Amberley CE Primary School

St. James' CE Primary School, Coldwaltham

Enabling every child to thrive and succeed

At Arun Villages Federation, we care for EVERYONE. We embrace challenges and all opportunities to learn, recognising the value of education and persevering even when it feels difficult.

We are uncompromising in our aspirations, proud of our – and each other's - achievements and look forward to embracing the experiences the wider world offers.

Respect, Kindness, Honesty, Positivity and Teamwork

Science

Intent

It is our intention to develop in all young people a lifelong curiosity and interest in the sciences. When planning for the science curriculum, we intend for children to have the opportunity, wherever possible, to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions. We want the children to consolidate and retain the science knowledge they have learnt and also reinforce key scientific vocabulary from each area of study.

Implementation

The acquisition of key scientific knowledge is an integral part of our science lessons. The progression of skills for working scientifically are developed through the year groups and scientific enquiry skills are of key importance within lessons. The progression of these skills is set out in the Science Progression Map. Each lesson has a clear focus. Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each area of study. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. There is also the opportunity to regularly review and evaluate children's understanding. Children to know more and remember more through revision and building upon previous learning. Activities are effectively accessible to all so that all children have an appropriate level of support and challenge. Enabling us to deliver high-quality teaching and learning opportunities while making them aware of possible scientific misconceptions.

Impact

In Science, progress is measured through a child's ability to know more, remember more and explain more. The learning environment across the school will be more consistent with science technical vocabulary displayed, spoken and used by all learners. Whole-school and parental engagement will be improved through the use of science-specific home learning tasks and shared use of resources. Children who feel confident in their science knowledge and enquiry skills will be excited about science, show that they are actively curious to learn more and will see the relevance of what they learn in science lessons to real-life situations and also the importance of science in the real world.

Science Progression Map – Whole School

Cycle A

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cycle A Substantive Knowledge							
Animals including humans	Understanding of Our World **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class.	**Pupils should be taught to:** • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals; • identify and name a variety of common animals that are carnivores, herbivores and omnivores; • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets); • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	**Pupils should be taught to:** • notice that animals, including humans, have offspring which grow into adults; • find out about and describe the basic needs of animals, including humans, for survival (water, food and air); • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	**Pupils should be taught to:** • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat; • identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Pupils should be taught to:** • describe the simple functions of the basic parts of the digestive system in humans; • identify the different types of teeth in humans and their simple functions; • construct and interpret a variety of food chains, identifying producers, predators and prey.	**Pupils should be taught to:** • describe the changes as humans develop to old age.	**Pupils should be taught to:** • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood; • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function; • describe the ways in which nutrients and water are transported within animals, including humans.

Key Vocabulary	Science • Experiment • Test • Fair • Find out Explain • Reason • Why • Record • Senses	• Names of animal groups: **fish, amphibians, reptiles, birds, mammals.** • Animal diets: **carnivore, herbivore, omnivore.** • Human and animal body parts: e.g. body, head, neck, arms, elbows, legs, knees, face, ears, eyes, nose, hair, mouth, teeth, hands, feet, tail, wings, feathers, fur, beak, fins, gills. • Human senses: **sight, hearing, touch, smell, taste.** • Exploring senses: loud, quiet, soft, rough. • Other: human, animal, pet.	• Being born and growing: **Young, offspring, live young**, grow, **develop**, change, hatch, lay, fly, crawl, talk. • Young and adult names: e.g. lamb and sheep, kitten and cat, duckling and duck. • **Life cycle** stages: e.g. baby, toddler, child, teenager, **adult;** frogspawn, tadpole, froglet, frog. • Survival and staying healthy: basic needs, survive, food, air, **exercise, diet, nutrition**, healthy, balanced diet, **hygiene, germs.** • Food groups: fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar. Previously introduced vocabulary: **water**.	• Food groups and **nutrients**: fibre, fats **(saturated and unsaturated**), vitamins, minerals. • Skeletons and muscles: skeleton, **muscles, tendons, joints,** protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, **vertebrate, invertebrate,** endoskeleton, exoskeleton, hydrostatic skeleton. • Names of human bones: e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula. • Other: **energy**. Previously introduced vocabulary: movement.	• Digestive system: **digest**, digestion, tongue, teeth, saliva, salivary glands, **oesophagus, stomach,** liver, pancreas, gall bladder, **small intestine,** duodenum**, large intestine, rectum,** anus, faeces, organ. • Types of teeth and dental care: **molar**, **premolar**, **incisor**, **canine**, wisdom teeth, tooth decay, plaque, enamel, baby (milk) teeth. • Food chains and animal diets: decomposer, food web. Previously introduced vocabulary: **producer,** consumer**, prey, predator,** excretion**,** habitat.	• Process of reproduction: **gestation, asexual reproduction, sexual reproduction,** sperm, egg, cells, clone. • Changes and **life cycle:** embryo, foetus, uterus, **prenatal, adolescence, puberty, menstruation, adulthood,** menopause**, life expectancy,** old age, hormones, sweat. • Changing body parts: e.g. breasts, penis, larynx, ovaries, genitalia, pubic hair. Previously introduced vocabulary: reproduction, **reproduce,** types of animals and animal groups, **fertilisation.**	• **Circulatory system**: circulation, **heart**, pulse, heartbeat, heart rate, lungs, breathing, **blood vessels**, blood, pump, transported, **oxygenated blood, deoxygenated blood,** oxygen, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells. • Lifestyle: **drug, alcohol,** smoking, disease, calorie, energy input, energy output. • Other: water transportation, nutrient transportation, waste products. Previously introduced vocabulary: co2
Experiments and Scientists/key people		https://www.stem.org.uk/resources/community/collection/12726/year-1-animals-including-humans local aquatic specialist	https://www.stem.org.uk/resources/community/collection/12727/year-2-animals-including-humans Florence Nightingale (hygiene) Louis Pasteur Charlotte Armah Mah Hussain-Gambles	https://www.stem.org.uk/resources/community/collection/12601/year-3-animals-including-humans David Attenborough Elizabeth Blackwell Elsie Widdowson	https://www.stem.org.uk/resources/community/collection/12365/year-4-animals-including-humans Elizabeth Blackwell Rosalind Franklin	https://www.stem.org.uk/resources/community/collection/13293/year-5-animals-including-humans Francesco Redi (life cycles) Jennifer Doudna Donald Palmer	**https://www.stem.org.uk/resources/community/collection/13109/year-6-animals-including-humans** **Karl Landsteiner** **Marie M. Daly**
Plants	**The Natural World** - Explore the natural world around them, making observations and drawing pictures	**Pupils should be taught to:** • identify and name a variety of common wild and garden	**Pupils should be taught to:** • observe and describe how seeds and bulbs grow into mature plants;	**Pupils should be taught to:** • identify and describe the functions of different parts of flowering plants:			

	of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class.	plants, including deciduous and evergreen trees; • identify and describe the basic structure of a variety of common flowering plants, including trees.	• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	roots, stem/trunk, leaves and flowers; • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant; • investigate the way in which water is transported within plants; • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
Vocabulary		• Names of common plants: **wild plant, garden plant, evergreen** tree, **deciduous** tree, common flowering plant, **weed,** grass. • Name some features of plants: e.g. **flower**, vegetable, **fruit**, berry, **leaf/leaves**, blossom, **petal**, **stem**, trunk, branch, **root**, **seed, bulb,** soil. • Name some common types of plant e.g. sunflower, daffodil.	• Growth of plants: **germination**, **shoot, seed dispersal,** grow, food store, life cycle, die, wilt, seedling, sapling. • Needs of plants: **sunlight, nutrition,** light, healthy, space, air. • Name different types of plant: e.g. bean plant, cactus. • Names of different habitats: e.g. rainforest, desert. Previously introduced vocabulary: **water**, **temperature**, warm, hot, cold, habitat.	• Water transportation: transport, **evaporation, evaporate, nutrients,** absorb, anchor. • Life cycle of flowering plants: **pollination** (insect/wind), pollen, nectar, pollinator, seed formation, **seed dispersal** (animal/wind/water), reproduce, **fertilisation,** fertilise, **stamen,** anther, filament, **carpel (pistil),** stigma, style, ovary, ovule, **sepal**, carbon dioxide. Previously introduced vocabulary: life cycle**.**			
Experiments and Scientists/key people		https://www.stem.org.uk/resources/community/collection/12534/year-1-plants	https://www.stem.org.uk/resources/community/collection/13299/year-2-plants George Washington Carver	https://www.stem.org.uk/resources/community/collection/12535/year-3-plants?gclid=CjwKCAjwoIqhBhAGEiwArXT7K-			

		Beatrix Potter		FQ2ru1mFXBliDZl-7p1gdIaLMHiYzFfzp4OXxVREBrie4D-hFiLhoCbZkQAvD_BwE Judith D. Zuk			
Living things and their habitats	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion.		**Pupils should be taught to:** • explore and compare the differences between things that are living, dead, and things that have never been alive; • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other; • identify and name a variety of plants and animals in their habitats, including microhabitats; • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		**Pupils should be taught to:** • recognise that living things can be grouped in a variety of ways; • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; • recognise that environments can change and that this can sometimes pose dangers to living things.	**Pupils should be taught to:** • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; • describe the life process of reproduction in some plants and animals.	**Pupils should be taught to:** • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals; • give reasons for classifying plants and animals based on specific characteristics.

	The Natural World - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.						
Vocabulary			• Living or dead**: living, dead, never living,** not living, alive, never been alive, healthy. • **Habitats** including **microhabitats**: **depend,** shelter, safety, **survive**, suited, space, minibeast, air. • **Life processes:** movement, sensitivity, growth, reproduction, nutrition, excretion, respiration. • **Food chains: food sources,** food, producer, consumer, predator, prey. • Names of habitats and microhabitats: e.g. under leaves, woodland, rainforest,		• Living things: **organisms, specimen,** species. • Grouping living things: **classification,** classification keys, classify, **characteristics**. • Names of invertebrate animals: snails and slugs, worms, spiders, insects. • Invertebrate body parts: e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs. • Environmental changes: **environment,** environmental dangers,	• **Reproduction**: **asexual reproduction, sexual reproduction**, **gestation, metamorphosis,** gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation. Previously introduced vocabulary: **life cycle, pollination,** offspring, **fertilise,** fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma, style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young.	• Classifying: Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation. • **Microorganisms**: **bacteria,** single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, **microscope**, decompose.

			sea shore, ocean, urban, local habitat. Previously introduced vocabulary: senses, **carnivore**, **herbivore**, **omnivore**, **seed**, **water**, names of materials.		adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, **endangered species, extinct.** Previously introduced vocabulary: carbon dioxide, **fish, bird, mammal, amphibian, reptile**, skeleton, bone, **vertebrate, invertebrate,** backbone, names for animal body parts, names of common plants, photosynthesis.		
Experiments and Scientists/key people			https://www.stem.org.uk/resources/community/collection/12723/year-2-living-things-and-their-habitats Rachel Carson		https://www.stem.org.uk/resources/community/collection/12774/year-4-living-things-and-their-habitats Jane Goodall	**https://www.stem.org.uk/resources/community/collection/12775/year-5-living-things-and-their-habitats** **Nettie Stevens**	https://www.stem.org.uk/resources/community/collection/12740/year-6-all-living-things Priscilla Susan Bury Alexander Fleming Emmanuelle Charpentier
Evolution and Inheritance	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail.						**Pupils should be taught to:** • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago; • recognise that living things produce offspring of the same kind, but normally offspring vary and

	• Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **Personal, social and emotional development –** • Know and talk about the different factors that support their overall health and wellbeing: • regular physical activity • healthy eating • toothbrushing • sensible amounts of 'screen time' • having a good sleep routine • being a safe pedestrian						are not identical to their parents; • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Vocabulary							• **Evolution** and **inheritance:** evolve, **adaptation,** inherit, **natural selection, adaptive traits, inherited traits,** mutations, theory of evolution, ancestors, biological parent, chromosomes, genes, Charles Darwin. • Other: selective breeding, artificial selection, breed, cross breeding,

							genetically modified food, cloning, DNA. Previously introduced vocabulary: classification, **offspring, characteristics, habitat, environment,** adapt, **variations**, human, **fossil,** suited, cells, names of different habitats, names of animals and their body parts, species, **sedimentary rock**, lava, **igneous rock**, **metamorphic rock**, **magma**, heat, **fossilisation**.
Experiments and Scientists/key people							**https://www.stem.org.uk/resources/community/collection/12648/year-6-evolution-and-inheritance** Mary Anning Charles Darwin Alfred Wallace Jack Horner
Seasonal Changes	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them.	**Pupils should be taught to:** • observe changes across the 4 seasons; • observe and describe weather associated with the seasons and how day length varies.					

	• Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion. **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences						

	and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.						
Vocabulary		• **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.**					
Experiments and Scientists/key people		https://www.stem.org.uk/resources/community/collection/13195/year-1-seasonal-changes					

		Sarah Keith-Lucas (bbc meteorologist)					
Light	**People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion. **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.		•	**Pupils should be taught to:** • recognise that they need light in order to see things and that dark is the absence of light; • notice that light is reflected from surfaces; • recognise that light from the sun can be dangerous and that there are ways to protect their eyes; • recognise that shadows are formed when the light from a light source is blocked by an opaque object; • find patterns in the way that the size of shadows change.			**Pupils should be taught to:** • recognise that light appears to travel in straight lines; • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye; • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes; • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Vocabulary				• **Light** and seeing: **dark,** absence of light, **light source,** illuminate, visible, **shadow,**			• Reflection: periscope.

				translucent, energy, block. • **Light sources:** e.g. candle, torch, fire, lantern, lightning. • **Reflective light: reflect, reflection,** surface, **ray**, scatter, reverse, beam, angle, mirror, moon. • Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct. Previously introduced vocabulary: **opaque, transparent,** sunlight, sun.			• Seeing light: **visible spectrum, prism.** • How light travels: light waves, wavelength, straight line, **refraction.** Previously introduced vocabulary: names and properties of materials, absorb.
				https://www.stem.org.uk/resources/community/collection/12719/year-3-light Isaac Newton https://www.livescience.com/physics-mathematics/refraction-is-then-all-there-is-to-it-how-isaac-newtons-experiments-revealed-the-mystery-of-light			https://www.stem.org.uk/resources/community/collection/12741/year-6-light Thomas Young Dr. Cecelia Payne-Gaposchkin
Sound	**Communication & language –**				**Pupils should be taught to:**	•	

	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts				• identify how sounds are made, associating some of them with something vibrating; • recognise that vibrations from sounds travel through a medium to the ear; • find patterns between the pitch of a sound and features of the object that produced it; • find patterns between the volume of a sound and the strength of the vibrations that produced it; • recognise that sounds get fainter as the distance from the sound source increases.		
Vocabulary					• Parts of the **ear**: **eardrum.** • Making sound: **vibration,** vocal cords, **particles.** • Measuring sound: **pitch**, **volume, amplitude, sound wave,** quiet, loud, high, low, travel**, distance.** • Other: **soundproof, absorb sound.**		

Experiments and Scientists/key people					https://www.stem.org.uk/resources/community/collection/12746/year-4-sound Katy Payne https://www.birds.cornell.edu/ccb/elephant-listening-project/		
Electricity	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **The Natural World** - Explore the natural world around them, making observations and drawing pictures				**Pupils should be taught to:** • identify common appliances that run on electricity; • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers; • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery; • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit; • recognise some common conductors and insulators, and associate metals with being good conductors.		**Pupils should be taught to:** • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit; • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches; • use recognised symbols when representing a simple circuit in a diagram.

	of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.						
Vocabulary					• **Electricity:** mains-powered, battery-powered, **mains electricity,** plug, **appliances**, devices. • Circuits: **circuit,** simple series circuit, complete circuit, incomplete circuit. • Circuit parts: bulb, cell, wire, buzzer, switch, motor, **battery.** • Materials: **electrical conductor, electrical insulator.** • Other: safety. Previously introduced vocabulary: names of materials.		• Flow and measure of electricity: **voltage, amps, resistance, electrons**, volts (V), **current.** • Circuits**: symbol,** circuit diagram, component, function, filament. • Variations: dimmer, brighter, louder, quieter. • Types of electricity: natural electricity, human-made electricity, solar panels, power station. • Other: positive, negative.

Experiments and Scientists/key people					https://www.stem.org.uk/resources/community/collection/12388/year-4-electricity **Jo Shien Ng**		https://www.stem.org.uk/resources/community/collection/12390/year-6-electricity Alessandro Volta Hertha Ayrton
Materials	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise	Everyday Materials **Pupils should be taught to:** • distinguish between an object and the material from which it is made; • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock; • describe the simple physical properties of a variety of everyday materials; • compare and group together a variety of everyday materials on the basis of their simple physical properties.	Use of Everyday Materials **Pupils should be taught to:** • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses; • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Rocks **Pupils should be taught to:** • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties; • describe in simple terms how fossils are formed when things that have lived are trapped within rock; • recognise that soils are made from rocks and organic matter.	States of Matter **Pupils should be taught to:** • compare and group materials together, according to whether they are solids, liquids or gases; • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C); • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Properties and Changes of Materials **Pupils should be taught to:** • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets; • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution; • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials,	

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	thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.					including metals, wood and plastic; • demonstrate that dissolving, mixing and changes of state are reversible changes; • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	

Vocabulary		• Names of **materials**: wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric. • Properties of materials: **hard, soft, shiny, dull, stretchy**, **rough**, **smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof**, **absorbent, not absorbent,** sharp, stiff. • Other: **object.**	• Changing shape: squash, bend, twist, stretch. • **Properties** of **materials:** e.g. strong, flexible, light, hard-wearing, elastic. • Other: **suitability**, recycle, pollution.	• Types of rock**: sedimentary rock, igneous rock, metamorphic rock.** • **Properties of rocks: permeable,** semi-permeable, **impermeable,** durable. • Names of rocks: e.g. marble, chalk, granite, sandstone, slate. • Formation of rocks and fossils: natural, human-made, **magma, lava,** molten rock, **sediment, erosion, fossilisation,** layers, bone, fossil. • Soil: sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost. • Other: **palaeontology.** Previously introduced vocabulary: soil, **water**, air.	• **States of matter: solids, liquids, gases,** particles. • State change: **evaporate, condense, melt, freeze**, heat, cool, melting point, freezing point, boiling point, **water vapour**. • Water cycle: **precipitation**, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail. • Other: atmosphere. Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide.	• Properties of **materials**: thermal **conductor/insulator,** magnetism, electrical resistance, **transparency**. • Mixtures and solutions: dissolving, substance, soluble, insoluble. • Changes of materials: reversible change, physical change, irreversible change, chemical change, burning, new material, product. • Separating: sieving, filtering, magnetic attraction. Previously introduced vocabulary: electrical **conductor/insulator,** bulb, **translucent**.	
Experiments and Scientists/key people		https://www.stem.org.uk/resources/community/collection/12725/year-1-everyday-materials Stephanie Kwolek	https://www.stem.org.uk/resources/community/collection/12724/year-2-uses-everyday-materials Harry Bhadeshia Sanjeev Gupta	https://www.stem.org.uk/resources/community/collection/12367/year-3-rocks Alice Wilson Ida Slater	https://www.stem.org.uk/resources/community/collection/12345/year-4-states-matter	https://www.stem.org.uk/resources/community/collection/14764/year-5-changes-state Walter Lincoln Hawkins	
Cycle A Disciplinary Knowledge							
		• Ask simple questions and recognise that they can be answered in different ways (Year 1 focus)	Ask simple questions and recognise that they can be answered in different ways including use of scientific	Ask relevant questions and use different types of scientific enquiries to answer them (Year 3 focus)	Ask relevant questions and use different types of scientific enquiries to answer them (Year 4 focus)	Plan different types of scientific enquiries to answer questions, including recognising and controlling	• Plan different types of scientific enquiries to answer their own or others' questions,

		• Use simple equipment to observe closely (Year 1 focus) • Perform simple tests (Year 1 focus) • Identify and classify (Year 1 focus) • Use his/her observations and ideas to suggest answers to questions (Year 1 focus) • Gather and record data to help in answering questions (Year 1 focus)	language from the national curriculum (Year 2 focus) • Use simple equipment to observe closely including changes over time (Year 2 focus) • Perform simple comparative tests (Year 2 focus) • Identify, group and classify (Year 2 focus) • Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns (Year 2 focus) • Gather and record data to help in answering questions including from secondary sources of information (Year 2	• Set up simple practical enquiries, comparative and fair tests (Year 3 focus) • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (Year 3 focus) • Gather, record, classify and present data in a variety of ways to help in answering questions (Year 3 focus) • Record findings using simple	• Set up simple practical enquiries, comparative and fair tests (Year 4 focus) • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (Year 4 focus) • Gather, record, classify and present data in a variety of ways to help in answering questions (Year 4 focus) • Record findings using simple	variables where necessary (Year 5 focus) • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Year 5 focus) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (Year 5 focus) • Use test results to make predictions to set up further comparative and fair tests (Year 5 focus) • Report and present findings from enquiries,	including recognising and controlling variables where necessary (Year 6 focus) • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Year 6 focus) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (Year 6 focus)

			focus)	scientific language, drawings, labelled diagrams, keys, bar charts, and tables (Year 3 focus) • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Year 3 focus) • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Year 3 focus) • Identify differences, similarities or changes related	scientific language, drawings, labelled diagrams, keys, bar charts, and tables (Year 4 focus) • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Year 4 focus) • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Year 4 focus) • Identify differences, similarities or changes related to	including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 5 focus) • Identify scientific evidence that has been used to support or refute ideas or arguments (Year 5 focus)	• Use test results to make predictions to set up further comparative and fair tests (Year 6 focus) • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 6 focus) • Report and present findings from enquiries, including conclusions, causal relationships and

				to simple scientific ideas and processes (Year 3 focus) • Use straightforward scientific evidence to answer questions or to support his/her findings (Year 3 focus)	simple scientific ideas and processes (Year 4 focus) • Use straightforward scientific evidence to answer questions or to support his/her findings (Year 4 focus)		explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 6 focus) • Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources • Group and classify things and recognise patterns

Key Vocabulary							
Assessment	Through provision, focus groups and with adult support, can children… ● Discuss what they can see, touch, smell, hear or taste? ● Use simple equipment to help them make observations? Can they find out by watching, listening, tasting, smelling and touching?	https://assets.publishing.service.gov.uk/media/5c0e68eae5274a0bbd46419e/2018_key_stage_1_teacher_assessment_exemplification_science.pdf		https://assets.publishing.service.gov.uk/media/5c0e698440f0b60bc4029c0a/2018_key_stage_2_teacher_assessment_exemplification_science.pdf			

	Assessment can take the form of quizzes, diagrams, explanation texts, and poster. Evidence that is created away from the point of teaching and is completed independently.						

Science Progression Map – Whole School

Cycle B

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Cycle B Substantive Knowledge							
Plants	**The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class.	**Pupils should be taught to:** • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees; • identify and describe the basic structure of a variety of common flowering plants, including trees.	**Pupils should be taught to:** • observe and describe how seeds and bulbs grow into mature plants; • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	**Pupils should be taught to:** • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers; • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant; • investigate the way in which water is transported within plants; • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			

Vocabulary		• Names of common plants: **wild plant, garden plant, evergreen** tree, **deciduous** tree, common flowering plant, **weed,** grass. • Name some features of plants: e.g. **flower**, vegetable, **fruit**, berry, **leaf/leaves**, blossom, **petal**, **stem**, trunk, branch, **root**, **seed, bulb,** soil. • Name some common types of plant e.g. sunflower, daffodil.	• Growth of plants: **germination**, **shoot, seed dispersal,** grow, food store, life cycle, die, wilt, seedling, sapling. • Needs of plants: **sunlight, nutrition,** light, healthy, space, air. • Name different types of plant: e.g. bean plant, cactus. • Names of different habitats: e.g. rainforest, desert. Previously introduced vocabulary: **water**, **temperature**, warm, hot, cold, habitat.	• Water transportation: transport, **evaporation, evaporate, nutrients,** absorb, anchor. • Life cycle of flowering plants: **pollination** (insect/wind), pollen, nectar, pollinator, seed formation, **seed dispersal** (animal/wind/water), reproduce, **fertilisation,** fertilise, **stamen,** anther, filament, **carpel (pistil),** stigma, style, ovary, ovule, **sepal**, carbon dioxide. Previously introduced vocabulary: life cycle**.**			
Experiments and scientists		https://www.stem.org.uk/resources/community/collection/12534/year-1-plants women in science https://www.kew.org/read-and-watch/250-years-women-in-botany Carl Linnaeus, Mary, the Duchess of Beaufort	https://www.stem.org.uk/resources/community/collection/13299/year-2-plants Elizabeth Blackwell Carl Linnaeus, Mary, the Duchess of Beaufort	https://www.stem.org.uk/resources/community/collection/12535/year-3-plants?gclid=CjwKCAjwoIqhBhAGEiwArXT7K-FQ2ru1mFXBliDZl-7p1gdIaLMHiYzFfzp4OXxVREBrie4D-hFiLhoCbZkQAvD_BwE Mary Lawrence			

Living things and their habitats	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion. **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class.		**Pupils should be taught to:** • explore and compare the differences between things that are living, dead, and things that have never been alive; • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other; • identify and name a variety of plants and animals in their habitats, including microhabitats; • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		**Pupils should be taught to:** • recognise that living things can be grouped in a variety of ways; • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; • recognise that environments can change and that this can sometimes pose dangers to living things.	**Pupils should be taught to:** • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; • describe the life process of reproduction in some plants and animals.	**Pupils should be taught to:** • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals; • give reasons for classifying plants and animals based on specific characteristics.

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

Experiments and Scientists			https://www.stem.org.uk/resources/community/collection/12723/year-2-living-things-and-their-habitats Maria Sybilla Merian		https://www.stem.org.uk/resources/community/collection/12774/year-4-living-things-and-their-habitats Queen Charlotte of England promoted women botanists	**https://www.stem.org.uk/resources/community/collection/12775/year-5-living-things-and-their-habitats** **Elizabeth Garrett Anderson**	https://www.stem.org.uk/resources/community/collection/12740/year-6-all-living-things Women in micro biology https://fems-microbiology.org/opportunities/10-inspirational-women-in-microbiology-infographic/
Forces	**People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion. **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around		•	Forces and Magnets **Pupils should be taught to:** • compare how things move on different surfaces; • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance; • observe how magnets attract or repel each other and attract some materials and not others; • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials; • describe magnets as having 2 poles; • predict whether 2 magnets will attract or repel each		Forces **Pupils should be taught to:** • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object; • identify the effects of air resistance, water resistance and friction, that act between moving surfaces; • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	

	them including the seasons and changing states of matter.			other, depending on which poles are facing.			
Vocabulary				• How things move: move, movement, **surface**, distance, strength. • Types of **forces**: push, pull, contact force, non-contact force, **friction**. • **Magnets: magnetic, magnetic field,** magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic **poles** (north pole, south pole), **attract, repel,** compass. • Magnetic and non-magnetic materials: e.g. iron, nickel, cobalt. Previously introduced vocabulary: metal, names of materials.		• Types of forces: **air resistance, water resistance, buoyancy, upthrust,** Earth's **gravitational pull, gravity**, opposing forces, driving force. • **Mechanisms:** levers, pulleys, gears/cogs. • Measurements: **weight, mass,** kilograms (kg), Newtons (N), scales, speed, fast, slow. • Other: **streamlined**, Earth. Previously introduced vocabulary: air, heat, moon.	
Experiments and scientists				https://www.stem.org.uk/resources/community/collection/12391/year-3-forces-and-magnets Isaac Newton Hans Christian Oersted Mary Somerville		https://www.stem.org.uk/resources/community/collection/12696/year-5-forces	

Light	**People, Culture & Communities** - Describe their immediate environment using knowledge from observation and discussion. **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.		•	**Pupils should be taught to:** • recognise that they need light in order to see things and that dark is the absence of light; • notice that light is reflected from surfaces; • recognise that light from the sun can be dangerous and that there are ways to protect their eyes; • recognise that shadows are formed when the light from a light source is blocked by an opaque object; • find patterns in the way that the size of shadows change.			**Pupils should be taught to:** • recognise that light appears to travel in straight lines; • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye; • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes; • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Vocabulary				• **Light** and seeing: **dark,** absence of light, **light source,** illuminate, visible, **shadow, translucent,** energy, block.			• Reflection: periscope. • Seeing light: **visible**

				• **Light sources:** e.g. candle, torch, fire, lantern, lightning. • **Reflective light: reflect, reflection,** surface, **ray**, scatter, reverse, beam, angle, mirror, moon. • Sun safety: dangerous, glare, damage, UV light, UV rating, sunglasses, direct. Previously introduced vocabulary: **opaque, transparent,** sunlight, sun.			**spectrum, prism.** • How light travels: light waves, wavelength, straight line, **refraction.** Previously introduced vocabulary: names and properties of materials, absorb.
Experiments and scientists				https://www.stem.org.uk/resources/community/collection/12719/year-3-light Francesco Maria Grimaldi			https://www.stem.org.uk/resources/community/collection/12741/year-6-light C. V. Raman
Earth and Space	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and					**Pupils should be taught to:** • describe the movement of the Earth and other planets relative to the Sun in the solar system; • describe the movement of the Moon relative to the Earth; • describe the Sun, Earth and Moon as approximately spherical bodies;	

	to explain how things work and why they might happen. • Use new vocabulary in different contexts **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.					• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
Vocabulary						• Solar system: **star, planet.** • Names of planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus. • Shape: **spherical bodies, sphere.** • Movement: **rotate, axis, orbit, satellite.** • Theories: **geocentric model, heliocentric**	

						model, astronomer. • Day length: sunrise, sunset, midday, time zone. Previously introduced vocabulary: **Sun, moon, shadow**, day, night, heat, **light**, **reflect**.	
Experiments and scientists						https://www.stem.org.uk/resources/community/collection/12347/year-5-earth-and-space Anaximander Aristarchus Tim Peak Hypatia Katherine Johnson Gene Shoemaker	
Materials	Understanding of Our World **Communication & language –** • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail.	Everyday Materials **Pupils should be taught to:** • distinguish between an object and the material from which it is made; • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock; • describe the simple physical properties of a variety of everyday materials; • compare and group together a variety of everyday materials on the basis of their simple physical properties.	Use of Everyday Materials **Pupils should be taught to:** • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses; • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Rocks **Pupils should be taught to:** • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties; • describe in simple terms how fossils are formed when things that have lived are trapped within rock; • recognise that soils are made from rocks and organic matter.	States of Matter **Pupils should be taught to:** • compare and group materials together, according to whether they are solids, liquids or gases; • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C); • identify the part played by evaporation and condensation in the	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	

Commented [ST2]:

	• Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts **The Natural World** - Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their own experiences and what has been read in class. Understand some processes and changes in the natural world around them including the seasons and changing states of matter.				water cycle and associate the rate of evaporation with temperature.	dissolve in liquid to form a solution, and describe how to recover a substance from a solution; • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic; • demonstrate that dissolving, mixing and changes of state are reversible changes; • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Vocabulary		• Names of **materials**: wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric. • Properties of materials: **hard, soft, shiny, dull, stretchy**, **rough**, **smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof**, **absorbent, not absorbent,** sharp, stiff. • Other: **object.**	• Changing shape: squash, bend, twist, stretch. • **Properties** of **materials:** e.g. strong, flexible, light, hard-wearing, elastic. • Other: **suitability**, recycle, pollution.	• Types of rock**: sedimentary rock, igneous rock, metamorphic rock.** • **Properties of rocks: permeable,** semi-permeable, **impermeable,** durable. • Names of rocks: e.g. marble, chalk, granite, sandstone, slate. • Formation of rocks and fossils: natural, human-made, **magma, lava,** molten rock, **sediment, erosion, fossilisation,** layers, bone, fossil. • Soil: sandy, chalky, clay, peaty, loamy, topsoil, subsoil,	• **States of matter: solids, liquids, gases,** particles. • State change: **evaporate, condense, melt, freeze**, heat, cool, melting point, freezing point, boiling point, **water vapour**. • Water cycle: **precipitation**, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail.	• Properties of **materials:** thermal **conductor/insulator,** magnetism, electrical resistance, **transparency**. • Mixtures and solutions: dissolving, substance, soluble, insoluble. • Changes of materials: reversible change, physical change, irreversible change, chemical change, burning, new material, product.	

				bedrock, mineral, organic matter, compost. • Other: **palaeontology.** Previously introduced vocabulary: soil, **water**, air.	• Other: atmosphere. Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide.	• Separating: sieving, filtering, magnetic attraction. Previously introduced vocabulary: electrical **conductor/insulator,** bulb, **translucent**.	
Experiments and scientists		https://www.stem.org.uk/resources/community/collection/12725/year-1-everyday-materials Charles Macintosh	https://www.stem.org.uk/resources/community/collection/12724/year-2-uses-everyday-materials Stephanie Kwolek	https://www.stem.org.uk/resources/community/collection/12367/year-3-rocks	https://www.stem.org.uk/resources/community/collection/12345/year-4-states-matter	https://www.stem.org.uk/resources/community/collection/14764/year-5-changes-state	
Cycle A Disciplinary Knowledge							
		• Ask simple questions and recognise that they can be answered in different ways (Year 1 focus) • Use simple equipment to observe closely (Year 1 focus) • Perform simple tests (Year 1 focus)	Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum (Year 2 focus) • Use simple equipment to observe closely including changes over time (Year 2 focus)	Ask relevant questions and use different types of scientific enquiries to answer them (Year 3 focus) • Set up simple practical enquiries, comparative and fair tests (Year 3 focus) • Make systematic and careful observations and, where appropriate, take accurate measurements	Ask relevant questions and use different types of scientific enquiries to answer them (Year 4 focus) • Set up simple practical enquiries, comparative and fair tests (Year 4 focus) • Make systematic and	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (Year 5 focus) • Take measurement	• Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary

		• Identify and classify (Year 1 focus) • Use his/her observations and ideas to suggest answers to questions (Year 1 focus) • Gather and record data to help in answering questions (Year 1 focus)	• Perform simple comparative tests (Year 2 focus) • Identify, group and classify (Year 2 focus) • Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns (Year 2 focus) • Gather and record data to help in answering questions including from secondary sources of information (Year 2 focus)	using standard units, using a range of equipment, including thermometers and data loggers (Year 3 focus) • Gather, record, classify and present data in a variety of ways to help in answering questions (Year 3 focus) • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (Year 3 focus) • Report on findings from enquiries, including oral and written explanations, displays or presentations of	careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (Year 4 focus) • Gather, record, classify and present data in a variety of ways to help in answering questions (Year 4 focus) • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar	s, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Year 5 focus) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (Year 5 focus) • Use test results to	(Year 6 focus) • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Year 6 focus) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables,

				results and conclusions (Year 3 focus) • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Year 3 focus) • Identify differences, similarities or changes related to simple scientific ideas and processes (Year 3 focus) • Use straightforward scientific evidence to answer questions or to support his/her findings (Year 3 focus)	charts, and tables (Year 4 focus) • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Year 4 focus) • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Year 4 focus) • Identify differences, similarities or changes related to	make predictions to set up further comparative and fair tests (Year 5 focus) • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 5 focus) • Identify scientific evidence that	scatter graphs, bar and line graphs (Year 6 focus) • Use test results to make predictions to set up further comparative and fair tests (Year 6 focus) • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and

					simple scientific ideas and processes (Year 4 focus) • Use straightforward scientific evidence to answer questions or to support his/her findings (Year 4 focus)	has been used to support or refute ideas or arguments (Year 5 focus)	written forms such as displays and other presentations (Year 6 focus) • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (Year 6 focus) • Describe and

							evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources • Group and classify things and recognise patterns
Key Vocabulary							

Assessment							

Adaptations to help reduce/remove barriers to learning

Potential Barriers to consider:	Adaptations to try:
Poor working memory	• Pe-teaching prior to the lesson with key knowledge and vocabulary

	• Step by step visual reminders of key steps in processes of designing/making/evaluating • Ensure that all demonstrations of experiments are laidout and uncluttered to allow all children a clear view • Use displays to revisit prior knowledge (focus on scientific symbols/vocabulary) • Repeated modelling of key learning knowledge in a small group or 1:1 setting • Supportive, flexible grouping to utilise peer collaboration to best impact • Clear, visual instructions broken down into small steps that the child can refer to and tick off • Seating places chosen carefully to ensure child can see/hear input and safety demonstrations with fewest distractions • When switching focus between board and desk, print key slides for child to have next to them. This will reduce the fatigue from them looking between two places – key support strategy for dyslexia
Lack of vocabulary knowledge/understanding	• Clear definitions of subject specific vocabulary given with visuals to support recall and understanding – make good use of dual-coding • Provide as many multi-sensory links to understand words as possible • Provide clear, easily accessible scaffolds for children to help choose vocabulary when describing/explaining each phase of their learning. Encourage them to use these for verbal recording as much as for written recording. • Label equipment with a word and symbol – repeatedly utilise these in labels in lesson PowerPoints/instructions, checklists, scaffolds etc. • Pre-teach vocab with images, regular exposure to language • Label equipment with symbols and words • Allow thinking time when asking questions using terminology

Challenges with written recording methods	• Encourage use of drawing and annotation; consider scribing, peer collaboration, cut and stick vocabulary, video or audio recording explaining the design, make and evaluation. • Use available technology to support recording; computer, iPad, talking tins, photography • Remove expectation of writing own 'we are learning to…' statement to ensure effort and energy goes into the recording of their learning
Sensory issues with textures/smells/sounds of materials and equipment being used	• Consider alternative resources that may be less challenging to work with e.g. playdough or plasticine instead of clay • Check safety procedures are understood • Utilise peer collaboration to provide access to materials and discussion of how they can be used but reducing pressure of needing to touch/handle the material • Provide a quieter space for working in • Colour water so it is easier to see • Label new equipment and processes to help develop vocabulary • Consider ventilation and position of children for anything that may have an odour • Pre-teach/ show experiment to ensure any sensory complications are addressed (show video of experiment/ handle materials) • Ask advice if needed on equipment (some SEND children have an aversion to grating noises, glass, need tactile ridges on measuring glasswear tec. • Are standing desks needed/ wobble cushions etc.
Physical barriers to using equipment	• Provide a range of adapted resources to improve accessibility of equipment e.g. larger pencils, pencil grips, darker pencils for improved visibility, a variety of sizes of paintbrush handles, left-handed and spring-loaded scissors etc.

	• Provide additional time before the lessons to practise using specific equipment and to build confidence • Provide additional support to ensure safe use of resources as necessary e.g. adult provides hand-over-hand support, 1:1 adult modelling • Have clear, simple instructions, written with visuals or video recorded, for children to refer to when using specific equipment • Use aids to hold parts in place as needed e.g. masking tape, blu-tac, paper clips • Consider if specific templates or pre-made sections will support the child to achieve the outcome objective
Sensory concerns and possible anxiety due to a more unstructured and noisier classroom environment	• Use of AVF Federation QFT lesson structure to help children feel reassured by lesson format • Clear explanations, with visual supports, for expectations during the lesson • Clarification of when the unstructured time will end, and what will come next, to help reduce anxiety (Now, Next, Then approach) • Time out, quiet space and brain breaks/movement breaks as needed • Use of flexible grouping to provide peer and staff supports • Use of individual tools to help with self-regulation e.g. fidget resources, doodle books, ear defenders, wobble cushion, sensory calming materials etc. •
Group work difficulties	• Provide clear roles for each member of the group • Ensure each group role has a short set of visual expectations that they can refer to, as a reminder of what they part is in the group • Flexible grouping used to provide supportive and encouraging groups for different lessons • Have a record sheet to remind and prompt the group of task expectations • Provide quieter spaces to work, where possible

Poor attention span	• Break tasks into small, achievable chunks • Use backward chaining to help engagement and sense of achievement (all steps prior to final step are completed for the child, modelling each step to teach them; they complete the final step. Once the final step is mastered, they then complete the final 2 steps and so on.) • Provide the child with their own 'bigger picture' of the sequence of lessons, so they can understand how each lesson builds toward a clear outcome. • Timers to provide focused time before a brain/movement break • Choice of order in which to complete set tasks
Participation and Practical work	• Constant approach to reduce anxiety around practical work • Pre-teach experiment (show them a video of what will happen and explain what will be expected of them) • Consider grouping for support • Assign roles within group activities to encourage participation • When organising a practical exercise consider – how you establish investigation routines – the level of supervision needed, the resources available • Link to PHSCE on how to work together and values • Ensure that equipment is available such as ear defenders, gloves for sensory issues