of vibrations (sound energy) that produces it. • The pitch of a sound is linked to the frequency of vibrations (sound energy) that produces it. 	<p>that this can sometimes pose dangers to living things.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Living things can be grouped in a variety of ways. • Use classification keys to group, identify and name living things in the local and wider environment. • <i>Know how to sample a habitat for species diversity identification.</i> • Environments can change and this can pose dangers to living things. <i>Conservation acts to save species and restore habitats.</i> • <p>Scientists – Seirian Summer</p> <p>(Notes- Use the local environment. / Questions to identify and study plants in their habitat. / Identify how the habitat changes throughout the year. / Explore possible ways of grouping a wide selection of living things. / Put vertebrate and invertebrate animals into groups.</p>
	<p>Working as a Scientist</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Finding patterns • Comparative and fair testing 	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Finding patterns • Comparative and fair testing <p>In this topic you will investigate, observe, measure and predict how sound volume and</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Sorting & classifying • Finding patterns • Observing / measuring over time • Comparative and fair testing

		In this topic you will also explore and classify solids, liquids and gases. You will investigate and measure changes in state.	pitch can be changed. You will describe how sound energy travels through vibrating particles and begin to explain how the medium, material and distance affect this.	In this topic you will explore, observe and measure biodiversity in a range of habitats and investigate how changing habitats affects the species found. You may also visit local habitats to see how humans are both damaging and conserving wildlife.
	POP tasks/ pre and post assessment	APJS Pre and post assessments task	APJS Pre and post assessments task	APJS Pre and post assessments task
	Links with other subjects		Design & Technology: Make a musical instrument. P4C	
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/
	Topic/ No of lessons	Autumn 2 Animals including Humans	Spring 2 Electricity	Summer 2 Human Impact
	Key vocabulary	Nutrition, digestion (physical / chemical), enzymes, acid, mouth, teeth, incisor, canine, pre-molar, molar, enamel, bacteria, plaque, decay, hygiene, gullet (oesophagus), stomach, small intestine, large intestine, anus, liver, gall bladder, pancreas, absorb (absorption), faeces, diet, carbohydrate, protein, fat, energy, calories, food chain, producer, consumer, predator, prey, transfer, carnivore, herbivore, omnivore, pattern, trend, relationship, conclusion, valid (validity).	Electric (electricity), source, energy, transfer, flow, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, light, sound, conductor, insulator, metal, copper, iron, steel, non-metals, plastic, wood, glass, rubber, pattern, trend, relationship, conclusion, valid (validity).	Environment, impact, positive, negative, litter, pollution, biodiversity, ecosystem, habitat, derelict, graffiti, traffic, destroy, create, pattern, compare, data, primary data, secondary data, conclusion.
	Key knowledge and skills	National Curriculum - 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	National Curriculum - Identify common appliances that run on electricity. / Construct a simple series electrical circuit, identifying and naming its basic parts, including cells,	National Curriculum – Recognise that environments can change and that these

		<p>functions. / Construct and interpret a variety of food chains, identifying producers, predators and prey. (Notes- Main body parts associated with the digestive system. / Explore questions that help them to understand their special functions.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Know the basic functions of parts of the digestive system in humans. Digestion breaks down food into smaller and smaller bits to eventually get through the gut into the blood. • Identify different types of teeth and describe their functions. • Construct and interpret food chains. Identify producers (of energy), consumers (of energy), predators & prey. 	<p>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. (Notes- Construct simple series circuits, trying different components and use their circuits to create simple devices. / Draw the circuits as a pictorial representation, not necessarily using conventional circuit symbols. / Pupils may use the terms current and voltage. / Teach about precautions for working safely with electricity.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Construct a range of simple closed series circuits. Draw these circuits with correct component symbols (named). • <i>Recognise and solve 'errors' in circuits to make them work.</i> • A switch opens and closes a circuit. • Conductors allow electrical (<i>energy</i>) to pass through them. Insulators do not allow electrical (<i>energy</i>) to pass through. 	<p>changes can sometimes pose dangers to living things.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • To give examples of positive and negative ways in which humans change the environment. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Group and classify things.
	<p>Working as a scientist</p>	<p>Science Enquiry Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Sorting & classifying 	<p>Science Enquiry Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Sorting & classifying • Finding patterns 	<p>Science Enquiry Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Identifying differences, similarities or changes related to simple scientific ideas and processes.

		<ul style="list-style-type: none"> Finding patterns Observing / measuring over time Comparative and fair testing <p>In this topic you will explore, investigate, observe, measure and understand feeding relationships between living things. You will also learn how to keep your teeth and yourselves healthy.</p>	<ul style="list-style-type: none"> Comparative and fair testing <p>In this topic you will explore, investigate, observe, measure and describe how electrical energy transfers (flows) around a circuit. You will also use and make switches and investigate whether materials are good conductors or insulators of electricity.</p>	<ul style="list-style-type: none"> Grouping and classifying. Observing change over time. Making conclusions. <p>In this topic you will consider the impact that humans have on the local environment. You will explore how the local environment has changed over time and suggest improvement to conserve the area for the future. You will explore the importance of biodiversity.</p>
	POP tasks/ pre and post assessment	APJS Pre and post assessments task	APJS Pre and post assessments task	APJS Pre and post assessments task
	Links with other subjects	P4C	P4C	PSHCE: Life Skill Weeks P4C
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/

		<u>Autumn</u>	<u>Spring</u>	<u>Summer</u>
Year 5	Topic/ No of lessons	<p>Autumn 1 Materials (Progressing form Y4)</p> <p>Autumn 2 States of Matter (Progressing form Y4)</p>	Spring 1 Animals and Life Cycles: Circle of Life	Summer 1 Space: The Earth and Beyond
	Key vocabulary	Material, particle, substance, mixture, compound, state, solid, liquid, gas, melting, boiling, evaporation, condensation, freezing, energy, attraction, dissolve (dissolving),	baby, toddler, child, adolescent, adult, geriatric, growth, puberty, fertilisation, gestation, birth, egg, sperm, gamete, embryo, foetus, periods, pubic hair, testicle, scrotum,	Solar system, sun, star, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Asteroids, moon, orbit, ellipses, gravity force, temperature, solid,

		<p>solute, solvent, soluble (solubility), insoluble, opaque, translucent, transparent (transparency), conductive (conductivity), insulating (insulation), heat, temperature, thermal, flexible (flexibility), rigid (rigidity), elastic (elasticity), absorbent (absorbency), magnetic, filtration, sieving, permeable (permeability), chromatography, chemical, physical, reaction, bond (bonded), combined, reversible, irreversible, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method.</p>	<p>penis, vagina, vulva, cervix, uterus, ovary, erection, intercourse, ejaculation, metamorphosis, table of results, cause, effect, repeats, bar chart, coordinate, graph, data point, scale, plot, mean, trend line.</p>	<p>liquid, gas, axis, tilted axis, day, night, month, year, satellite, atmosphere, surface, new moon, full moon, quarter moon, waxing, waning, crescent, gibbous, energy, transfer, Universe, telescope, astronomy, pattern, data, primary data, secondary data, trend, relationship, conclusion, valid (validity).</p>
	<p>Key knowledge and skills</p>	<p>National Curriculum - 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 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</p>	<p>National Curriculum - Describe the differences in the life cycles of a mammal, and amphibian, an insect and a bird. / Describe the life process of reproduction in some plants and animals. (Notes- Question about the local environment. / Observe life-cycle changes in a variety of living things.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Order and compare the stages in the human life cycle • Understand and describe the changes as humans develop to old age • Describe the changes experienced in puberty. Understand why puberty happens. • Compare gestation time in animals 	<p>National Curriculum - 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. (Notes- It is not safe to look directly at the sun, even when wearing dark glasses. / Find out about the way that ideas about the solar system have developed. / Understanding how the geocentric model of the solar system gave way to the heliocentric model.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • The sun, planets and moon(s) are spherical bodies.

		<p>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. (Notes- Build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in Y3 and electricity in Y4. / Explore reversible changes, recognising that melting and dissolving are different processes. / Explore changes that are difficult to reverse e/g/ burning, rusting and vinegar with bicarbonate of soda. / Pupils aren't required to make quantitative measurements about conductivity and insulation. / Observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. / Follow safety guidelines when burning materials.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Compare and Group materials based on their properties. Give reasons (from evidence) for uses of these materials. • A mixture is made up of 2 or more substances (particles mix). A solute (solid) dissolves in a solvent (liquid) to form a solution. • A solution and other mixtures can be separated through evaporating, filtering, sieving and chromatography. 	<p>Scientists – David Attenborough, Jane Goodall</p>	<ul style="list-style-type: none"> • The Earth and other planets orbit the sun in the Solar System. Day and night are caused by the Earth's rotation (sun appears to move across the sky). • The moon orbits the Earth. Know the phases of the moon. <p>Scientists – Tim Peake, Neil Armstrong, Ptolemy, Alhazen, Copernicus, Maggie Aderin-Pocock</p>
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		<ul style="list-style-type: none"> Dissolving, mixing and changes in state are reversible changes Some changes form new materials (compounds) through chemical reactions. These are irreversible reactions. <p>Scientists – Spencer Silver, Ruth Benerito, Patsy Sherman, Joe Keddie</p>		
	Working as a scientist	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Classifying and sorting Finding patterns Observing / measuring over time Comparative and fair testing <p>In this topic you will explore and investigate materials, mixtures and compounds. Use should use the particle model to explain changes.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Finding patterns Observing over time <p>In this topic you will also develop surveys to collect data.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Sorting & classifying Finding patterns Observing / measuring over time Comparative and fair testing <p>In this topic you will explore, investigate, observe, measure and understand the relationships between the sun, the Earth and our moon. You will also use data and research our Solar System. as Stonehenge might have been used as astronomical clocks.</p>
	POP tasks/ pre and post assessment	APJS Pre and post assessments task	APJS Pre and post assessments task	APJS Pre and post assessments task
	Links with other subjects	SAM LABS: Mixing Substances P4C	Geography: Rainforests P4C	SAM LABS: Daylight P4C
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/

	Topic/ No of lessons	Autumn 1 Materials (Cont) Autumn 2 States of Matter (Cont)	Spring 2 Plants and Animals (Progressing form Y3)	Summer 2 Forces: Feel the Force (Progressing form Y3)
	Key vocabulary		sexual, asexual, growth, metamorphosis, puberty, reproduction, fertilisation (internal / external), gamete, egg, sperm, embryo, foetus, larva, pupa (chrysalis), testes, uterus, gestation, birth, petals, sepals, carpel, stigma, ovary, anther, stamen, pollen, pollination, dispersal, vegetative, bulb, runner, tuber, rhizome, corm, stem, root, variation, clone, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method, scale.	force, force arrow, contact force, non-contact force, push force, pull force, twist force, friction force, up thrust force, reaction force, gravity force, air resistance force, water resistance force, particle, solid, liquid, gas, balanced, unbalanced, resultant force, force meter, Newton (N), mass, weight, machine, lever (type 1,2 & 3), pivot, fulcrum, effort, load, pulley, mechanical advantage, force multiplier, gear, cog, turning force, speed, acceleration, table of results, cause, effect, repeats, bar chart, bar, coordinate, graph, data point, extrapolate, scale, plot, mean, trend line.
	Key knowledge and skills		NC- Describe the changes as humans develop too old age. (Notes- Draw a timeline to indicate stages in the growth and development of humans. / Learn about the changes experienced in puberty.) Key Knowledge <ul style="list-style-type: none"> Describe the similarity and differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction <ul style="list-style-type: none"> Sexual – fertilisation leading to variation Asexual – vegetative growth leading to clones 	NC- 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 effort (Notes- Explore falling objects and raise questions about air resistance. / Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. / Explore the effects of friction on

			<p>Scientists – Sir David Attenborough, Sarah Fowler</p>	<p>movement and find out how it slows or tops moving objects e.g. by observing the effects of a brake on a bicycle wheel. / Explore the effect of levers, pulleys and simple machines on movement.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • <i>Opposing forces can be in balance or unbalanced.</i> • Unsupported objects fall towards earth because of gravity force acting between earth and the falling object. • Air resistance force (gas) water resistance force (liquid) and friction force (solid) act between moving surfaces. • Levers, pulleys and gears allow a smaller force to have a greater effect (force multipliers). <p>Scientists – Aristotle, Galileo Galilei, Isaac Newton</p>
	<p>Working as a scientist</p>		<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Classifying and sorting • Finding patterns • Observing / measuring over time • Comparative and fair testing <p>In this topic you will explore, research, describe and compare life cycles (Big-Picture Models) in plants and animals. You will also grow plants to show asexual reproduction.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching & problem solving • Finding patterns • Comparative and fair tests <p>In this topic you will explore, investigate, describe and explain effects when forces are in balance or are unbalanced. You may also design machines that use levers, pulleys and gears.</p>

	POP tasks/ pre and post assessment		APJS Pre and post assessments task	APJS Pre and post assessments task
	Links with other subjects		SAM Labs: Pollination As We Grow	SAM LABS: Feel the Force

		<u>Autumn</u>	<u>Spring</u>	<u>Summer</u>
Year 6	Topic/ No of lessons	Autumn 1 Evolution & Inheritance	Spring 1 Electricity (Progressing form Y4)	Summer 1 Light & Shadows (Progressing form Y3)
	Key vocabulary	Adaptation, adaptive traits, natural selection, DNA, genes, variation, offspring, habitat, fossilisation, mutations, inherit (inheritance), variation, asexual, sexual, reproduction, sperm, egg, cell, nucleus, gene, characteristic, trait, environment, parent, offspring, selection (selected), adapt (adaptation), species, evolution, fossil, extinct (extinction), survival, table of results, cause, effect, repeats, bar chart, bar, coordinate, graph, data point, extrapolate, scale, plot, mean, trend line, linear, non-linear.	Electric (electricity), source, energy, transfer, Voltage, flow, Current, resistance, insulator, conductor, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, metal, light energy, sound energy, heat energy, kinetic energy, Voltmeter, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method, precision, error.	Light, source, energy, transfer, reflection (reflected), transmits (transmitted), absorbs (absorbed), shiny, dull, mirror, transparent, translucent, opaque, ray, eye, receptor, shadow, angle, incidence, perpendicular, pattern, data, primary data, secondary data, trend, relationship, conclusion, valid (validity), limitation.
	Key knowledge and skills	NC- 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	NC- 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	NC- 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

		<p>animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Notes- Building on their Y3 work on fossils and rocks, pupils should find out how living things on Earth have changed over time. / Characteristics are passed from parents to their offspring e.g. dogs → Labradors and poodles. / Variation in offspring over time can make animals more or less able to survive in particular environment e.g. how giraffes' necks got longer or insulating fur on the artic fox. / Pupils aren't expected to understand how genes and chromosomes work.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Living things can produce identical offspring (<i>asexual</i>) but <i>sexual reproduction results in offspring that, although share inherited features, may vary (not identical) from their parents. Know some inherited features</i> • <i>This variation means that some individuals will have features better suited to a changing environment. These better features will be selected for by nature, and so, individuals that have them are more likely to survive.</i> • <i>Natural selection is the process where species adapt to their environment. It is the engine that drives evolution. Know how some species are adapted</i> • Fossil evidence shows how living things have changed over time 	<p>recognised symbols when representing a simple circuit in a diagram. (Notes- Expected to learn only about series not parallel circuits. / Take necessary precautions for working safely with electricity.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Confidently draw a range of series circuits using symbols. • Link the brightness of a bulb / volume of a buzzer to the number & Voltage of cells used in the battery. <i>Measure Voltage.</i> • Explain changes in brightness / volume <i>using the Energy Transfer Model</i> (link to Voltage). Explain the action of a switch. • <i>Begin to explain component 'failure' by resistance to electrical flow (energy transfer out of the circuit as heat energy). Begin to describe electrical flow as Current.</i> <p>Scientists – Thomas Edison, Joseph Swan</p>	<p>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. (Notes- Build on from Y3, exploring the way that light behaves, including light sources, reflection and shadows. Talk about what happens and make predictions.)</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> • Light travels in straight lines from a light source (<i>Energy Transfer Model</i>) <i>directly, reflects, goes through a material or is absorbed</i> • Light travels in straight lines from a light source directly into the eye (<i>represent this using a light ray diagram</i>) • Light travels in straight lines from a light source to an object (reflected) into the eye (<i>represent using a light ray diagram</i>) • <i>Know the angle of incidence is equal to the angle of reflection</i> • Explain the size and shape of a shadow knowing that light travels in straight lines (<i>represent using a light ray diagram</i>)
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		Scientists – Charles Darwin, Alfred Wallace		
	Working as a scientist	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Finding patterns • Observing / measuring over time • Comparative and fair testing <p>In this topic you will explore variation and some inherited / non-inherited features in humans. You will investigate natural selection and look at fossils.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Finding patterns • Comparative and fair testing <p>In this topic you will explain observations using Voltage (energy transfer). You will investigate, design and build circuits to solve useful applications.</p>	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> • Researching • Finding patterns • Observing / measuring over time • Comparative and fair testing <p>In this topic you will explain observations using the Energy Transfer Model and represent your thinking using annotated light ray diagrams.</p>
	POP tasks/ pre and post assessment	APJS Pre and post assessments task	APJS Pre and post assessments task	APJS Pre and post assessments task
	Links with other subjects	P4C	P4C	P4C
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/
	Topic/ No of lessons	Autumn 2 Animals Including Humans		Summer 2 Living things and their habitats
	Key vocabulary	Circulation (circulatory), heart, atrium (atria), ventricle (ventricles), valve, vessel, artery, vein, capillary, blood, red blood cell, white blood cell, platelets, plasma, lungs, oxygen, oxygenated, deoxygenated, carbon dioxide, nutrients, obesity, exchange, exercise, pulse, recovery time, drugs (various), variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability,		Classification, taxonomy, characteristic, diversity, variation, Kingdom, phylum, class, order, family, genus, species, binomial, animal, plant, fungi, Protista (single-celled), Monera (bacteria), virus, vertebrate, invertebrate, agar, sort, group, re-group, classify, criteria, spider key, number key.

		<p>risk, relationship prediction, hypothesis, method, precision, error.</p>		
	<p>Key knowledge and skills</p>	<p>NC- 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.</p> <p>(Notes- Build on Y3/4 learning about the main body parts and internal organs to explore and answer questions that help them to understand how the circulatory system enables the body to function. / How to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> Name the main parts of the human circulatory system. Describe the functions of the heart (structure), blood vessels (artery, vein & capillaries) & blood (components) Understand & describe the double circulatory system of humans (<i>Big-Picture Model – using the parts above</i>) to describe the way water, nutrients & oxygen are transported in animals 		<p>NC- 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. (Notes- Look at classification in more detail. / Broad groupings, such as microorganisms, plants and animals can be subdivided. / Through direct observations, they should classify animals into commonly found invertebrates and vertebrates. / Discuss reasons why living things are placed in one group and not another.</p> <p>Key Knowledge</p> <ul style="list-style-type: none"> Living things are classified into broad groups according to observable features (binomial naming system). Reasons. <i>There are five Kingdoms of living things.</i> <i>Collect and identify animals and plants using their binomial names. Begin to organise them into classification groups.</i> <i>Microbes include bacteria and fungi.</i> <p>Scientists – Carl Linnaeus</p>

		<ul style="list-style-type: none"> Know the impact of diet, exercise, drugs & lifestyle on the way our bodies function 		
	Working as a scientist	<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Finding patterns Observing / measuring over time Comparative and fair testing <p>In this topic you will explore and investigate how your body responds to exercise and research/plan improvements to your lifestyle.</p>		<p>Science Enquiry</p> <p>Types of Enquiry you may use are:</p> <ul style="list-style-type: none"> Researching Classifying and sorting Finding patterns Observing over time Comparative and fair testing <p>In this topic you will also identify and group animals and plants within a range of habitats. You will also research, explore and investigate growing microbes safely.</p>
	POP tasks/ pre and post assessment	APJS Pre and post assessments task		APJS Pre and post assessments task
	Links with other subjects	P4C		P4C
	Possible resources/ websites	Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/		Tigtag https://www.tigtagworld.co.uk/ Explorify https://explorify.uk/

*Planning is adapted from SNAP SCIENCE units and PHIL WATKINS planning.