



SOUND & DISTRICT PRIMARY SCHOOL

Whole School Science Progression Map

Scheme: ECM (Knowledge Organisers)



Who is this document for?

This progression has been made to help both Class Teachers and the Science Subject Lead.

For Class Teachers this progression document allows teachers to clearly see what has already been covered in the previous year, the areas which are to be covered in the current year but also where learning continues into the next year. This progression document allows us to see how topics are developed over time and built on, as well as exact key knowledge that children must know in each unit and each class.

In addition to the above, it also allows the Science Subject Lead to know when topics are being taught, which resources may be needed across the school at a particular time and also help with monitoring of key knowledge and coverage for triangulation.

Note: In mixed year groups, the rotation of topics is based on a 2 year rolling programme. This ensures that pupils gain the coverage of each topic area building on as they move through school and gain the key knowledge associated. The progression of Scientific Knowledge is specific to each year group NOT class e.g. 3/4, 4/5 (see progression detailed below) so the end points in mixed classes will be different depending on age group.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Diamond Class (R)	<p><u>Understanding the World</u> Explore the natural world around them Describe what they see, hear and feel whilst outside. Recognise some environments that are different from the one in which they live. Understand the effect of changing seasons on the natural world around them.</p> <p><u>Personal Social and Emotional Development</u> Observe effects on own bodies, hunger, tiredness, safety and tools, toileting, washing and drying of hands, dressing.</p>		<p><u>Understanding the World</u> Explore the natural world around them Describe what they see, hear and feel whilst outside. Recognise some environments that are different from the one in which they live. Understand the effect of changing seasons on the natural world around them.</p> <p><u>Personal, Social and Emotional Development</u> Eats healthily, understanding of safety, good practice with exercise, eating, sleeping and hygiene.</p>		<p><u>Understanding the World</u> Explore the natural world around them Describe what they see, hear and feel whilst outside. Recognise some environments that are different from the one in which they live. Understand the effect of changing seasons on the natural world around them.</p> <p><u>Personal, Social and Emotional Development</u> Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe. They manage their own basic hygiene and personal needs successfully, including dressing and going to the toilet independently.</p>	
Emerald Class (Y1)	Animals Including Humans	Seasonal Changes (Autumn-Winter)	Everyday Materials		Plants Seasonal Changes (Spring-Summer)	
Ruby Class (Y2)	Animals Including Humans	Use of Everyday Materials	Living things and their habitats		Plants	
Opal Class (Y3/4)	Forces & Magnetism		Animals including humans	Light	Rocks	Plants
Topaz Class (Y4/5)	Earth & Space	Forces	Properties of Materials		Animals including humans	Living things and their habitats
Onyx Class (Y6)	Living things and their habitats	Animals including humans	Electricity		Evolution and Inheritance	Light

Key Scientists and Linked Texts

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Diamond Class (R)	<p><u>Key Scientists</u> Marie Curie, Stephen Hawking</p> <p><u>Linked Texts:</u> Otto Blotter, Bird Spotter (Graham Carter), The Extraordinary Gardener (Sam Boughton), Bug Hotel (Libby Walden), Dear Earth (Isabel Otter), Seasons (Hannah Pang)</p>					
Emerald Class (Y1)	<p><u>Animals Including Humans</u> <u>Key Scientists</u> Jane Goodhall (Primatologist) Joan Beauchamp Proctor (Zoologist)</p> <p><u>Linked Texts</u> One Year with Kipper (Mick Inkpen) Snail Trail (Ruth Brown) Superworm (Julia Donaldson & Axel Scheffler)</p>	<p><u>Seasonal Changes (Autumn-Winter)</u> <u>Key Scientists</u> George James Symons (Meteorologist) Anders Celsius (Astronomer, Physicist & Mathematician)</p> <p><u>Linked Texts</u> Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup) One Year with Kipper (Mick Inkpen) After the Storm (Nick Butterworth)</p>	<p><u>Everyday Materials</u> <u>Key Scientists</u> Charles Mackintosh (Chemist & inventor) Ole Kirk Christiansen (Inventor) Martin Brock (Engineer)</p> <p><u>Linked Texts</u> The Great Paper Caper (Oliver Jeffers) Who Sank the Boat (Pamela Allen) The Story of Cinderella (Walt Disney)</p>	<p style="text-align: center;"><u>Plants</u> <u>Key Scientists</u> Beatrix Potter (Botanist & Natural Scientist) John Ray (Naturalist) Wangari Maathai</p> <p style="text-align: center;"><u>Linked Texts</u> Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup) A Little Guide to Wild Flowers (Charlotte Voake) The Things That I LOVE about TREES (Chris Butterworth) Harry's Hazelnut (Ruth Parsons)</p> <p style="text-align: center;"><u>Seasonal Changes (Spring-Summer)</u> <u>Key Scientists</u> Dr Steve Lyons (Extreme Weather) Holly Green (Meteorologist)</p> <p style="text-align: center;"><u>Linked Texts</u> Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup) One Year with Kipper (Mick Inkpen) After the Storm (Nick Butterworth)</p>		
Ruby Class (Y2)	<p><u>Animals Including Humans</u> <u>Key Scientists</u> Dr Ernest Madu (Cardiologist), Maria Sibylla Merian (Scientific illustrator & Entomologist) Louis Pasteur (Biologist & Chemist)</p>	<p><u>Use of Everyday Materials</u> <u>Key Scientists</u> Jon Dunlop (Inventor) Robert Gair (Inventor) John Loudon McAdam (Engineer) Julie Brusaw (Inventor)</p> <p><u>Linked Texts</u></p>	<p><u>Living things and their habitats</u> <u>Key Scientists</u> Sylvia Earle (Marine Biologist & explorer) Sir Ernest Shackleton (Antarctic Explorer)</p> <p><u>Linked Texts</u> The Gruffalo (Julia Donaldson) Meerkat Mail (Emily Gravett) No Place Like Home (Jonathon Emmett)</p>	<p style="text-align: center;"><u>Plants</u> <u>Key Scientists</u> David Douglas (Botanist) Agnes Arber (Botanist) Jane Colden (Botanist)</p> <p style="text-align: center;"><u>Linked Texts</u> The Tin Forest (Helen Ward) Jack and the Beanstalk (Richard Walker) Ten Seeds (Ruth Brown) A Seed Is Sleepy (Dianna Aston)</p>		

	<p><u>Linked Texts</u> The Gruffalo (Julia Donaldson) Meerkat Mail (Emily Gravett) Tadpole's Promise (Jeanne Willis and Tony Ross)</p>	<p>The Tin Forest (Helen Ward) Traction Man (Mini Grey) Three Little Pigs (Lesley Sims)</p>				
Opal Class (Y3/4)	<p style="text-align: center;">Forces & Magnets <u>Key Scientists</u> John McAdam (Civil Engineer & Road Builder) Isaac Newton (Physicist) Michael Faraday (Scientist) <u>Linked Texts</u> Float (Daniel Miyares), Magnetic Max (Monica Lozano Hughes), The Iron Man (Ted Hughes)</p>		<p>Animals including humans <u>Key Scientists</u> Wilhelm Rontgen (Mechanical engineer & physicist) Ibn Sina "Avicenna" (Physician) <u>Linked Texts</u> Life on Earth: Human Body (Heather Alexander), Book of Bones (Gabrielle Balkan), Can I build another me? (Shinsuke Yoshitake)</p>	<p style="text-align: center;">Light <u>Key Scientists</u> Ibn al-Haytham "Alhazen" (Inventor) Lewis Latimer (Inventor) Justus von Liebig (Chemist) <u>Linked Texts</u> My Shadow (Robert Louis Stevenson), The Night Box (Louise Greig), You are Light (Aaron Becker)</p>	<p style="text-align: center;">Rocks <u>Key Scientists</u> Mary Anning (Paleontologist) Florence Bascom (Geologist) Holly Betts (palaeobiologist) <u>Linked Texts</u> The Pebble in My Pocket: A History of Our Earth (Meredith Hooper), A Rock is Lively (Dianna Hutts Aston), The Street Beneath My Feet (Charlotte Guillian)</p>	<p style="text-align: center;">Plants <u>Key Scientists</u> Stephen Hales (Botanist) Anna Atkins (Botanist & Photographer) Joseph Dalton Hooker (Doctor) Professor Monique Simmonds (Director of Science) <u>Linked Texts</u> The Night Flower (Lara Hawthorne), The Big Book of Blooms (Yuval Zommer), I am a Seed that grew the tree (Fiona Waters)</p>
Topaz Class (Y4/5)	<p style="text-align: center;">Earth & Space <u>Key Scientists</u> Galileo Galilei (Astronomer, Physicist & Engineer) Mae Jemison (Astronaut) Nicolaus Copernicus (Astronomer) Maggie Aderin-Pocock (Space Scientist) <u>Linked Texts</u> Cosmic (Frank Cottrell Boyce), Curisity: The Story of the Mars Rover (Markus Motum), Armstrong:The Adventurous Story of a</p>	<p style="text-align: center;">Forces <u>Key Scientists</u> Albert Einstein (Theoretical Physicist) Archimedes (Mathematician, Engineer & Inventor) Emma England – (Aeronautical engineer) <u>Linked Texts</u> On a Beam of Light: A Story Of Albert Einstein (Jennifer Berne & Vladimer Radunsky), Aerodynamics of Biscuits (Clare Helen</p>	<p style="text-align: center;">Properties of Materials <u>Key Scientists</u> Spencer Silver & Arthur Fry (Chemist & Inventor) Stephanie Kwolek (Chemist) Joe Keddie (Prof of Physics) <u>Linked Texts</u> Make it Change (Anna Claybourne), Itch (Simon Mayo), Kensuke's Kingdom (Michael Morpurgo)</p>	<p style="text-align: center;">Animals including humans <u>Key Scientists</u> Elizabeth Blackwell (Doctor) Patrick Steptoe, Robert Edwards & Jean Purdy (Obstetrician, Physiologist & Embryologist) Sarah Fowler (Marine Biologist) <u>Linked Texts</u> Home in the Woods (Eliza Wheeler), Nine Months (Miranda Paul), The Borrowers (Mary Norton)</p>	<p style="text-align: center;">Living things and their habitats <u>Key Scientists</u> Mary Agnes Chase (Botanist) David Attenborough (Broadcaster & Natural Historian) Lucy Evelyn Cheesman (Entomologist) <u>Linked Texts</u> Beetle Boy (M.G.Leonard), The</p>	

	Mouse on The Moon (Torben Kuhlmann)	Walsh), Newton's Rainbow (Kathryn Lasky)			Butterfly is Patient (Dianna Aston), Where the World turns Wild (Nicola Penfold)
Onyx Class (Y6)	<p>Living things and their habitats Key Scientists Carl Linnaeus (Botanist & Zoologist) Marjory Stoneman Douglas (Writer & Conservation) Chris Nelson (Horticulturalist)</p> <p><u>Linked Texts</u> Beetle Boy (M G Leonard) Insect Soup (Barry Louis Polisar) Fur and Feathers (Janet Halfmann)</p>	<p>Animals including humans Key Scientists Marie Curie (Physicist & Chemist) Alexander Fleming (Physician & Microbiologist), William Harvey (Physician)</p> <p><u>Linked Texts</u> Pig-Heart Boy (Malorie Blackman) Skellig (David Almond) A Heart Pumping Adventure (Heather Manley)</p>	<p>Electricity Key Scientists Michael Faraday (Physicist) William Kamkwamba (Inventor) Nicholas Tesla (Engineer & Physicist), Peter Rawlinson (Engineer)</p> <p><u>Linked Texts</u> Goodnight Mister Tom (Michelle Magorian) Blackout (John Rocco) Hitler's Canary (Sandi Toksvig)</p>	<p>Evolution and Inheritance Key Scientists Charles Darwin (Naturalist) Gregor Mendel (Botanist & Biologist) Alfred Wallace (explorer, naturalist and anthropologist).</p> <p><u>Linked Texts</u> One Smart Fish (Christopher Wormell) The Molliebird (Jules Pottle) Our Family Tree (Lisa Westberg Peters)</p>	<p>Light Key Scientists Thomas Edison (Inventor) Edith Clarke (Electrical Engineer) Abu Ali al-Hasan (Alhazen) (Mathematician) Ben Jensen (Inventor)</p> <p><u>Linked Texts</u> Letters from the Lighthouse (Emma Carroll) The Gruffalo's Child (Julia Donaldson) The King Who Banned the Dark (Emily Haworth- Booth)</p>

NB: See separate document for more texts linked to each year group & Science.

Progression of Learning for Units

	Reception	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Animals Including Humans	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • be able to identify different parts of their body. • Have some understanding of healthy food and the need for variety in their diets. • Be able to show care and concern for living things. • Know the effects exercise has on their bodies. • Have some understanding of growth and change. • Can talk about things they have observed including animals 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • describe the changes as humans develop to old age. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: water.</p>	<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: movement.</p>	<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: producer, consumer, prey, predator, excretion, habitat.</p>	<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: reproduction, reproduce, types of animals and animal groups, fertilisation.</p>	<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: carbon dioxide.</p>
Plants	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> Make observations of plants Know some names of plants, trees and flowers <p>May be able to name and describe different plants, trees and flowers</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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, 			

		common flowering plants, including trees.		<p>water, nutrients from soil, and room to grow) and how they vary from plant to plant;</p> <ul style="list-style-type: none"> 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		<ul style="list-style-type: none"> <u>Names of common plants:</u> wild plant, garden plant, evergreen tree, deciduous tree, common flowering plant, weed, grass. <u>Name some features of plants:</u> e.g. flower, vegetable, fruit, berry, leaf/leaves, blossom, petal, stem, trunk, branch, root, seed, bulb, soil. <u>Name some common types of plant</u> e.g. sunflower, daffodil. 	<ul style="list-style-type: none"> <u>Growth of plants:</u> germination, shoot, seed dispersal, grow, food store, life cycle, die, wilt, seedling, sapling. <u>Needs of plants:</u> sunlight, nutrition, light, healthy, space, air. <u>Name different types of plant:</u> e.g. bean plant, cactus. <u>Names of different habitats:</u> e.g. rainforest, desert. <p>Previously introduced vocabulary: water, temperature, warm, hot, cold, habitat.</p>	<ul style="list-style-type: none"> <u>Water transportation:</u> transport, evaporation, evaporate, nutrients, absorb, anchor. <u>Life cycle of flowering plants:</u> 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. <p>Previously introduced vocabulary: life cycle.</p>			
Living Things Including Habitats	<p>Pupils should be taught to: In Early Years children should:</p> <ul style="list-style-type: none"> Comments and questions about the place they live or the natural world. Shows care and concern for living things and the environment. 		<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive; 		<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways; explore and use classification keys 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable

	<ul style="list-style-type: none"> • Can talk about things they have observed such as plants and animals. • Notices features of objects in their environment. • Comments and asks questions about their familiar world. 		<ul style="list-style-type: none"> • 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. 		<p>to help group, identify and name a variety of living things in their local and wider environment;</p> <ul style="list-style-type: none"> • recognise that environments can change and that this can sometimes pose dangers to living things. 	<ul style="list-style-type: none"> • describe the life process of reproduction in some plants and animals. 	<p>characteristics and based on similarities and differences, including micro-organisms, plants and animals;</p> <ul style="list-style-type: none"> • give reasons for classifying plants and animals based on specific characteristics.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Vocabulary</p>			<ul style="list-style-type: none"> • <u>Living or dead:</u> living, dead, never living, not living, alive, never been alive, healthy. • <u>Habitats including microhabitats:</u> depend, shelter, safety, survive, suited, space, minibeast, air. • <u>Life processes:</u> movement, sensitivity, growth, reproduction, nutrition, excretion, respiration. • <u>Food chains:</u> food sources, food, producer, consumer, predator, prey. • <u>Names of habitats and microhabitats:</u> e.g. under leaves, woodland, 		<ul style="list-style-type: none"> • <u>Living things:</u> organisms, specimen, species. • <u>Grouping living things:</u> classification, classification keys, classify, characteristics. • <u>Names of invertebrate animals:</u> snails and slugs, worms, spiders, insects. • <u>Invertebrate body parts:</u> e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs. • <u>Environmental changes:</u> 	<ul style="list-style-type: none"> • <u>Reproduction:</u> asexual reproduction, sexual reproduction, gestation, metamorphosis, gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation. <p>Previously introduced vocabulary: life cycle, pollination, offspring, fertilise, fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma,</p>	<ul style="list-style-type: none"> • <u>Classifying:</u> Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation. • <u>Microorganisms:</u> bacteria, single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, microscope, decompose.

			<p>rainforest, sea shore, ocean, urban, local habitat.</p> <p>Previously introduced vocabulary: senses, carnivore, herbivore, omnivore, seed, water, names of materials.</p>		<p>environment, environmental dangers, adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, endangered species, extinct.</p> <p>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.</p>	<p>style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young.</p>	
<p>Evolution and Inheritance</p>							<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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;

							<ul style="list-style-type: none"> • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
<p style="text-align: center;">Vocabulary</p>							<ul style="list-style-type: none"> • 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. <p>Previously introduced vocabulary: classification, offspring, characteristics, habitat, environment, adapt, variations, human, fossil, suited, cells, names of different habitats, names of animals and their</p>

							body parts, species, sedimentary rock , lava, igneous rock , metamorphic rock , magma , heat, fossilisation .
Seasonal Changes	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • Developing an understanding of change. • Observe and explain why certain things may occur (e.g. leaves falling off trees, weather changes). • Look closely at similarities, differences, patterns and change. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • observe changes across the 4 seasons; • observe and describe weather associated with the seasons and how day length varies. 					
Vocabulary		<ul style="list-style-type: none"> • 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. 					
Forces	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • know about similarities and differences in relation to places, 			Forces and Magnets		Forces	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • explain that unsupported objects fall

	<p>objects, materials and living things.</p> <ul style="list-style-type: none"> • talk about the features of their own immediate environment and how environments might vary from one another. <p>make observations of animals and plants and explain why some things occur, and talk about changes.</p>			<ul style="list-style-type: none"> • 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. 		<p>towards the Earth because of the force of gravity acting between the Earth and the falling object;</p> <ul style="list-style-type: none"> • 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. 	
<p>Vocabulary</p>				<ul style="list-style-type: none"> • <u>How things move:</u> move, movement, surface, distance, strength. • <u>Types of forces:</u> push, pull, contact force, non-contact force, friction. • <u>Magnets:</u> magnetic, magnetic field, 		<ul style="list-style-type: none"> • <u>Types of forces:</u> air resistance, water resistance, buoyancy, upthrust, Earth's gravitational pull, gravity, opposing forces, driving force. • <u>Mechanisms:</u> levers, pulleys, gears/cogs. 	

				<p>magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic poles (north pole, south pole), attract, repel, compass.</p> <ul style="list-style-type: none"> • <u>Magnetic and non-magnetic materials</u>: e.g. iron, nickel, cobalt. <p>Previously introduced vocabulary: metal, names of materials.</p>		<ul style="list-style-type: none"> • <u>Measurements</u>: weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow. • <u>Other</u>: streamlined, Earth. <p>Previously introduced vocabulary: air, heat, moon.</p>	
Light	<ul style="list-style-type: none"> • Pupils should be taught to: Developing an understanding of change. • Observe and explain why certain things may occur (e.g. leaves falling off trees, weather changes). • Look closely at similarities, differences, patterns and change. 			<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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; <ul style="list-style-type: none"> • 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. 			<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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				<ul style="list-style-type: none"> • 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. <p>Previously introduced vocabulary: opaque, transparent, sunlight, sun.</p>			<ul style="list-style-type: none"> • Reflection: periscope. • Seeing light: visible spectrum, prism. • How light travels: light waves, wavelength, straight line, refraction. <p>Previously introduced vocabulary: names and properties of materials, absorb.</p>
Sound	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • May have some understanding that objects make different sounds. <ul style="list-style-type: none"> • Some understanding that they use their ears to hear sounds. • Know about their different senses. 				<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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; 		

					<ul style="list-style-type: none"> 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					<ul style="list-style-type: none"> <u>Parts of the ear:</u> eardrum. <u>Making sound:</u> vibration, vocal cords, particles. <u>Measuring sound:</u> pitch, volume, amplitude, sound wave, quiet, loud, high, low, travel, distance. <u>Other:</u> soundproof, absorb sound. 		
Earth and Space	<ul style="list-style-type: none"> Pupils should be taught to: Understand changes in weather patterns and seasons. Compare how things move on different surfaces. 					<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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 	

						<p>movement of the sun across the sky.</p>	
<p>Vocabulary</p>						<ul style="list-style-type: none"> • <u>Solar system</u>: star, planet. • <u>Names of planets</u>: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. • <u>Shape</u>: spherical bodies, sphere. • <u>Movement</u>: rotate, axis, orbit, satellite. • <u>Theories</u>: geocentric model, heliocentric model, astronomer. • <u>Day length</u>: sunrise, sunset, midday, time zone. <p>Previously introduced vocabulary: Sun, moon, shadow, day, night, heat, light, reflect.</p>	
<p>Electricity</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • May have some understanding that objects need electricity to work. • May understand that a switch will turn something on or off 				<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 		<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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

					<p>part of a complete loop with a battery;</p> <ul style="list-style-type: none"> 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. 		<p>loudness of buzzers and the on/off position of switches;</p> <ul style="list-style-type: none"> use recognised symbols when representing a simple circuit in a diagram.
<p>Vocabulary</p>					<ul style="list-style-type: none"> 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. <p>Previously introduced vocabulary: names of materials.</p>		<ul style="list-style-type: none"> 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.

Pupils should be taught to:

- be able to ask questions about the place they live.
 - Talk about why things happen and how things work.
- Discuss the things they have observed such as natural and found objects.
- Manipulates materials to achieve a planned effect.

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 ($^{\circ}\text{C}$);
- 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

						<p>state are reversible changes;</p> <ul style="list-style-type: none"> 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. 	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Vocabulary</p>		<ul style="list-style-type: none"> <u>Names of materials</u>: wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric. <u>Properties of materials</u>: hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent, sharp, stiff. <u>Other</u>: object. 	<ul style="list-style-type: none"> <u>Changing shape</u>: squash, bend, twist, stretch. <u>Properties of materials</u>: e.g. strong, flexible, light, hard-wearing, elastic. <u>Other</u>: suitability, recycle, pollution. 	<ul style="list-style-type: none"> <u>Types of rock</u>: sedimentary rock, igneous rock, metamorphic rock. <u>Properties of rocks</u>: permeable, semi-permeable, impermeable, durable. <u>Names of rocks</u>: e.g. marble, chalk, granite, sandstone, slate. <u>Formation of rocks and fossils</u>: natural, human-made, magma, lava, molten rock, sediment, erosion, fossilisation, layers, bone, fossil. <u>Soil</u>: sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost. <u>Other</u>: palaeontology. <p>Previously introduced vocabulary: soil, water, air.</p>	<ul style="list-style-type: none"> <u>States of matter</u>: solids, liquids, gases, particles. <u>State change</u>: evaporate, condense, melt, freeze, heat, cool, melting point, freezing point, boiling point, water vapour. <u>Water cycle</u>: precipitation, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail. <u>Other</u>: atmosphere. <p>Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide</p>	<ul style="list-style-type: none"> <u>Properties of materials</u>: thermal conductor/insulator, magnetism, electrical resistance, transparency. <u>Mixtures and solutions</u>: dissolving, substance, soluble, insoluble. <u>Changes of materials</u>: reversible change, physical change, irreversible change, chemical change, burning, new material, product. <u>Separating</u>: sieving, filtering, magnetic attraction. <p>Previously introduced vocabulary: electrical conductor/insulator, bulb, translucent.</p>	

Vocabulary for EYFS

family, baby, toddler, child, teenager, adult, elderly person, classroom, playground, dining hall, office

names of senses, names of body parts

weather, seasons, investigate, magnifying glass

igloo, iceberg, snowflake, glacier, snow, ice, freezing, melting, water, cold, arctic

polar bear, penguin, seal, walrus, arctic hare, husky

light, dark, sun, planet, rays, night and day, reflection, electricity, fire

nocturnal, owl, bat, fox, badger, mole, cats, hedgehogs, hamsters, desert, rainforest, city, town, savannah, arctic, farmland, woodland, marine, environment, trees, grass, sand, mountains, ocean

pollution, damage, rubbish, care, citizenship, nature, oil slicks, cars and gases, deforestation

recycling, litter, plastic bags, reusing, paper, saving electricity, turning off taps

trains, aeroplanes, ships, cars, buses, bikes, motorbikes, barges, hot air balloon, hovercraft, wheels, rotor blades, helicopter, sea, canal, rail tracks, roads, airport, port, dock

butterflies, caterpillars, cocoons, hatch, wings, antennae, chicks, chickens, eggs, shells, peck, beak, life cycles, growth and change, incubator, map, globe, atlas, flags, country, city

sheep, lamb, cow, calf, horse, foal, goat, kid, pig, piglet, dog, puppy, cat, kitten, duck, duckling, chicken, chick

Progression of Key Knowledge by class & unit

	Diamond Class (Reception)
Autumn	<p><u>Understanding the World</u></p> <ul style="list-style-type: none">• Provide children with have frequent opportunities for outdoor play and exploration.• Offer opportunities to sing songs and join in with rhymes and poems about the natural world.• Observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.• Listen to children describing and commenting on things they have seen whilst outside, including plants and animals.• Model the vocabulary needed to name specific features of the world, both natural and made by people.• Share non-fiction texts that offer an insight into contrasting environments.• Listen to how children communicate their understanding of their own environment and contrasting environments through conversation and in play.• Guide children's understanding by drawing children's attention to the weather and seasonal features.• Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.• Look for children incorporating their understanding of the seasons and weather in their play. <p><u>Personal Social and Emotional Development</u></p> <ul style="list-style-type: none">• Model practices that support good hygiene, such as insisting on washing hands before snack time.• Help individual children to develop good personal hygiene. Acknowledge and praise their efforts. Provide regular reminders about thorough handwashing and toileting. <p><u>Communication and Language</u></p> <ul style="list-style-type: none">• Learn new vocabulary• Ask questions to find out more and to check what has been said to them• Articulate their ideas and thoughts into well-thought sentences• Describe events in some detail• Use talk to help work out problems and organize thinking and activities to explain how things work and why they might happen,• Use new vocabulary in different contexts
Spring 1	<p><u>Understanding the World</u></p> <ul style="list-style-type: none">• Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.

- Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons.
- After close observation, draw pictures of the natural world, including animals and plants.
- Name and describe some plants and animals children are likely to see, encouraging children to recognise familiar plants and animals whilst outside.
- Teach children about a range of contrasting environments within both their local and national region.
- Model the vocabulary needed to name specific features of the world, both natural and made by people.
- Guide children's understanding by drawing children's attention to the weather and seasonal features.
- Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons.
- Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.

Personal Social and Emotional Development

- Narrate your own decisions about healthy foods, highlighting the importance of eating plenty of fruits and vegetables.
- Use picture books and other resources to explain the importance of the different aspects of a healthy lifestyle. Explain to children and model how to travel safely in their local environment, including: staying on the pavement, holding hands and crossing the road when walking, stopping quickly when scootering and cycling, and being sensitive to other pedestrians.
- Talk with children about exercise, healthy eating and the importance of sleep.

Communication and Language

- Learn new vocabulary
- Ask questions to find out more and to check what has been said to them
- Articulate their ideas and thoughts into well-thought sentences
- Describe events in some detail
- Use talk to help work out problems and organize thinking and activities to explain how things work and why they might happen,
- Use new vocabulary in different contexts

Summer

Understanding the World

- Encourage interactions with the outdoors to foster curiosity and give children freedom to touch, smell and hear the natural world around them during hands-on experiences.
- Create opportunities to discuss how we care for the natural world around us.
- Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.
- Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons.

- Encourage focused observation of the natural world.
- Encourage positive interaction with the outside world, offering children a chance to take supported risks, appropriate to themselves and the environment within which they are in.
- Model the vocabulary needed to name specific features of the world, both natural and made by people.
- Guide children's understanding by drawing children's attention to the weather and seasonal features.
- Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change.

Personal Social and Emotional Development

- Know and talk about the different factors that support their overall health and wellbeing:
 - Regular physical activity
 - Healthy eating
 - Tooth brushing
 - Sensible amounts of 'screen time'
 - Having a good sleep routine
 - Being a safe pedestrian

Communication and Language

- Learn new vocabulary
- Ask questions to find out more and to check what has been said to them
- Articulate their ideas and thoughts into well-thought sentences
- Describe events in some detail
- Use talk to help work out problems and organize thinking and activities to explain how things work and why they might happen,
- Use new vocabulary in different contexts

Understanding the 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.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Personal Social and Emotional Development

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Communication and Language

**By the End
of
Reception
(ELG)**



- Make comments about what they have heard and ask questions to clarify their understanding.

Emerald Class (Year One)	
Autumn 1	<p><u>Animals Including Humans</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
Autumn 2	<p><u>Seasonal Changes (Autumn to Winter)</u></p> <ul style="list-style-type: none"> • Key Knowledge • Observe changes across the 4 seasons; • Observe and describe weather associated with the seasons and how day length varies.
Spring	<p><u>Everyday Materials</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
Summer	<p><u>Plants and Seasonal Changes (Spring to Summer)</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • Observe changes across the 4 seasons; • Observe and describe weather associated with the seasons and how day length varies. • 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.

Ruby Class (Year Two)

Autumn
1

Animals Including Humans

Key Knowledge:

- 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

Autumn
2

Use of Everyday Materials

Key Knowledge

- 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.

Spring

Living Things and Their Habitats

Key Knowledge

- Explore and compare the differences between things that are living, dead, and things that have never been alive;
- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other;
- Identify and name a variety of plants and animals in their habitats, including microhabitats;
- 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.

Summer

Plants

Key Knowledge

- 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.

Opal Class Years Three and Four (NC Y3)

Autumn

Forces and Magnets

Key Knowledge

- 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.

Spring 1

Animals Including Humans

Key Knowledge

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat;
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Spring 2

Light

Key Knowledge

- recognise that they need light in order to see things and that dark is the absence of light;
- notice that light is reflected from surfaces;
- recognise that 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.

Summer 1

Rocks

Key Knowledge

- 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

Summer 2	<p>Plants</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
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Topaz Class Year Four and Five (NC Y5)	
Autumn 1	<p>Earth & Space</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
Autumn 2	<p>Forces</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
Spring	<p>Properties of Materials</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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);

	<ul style="list-style-type: none"> identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Summer 1	<p><u>Animals Including Humans</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> describe the changes as humans develop to old age.
Summer 2	<p><u>Living things & their habitats</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> 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.

Onyx Class (Year Six)	
Autumn 1	<p><u>Living Things and Their Habitats</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> 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.
Autumn 2	<p><u>Animals Including Humans</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> 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.
Spring	<p><u>Electricity</u></p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit;

	<ul style="list-style-type: none"> • 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.
Summer 1	<p>Evolution & Inheritance</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.
Summer 2	<p>Light</p> <p><u>Key Knowledge</u></p> <ul style="list-style-type: none"> • 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.

Progression of Scientific Enquiry Skills (Year 1- Year 6)

YEAR 1 AND 2	YEAR 3 AND 4	YEAR 5 AND 6
<p>During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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. 	<p>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:</p> <ul style="list-style-type: none"> • 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. 	<p>During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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 • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • using test results to make predictions to set up further comparative and fair tests • using simple models to describe scientific ideas • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of 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.

	Year 1	Year 2
PLAN	<ul style="list-style-type: none"> -I can ask a few simple questions about the world around us. -I can begin to use some different types of enquiry to answer questions. 	<ul style="list-style-type: none"> -I can ask simple questions about the world around us. -I can begin to use different types of enquiry to answer questions.
DO	<ul style="list-style-type: none"> -With support, I can observe changes over time. -With direction, I am beginning to notice patterns. -I can begin to perform simple tests. -I can begin to discuss my ideas. -I can begin to say what happened in an investigation. 	<ul style="list-style-type: none"> -I can observe changes over time. -I can say what I am looking for and what I am measuring. -I can measure with nonstandard units and can begin to use simple standard units. -I can use simple equipment eg hand lenses, egg timers. -I am beginning to notice patterns. -I can perform simple tests. -I can discuss my ideas. -I can say what happened in an investigation.
RECORD	<ul style="list-style-type: none"> -I can begin to collect simple data. -I can begin to record data in a table my teacher has provided. -I can begin to communicate my findings in a variety of ways. 	<ul style="list-style-type: none"> -I can collect simple data. -I can record data in a table my teacher has provided. -I can communicate my findings in a variety of ways.
REVIEW	<ul style="list-style-type: none"> -I can begin to talk about what I have found out. -I can begin to explain how I carried out my enquiry. -I can begin to suggest simple changes to my enquiry. 	<ul style="list-style-type: none"> -I can talk about what I have found out to suggest answers to questions. -I can explain how I carried out my enquiry. -I can suggest simple changes to my enquiry.
IDENTIFY AND CLASSIFY	<ul style="list-style-type: none"> - I can explain where further additional items could be placed in a sorting/grouping task. 	<ul style="list-style-type: none"> - I can sort and record into two groups in which one group has a feature and the other doesn't (Carroll Diagrams).
UNDERSTANDING	<ul style="list-style-type: none"> -I can say how science helps us in our daily lives. -I can say how science can be dangerous eg electricity can give you a shock. 	<ul style="list-style-type: none"> -I can say how science helps us in our daily lives. -I can say how science can be dangerous eg electricity can give you a shock.
RESEARCH	<ul style="list-style-type: none"> -I can begin to find information to help me from books, computers and other familiar sources. 	<ul style="list-style-type: none"> -I can find information to help me from books, computers and other familiar sources.
VOCABULARY	<ul style="list-style-type: none"> - I can begin to use simple scientific language. - I can begin to describe what I see eg something is long. - I can begin to compare eg something is longer or shorter. 	<ul style="list-style-type: none"> -I can use simple scientific language. -I can describe what I see. -I can compare eg something is longer or shorter.

	Year 3	Year 4
PLAN	<ul style="list-style-type: none"> -I can ask some relevant questions about the world around us. -I can use some different types of scientific enquiry to answer questions. -I am beginning to decide which type of enquiry is best to answer my question. - I can make a simple prediction using my prior scientific knowledge and understanding. 	<ul style="list-style-type: none"> -I can ask relevant questions about the world around us. -I can use different types of scientific enquiry to answer questions. -I am beginning to decide which type of enquiry is best to answer my question. -I can make simple predictions and give an explanation based on my everyday experiences and knowledge.
DO	<ul style="list-style-type: none"> -I can set up some simple practical enquiries. Including comparative and fair tests. - I can recognise when a simple fair test is necessary independently. - I can use standard measures and confidently measure to the nearest whole or half unit. -I am beginning to help decide which variables to keep the same and which to change. 	<ul style="list-style-type: none"> -I can set up simple practical enquiries. Including comparative and fair tests. -I can carry out a comparative or fair test that I have planned, ensuring that I change only the necessary variables. - With increased accuracy, I can use standard confidently measure to the nearest whole or half unit or mixed units.
RECORD	<ul style="list-style-type: none"> - I am beginning to collect data in a variety of ways, including labelled diagrams, bar charts and tables. -I am beginning to help decide how to record data. -I am beginning to use some scientific language in my work. 	<ul style="list-style-type: none"> -I can collect data in a variety of ways, including labelled diagrams, bar charts and tables. -I can help decide how to record data. -I can use some scientific language in my work.
REVIEW	<ul style="list-style-type: none"> -I am beginning to draw simple conclusions based on the results of my enquiry. -I am beginning to answer my questions using the results of my enquiry. -I am beginning to use my findings to make new simple predictions, suggest improvements and think of new questions. 	<ul style="list-style-type: none"> -I can draw simple conclusions based on the results of my enquiry. -I can answer my questions using the results of my enquiry. -I can use my findings to make new simple predictions, suggest improvements and think of new questions. -I can begin to think of cause and effect in my explanations.
IDENTIFY AND CLASSIFY	<ul style="list-style-type: none"> -I am beginning to talk about and identify differences and similarities in the properties or behaviour of living things, materials and other scientific phenomena. -I am beginning to identify simple changes related to simple scientific phenomena. -I am beginning to discuss criteria for grouping and sorting and can classify using simple keys. 	<ul style="list-style-type: none"> -I can talk about and identify differences and similarities in the properties or behaviour of living things, materials and other scientific phenomena. -I can identify simple changes related to simple scientific phenomena. -I can discuss criteria for grouping and sorting and can classify using simple keys.
UNDERSTANDING	<ul style="list-style-type: none"> -I am beginning to know which things in science have made our lives better eg computers in schools, hospitals etc -I can begin to understand risk in science. 	<ul style="list-style-type: none"> -I know some things in science which have made our lives better eg computers in schools, hospitals etc -I understand there is some risk in science.
RESEARCH	<ul style="list-style-type: none"> -I can begin to decide when research will help in my enquiry. -I am beginning to carry out simple research on my own. 	<ul style="list-style-type: none"> -I can begin to decide when research will help in my enquiry. -I can carry out simple research on my own.
VOCABULARY	<ul style="list-style-type: none"> -I am beginning to use some scientific language in my work. 	<ul style="list-style-type: none"> -I can use some scientific language in my work.

	Year 5	Year 6
PLAN	<ul style="list-style-type: none"> -I am beginning to explore ideas and ask my own questions about scientific phenomena. -I am beginning to plan different types of scientific enquiry to answer questions. -I am beginning to decide which variables to control. -I can make predictions based on scientific knowledge independently. 	<ul style="list-style-type: none"> -I can explore ideas and ask my own questions about scientific phenomena. -I can plan different types of scientific enquiry to answer questions. -I can decide which variables to control. -I can make predictions based on scientific knowledge and explain why confidently.
DO	<ul style="list-style-type: none"> -I can sometimes set up a range of comparative and fair tests. -I am beginning to explain which variables need to be controlled and why. -I can make a series of measurements adequate for the task. -I am beginning to suggest improvements to my test, giving reasons. 	<ul style="list-style-type: none"> -I can set up a range of comparative and fair tests. -I can explain which variables need to be controlled and why. -I can make a series of accurate measurements adequate for the task independently and confidently. -I can suggest improvements to my test, giving reasons.
RECORD	<ul style="list-style-type: none"> -I am beginning to record data and results of increasing complexity using – scientific diagrams and labels, classification keys, tables, bar graphs, line graphs. -I am beginning to choose how best to present data. -I can use some scientific language in my work. 	<ul style="list-style-type: none"> -I can record data and results of increasing complexity using – scientific diagrams and labels, classification keys, tables, bar graphs, line graphs -I can choose how best to present data. -I can confidently use the correct scientific language when appropriate.
REVIEW	<ul style="list-style-type: none"> -I am beginning to draw scientific, causal conclusions using the results of an enquiry to justify my ideas. -I am beginning to explain my conclusion using scientific knowledge and understanding. -I am beginning to distinguish opinion and facts. -I am beginning to use my findings to make predictions and set up further enquiries. -I can begin to use abstract models to explain my ideas. 	<ul style="list-style-type: none"> -I can draw scientific, causal conclusions using the results of an enquiry to justify my ideas. -I can explain my conclusion using scientific knowledge and understanding. -I can distinguish between opinion and facts. -I can use my findings to make predictions and set up further enquiries. -I can begin to use abstract models to explain my ideas.
IDENTIFY AND CLASSIFY	<ul style="list-style-type: none"> -I am beginning to use keys and other information records to classify and describe living things, materials and other scientific phenomena. -I am beginning to develop my own keys and other information records to classify and describe. -I am beginning to identify changes related to scientific phenomena. 	<ul style="list-style-type: none"> -I can use keys and other information records to classify and describe living things, materials and other scientific phenomena. -I can develop my own keys and other information records to classify and describe. -I can identify changes related to scientific phenomena.
UNDERSTANDING	<ul style="list-style-type: none"> -I am beginning to see how science is useful in lots of different ways. -I am beginning to say which parts of our lives rely on science. -I am beginning to explain the positive and negative effects of scientific developments. 	<ul style="list-style-type: none"> -I can see how science is useful in lots of different ways. -I can say which parts of our lives rely on science. -I can explain the positive and negative effects of scientific developments.
RESEARCH	<ul style="list-style-type: none"> -I am beginning to recognise which secondary source will be most useful to my research. -I can begin to carry out research independently. 	<ul style="list-style-type: none"> -I can recognise which secondary source will be most useful to my research. -I can carry out research independently.
VOCABULARY	<ul style="list-style-type: none"> -I am beginning to confidently use the correct scientific language when appropriate. 	<ul style="list-style-type: none"> -I can confidently use the correct scientific language when appropriate.

Routes for KS2 22-25

2022-23

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Opal (NC Y4)	Animals	Electricity	States of Matter	States of Matter	Sound	Living Things including Habitats
Topaz (NC Y4)	Animals	Electricity	States of Matter	States of Matter	Sound	Living Things including Habitats
Onyx (NC Y6)	Living things including Habitats	Animals including humans	Animals including humans	Electricity	Evolution and inheritance	Light

2023-24

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Opal (NC Y3)	Forces and Magnetism	Forces and Magnetism	Animals including Humans	Light and Sight	Rocks	Plants
Topaz (NC Y5)	Earth and Space	Forces	Properties of Materials	Properties of Materials	Animals including Humans	Living Things including Habitats
Onyx (NC Y6)	Living things including Habitats	Animals including Humans	Animals including humans	Electricity	Evolution and inheritance	Light

2024-2025

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Opal (NC Y4)	Animals	Electricity	States of Matter	States of Matter	Sound	Living Things including Habitats
Topaz (NC Y4)	Animals	Electricity	States of Matter	States of Matter	Sound	Living Things including Habitats
Onyx	Living things including Habitats	Animals including Humans	Animals including humans	Electricity	Evolution and inheritance	Light