



Science

At Caldecote Primary School our aim is for pupils to:

- Be curious, ask questions and consider how to answer these through a range of scientific enquires
- Gain knowledge and conceptual understanding through Biology, Chemistry and Physics building upon their prior knowledge
- Use equipment, carry out experiments and retrieve knowledge in order to explain concepts
- Communicate scientific information in a clear and concise manner including using diagrams, tables, graphs and charts
- Apply scientific concepts and skills taught to the world around them, for now and in the future



Reception

Area of science		Big Question	Big idea	Key Vocabulary	Enquiry type	Working Scientifically
Biology	Senses	<p>What are our senses?</p> <p>How do we use our senses to explore, investigate and understand the world around us?</p>	Our senses help us to understand the world	<p>See</p> <p>Hear</p> <p>Touch</p> <p>Smell</p> <p>Taste</p>	<p>Exploration</p> <p>Finding out things from secondary sources</p> <p>Engage in open-ended activity</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Show curiosity by asking questions about aspects of their familiar world <input type="checkbox"/> Ask how and why questions e.g. how did the dinosaur get stuck in the ice? Why do leaves fall off the trees? <input type="checkbox"/> Closely observe what animals, people and vehicles do <input type="checkbox"/> Observe changes e.g. lifecycle of a butterfly / water into ice back into water? <input type="checkbox"/> Make a suggestion to solve a problem/find new ways of doing things <input type="checkbox"/> Test ideas through open-ended activities <input type="checkbox"/> Identify similarities and differences <input type="checkbox"/> Make a general statement e.g. when looking for woodlice they may say, "They might be in the grass." <input type="checkbox"/> Gather data using non-standard measurements e.g. loud, quiet, short, long, fast, slow <input type="checkbox"/> Develop their own narratives and explanations
	Living things and their habitats	<p>How do animals grow and change?</p>	All living things have a life cycle	<p>Caterpillar</p> <p>Cocoon</p> <p>Butterfly</p>	<p>Observe</p> <p>Noticing patterns</p> <p>Finding out things from secondary sources</p> <p>Engage in open-ended activity</p>	
	Keeping healthy	<p>Why do we eat and exercise?</p>	All living things need energy and grow	<p>Fruit</p> <p>Vegetables</p> <p>Diary</p> <p>Meat</p> <p>Healthy</p> <p>Unhealthy</p> <p>Exercise</p>	<p>Compare and sort</p> <p>Engage in open-ended activity</p>	
Chemistry	Materials	<p>Are all materials the same?</p>	There are different types of materials which can be used for different types of things	<p>Wood</p> <p>Plastic</p> <p>Glass</p> <p>Metal</p> <p>Rock</p> <p>Water</p> <p>Freeze</p> <p>Melt</p>	<p>Compare and contrast</p> <p>Group</p> <p>Engage in open-ended activity</p>	
Physics	Seasonal changes	<p>Is the weather the same every day?</p>	Different seasons have different weather	<p>Autumn</p> <p>Spring</p> <p>Summer</p> <p>Winter</p>	<p>Observe changes over time</p> <p>Engage in open-ended activity</p>	



Area of science		Young Scientists should be able to
Biology	Senses	<ul style="list-style-type: none"><input type="checkbox"/> Name and provide examples of the 5 senses<input type="checkbox"/> Explore different objects/materials using their senses<input type="checkbox"/> Use appropriate vocabulary to describe<input type="checkbox"/> Write observations/take photos
	Living things and their habitats	<ul style="list-style-type: none"><input type="checkbox"/> Look at diagrams to show steps of a life cycle<input type="checkbox"/> Act out the life cycle of a butterfly<input type="checkbox"/> Use cards to order a life cycle<input type="checkbox"/> Ask questions about mini-beasts found in their environment<input type="checkbox"/> Look at books to learn about a mini-beast e.g. worm
	Keeping healthy	<ul style="list-style-type: none"><input type="checkbox"/> Name and draw some healthy and unhealthy foods<input type="checkbox"/> Sort healthy and unhealthy food<input type="checkbox"/> Name different ways to keep fit and healthy<input type="checkbox"/> Explain the difference between dairy, meat and fruit/vegetables based on where some different foods come from<input type="checkbox"/> Identify where different foods come from
Chemistry	Materials	<ul style="list-style-type: none"><input type="checkbox"/> Recognise that materials can change state e.g. melting and freezing<input type="checkbox"/> Using their understanding of how the world works, discuss ways in which they can trap an object in ice<input type="checkbox"/> Sort different materials and explain the reason for it<input type="checkbox"/> Investigate where wood comes from
Physics	Seasonal changes	<ul style="list-style-type: none"><input type="checkbox"/> Go on seasonal walks, make observations and take photos/collect resources<input type="checkbox"/> Explain changes to their outside world in each season<input type="checkbox"/> Name different types of weather<input type="checkbox"/> Discuss things we wear in different seasons/weather<input type="checkbox"/> Match pictures/objects with seasons<input type="checkbox"/> Verbal observations and comparisons



Year 1

Area of science		Big Question	Big idea	Key Vocabulary	Enquiry type	Working Scientifically
Biology	Plants	Are all plants the same?	Living things on Earth come in a variety of different forms	Deciduous Evergreen Blossom Petal Stem Trunk Roots	Grouping and classifying Use secondary sources of information	<input type="checkbox"/> Ask simple questions which begin with does/do, how and what/which e.g. What is a bud? How do the seasons change? Does it snow in the summer? Which materials are waterproof? <input type="checkbox"/> Recognise that these questions could be answered in different ways <input type="checkbox"/> Observe closely using simple equipment such as magnifying glasses including bug collectors and binoculars <input type="checkbox"/> Use discrete data to perform comparative tests to gather data e.g. set up a test to see which material for mopping up water? <input type="checkbox"/> Know if the test has been successful <input type="checkbox"/> There is an ability to sort and classify <input type="checkbox"/> Gather data in line with Year 1 measurement curriculum (non-standard units) <input type="checkbox"/> Use drawings and simple tables to record results <input type="checkbox"/> Explain what has been observed using appropriate vocabulary <input type="checkbox"/> Use observations to suggest reasons 'why' something has happened <input type="checkbox"/> Say what has been learned
	Animals including humans	Are we all the same or are we all different?	Animals need food they can break down which comes either directly by eating plants or by eating other animals Animals vary in many ways	Mammals Amphibians Reptile Carnivore Herbivore Omnivore	Noticing patterns Use secondary sources of information Grouping and classifying things	
Chemistry	Everyday materials	Can we change the shape of a material?	All objects are made of one or more materials There are various ways of bring about change in materials e.g. movement (pushing or pulling) and heating	Float/sink Strong Bendy/stiff Waterproof Squash Liquid See through Mix Melt	Simple comparative test Grouping and classifying things Observing changes over a period of time	
Physics	Seasonal changes	How does the weather change?	The weather changes with the seasons	Seasons Sunrise Sunset Day length Weather	Observing changes over a period of time Noticing patterns Grouping and classifying things	



Area of science		Year 1 Scientists should be able to
Biology	Plants	<ul style="list-style-type: none"><input type="checkbox"/> Use simple charts to name trees and other plants they see regularly (wild and garden plants, deciduous and evergreen trees)<input type="checkbox"/> Describe some key features e.g. shape of leaves, colour of the flower/blossom<input type="checkbox"/> Point out trees which lost their leaves and those that kept the same the whole year<input type="checkbox"/> Point to and name the parts of a plant recognising that they are not always the same e.g. leaves and stems may not be green<input type="checkbox"/> Can sort and group parts of plants explaining why e.g. petals vs no petals
	Animals and humans	<ul style="list-style-type: none"><input type="checkbox"/> Know and classify animals by what they eat (carnivore, herbivore and omnivore)<input type="checkbox"/> Name and describe animals from different vertebrate groups (fish, amphibians, reptiles, birds and animals)<input type="checkbox"/> Use simple charts to identify unknown animals<input type="checkbox"/> Create an imaginary animal labelling its key features<input type="checkbox"/> Describe, label and compare the structure of common animals<input type="checkbox"/> Name, draw and label parts of a human body that can be seen<input type="checkbox"/> Use secondary resources to find out about what animals eat including talking to experts<input type="checkbox"/> Use first-hand close observations to make detailed drawings<input type="checkbox"/> Use non-standard units to measure body parts e.g. "My arm is x straws long"
Chemistry	Everyday materials	<ul style="list-style-type: none"><input type="checkbox"/> Identify and name a variety of everyday materials<input type="checkbox"/> Label a picture or diagram of an object made from different materials<input type="checkbox"/> Describe and compare the properties of different materials<input type="checkbox"/> Sort materials using a range of properties<input type="checkbox"/> Choose an appropriate method for testing an object for a particular property<input type="checkbox"/> Test evidence to answer questions about properties e.g. which cloth is the most absorbent?<input type="checkbox"/> Know the name of the materials an object is made of
Physics	Seasonal changes	<ul style="list-style-type: none"><input type="checkbox"/> Describe and observe weather changes across the four seasons<input type="checkbox"/> Collect information on features that change during the year<input type="checkbox"/> Use photographs to talk about change overtime<input type="checkbox"/> Notice the pattern between the seasons and the varying day lengths<input type="checkbox"/> Name the seasons and know about the type of weather in each season<input type="checkbox"/> Compare and contrast different plants and how they have changed overtime



Year 2

Area of science		Big Question	Big idea	Key Vocabulary	Enquiry type	Working Scientifically
Biology	Living things and their habitats	How do you know if something is alive?	<p>All living things need food as their source of energy as well as air, water and certain temperature conditions</p> <p>Living things are distinguished from non-living things by their ability to move, grow, reproduce and react to certain stimuli</p>	<p>Micro habitats</p> <p>Living</p> <p>Dead</p> <p>Food chains</p>	<p>Grouping and classifying</p> <p>Finding out using secondary sources</p> <p>Noticing patterns</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Ask questions beginning with would, why and where e.g. why are these seeds shaped as they are? Would plants go in the dark? Where do snails live? <input type="checkbox"/> Discuss ways in which their questions could be answered e.g. through research, observations or simple tests <input type="checkbox"/> Close observations are made independently considering which equipment would be most useful <input type="checkbox"/> Use microscopes <input type="checkbox"/> Suggest and perform comparative tests <input type="checkbox"/> Understand the meaning of discrete data <input type="checkbox"/> Independently classify and group things according to a given criteria or justifying reasons why it is grouped in this way <input type="checkbox"/> Gather data in line with Year 2 measurement (standard units) and statistics curriculum (tally charts, pictograms, block charts) as well as labelled diagrams <input type="checkbox"/> Draw conclusions from observations, measurements and scientific knowledge <input type="checkbox"/> Independently suggest answers to questions based on what they have found out
	Plants	Do plants grow the same?	Living things are special collections of matter that use energy and grow	<p>Shelter</p> <p>Seeds</p> <p>Bulb</p> <p>Growth</p> <p>Temperature</p>	<p>Comparative tests</p> <p>Observing changes over time</p>	
	Animals including humans	<p>Is all food good for us?</p> <p>Do all animals start off small?</p>	Living things produce offspring of the same kind, but offspring are not identical with each other or with their parents	<p>Offspring</p> <p>Life cycle</p> <p>Survival</p> <p>Food types</p> <p>Hygiene</p>	<p>Finding out using secondary sources</p> <p>Noticing patterns</p>	
Chemistry	Materials	What materials could be used to make a good raincoat?	All matter (stuff) in the universe is made up of tiny building blocks. The arrangement of these building blocks determines the properties of materials	<p>Flexible</p> <p>Transparent</p> <p>Magnetic</p> <p>Suitable</p> <p>Unsuitable</p> <p>Properties</p>	<p>Grouping and classifying</p> <p>Simple comparative tests</p> <p>Finding out using secondary sources</p>	



Area of science		Year 2 Scientists should be able to
Biology	Living things and their habitats	<ul style="list-style-type: none"> <input type="checkbox"/> Classify things that are living, dead and have never been alive <input type="checkbox"/> Name a range of animals and plants that live in a habitat and micro-habitats that they have studied <input type="checkbox"/> Explain how a specific habitat provides basic needs for things living there (plants and animals) <input type="checkbox"/> Understand that animals and plants depend on each other e.g. plants serving as a source of food and shelter, animals create nutritious soil (Children do not need to learn about animals helping plants through seed dispersal or pollination) <input type="checkbox"/> Construct a food chain that starts with a plant and has the arrows pointing in the correct direction <input type="checkbox"/> Identify that food chains usually begin with a plant
	Plants	<ul style="list-style-type: none"> <input type="checkbox"/> Spot similarities and differences between bulbs and seeds <input type="checkbox"/> Use their local environment throughout the year to observe how different plants grow <input type="checkbox"/> Describe how plants grow from seeds and bulbs have developed over time <input type="checkbox"/> Identify plants that grew well in different conditions and explain what plants need in order to grow and stay healthy Note: Seeds and blubs need water to grow but do not need light. This is because seeds and bulbs have a store of food inside them and therefore do not need light to grow <input type="checkbox"/> Measure height of a growing plant
	Animals including humans	<ul style="list-style-type: none"> <input type="checkbox"/> Notice that animals, including humans, have offspring which grow into adults <input type="checkbox"/> Pair up pictures of a variety of animals with their very young and juvenile forms <input type="checkbox"/> Name the basic needs of animals, including humans, for survival (water, food and air) <input type="checkbox"/> Explain why exercise, a balanced diet and good hygiene are important for humans <input type="checkbox"/> Look at food labels including traffic light system and compare which are healthy and why
Chemistry	Materials	<ul style="list-style-type: none"> <input type="checkbox"/> Can name an object, say what material it is made from and identify its properties <input type="checkbox"/> Explain using key properties why a material is suitable or unsuitable for its purpose <input type="checkbox"/> Identify that different materials are used for the same thing (spoon can be made from plastic, wood, metal but not normally glass) and the same material can be used for more than one thing (metal can be used for coins, cans, cars and chair legs) <input type="checkbox"/> Describe differences in the properties of objects made from the same material (e.g. metal – shiny, rusty, strong, weak, different thickness) <input type="checkbox"/> Demonstrate how materials can be changed by bending, twisting, squashing and stretching <input type="checkbox"/> Children could choose to find out about people who have developed useful new materials e.g. John Dunlop, Charles Macintosh or John McAdam



Year 3

Area of science		Big Question	Big idea	Key Vocabulary		Enquiry type	Working Scientifically
Biology	Plants	Do all plants need exactly the same things?	Plants have different structures that serve different functions in growth, survival and reproduction Plants depend on animals e.g. pollination and seed dispersal	Seed dispersal Species Pollination Seed formation	Photosynthesis Fertilisers Transportation Germination	Observing changes over a period of time (e.g. water transported through celery) Fair tests Noticing patterns	<input type="checkbox"/> Ask relevant questions related to prior knowledge <input type="checkbox"/> Understand that science investigations begin with a question <input type="checkbox"/> An awareness that there are different ways of asking scientific questions which result in different types of enquiries <input type="checkbox"/> Make a prediction which has a plausible reason <input type="checkbox"/> Set up comparative tests and fair tests <input type="checkbox"/> Make careful and accurate observations including the use of standard units taking into account mathematical knowledge up to Year 3 (read time, add and subtract length, mass and capacity) <input type="checkbox"/> With support use drawings, labelled diagrams, bar charts and tables to record findings <input type="checkbox"/> Recognise why it is important to collect data in order to answer a question <input type="checkbox"/> Draw simple conclusions from the data collected <input type="checkbox"/> With prompts, report findings from investigations in a range of ways
	Animals incl humans	Do all animals depend on plants for their survival? Could we live without a skeleton?	All living things need food as their source of energy	Producer Consumer Prey Predator Movement Joints	Incisors Canines Endoskeleton Exoskeleton	Using secondary sources of information Grouping and classifying	
Chemistry	Rocks	Are all rocks made in the same way?	There are many different kinds of rock with different compositions and properties	Igneous Density Sedimentary Minerals	Metamorphic Fossilisation Permeability Durability	Grouping and classifying Comparative tests Using secondary sources of information	
Physics	Light	Can shadows change shape?	Light energy travels in straight lines and doesn't pass through some objects There are patterns in the position of the Sun seen at different times of the day	Light source Dispersion Transparent Refraction Translucent	Opaque Reflect Shadow	Noticing patterns Observing changes overtime	
	Forces and magnets	Are all metals attracted to magnets?	Forces are different kinds of pushes and pulls that act on all the matter Equal forces acting in opposite directions in the same line cancel each other out and are described as being in balance. The movement of objects is changed if the forces acting on them are not in balance.	Attract Repel Poles Magnetic Newton	Force (direct and indirect) Gravity Friction	Grouping and classifying Comparative and fair tests Noticing patterns	



Area of science		Year 3 Scientists should be able to
Biology	Plants	<ul style="list-style-type: none"><input type="checkbox"/> Explain the function of the parts of a flowering plant (Is a stem the same as a trunk?)<input type="checkbox"/> Explore the requirements of plants for life and growth (air, light, water, nutrients and room to grow) and explain how they vary from plant to plant<input type="checkbox"/> Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination<input type="checkbox"/> Can give different methods of pollination and seed dispersal, including examples<input type="checkbox"/> Look at features of seeds to decide on their method of dispersal<input type="checkbox"/> Explain observations made during investigations
	Animals including humans	<ul style="list-style-type: none"><input type="checkbox"/> Understand that animals cannot make their own food<input type="checkbox"/> Explain how most plants create their own food<input type="checkbox"/> Draw and interpret food chains<input type="checkbox"/> Explain the difference between a producer, consumer, predator and prey and provide examples<input type="checkbox"/> Name some bones that make up their skeleton, giving examples that support, help them move and provide protection<input type="checkbox"/> Can describe how muscles and joints help them to move
Chemistry	Rocks	<ul style="list-style-type: none"><input type="checkbox"/> Ask questions about different types of rocks e.g. why are they different colours?<input type="checkbox"/> Name and classify types of rocks based on its physical properties and appearance<input type="checkbox"/> Explain the difference between sedimentary, metamorphic and igneous rock<input type="checkbox"/> Devise tests to explore properties of rocks and use data to rank the rocks<input type="checkbox"/> Describe the rock cycle
Physics	Light	<ul style="list-style-type: none"><input type="checkbox"/> Predict which lighting will cause an object to be more or less visible<input type="checkbox"/> Know darkness is the absence of light<input type="checkbox"/> Know the danger of direct sunlight and describe how to keep protected<input type="checkbox"/> Classify reflective and unreflective surfaces<input type="checkbox"/> Can define transparent, translucent and opaque<input type="checkbox"/> Predict what will happen when a light source or object is moved<input type="checkbox"/> Experiment with torches and opaque objects, moving them to different distances from the light source and noting their findings<input type="checkbox"/> Know that a shadow is formed when light from its source is blocked by a solid object<input type="checkbox"/> Note the changing length of a shadow thrown by a metre stick or other object
	Forces and magnets	<ul style="list-style-type: none"><input type="checkbox"/> Give examples of forces in everyday life<input type="checkbox"/> Provide examples of forces that require contact and others that do not (magnets)<input type="checkbox"/> Use results to describe how objects move on different surfaces and make predictions for further tests<input type="checkbox"/> Draw diagrams using arrows to show the attraction and repulsion between the poles of magnets<input type="checkbox"/> Predict whether magnets will attract or repel<input type="checkbox"/> Use test data to rank magnet strength



Year 4

Area of Science		Big Question	Big Idea	Key Vocabulary		Enquiry Type	Working scientifically
Biology	Living things and their habitats	Are some animals more alike than others?	Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.	Human impact Deforestation Nature reserves Extinction	Endangered Classification keys Migrate Hibernate	Grouping and classifying Use secondary sources of information	<input type="checkbox"/> Questions are beginning to be improved in order to clarify exactly what is being investigated <input type="checkbox"/> Identify which type of enquiry they would need to use to answer their question e.g. secondary research, fair test, grouping and sorting <input type="checkbox"/> Make a prediction which has a plausible reason <input type="checkbox"/> Amend predictions according to findings <input type="checkbox"/> Plan and conduct investigations independently to produce evidence to answer a question <input type="checkbox"/> Identify some variables in a fair test <input type="checkbox"/> Set up a fair test using continuous data identifying a variable that can be changed and measured <input type="checkbox"/> Explain why a test is a fair one <input type="checkbox"/> Make careful and accurate observations including the use of standard units taking into account mathematical knowledge up to Year 4 (convert units of measurements) <input type="checkbox"/> Accurately read scales on a range of thermometers and know that there are two main scales used to measure temperature <input type="checkbox"/> Suggest appropriate ways in which to gather, record and classify <input type="checkbox"/> Present continuous data on a line graph e.g. to show the temperature of a melting material changes with time <input type="checkbox"/> Planning, doing and evaluating process (with support) <input type="checkbox"/> Make sense of findings noticing patterns, similarities and differences to draw simple conclusions and answer questions
	Animals inc humans	Does our stomach digest our food?	The different kinds of life have evolved over millions of generations into different forms in order to survive in the environments in which they live	Digestion Absorption Muscles Protection Enzyme		Finding out things from secondary sources Grouping and classifying	
Chemistry	States of matter	Is it always easy to tell the difference between solids, liquids and gases? Are all solids hard?	At room temperature, some substances are in a solid, liquid or gas state. The state of many substances can be changed by heating or cool them. The amount of matter does not change.	Gases Particles State Evaporate Condense	Condensation Celsius Fahrenheit Precipitation	Grouping and classifying Observing changes over a period of time Comparative and fair tests	
	Rocks	How can we know things about a dinosaur when they have been extinct for 65 million years?	Much of the solid surface of the Earth is covered by soil, which is a mixture of pieces of rock and remains of organisms. We know about extinct animals through fossils.	Sediment Peat Dead Matter Filter	Retention Fossilisation Mary Anning	Comparative and fair tests Find out things using secondary sources	
Physics	Sound	Why can we hear things that we can't see?	Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it (Sound is one form of energy.)	Pitch Volume Instrument Amplitude	Frequency Ear drum Vibration Mediums	Noticing patterns Use secondary sources of information Comparative and fair tests	
	Electricity	Does electricity flow easily through all objects?	Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it	Conductor Insulator Circuit Cell	Switch Wire Lamp Electrical appliance	Grouping and classifying Comparative and fair tests Noticing patterns	



Area of science		Year 4 Scientists should be able to
Biology	Living things and their habitats	<ul style="list-style-type: none"> <input type="checkbox"/> Can use classification keys to identify unknown plants and animals e. flowering and non-flowering plants <input type="checkbox"/> Explore and identify local plants and animals <input type="checkbox"/> Can give examples of how an environment may change both naturally and due to human impact <input type="checkbox"/> Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter
	Animals including humans	<ul style="list-style-type: none"> <input type="checkbox"/> Classify food into particular nutrients <input type="checkbox"/> State the importance of a nutritious, balanced diet <input type="checkbox"/> Sequence main parts of the digestive system <input type="checkbox"/> Describe what happens in each part of the digestive system <input type="checkbox"/> Identify the functions of different organs <input type="checkbox"/> Identify the different types of teeth and their functions <input type="checkbox"/> Explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores <input type="checkbox"/> Retrieve the names of bones (learnt in Year 3)
Chemistry	States of matter	<ul style="list-style-type: none"> <input type="checkbox"/> Justify why something is a solid, liquid or gas <input type="checkbox"/> Give examples of things that melt/freeze and how their melting points vary <input type="checkbox"/> Explore how some materials can change state <input type="checkbox"/> Measure temperatures using a thermometer <input type="checkbox"/> Explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup <input type="checkbox"/> From their data, can explain how to speed up or slow down evaporation <input type="checkbox"/> Can describe the water cycle in a range of ways e.g. diagrams, story of a water droplet, explanation <input type="checkbox"/> Explain the difference between air and gas
	Rocks	<ul style="list-style-type: none"> <input type="checkbox"/> Can explain how a fossil is formed <input type="checkbox"/> Identify plant and animal matter as well as rocks in samples of soil <input type="checkbox"/> Identify the importance of rich soil <input type="checkbox"/> Test water retention of soils and suggest reasons for their results
Physics	Sound	<ul style="list-style-type: none"> <input type="checkbox"/> Explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds travel from an object to the ear <input type="checkbox"/> Describe sounds (vibrations) travelling through different mediums such as air, water, metal <input type="checkbox"/> Identify a correlation between pitch and the features of the object producing the sound (the shorter the bar on xylophone the higher the pitch) <input type="checkbox"/> Find patterns between the volume and the strength of vibrations (amplitude) and pitch and frequency <input type="checkbox"/> Recognise that sounds get fainter as the distance from the sound source increases or using a sound insulating medium
	Electricity	<ul style="list-style-type: none"> <input type="checkbox"/> Identify electrical appliances <input type="checkbox"/> Can construct electric circuits and incorporate a switch into a circuit to turn it on and off <input type="checkbox"/> Communicate structures of circuits using drawings which show how the components are connected <input type="checkbox"/> Predict whether or not a lamp will light in a simple series circuit and justify their reasons <input type="checkbox"/> Sort and classify common conductors and insulators <p>N.B. Children should be given only one component at a time to add to circuits. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.</p>



Year 5

Area of science		Big Question	Big idea	Key Vocabulary	Enquiry type	Working Scientifically
Biology	Living things	If life has existed for billions of years, why are there still people alive today?	Living things are special collections of matter that make copies of themselves One of the results of sexual reproduction is that offspring are never exactly like their parents	Fertilisation Reproduction Style Ovary Metamorphosis	Pistil Asexual Stigma Stamen	Finding out using a wide variety of secondary sources Noticing patterns Grouping and classifying
	Animals including humans	What is it like to be old in the UK?	All living things will at some stage carry out the life processes of respiration, reproduction, feeding, excretion, growth and developments and will eventually die	Foetus Embryo Womb Gestation Life expectancy	Puberty Development Adolescent Fertilised	Finding out using a wide variety of secondary sources Recognising changes over different periods of time
Chemistry	Materials	Is it possible to separate even very small things like sand, sugar and salt?	Matter can change if the arrangement of their building blocks changes. (In this case, dissolving, breaks the bonds between building blocks.)	Solution Sediment Acid Thermal Soluble/Insoluble Irreversible/Reversible	Conductivity Spencer Silver Ruth Benerito	Noticing patterns Comparative and fair tests Identify and classify
Earth Science	Earth and space	What shape is the moon and does it change?	The Earth rotates on an axis lying north to south and this motion makes it appear that the Sun, Moon and stars are moving round the Earth. Rotation causes day and night and the axis varies day length and seasons	Rotation Celestial Orbit Solar system	Weight/Mass Geocentric Heliocentric	Observing changes over periods of time Noticing patterns Finding out using secondary sources
Physics	Forces	Does the shape of a boat matter?	A force acting on an object is not perceived directly but is detected by its effect on the object's motion or shape	Air resistance Water resistance Levers Gears Magnetic force	Mechanisms Displacement Gravity Pulleys Springs	Comparative and fair tests Grouping and classifying

- Plan and set up** an investigation
- Understand the difference between **comparative** (discrete data) and **fair tests** (continuous data)
- Know what **variables** are in a given enquiry and **isolate** them
- Use all **measurements** set out in **Year 5 mathematics** which includes converting different units of metric measure
- Use **scientific instruments** accurately e.g. thermometer, rain gauge, spring scales, lux meter
- Record and present** data in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs
- Use **data** generated to help **make sense of the investigation**
- Use information gleaned from investigations to make **predictions** for further comparative and fair tests
- Create **new investigations** which take into account what has been learned previously
- Present** information using IT such as power-point and iMovie
- Use written methods to **report findings** and include diagrams where appropriate
- Orally present** findings to other students in the class
- Clear about what has been found
- Evaluate** investigation
- Identify **causal relationships**
- Aware that the outcome from an enquiry needs to be supported with **scientific knowledge** and state whether the evidence **supports or refutes** an argument or theory
- Give an example of something that has been focused on e.g. how much easier it is the lift a heavy object using pulleys using **scientific theories to support this theory**



Area of science		Year 5 Scientists should be able to
Biology	Living things	<ul style="list-style-type: none"> <input type="checkbox"/> Present their understanding of the life cycle of a range of animals and plants in different ways e.g. drama, pictorially, chronological reports, creating a game <input type="checkbox"/> Identify patterns in life cycles <input type="checkbox"/> Compare two or more animal life cycles (mammal, amphibian, insect and bird) <input type="checkbox"/> Explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both way
	Animals including humans	<ul style="list-style-type: none"> <input type="checkbox"/> Create a timeline to indicate the stages of growth in humans <input type="checkbox"/> Explain the changes that takes place in boys and girls during puberty <input type="checkbox"/> Describe how a baby changes physically as it grows and also what it is able to do <input type="checkbox"/> Use the office for national statistics information to discuss some of the challenges that face older citizens of the UK
Chemistry	Materials	<ul style="list-style-type: none"> <input type="checkbox"/> Create a chart or table grouping/comparing everyday materials by different properties e.g. conductivity, response to magnets, solubility and transparency <input type="checkbox"/> Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose <input type="checkbox"/> Explain what dissolving means, giving examples and group solids based on their observations when mixing them with water <input type="checkbox"/> Name equipment used for filtering, sieving and evaporating <input type="checkbox"/> Use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving <input type="checkbox"/> Explain the results from their investigations involving dissolving and irreversible change <input type="checkbox"/> Provide examples of changes which result in the formation of new materials and understand that these are usually irreversible (burning and the reaction of acid on bicarbonate of soda)
Physics	Earth and space	<ul style="list-style-type: none"> <input type="checkbox"/> Show using diagrams the movement of the Earth in relation to the Sun and the Moon relative to the Earth <input type="checkbox"/> Describe the Sun as approximately spherical bodies <input type="checkbox"/> Explain how day and night occur and the apparent movement of the Sun across the sky <input type="checkbox"/> Can explain how a sundial works <input type="checkbox"/> Describe, using a model, why we have time zones <input type="checkbox"/> Can describe the arguments and evidence used by scientists in the past
Physics	Forces	<ul style="list-style-type: none"> <input type="checkbox"/> Demonstrate the effect of gravity acting on an unsupported object <input type="checkbox"/> Explain how gravity impacts our lives <input type="checkbox"/> Give examples of friction, water resistance and air resistance and explain results from investigation <input type="checkbox"/> Provide examples of when it is beneficial to have high or low friction, water resistance and air resistance <input type="checkbox"/> Create parachutes, changing a variable to try to isolate what is needed for an effective parachute (e.g. changing parachute material, size, shape, etc) <input type="checkbox"/> Create paper boats, testing different sizes while keeping other variables the same (or testing different shapes). <input type="checkbox"/> Demonstrate how pulleys, levers and gears work <input type="checkbox"/> Explain how levers, pulleys and gears allow a smaller force to have a greater effect

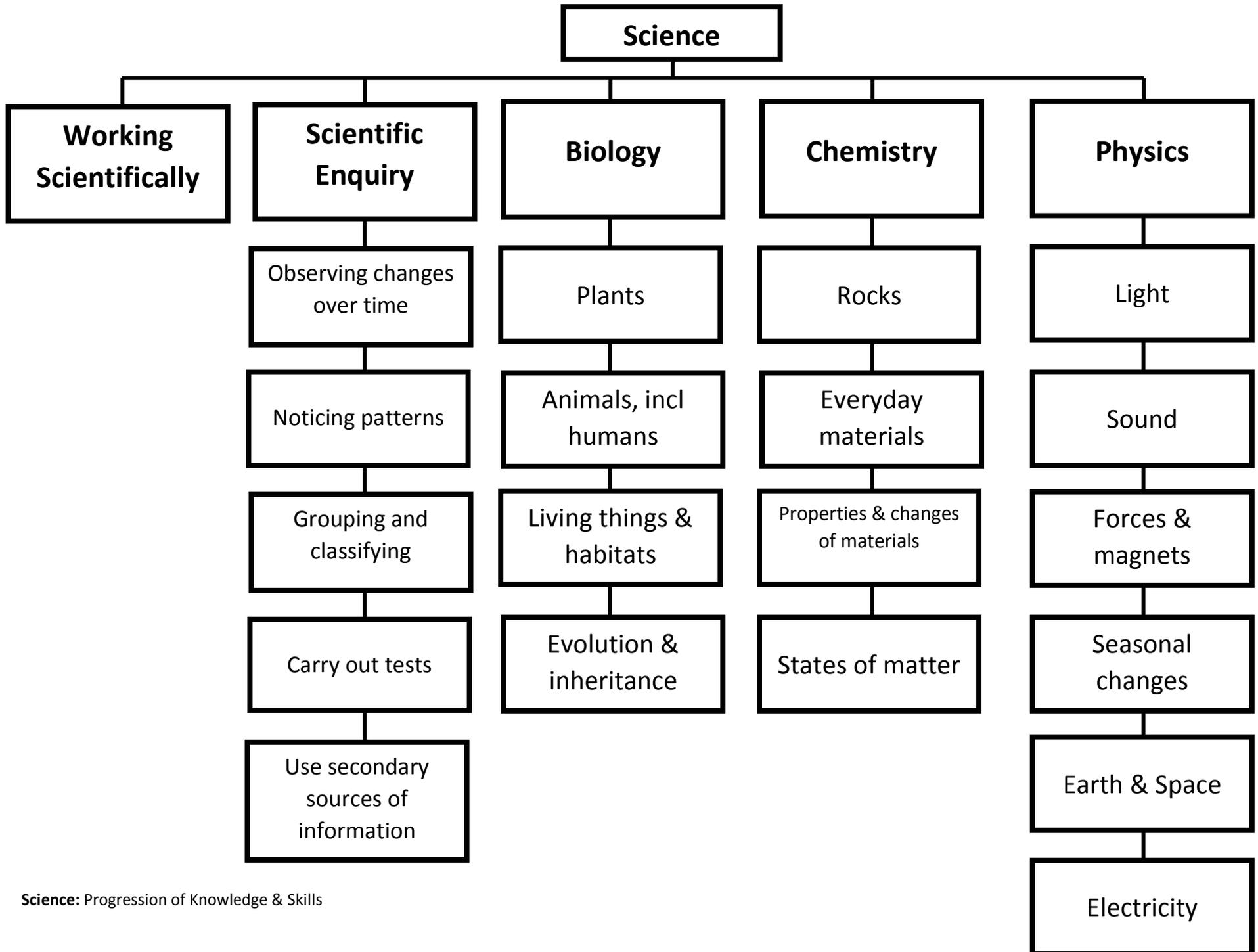


Year 6

Area of science		Big Question	Big idea	Key Vocabulary	Enquiry type	Working Scientifically
Biology	Living things and their habitats	Is bacteria a living thing? In what ways are living things the same and in what ways are they different?	Although some living things do not appear to be active, all will at some stage carry out the life processes of respiration, reproduction, feeding, excretion, growth and developments and will eventually die	micro-organisms crustaceans arthropods mollusc virus bacteria characteristics vertebrates invertebrates Carl Linnaeus	Finding out using a wide variety of secondary sources Observing over different periods of time Grouping and classifying Comparative and fair tests	<input type="checkbox"/> Decide which type of test they will do based on the type of data collected (continuous or discrete) <input type="checkbox"/> Understand the difference between dependent and independent variables <input type="checkbox"/> Justify why the variable has been isolated in the investigation <input type="checkbox"/> Use all measurements set out in Year 6 mathematics which includes capacity, mass, ratio and proportion <input type="checkbox"/> Choose appropriate scientific instruments for particular investigations e.g. spring scales, lux meter, thermometer <input type="checkbox"/> Take repeated readings where necessary (finding the average) and understand the importance of doing this <input type="checkbox"/> Decide how best to record an present their data based on their investigation and justify their reasons why <input type="checkbox"/> Confidently use data generated to explain the possible reasons for the results <input type="checkbox"/> Make accurate predictions for further tests by referring back to the results from previous investigations <input type="checkbox"/> Create new investigations based on their previous findings rationalising why they think this is the next step Present information using IT such as power-point, animoto and iMovie <input type="checkbox"/> Focus on the planning, doing and evaluating phases when reporting findings <input type="checkbox"/> Use diagrams when necessary <input type="checkbox"/> Confidently present findings orally in front of the class and compare findings with other students <input type="checkbox"/> Explain about what has been found through the investigation and compare this to other enquiries <input type="checkbox"/> Evaluate investigation considering the degree in which results should be trusted e.g. repeated readings <input type="checkbox"/> Explain causal relationships suggesting reasons why based on scientific knowledge. <input type="checkbox"/> Make conclusions based scientific theories and decide whether the results from an investigation support or refute an argument or theory <input type="checkbox"/> Explain reasons why evidence could contradict scientific knowledge
	Animals including humans	Does our heart stop when we sneeze? Can a heart become unhealthy?	The circulatory system takes material needed by cells to all parts of the body and removes waste	biometrics DNA blood vessels nature vs nurture circulatory system pulmonary artery pulmonary vein platelets plasma haemoglobin	Noticing patterns Observing over different periods of time Comparative and fair tests Finding out using a wide variety of secondary sources	
	Evolution and inheritance	Why do animals often have colours that match their environment? Why do animals look the way they do?	The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live	adaption ancestry evolution extinct natural selection inheritance species variation naturalist	Noticing patterns Grouping and classifying Using secondary sources of information	
Physics	Light	Why can I hear round corners but not see round corners?	Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.	refraction dispersion filters periscope phenomena light rays spectrum variables control	Noticing patterns Using secondary sources of information	
	Electricity	Is it possible to change how bright a bulb is or how loud a buzzer is?	Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.	voltage function series circuit circuit diagram symbols brightness buzzer cell components	Noticing patterns Comparative and fair tests	



Area of science		Year 6 Scientists should be able to
Biology	Living things and their habitats	<ul style="list-style-type: none"> <input type="checkbox"/> Can give examples of animals in the five vertebrate groups and some of the invertebrate groups <input type="checkbox"/> Can give the key characteristics of the five vertebrate groups and some invertebrate groups and create classification keys <input type="checkbox"/> Can compare the characteristics of animals in different groups and give a number of characteristics that explain why an animal belongs to a particular group <input type="checkbox"/> Can give examples of flowering and non-flowering plants <input type="checkbox"/> Chn use given resources and online research to investigate whether bacteria, viruses and fungi are definitely living things. (Whether viruses are alive is open to debate) <input type="checkbox"/> Chn are shown how yeast, sugar and warm water causes a reaction; they then investigate what happens to this reaction when they change particular variables of their choice (sugar/no sugar, water temperature, adding chemicals, etc) <input type="checkbox"/> Chn to use advanced keys to classify a variety of insects. Chn to create their own key to allow others to identify specimens found on the school grounds.
	Animals including humans	<ul style="list-style-type: none"> <input type="checkbox"/> Use diagrams/role play to explain main parts of the circulatory system and their role <input type="checkbox"/> Explain the function of the heart, blood vessels and blood <input type="checkbox"/> Can use subject knowledge about the heart whilst writing conclusions for investigations <input type="checkbox"/> Can explain both the positive and negative effects of diet, exercise, drugs and lifestyle on the body <input type="checkbox"/> Present information e.g. in a health leaflet describing impact of drugs and lifestyle on the body <input type="checkbox"/> Know the ways in which nutrients and water are transported in animals including humans <input type="checkbox"/> Chn to investigate the effect of exercise on heart rate and how long it takes for their pulse to return to the resting rate after exercising for a minute <input type="checkbox"/> Over the course of a month, chn investigate whether some volunteers (who do consistent exercise at break time) can lower their resting heart rate.
	Evolution and inheritance	<ul style="list-style-type: none"> <input type="checkbox"/> Know how the Earth has changed over time and how this impacts living things <input type="checkbox"/> Can explain the process of evolution and examples of how an animal or part has evolved over time <input type="checkbox"/> Understand that fossils provide information about things that inhabited the Earth millions of years ago <input type="checkbox"/> Identify characteristics that will make a plant or animal suited or not suited to a particular habitat <input type="checkbox"/> Can explain why the dominant colour of the peppered moth changed over a very short period of time <input type="checkbox"/> Can give examples of fossil evidence that can be used to support the theory of evolution <input type="checkbox"/> Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)
Physics	Light	<ul style="list-style-type: none"> <input type="checkbox"/> Can describe (with diagrams) how light travels in straight lines <input type="checkbox"/> Explain we can see because light either travels from light sources or reflected from other objects into our eyes <input type="checkbox"/> Can describe with diagrams, as appropriate, how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape <input type="checkbox"/> Can predict and explain with diagrams or models, as appropriate, how the path of light rays can be directed by reflection to be seen, for example, reflection in car rear view mirrors or in a periscope. <input type="checkbox"/> Explore how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass <input type="checkbox"/> Can predict and explain with diagrams or models, as appropriate, how the shape and size of shadows can be varied
	Electricity	<ul style="list-style-type: none"> <input type="checkbox"/> Compare and give reasons for why components work and do not work in a circuit <input type="checkbox"/> Create circuits to investigate the effect of different voltages on different components <input type="checkbox"/> Change cells and components in a circuit to achieve a specific effect <input type="checkbox"/> Draw circuit diagrams of a range of simple series circuits using recognised symbols <input type="checkbox"/> Predict results and answer questions by drawing on evidence gathered <p>N.B. Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.</p>





	Biology						Chemistry				Physics					
	Senses	Keeping healthy	Plants	Animals including humans	Living things & habitats	Evolution & inheritance	Rocks	Everyday materials	Properties & changes of materials	States of matter	Light	Sound	Forces & magnets	Seasonal changes	Earth & space	Electricity
Yr R	X	X			X			X						X		
Yr 1			X	X				X						X		
Yr 2			X	X	X			X								
Yr 3			X	X			X				X		X			
Yr 4				X	X		X			X		X				X
Yr 5				X	X				X				X		X	
Yr 6				X	X	X					X					X