

The Wolds Federation of Schools



Science Curriculum

“The important thing is to never stop questioning”

Albert Einstein

Science Curriculum Intent

At The Wolds Federation we teach science to enable children to understand the physical, natural, and man-made world around them. The teaching of science allows our children to be able to be involved in an increasingly scientific and technological world. Our children are acting as agents of change by fostering concern and active care for our environment. Within the Federation, our vision is to give children a Science curriculum which enables children to think critically and question the world around them, allowing them to make informed decisions as citizens of the world and be an agent of change. To achieve this, we plan exciting, practical hands on experiences that encourage curiosity and questioning; enabling children to secure and extend their scientific knowledge and vocabulary. We believe that these opportunities will ensure that our children are confident, life-long learners who will explore the world around them. We believe that a broad and balanced science education is the entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability. Through the use of first hand, rich experiences which ignite the curiosity and wonder of science, we provide opportunities that develop and extend our children's scientific concept of their world

How we teach Science

In key stage 1 science is taught on a 2 year rolling cycle ensuring accurate coverage of national curriculum expectations. Within key stage two, Science is taught across a 4 year rolling cycle to ensure all needs of the children within our unique classes are being met. The curriculum has been carefully planned to ensure a clear distinction between substantive knowledge, as well as giving children opportunities to progress in key disciplinary skills. As part of our science teaching, pupils are given the opportunity to work scientifically using the following processes:

- Observe and measure
- Classify and conclude
- Identify patterns and relationships
- Make predictions and explain results
- Devise and carry out investigations
- Handle equipment and a wide range of materials safely and effectively.

These enquiry types are interweaved through carefully planned activities within the overarching concepts of biology, chemistry and physics.

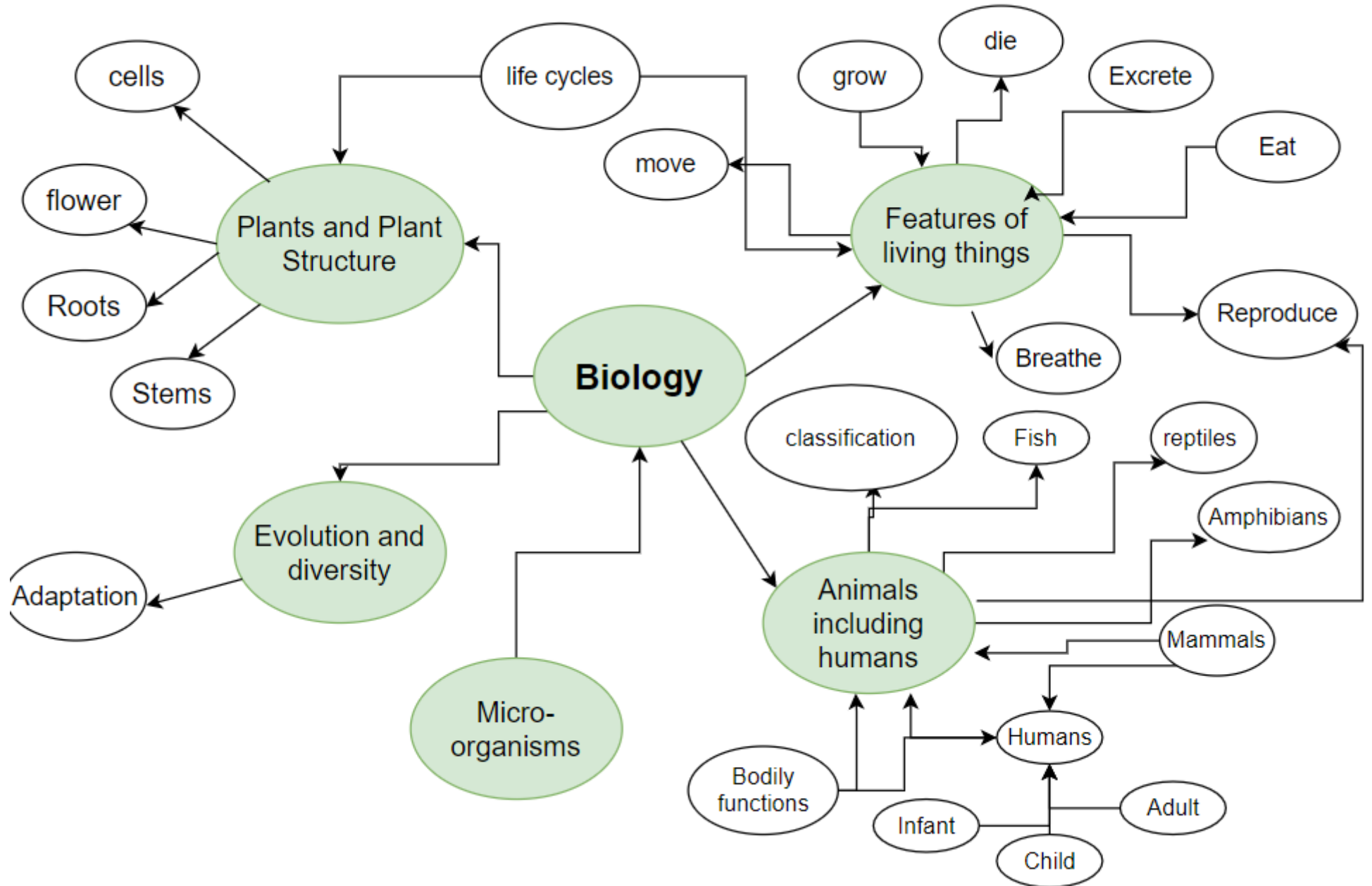
How do we assess Science?

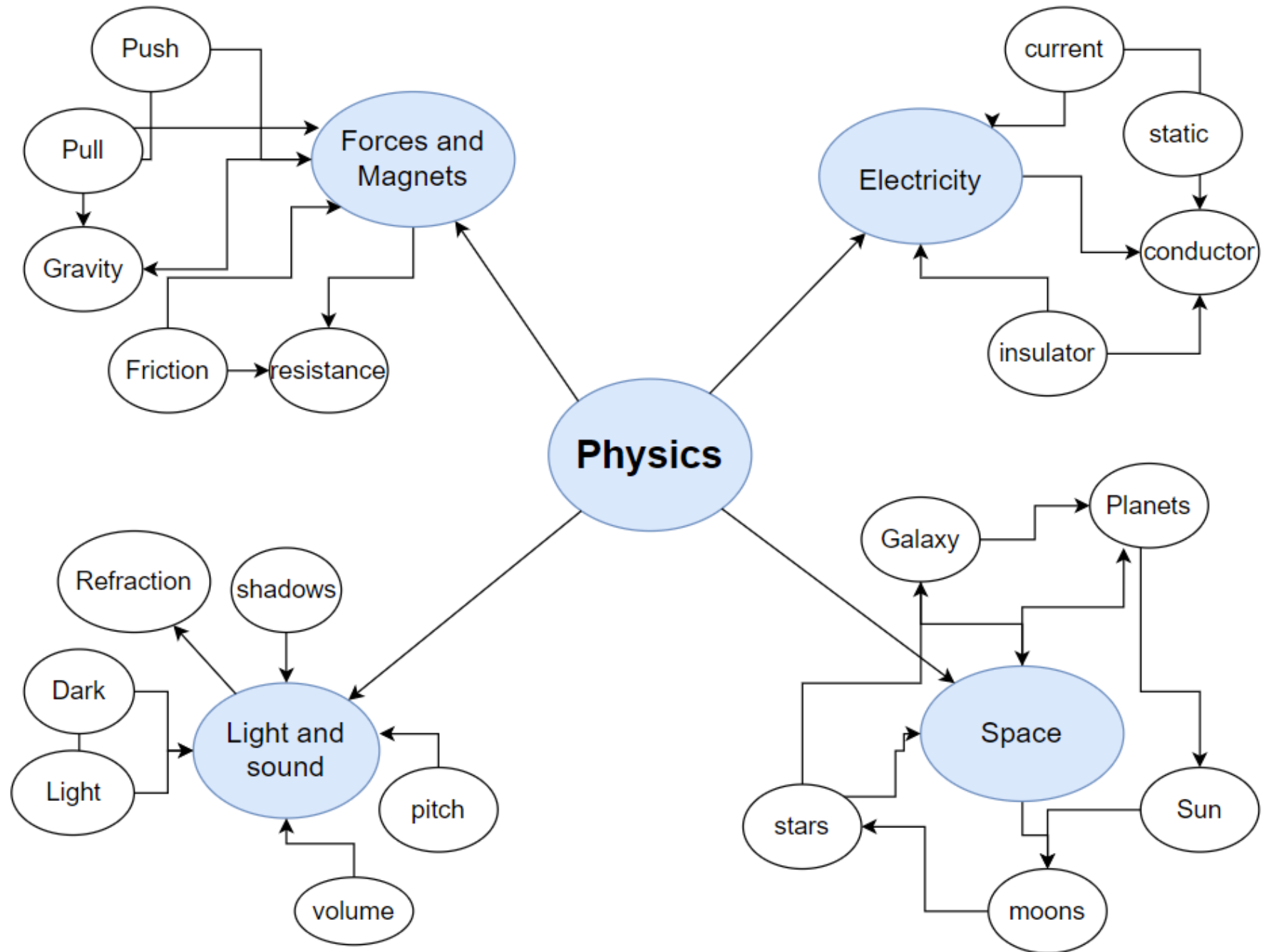
In Science, teachers use formative assessment as part of everyday practice to help pupils achieve the learning that is set out in the science curriculum. This is done through the use of careful questioning and ensuring children are using appropriate scientific vocabulary and terminology to demonstrate their understanding of a topic or disciplinary skill. At the end of each unit, teachers carry out an in school summative assessment which allows both teachers and leaders to see what learning has taken place. The outcomes of these assessments are recorded on topic over view grids at the end of each half term.

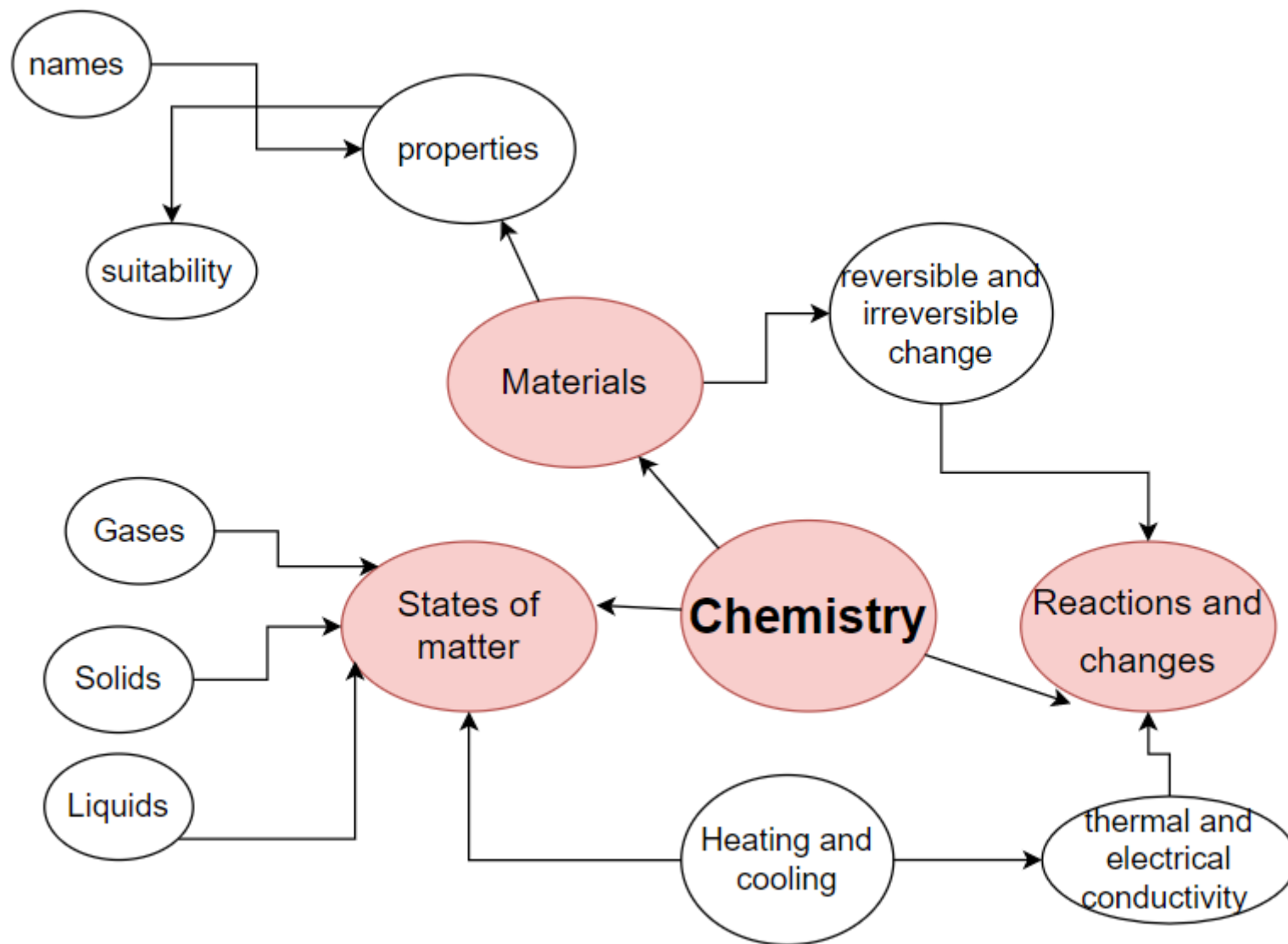
As part of statutory requirements, at the end of Key Stage one and Key stage two, teachers use their teacher assessment to make a formal judgement as to whether a child is working at or working below expectation. Teachers also use guidance from Teacher Assessment in Primary Science (TAPS) as a way of supporting them in making a judgement against the progress children have made.

	Biology	Physics	Chemistry
Year 1	Animals, including humans (naming animals and body parts) Plants (names & structure)	Seasonal Changes (changes and weather)	Everyday materials (names and properties of simple materials)
Year 2	Living things and their habitats (suitable habitats/simple food chains) Plants (growing conditions for seeds and bulbs) Animals, including humans (Health and growth)		Uses of everyday materials (suitability and changing shapes of materials)
Year 3	Plants (functions of parts and life cycles) Animals, including humans (skeletons)	Light (dark is the absence of light, size of shadows) Forces and magnets (friction – how things move on different surfaces, magnets)	Rocks (simple properties, fossils, soils)
Year 4	Living things and their habitats (grouping and simple classifying/changes to habitats can pose dangers) Animals, including humans (teeth, eating and digestions)	Sound (fainter sounds further away, vibrations, pitch and volume) Electricity (simple circuit, switches, conductors and insulators)	States of matter (solids, liquids, gases, heating & cooling, water cycle)
Year 5	Living things and their habitats (life cycles, reproduction) Animals, including humans (changes in humans as they grow)	Forces (gravity, friction, air-resistance, levers, pulleys and gears) Earth and Space (other planets)	Properties and changes of materials (more properties including thermal and electrical conductivity, mixing and separating reversible and irreversible)
Year 6	Animals, including humans (circulatory system, functions of heart, blood vessels and blood, health, water transport in animals) Living Things and their habitats (classifying including micro-organisms) Evolution and inheritance (more about fossils, adaptation)	Light (travels in straight lines, how we see things) Electricity (what affects bulb brightness, buzzer volume, voltage, symbols)	

Working Scientifically: Across all topics, children will be learning to work scientifically – using and developing investigative skills, including observation, pattern-seeking, fair testing, classification and identification.







The following table sets out the substantive science knowledge required at each key stage:

EYFS	Understanding the World The Natural World	ELG
		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.
Year 1	Unit	Core knowledge
	Animals, Including Humans	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
	Materials	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 Distinguish between an object and the material from which it is made.
	Seasonal Change	Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.
	Plants	Plants grow from bulbs/seeds. Plants need light and water to grow and survive Plants are important We can eat a lot of plants
Year 2	Unit	Core Knowledge
	End of KS1 Working Scientifically:	Ask their own questions about what they notice use different types of scientific enquiry to gather and record data, using simple equipment where appropriate to answer questions including: • observing changes over time • noticing similarities, differences and patterns • grouping and classifying things • carrying out simple comparative tests • finding things out using secondary sources of information • communicate their ideas, what they do and what they find out in a variety of ways
	Animals	Describe the importance of exercise, balanced diet and hygiene for humans. Describe the basic needs of animals for survival. Describe the main changes as young animals, including humans, grow into adults.
	Living things	Identify whether things are alive, dead or have never lived. Describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships. Describe how different plants and animals are suited to different habitats.
	Materials	Identify and group everyday materials, and compare their suitability for different uses.
	Plants	Describe the main changes as seeds and bulbs grow into mature plants

		Describe basic needs of plants for survival and the impact of changing these
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Wolds Federation Lower Key Stage 2 – Core Science Knowledge

Year 3	Unit of Science	Core knowledge
	Animals	identify that humans and some other animals have skeletons and muscles for support, protection and movement
	Plants	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Investigate the way in which water is transported within plants
	Rocks	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
	Light	Light comes from a source Transparent materials let light through them and opaque materials don't let light through Find patterns in the way that the size of shadows change
	Forces and Magnets	Predict whether two magnets will attract or repel each other, depending on which poles are facing
Year 4	Unit	Core Knowledge
	Animals	Describe the simple functions of the basic parts of the digestive system in humans Construct and interpret a variety of food chains, identifying producers, predators and prey
	Living things	Living things can be divided into groups based upon their characteristics Recognise that environments can change and that this can sometimes pose dangers to living things
	States of matter	Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
	Sound	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
	Electricity	A source of electricity (mains or battery) is needed for electrical devices to work. Electricity sources push electricity round a circuit. More batteries will push the electricity round the circuit faster. Devices work harder when more electricity goes through them. A complete circuit is needed for electricity to flow and devices to work. Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.

Wolds Federation Upper Key stage 2 – Core Science Knowledge

Year 5	Unit of Science	Core knowledge
	Living Things	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the life process of reproduction in some plants and animals
	Materials	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 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
	Earth and Space	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
	Forces and Magnets	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
Year 6	Unit	Core Knowledge
	End of KS2 Working Scientifically	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 Ask their own questions about the scientific phenomena they are studying, and select and plan the most appropriate ways to answer these questions, or those of others, recognising and controlling variables where necessary - including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources of information. Use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Draw conclusions in different forms, and raise further questions that could be investigated, based on their data and observations Raise further questions that could be investigated, based on their data and observations
	Animals	Describe the effects of diet, exercise, drugs and lifestyle on how the bodies functions Name and describe the functions of the main parts of the circulatory system in animals
	Living things	Use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods

		<i>Supporting information:</i> • <i>Variation exists within a population (and between offspring of some plants)</i> • <i>Organisms best suited to their environment are more likely to survive long enough to reproduce.</i> • <i>Organisms are best adapted to reproduce are more likely to do so.</i> • <i>Organisms reproduce and offspring have similar characteristic patterns.</i> • <i>Competition exists for resources and mates.</i>
	Evolution	Use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and describe how fossils are formed and provide evidence for evolution <i>Supporting Information:</i> • <i>Life cycles have evolved to help organisms survive to adulthood.</i> • <i>Over time the characteristics that are most suited to the environment become increasingly common.</i>
	Light	Use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects, and the formation, shape and size of shadows
	Electricity	Use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams <i>Supporting information:</i> • <i>Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'</i> • <i>The greater the current flowing through a device the harder it works.</i> • <i>Current is how much electricity is flowing round a circuit.</i> • <i>When current flows through wires heat is released. The greater the current, the more heat is released.</i>

This table sets out the disciplinary knowledge across the key stages:

Progression in Science (disciplinary knowledge)

	EYFS	End of KS1	End of Lower KS2	End of Upper KS2
Questioning and enquiring Planning	With prompting, ask a few simple questions about the natural world around us	Ask questions about the world around us. Recognise that they can be answered in different ways (different types of enquiry including - observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative tests, finding things out from secondary sources).	Ask relevant questions and use different types of scientific enquiries to answer them. Explore everyday phenomena and the relationships between living things and familiar environments. Begin to develop their ideas about functions, relationships and interactions. Raise their own questions about the world around them. Make some decisions about which types of enquiry will be the best way of answering questions including observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative and fair tests, finding things out using secondary sources.	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Explore and talk about ideas, ask their own questions about scientific phenomena, analyse functions, relationships and interactions more systematically. Begin to recognise more abstract ideas and begin to recognise how these ideas help them to understand how the world operates. Begin to recognise scientific ideas change and develop over time. Select the most appropriate ways to answer science questions using different types of scientific enquiry (including observing changes over different periods of time, noticing patterns, grouping and classifying, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.)

Observing, measuring and pattern seeking	With support, begin to observe closely, using simple equipment.	Observe closely, using simple equipment. Use observations and ideas to suggest answers to questions. To observe changes over time and, with guidance, begin to notice patterns and relationships. To say what I am looking for and what I am measuring. To know how to use simple equipment safely. Use simple measurements and equipment with increasing independence (eg hand lenses and egg timers) Begin to progress from non-standard units, reading mm, cm, m, ml, l, °C	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. Learn to use new equipment appropriately (eg data loggers). Can see a pattern in my results. Can choose from a selection of equipment. Can observe and measure accurately using standard units including time in minutes and seconds.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. Identify patterns that might be found in the natural environment. Make their own decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them. Choose the most appropriate equipment and explain how to use it accurately. Can interpret data and find patterns. Select equipment on my own. Can make a set of observations and say what the interval and range are. Accurate and precise measurements – N, g, kg, mm, cm, mins, seconds, cm³/s, km/h, m per sec, m/ sec Graphs – pie, line, bar (Year 6)
Investigating	Listen attentively and respond to what they hear with relevant questions, comments and actions	Perform simple tests. To discuss my ideas about how to find things out. To say what happened in my investigation.	Set up simple practical enquiries, comparative and fair tests. Recognise when a simple fair test is necessary and help to decide how to set it up. Can think of more than one variable factor.	Use test results to make predictions to set up further comparative and fair tests. Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Suggest improvements to my method and give reasons.

				Decide when it is appropriate to do a fair test.
recording and reporting findings	Gather and record data with adult support, to help in answering questions	Gather and record data to help in answering questions. Record simple data. Record and communicate their findings in a range of ways. Can show my results in a table that my teacher has provided.	Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Use notes, simple tables and standard units and help to decide how to record and analyse their data. Can record results in tables and bar charts.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. Report and present findings from enquiries. Decide how to record data from a choice of familiar approaches. Can choose how best to present data.
Identifying, grouping and classifying	Identify and classify with support	Identify and classify. Observe and identify, compare and describe. Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.	Identify differences, similarities or changes related to simple scientific ideas and processes. Talk about criteria for grouping, sorting and classifying and use simple keys. Compare and group according to behaviour or properties, based on testing.	Use and develop keys and other information records to identify, classify and describe living things and materials.

research	To begin to find information to help me using books	Use simple secondary sources to find answers. Can find information to help me from books and computers with help.	Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.	Recognise which secondary sources will be most useful to research their ideas
conclusions	Make comments about what they have heard and ask questions to clarify their understanding	Talk about what they have found out and how they found it out. To say what happened in my investigation. To say whether I was surprised at the results or not. To say what I would change about my investigation.	Using results to draw simple conclusions , make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings. With help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, identify new questions arising from the data, make new predictions and find ways of improving what they have already done. Can see a pattern in my results. Can say what I found out, linking cause and effect. Can say how I could make it better. Can answer questions from what I have found out.	Reporting and presenting findings from enquiries , including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence that has been used to support or refute ideas or arguments. Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings. Use test results to make predictions to set up further comparatives and fair tests. Look for different causal relationships in their data and identify evidence that refutes or supports their ideas. Use their results to identify when further tests and observations are needed. Separate opinion from fact. Can draw conclusions and identify scientific evidence. Can use simple models. Know which evidence proves a scientific point.

				Use test results to make predictions to set up further comparative and fair tests.
Vocabulary	Begin to use science vocabulary when appropriate.	Use simple scientific language and some science words. Use comparative language – bigger, faster etc	Use some scientific language to talk and, later, write about what they have found out. Use relevant scientific language. Use comparative and superlative language	Read, spell and pronounce scientific vocabulary correctly. Use relevant scientific language. And illustrations to discuss, communicate and justify scientific ideas. Can confidently use a range of scientific vocabulary. Can use conventions such as trend, rogue result, support prediction and - er word generalisation. Can use scientific ideas when describing simple processes. Can use the correct science vocabulary
Understanding	With support, begin to talk about how science helps us in our daily lives, eg torches and lights help us to see when it is dark.	Can talk about how science helps us in our daily lives eg. torches and lights help us see when it is dark. Am beginning to understand science can sometimes be dangerous.	Knows which things in science have made our lives better. Can understand there is some risk in science.	Can talk about how scientific ideas have changed over time. Can explain the positive and negative effects of scientific development. Can see how science is useful in everyday life. Can say which parts of our lives rely on science.

Federation Vocabulary Progression

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table	Working Scientifically Order Link rank	Working Scientifically Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers,	Working Scientifically Increase, decrease	Working Scientifically Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse	Working Scientifically NO NEW VOCAB
Animals including humans Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, body, Leg, Arm, Elbow, Head, neck Ear, Nose, Back, hair, mouth, tongue	Animals including humans Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene, food types	Animals including humans Movement, Muscles, Bones, Skull, Nutrition, Skeletons, protection, support	Animals including humans Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar, producers, predators, prey	Animals including humans Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty	Animals including humans Circulatory system, heart, blood, blood vessels, oxygen, carbon dioxide, lungs, water, diet, exercise, lifestyle
Plants Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem	Plants Seeds, Bulbs, Water, Light, Temperature, Growth, healthy	Plants Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Pollination, Flower Fertiliser, lifecycle, seed formation, seed dispersal	Living things and their habitats Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats Classification keys	Living things and their habitats Life cycle, reproduction, sexual, a sexual, Mammal, Insect, Amphibian, Bird, Offspring	Living things and their Habitats Organism, micro –organism Classification, Vertebrates, Invertebrates, Amphibians, Reptiles, Mammals, Insects
Everyday Materials Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, smooth, stretchy, waterproof, absorbent	Living things and their habitats Living, Dead, never been alive, habitats local habitats: pond, woodland, meadow, desert Microhabitats: under log, stony path, under bushes Energy, food, food chain, Predator, Prey, depend	Rocks Fossils, Soils, rock, grains, Sandstone, Granite, Marble, Pumice, Crystals, absorb water, let water through,	States of Matter States of matter, Solid, Liquid, Gas, change state, Evaporation, Condensation, Particles, Temperature, Freezing, Heating, cooled/cooling,, degrees Celsius, melt, melting point, boil/boiling point, water cycle	Properties and changes of materials Hardness, Solubility, Transparency, electrical Conductivity, thermal conductivity, magnetic, Filter, Evaporation, Dissolving, mixture/Mixing, solution, soluble, insoluble, filtering, sieving, reversible changes, new material, not usually reversible, burning, rusting,	Evolution and Inheritance Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, vary, variation, inherit/inheritance, suited

Seasonal Changes Season, summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark, weather	Everyday materials and their uses Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, foil suitable/unsuitable, use/useful, property, flexible, shape, changed	Light Light, Shadows, block, Mirror, direct/direction Reflect, Reflective, Dark, Reflection	Sound Sound, sound source, Volume, vibrate/Vibration, strength of vibrations, insulation Wave, Pitch, travel tone, fainter, speaker	Earth and Space Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation solar system, celestial body, sphere/spherical, mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, orbit, geocentric model, heliocentric model, shadow clocks, sundials, astronomical clocks.	Light Absorb, Refraction, Reflection, Light, Spectrum, Rainbow, Colour
		Forces and magnets Magnetic, magnet, bar magnet, ring magnet, button magnet, horse shoe magnet, non-magnetic material Force, Contact, Attract, Repel, Friction, Poles, Push, Pull	Electricity Electricity, appliances/device, electrical circuit, complete circuit, circuit symbol, Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, fast(er), slow (er), metal/non metal	Forces Air resistance, Water resistance, Friction, Gravity, Newton, Gears, levers, Pulleys, transfers fall, earth, moving surfaces, mechanisms,	Electricity Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell Terminal, volume, voltage

Progression in substantive knowledge, topic by topic

Note- Due to the unique nature of our classes, the following grids have been created to demonstrate how a topic is taught to a whole key stage not to individual year groups.

KS1 Biology

Vocabulary	Topic specific vocabulary	Y1 - Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, body, Leg, Arm, Elbow, Head, neck Ear, Nose, Back, hair, mouth, tongue Y2 - Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene, food types
	Working scientifically vocabulary	Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table
Key concepts		
<u>In a nutshell knowledge</u>		• 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 • Describe the importance of exercise, balanced diet and hygiene for humans. • Describe the basic needs of animals for survival. • Describe the main changes as young animals, including humans, grow into adults. • Identify whether things are alive, dead or have never lived. • Describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships. • Describe how different plants and animals are suited to different habitats.

Explicit opportunities to develop SMCS

Social development – Comparing humans and animals and how they interact, use of senses.

Animals including humans

Ks1 Biology

Plants

Vocabulary	Topic specific vocabulary	Y1 -Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem Y2 - Seeds, Bulbs, Water, Light, Temperature, Growth, healthy
	Working scientifically vocabulary	Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table
Key concepts		
<u>In a nutshell knowledge</u>		Y1 - Plants grow from bulbs/seeds. Plants need light and water to grow and survive Plants are important We can eat a lot of plants Y2 - Describe the main changes as seeds and bulbs grow into mature plants Describe basic needs of plants for survival and the impact of changing these

KS1 Biology

Living things and their habitats

Vocabulary	Topic specific vocabulary	Living, Dead, never been alive, habitats local habitats: pond, woodland, meadow, desert Microhabitats: under log, stony path, under bushes Energy, food, food chain, Predator, Prey, depend
	Working scientifically vocabulary	Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table
Key concepts		
<u>In a nutshell knowledge</u>		Y2 - Identify whether things are alive, dead or have never lived. Describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships. Describe how different plants and animals are suited to different habitats
Explicit opportunities to develop SMCS Spiritual development – The world around us and its beauty.		

KS1 Physics

Seasonal Change

Vocabulary	Topic specific vocabulary	Season, summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark, weather
	Working scientifically vocabulary	Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table
Key concepts		
<u>In a nutshell knowledge</u>		Y1 - Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.
Explicit opportunities to develop SMCS Cultural development – Awareness of seasonal change in the UK and around the world.		

KS1 Chemistry

Materials

Vocabulary	Topic specific vocabulary	Y1 - Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, smooth, stretchy, waterproof, absorbent Y2 - Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, foil suitable/unsuitable, use/useful, property, flexible, shape, changed
	Working scientifically vocabulary	Similarities, differences, identify, classify, sort, group, observe changes over time, notice patterns, notice relationships, Secondary sources, questions, answers, equipment, gather, measure, record, table
Key concepts		
<u>In a nutshell knowledge</u>		Y1 - 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 Distinguish between an object and the material from which it is made. Y2 - Identify and group everyday materials, and compare their suitability for different uses.
Explicit opportunities to develop SMCS Spiritual development – Awe and wonder e.g. wood, wool – where do the materials come from?		

KS2 Biology

Plants

Vocabulary	Topic specific vocabulary	Y3 - Air, Light, Water, Nutrients, oil, Reproduction, Transportation, Pollination, Flower, Fertiliser, lifecycle, seed formation, seed dispersal
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy, Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Investigate the way in which water is transported within plants

KS2 Biology

Animals including Humans

Vocabulary	Topic specific vocabulary	Y3 - Movement, Muscles, Bones, Skull, Nutrition, Skeletons, protection, support Y4 - Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar, producers, predators, prey Y5- Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty Y6 -Circulatory system, heart, blood, blood vessels, oxygen, carbon dioxide, lungs, water, diet, exercise, lifestyle
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers. Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Y3 - identify that humans and some other animals have skeletons and muscles for support, protection and movement Y4 - Describe the simple functions of the basic parts of the digestive system in humans Construct and interpret a variety of food chains, identifying producers, predators and prey Y6 - Describe the effects of diet, exercise, drugs and lifestyle on how the bodies functions Name and describe the functions of the main parts of the circulatory system in animals
Explicit opportunities to develop SMCS Social development – Interacting with humans and animals.		

KS2 Biology

Living things

Vocabulary	Topic specific vocabulary	Y4 - Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats, Classification keys Y5 - Life cycle, reproduction, sexual, asexual, Mammal, Insect, Amphibian, Bird, Offspring Y6 - Organism, micro-organism, Classification, Vertebrates, Invertebrates, Amphibians, Reptiles, Mammals, Insects
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers. Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		

<u>In a nutshell knowledge</u>		Y4 - Living things can be divided into groups based upon their characteristics Recognise that environments can change and that this can sometimes pose dangers to living things Y5 - 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 Y6 - Use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods <i>Supporting information:</i> • <i>Variation exists within a population (and between offspring of some plants)</i> • <i>Organisms best suited to their environment are more likely to survive long enough to reproduce.</i> • <i>Organisms are best adapted to reproduce are more likely to do so.</i> • <i>Organisms reproduce and offspring have similar characteristic patterns.</i> <i>Competition exists for resources and mates.</i>
Explicit opportunities to develop SMCS Social development – Interactions of plants and animals. Spiritual development – Opportunities to think about life, self and others.		

KS2 Biology

Evolution and inheritance

Vocabulary	Topic specific vocabulary	Y6 - Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, vary, variation, inherit/inheritance, suited
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers,
Key concepts		

<u>In a nutshell knowledge</u>		Y6 -Use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and describe how fossils are formed and provide evidence for evolution <i>Supporting Information:</i> • <i>Life cycles have evolved to help organisms survive to adulthood.</i> <i>Over time the characteristics that are most suited to the environment become increasingly common.</i>
Explicit opportunities to develop SMCS Cultural development – links to famous scientist Charles Darwin.		

KS2 PHYSICS

Sound

	Topic specific vocabulary	Y4 - Sound, sound source, Volume, vibrate/Vibration, strength of vibrations, insulation Wave, Pitch, travel. tone, fainter, speaker
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Vocabulary	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers,
Key concepts		
<u>In a nutshell knowledge</u>		Y4 - 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
Explicit opportunities to develop SMCS Social development – Opportunities to discuss sound travel and communication.		

KS2 Physics

Light

Vocabulary	Topic specific vocabulary	Y3 - Light, Shadows, block, Mirror, direct/direction, Reflect, Reflective, Dark, Reflection Y6 - Absorb, Refraction, Reflection, Light, Spectrum, Rainbow, Colour
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers. Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy, Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Y3 - Light comes from a source Transparent materials let light through them and opaque materials don't let light through Find patterns in the way that the size of shadows change Y6 - Use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects, and the formation, shape and size of shadows
Explicit opportunities to develop SMCS Spiritual development – Awe and Wonder.		

KS2 PHYSICS

Electricity

Vocabulary	Topic specific vocabulary	Y4 - Electricity, appliances/device, electrical circuit, complete circuit, circuit symbol, Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, fast(er), slow (er), metal/non metal Y6 - Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell, Terminal, volume, voltage
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers, Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy, Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Y4 - A source of electricity (mains of battery) is needed for electrical devices to work. Electricity sources push electricity round a circuit. More batteries will push the electricity round the circuit faster. Devices work harder when more electricity goes through them. A complete circuit is needed for electricity to flow and devices to work. Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators. Y6 - Use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams <i>Supporting information:</i> <i>Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'</i> <i>The greater the current flowing through a device the harder it works.</i> <i>Current is how much electricity is flowing round a circuit.</i> <i>When current flows through wires heat is released. The greater the current, the more heat is released.</i>

Explicit opportunities to develop SMCS

Cultural development – Alexander Graham-Bell, opportunities to discuss other places in the world that don't have electricity.

KS2 PHYSICS

Forces and Magnets

Vocabulary	Topic specific vocabulary	Y3 - Magnetic, magnet, bar magnet, ring magnet, button magnet, horse shoe magnet, non-magnetic material Force, Contact, Attract, Repel, Friction, Poles, Push, Pull Y5 - Air resistance, Water, resistance, Friction, Gravity, Newton, Gears, levers, Pulleys, transfers, fall, earth, moving surfaces, mechanisms,
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers, Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Y3 - Predict whether two magnets will attract or repel each other, depending on which poles are facing Y5 - 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

Explicit opportunities to develop SMCS Cultural and Moral development – discussions around Isaac Newton and gravity. Greek philosophers.		

KS2 PHYSICS

Earth and Space

Vocabulary	Topic specific vocabulary	Y5 - Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, solar system, celestial body, sphere/spherical, mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, orbit, geocentric model, heliocentric model, shadow clocks, sundials, astronomical clocks.
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers, Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		

<u>In a nutshell knowledge</u>		Y5 - 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
Explicit opportunities to develop SMCS Spiritual development – Awe and wonder		

KS2 Chemistry

Rocks and Soils

Vocabulary	Topic specific vocabulary	Y3- Fossils, Soils, rock, grains, Sandstone, Granite, Marble, Pumice, Crystals, absorb water, let water through,
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers, Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse

Key concepts		
<u>In a nutshell knowledge</u>		Y3 - 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.
Explicit opportunities to develop SMCS Cultural development – Discussions around Mary Anning - early female scientist.		

KS2 Chemistry

States of Matter and Materials

Vocabulary	Topic specific vocabulary	Y4 - States of matter, Solid, Liquid, Gas, change state, Evaporation, Condensation, Particles, Temperature, Freezing, Heating, cooled/cooling, degrees Celsius, melt, melting point, boil/boiling point, water cycle Y5 - Hardness, Solubility, Transparency, electrical Conductivity, thermal conductivity, magnetic, Filter, Evaporation, Dissolving, mixture/Mixing, solution, soluble, insoluble, filtering, sieving, reversible changes, new material, not usually reversible, burning, rusting
	Working scientifically vocabulary	Questions, types of scientific enquiry, answer, changes, comparative tests, fair tests, careful, accurate, observations, present, data/evidence/results, keys, bar charts, results, conclusions, prediction, thermometers, data loggers, Opinion, fact, variables, independent variable, dependent variable, controlled variable, accuracy Precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships support/refuse
Key concepts		
<u>In a nutshell knowledge</u>		Y4 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 Y5 - 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 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