






# Science Curriculum Overview



*“happy children who are confident,  
independent and thoughtful.”*

## Our Curriculum Design

We have used **Kapow** as the base for our **cyclical** curriculum, which weaves **working scientifically** through the 3 branches of Natural Sciences. Our pupils revisit these aspects throughout their time in our school. The elements of **working scientifically** are: **observing over time, pattern seeking, identifying, classifying/grouping, comparative/fair testing and researching using secondary sources**. Within each unit we have identified the working scientifically element that is the main focus. We have also ensured that working scientifically skills are **embedded and built upon** across each phase. Each time they revisit an aspect, it is with **increasing complexity** to build on their **prior knowledge**.

Observation over time	Pattern Seeking	Identifying, Classifying & Grouping	Comparative/Fair Testing	Researching Using Secondary Sources
				

In each year group starting in Y1, children learn about the work of **3 prominent scientists** to build up an overview of different people and the impact of their work on society. Science is **taught weekly for 1.5 hours** from Y1-Y6. Across each of the 6 half termly topics, they complete an investigation to put into practice and apply their working scientifically skills in the context of the area of science they have been studying. In EYFS children have an **investigative focus question** each half term, to start to build the foundations of science knowledge and working scientifically elements, alongside the continuous provision. From Reception to Y6 we have identified the **key vocabulary** that children will be introduced to.

Our science curriculum has been arranged in single age groups, however, in KS2 due to the fluctuations in pupil numbers the lower KS2 curriculum needs to revert to a 2 year cycle (A & B) in some years. Therefore we have ensured our class teachers have a clear progression of the disciplinary knowledge needed within the working scientifically strand.

## Our Big Ideas

Our curriculum is designed to enable our children to work towards an understanding of the 'big ideas' in science taken from "Working with Big Ideas in Science Education" edited by Wayne Harlen 2015 by the end of KS2.

By the time a child reaches Y6 we expect them to know:





1. All material in the Universe is made of very small particles.
2. Objects can affect other objects at a distance.
3. Changing the movement of an object requires a net force to be acting on it.
4. The total amount of energy in the Universe is always the same but energy can be transformed when things change or are made to happen.
5. The composition of the Earth and its atmosphere and the processes occurring within them shape the Earth's surface and its climate.
6. The solar system is a very small part of one of millions of galaxies in the Universe.
7. Organisms are organised on a cellular basis.
8. Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.
9. Genetic information is passed down from one generation of organisms to another.
10. The diversity of organisms, living and extinct, is the result of evolution.

This cumulative knowledge is developed over time to enable pupils to develop a secure understanding of the 3 core scientific disciplines and the themes within each as outlined in the National Curriculum. These are colour coded below:

The Study of Life & Living Organisms (Biology)	The Study of Matter (Chemistry)	The Study of the Universe (Physics)
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## Our Learning Cycles

Below is an overview of our unit titles, which are colour coded to show the science discipline and the graphic icons highlight the working scientifically aspects focused on within each taught unit.

	AUTUMN		SPRING		SUMMER	
EYFS	Plants-Why do trees look different in autumn? 	Materials-how can we sort different materials? 	States of matter-why does chocolate melt? 	Plants-why wont it grow? 	Animals incl Humans-how does a chicken grow? 	Forces-how can I make a boat float? 
Y1	Seasonal Changes 	Everyday Materials 	Animals incl Humans-Sensitive Bodies 	Animals incl Humans-Comparing Animals 	Living Things-Plants 	Animals incl Humans-Polar Places 
Y2	Animals incl Humans-Life Cycles & Health 	Plant – based materials	Materials-Uses of Everyday Materials 	Living Things-Habitats 	Plants-Plant Growth 	Living things-Microhabitats 
Y3/4A	Materials-Rocks & Soils 	Working scientifically Does hand span affect grip strength? 	Energy-Light & Shadow 	Materials-States of Matter 	Plants-Plant Reproduction 	Forces, Earth & Space-Forces & Magnets 
Y3/4B	Working scientifically How does the flow of liquids compare? 	Energy-Electricity & Circuits 	Animals incl Humans-movement including nutrition 	Animals incl Humans-Digestion and food 	Living Things-Classification 	Energy-Sound & Vibrations 
Y5	Forces, Earth & Space-Earth & Space 	Forces, Earth & Space-Unbalanced Forces 	Animals incl Humans-Human Timeline 	Living Things-Life Cycles & Reproduction 	Materials-Mixtures & Separation 	Materials-Properties & Changes 
Y6	Animals incl Humans-Circulation & Health 	Energy-Circuits, batteries & switches 	Living Things-Classification Big & Small 		Living Things-Evolution & Inheritance 	Energy-Light & Reflection 

Observing Overtime 	Pattern Seeking 	Identifying, Classifying & Grouping 	Comparative/Fair Testing 	Researching Using Secondary Sources 
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YR	Autumn		Spring		Summer	
Knowledge & Skills	<b>Plants-Why do trees look different in Autumn?</b> <ul style="list-style-type: none"> <li>Name, describe and sort animals that live in different habitats</li> <li>Describe different habitats</li> <li>Know about similarities and differences in relation to living things and places</li> <li>Can talk about some of the things they have observed such as plants, animals, natural and found objects</li> <li>Shows care and concern for living things and the environment</li> </ul>	<b>Materials-How can we sort different materials?</b> <ul style="list-style-type: none"> <li>Explore a range of materials, including natural materials</li> <li>Make objects from different materials, including natural materials.</li> <li>Shape and join materials</li> </ul>	<b>States of Matter-Why does chocolate melt?</b> <ul style="list-style-type: none"> <li>Combine and mix ingredients</li> <li>Change materials by heating and cooling</li> </ul>	<b>Plants-Why won't it grow?</b> <ul style="list-style-type: none"> <li>Help to grow and take care of plant</li> <li>Shows care and concern for living things and the environment</li> <li>Name common plants they see around school/in forest schools. Specific plants in our school to name: Daisy, buttercup, daffodils, sunflowers, apple tree, pear tree</li> </ul>	<b>Animals including humans-How does a chicken grow?</b> <ul style="list-style-type: none"> <li>Learn about the lifecycles of animals</li> <li>Observe how baby animals change over time</li> <li>Shows care and concern for living things and the environment</li> <li>Compare adult animals to babies</li> <li>Learn to take care of themselves</li> <li>Know the importance of good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe</li> <li>Learn about their senses</li> </ul>	<b>Forces-How can I make a boat float?</b> <ul style="list-style-type: none"> <li>Explore how to change how things work</li> <li>Explore how the wind can move objects</li> <li>Feel forces</li> <li>Explores Shadows</li> <li>Explores rainbows</li> </ul>
Vocab	animal names, land, water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice	Wood, paper, plastic, water, ice hard, soft, <i>materials, dull, shiny, bendy, stiff</i>	hot, cold, melt, wet, dry, change, change back, <i>solid, liquid</i>	Seed, plant, flower, soil, water, sun, leaf/leaves <i>fruit, petal, bud, blossom, stem</i>	Egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, grow, change, die	Wind, air, blow, fast, slow, turn, spin



	<b>Continuous Provision</b> <ul style="list-style-type: none"> <li>Children will use their senses to explore the natural world around them, describing and understanding the effect of changing seasons. They will also be encouraged to be curious, question and to give explanations as they explore the different provision areas to think about “why” something behaves or works in a certain way.</li> <li>Play and explore outside in all seasons and in different weather</li> <li>Observe living things throughout the year.</li> <li></li> </ul>					
Y1	Autumn		Spring		Summer	
Knowledge & Skills	<b>Seasonal Changes</b> <ul style="list-style-type: none"> <li>Observe changes across the four seasons.</li> <li>Observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<b>Everyday Materials</b> <ul style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made.</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</li> <li>Describe the simple physical properties of a variety of everyday materials.</li> <li>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	<b>Animals Including Humans Sensitive Bodies</b> <ul style="list-style-type: none"> <li>Identify, name, draw and label the basic parts of the human body.</li> <li>Say which part of the body is associated with each sense .</li> <li>Spot patterns and use this information to answer questions.</li> <li>Understand how science can support those who have lost sensory function.</li> <li>Explore how firefighters use their senses at work.</li> </ul>	<b>Animals Including Humans – comparing animals</b> <ul style="list-style-type: none"> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</li> <li>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</li> </ul>	<b>Living Things Plants</b> <ul style="list-style-type: none"> <li>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li> <li>Identify and describe the basic structure of a variety of common flowering plants, including trees</li> </ul> <b>Specific plants in our school to name:</b> <ul style="list-style-type: none"> <li>Wild plants –clover, poppies, bluebells</li> <li>Garden plants –crocus, Water lily (pond)</li> <li>Deciduous trees – oak, rowan, willow, cherry + purple leaf sand cherry, horse chestnut</li> </ul> <p>Evergreen - bamboo, cedar (2 varieties), Fir, Ivy (evergreen plants)</p>	<b>Animals Including Humans - Polar Places</b> <ul style="list-style-type: none"> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> </ul> <b>Specific animals in our locality:</b> <ul style="list-style-type: none"> <li>Pond – pond skater, backswimmer, dragonfly</li> <li>Forest school – ladybird, woodlouse, slug, snail, ant, spider, fox, caterpillar to butterfly</li> <li>Birds – Robin, blue tit, magpie, pigeon</li> </ul> <p>Pets – cat, dog, rabbit, hamster</p>
	Alfred Wegener		Jane Goodall		Maria Sibylla Merian	
WS	observing over time	identifying, classifying/grouping	pattern seeking	observing over time	researching using secondary sources	comparative/fair testing

Vocab	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length	Candle, dark, eat, food, light, light source, loud, music, opaque, plant, quiet, shadow, sound, translucent, transparent, vibrate	sight, hearing, touch, smell, taste, skeleton, skull, skin, head, neck, arms, elbows, fingers, chest, torso, legs, feet, toes, brain, lung, heart, kidney, liver	fish, reptiles, mammals, birds, amphibians, herbivore, carnivore, omnivore, head, ear, eye, mouth, nose, leg, knee, arm, elbow, back wings, beak	Berry, blossom, bud, bulb, branch, deciduous, evergreen, fruit, habitat, identify, leaf/leaves, petal, root, stem, tree, trunk	wing, claw, tail, beak, fur, feather, fin, scales, carnivore, habitat, herbivore, omnivore, pets, wild animals
Y2	Autumn		Spring		Summer	
Knowledge & Skills	<b>Animals Including Humans Life Cycles &amp; Health</b> <ul style="list-style-type: none"> <li>Understand that animals, including humans, have offspring which grow into adults</li> <li>Describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> </ul>	<b>Weather Patterns</b> <ul style="list-style-type: none"> <li>Introduce shared weather station and what it collects.</li> <li>Make predictions, record findings in tables and charts.</li> <li>Collect data about the wind, rainfall, clouds and temperature</li> </ul>	<b>Materials Uses of Materials</b> <ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> <li>Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul>	<b>Living Things Habitats</b> <ul style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>Identify and name a variety of plants and animals in their habitats, including micro-habitats SEE YEAR 1 LIST</li> <li>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</li> </ul>	<b>Plants Plant Growth</b> <ul style="list-style-type: none"> <li>Observe and describe how seeds and bulbs grow into mature plants</li> <li>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li> <li>Compare the survival needs of plants and identify the conditions for seed germination.</li> <li>Revisit and extend names of plants found in local area.</li> <li>Learn about the harmful effects of plastics and explore eco friendly alternatives.</li> </ul>	<b>Animals Including Humans Microhabitats</b> <ul style="list-style-type: none"> <li>Find out about and describe the basic needs of humans for survival (water, food and air).</li> <li>Describe the importance for humans of eating the right amounts of different types of food, and hygiene.</li> <li>Observe and describe how seeds and bulbs grow into mature plants.</li> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> </ul>
	Steve Irwin		Al Jahiz		Barbara McClintock	
WS	identifying, classifying/grouping	pattern seeking	comparative/fair testing	researching using secondary sources	observing over time	observing over time

Vocab	Adult, baby, basic needs (water, food, air), carbohydrate, child, dairy, exercise, fats, fruit, grow, hygiene, infection, offspring, oils, protein, sugar, survival, vegetables, teenager, toddler, unhealthy	Summer, Spring, Autumn, Winter, season, sun, day, moon, night, light, dark, sun, rain, snow, sleet, frost, ice, fog, cloud, hot/warm, cold, storm, wind, thunder, weather forecast, temperature	Changes, concrete, elastic, fabric, flexible, man-made, material, natural, opaque, properties, reflective, rigid, rubber, shape, squash, stretch, strong, suitable, translucent, transparent, twist, use/useful, weak, <i>characteristics, suitability, purpose</i>	Adaptation, alive, breathe, carnivore, conditions, characteristics, dead, excrete, feed, food chain, grow, heat, herbivore, living, micro-habitats, move, non-living, omnivore, reproduce, shelter, names of habitats, micro-habitats and describe conditions	Earth, fully grown, growth, healthy, light, nutrients, seedling, shoot	Air, bread, balanced diet, diet, food, fruit, healthy, hygiene, ingredients, vegetables, water, bones, change, chopping board, cook, dehydrate, digest, energy, fork fruit, frying pan, grow, heat, hot, knife, oven, saucepan, spoon, strong, temperature, utensils, whisk
Y3 (A)	Autumn		Spring		Summer	
Knowledge & Skills	<b>Materials Rocks &amp; Soils</b> <ul style="list-style-type: none"> <li>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>Recognise that soils are made from rocks and organic matter</li> </ul>	<b>Animals Including Humans Healthy Eating</b> <ul style="list-style-type: none"> <li>Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</li> </ul>	<b>Forces, Earth &amp; Space Forces and Magnets</b> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces</li> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li> <li>Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing</li> </ul>	<b>Plants Plant Reproduction</b> <ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li> <li>Investigate the way in which water is transported within plants</li> <li>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul>	<b>Energy Light and Shadow</b> <ul style="list-style-type: none"> <li>Recognise that he/she needs light in order to see things and that dark is the absence of light.</li> <li>Notice that light is reflected from surfaces</li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect eyes.</li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect eyes.</li> <li>Find patterns in the way that the size of shadows change</li> </ul>	<b>Animals Including Humans Skeletons</b> <ul style="list-style-type: none"> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> </ul>
	Marie Curie		Joseph Banks		James Clark Maxwell	
WS	pattern seeking	researching using secondary sources	identifying, classifying/grouping	Observing overtime	Comparative fair testing	researching using secondary sources



Vocab	Absorb, extinct, crystals, fossils, granite, grains, humus, igneous, impermeable, layers, magma, metamorphic, mineral, molten, paleontology, paleontologists, permeable, rock, sediment, sedimentary, soil, <i>erosion, particles, physical properties, porous</i>	Backbone, balanced diet, blood vessels, bones, brain, carbohydrate, dietary fibre, heart, invertebrates, joints, movement, minerals, muscles, nutrients, nutrition	Air resistance, attract, bar magnet, button magnet, compass, contact, float, force, force-meter, friction, gravity, horse shoe magnet, iron, magnet, magnetic, magnetic North, non-contact, non-magnetic, North pole, poles, repel, ring magnet, sink, South pole, strength	Absorb, fertiliser, plant life cycle, pollination, seed dispersal, seed formation, temperature, transported	Absorb, beam, block, direction of light, bright, dim, dull, light source, mirror, opaque, reflect, reflective, shadow, shiny, sun light, translucent, transparent. Names of light sources, <i>speed of light, emit, light spectrum</i>	Support, protection, ribs, sockets, skeleton, skull, spine, tendons, vertebrates, vitamins,
Y4 (B)	Autumn		Spring		Summer	
Knowledge & Skills	<b>Materials States of Matter</b> <ul style="list-style-type: none"> <li>Compare and group materials together, according to whether they are solids, liquids or gases</li> <li>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)</li> <li>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<b>Animals Including Human Digestion &amp; Food</b> <ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans</li> <li>Identify the different types of teeth in humans and their simple functions</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey</li> </ul>	<b>Animals Including Human Food Chains</b> <ul style="list-style-type: none"> <li>Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things.</li> <li>Understand what a food chain is.</li> <li>Explain/give examples of simple food chains and how they impact.</li> </ul>	<b>Energy Electricity &amp; Circuits</b> <ul style="list-style-type: none"> <li>Identify common appliances that run on electricity</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li> <li>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>Recognise some common conductors and insulators, and associate metals with being good conductor</li> </ul>	<b>Energy Sound &amp; Vibrations</b> <ul style="list-style-type: none"> <li>Identify how sounds are made, associating some of them with something vibrating</li> <li>Recognise that vibrations from sounds travel through a medium to the ear</li> <li>Find patterns between the pitch of a sound and features of the object that produced it</li> <li>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>Recognise that sounds get fainter as the distance from the sound source increases</li> </ul>	<b>Living Things Classification</b> <ul style="list-style-type: none"> <li>Recognise that living things can be group in a variety of ways.</li> <li>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>Identify the changes in the habitats within the school grounds.</li> <li>Recognise that environments can change and that this can sometimes pose dangers to living things.</li> <li>Explore the impact of humans both positive/negative on habitats.</li> </ul>
	Ivan Pavlov		Maria Telkes		Galileo Galilei	
WS	Observing over time	researching using secondary sources	identifying, classifying/grouping	comparative/fair testing	Pattern seeking	identifying, classifying/grouping

<b>Vocab</b>	Air, boiling point, boiling, condensation/condensing, degree Celsius, energy transfer, evaporation/evaporating, freezing, freezing point, gaseous, grain, matter, melting, melting point, oxygen, particles, powder, water cycle, water vapour	Absorb, anus, blood stream, canines, consumer, decay, dentine, digestion, enamel, energy, faeces, gums, incisors, large intestine, molars, nerves, oesophagus, plaque, saliva, small intestines, stomach, swallowing	fish, reptiles, mammals, birds, amphibians, snails, slugs, worms, spiders, insects, environment, habitat, vertebrate, invertebrate, exoskeleton, adaptation, predator, prey, producer	Battery, bulb, buzzer, cell, circuit, closed circuit, components, complete circuit, conductor, connection, crocodile clip, electricity, electrical device/appliance, insulator, mains, motor, negative, open circuit, plug, positive, rechargeable, simple circuit, symbol, switch, terminals, wires, series circuit and terminal	Brass, echo, insulation, instrument, percussion, pitch, sound source, sound wave, string, travel, tune, tuning fork, vibration, volume, woodwind	Organisms, life processes, environment, extinct, habitat, characteristics, impact, positive, negative, human
<b>Y5</b>	<b>Autumn</b>		<b>Spring</b>		<b>Summer</b>	
<b>Knowledge &amp; Skills</b>	<b>Forces, Earth &amp; Space Earth &amp; Space</b> <ul style="list-style-type: none"> <li>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>Describe the movement of the Moon relative to the Earth</li> <li>Describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	<b>Forces, Earth &amp; Space Unbalanced Forces</b> <ul style="list-style-type: none"> <li>Understand that unsupported objects fall to Earth due to gravity. (Parachutes &amp; seeds)</li> <li>Explore the effects of air resistance and friction as forces between moving surfaces. (breaks on wheels)</li> <li>Investigate how mechanisms such as levers, pulleys and gears allow a smaller force to have a greater effect.</li> </ul>	<b>Animals Including Humans Human Timeline</b> <ul style="list-style-type: none"> <li>Identify key stages of change in humans.</li> <li>Describe the changes as humans develop to old age.</li> <li>Consider what data might help determine if a child is growing normally.</li> <li>Describe how puberty affects boys/girls.</li> <li>Produce graphs to compare how gestation periods vary across different mammals, including humans.</li> </ul>	<b>Living Things Life Cycles &amp; Reproduction</b> <ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>Compare asexual and sexual reproduction in plants.</li> <li>Grow cuttings to measure and plot root growth overtime.</li> <li>Describe the life process of reproduction in some plants and animals</li> <li>Analyse secondary data to investigate how the amphibian lifecycle is affected by predators and climate change.</li> </ul>	<b>Materials Mixtures &amp; Separation</b> <ul style="list-style-type: none"> <li>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</li> <li>Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>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.</li> </ul>	<b>Materials Properties &amp; Changes</b> <ul style="list-style-type: none"> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>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.</li> </ul>
	<b>Stephen Hawking &amp; Mae Carol Jemison</b>		<b>Dr Steve Jones/Professor Robert Winston</b>		<b>Amedeo Avogadro</b>	

WS	comparative/fair testing	comparative/fair testing	pattern seeking	Secondary sources	observing over time	observing over time
Vocab	Asteroids, axes/Axis, celestial body, comets, galaxy, light years, meteors, orbit, phases of the moon, planet, revolve, rotation, shadow clocks, spherical, spin, solar system, star, sun, sundials, time zone	Gravity, air resistance, water resistance, friction, surface, force, effect, move, associate, decelerate, stop, change direction, brake, mechanism, pulley, gear, spring, theory of gravitation	Adolescence, adolescent, arthritis, gestation period, life expectancy, menstruation, pregnant, puberty	Anther, asexual reproduction, carpel, external fertilisation, fertilisation, filament, germination, gestation, internal fertilisation, larva, metamorphosis, pollen, pollination, seed dispersal, seed formation, sepal, sexual reproduction, sperm, stamen, style, stigma	Burning, dissolve, electrical conductor, filter, insoluble, irreversible change, mixture, reversible change, rust, sieving, soluble, solute, solution, solvent, thermal conductor, thermal insulator, <i>combustion, oxidisation, chemical reaction, residue, filtrate</i>	Burning, acid, irreversible, chemical change and rust
Y6	Autumn		Spring		Summer	
Knowledge & Skills	<b>Animals Including Humans- Circulation &amp; Health</b> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans</li> </ul>	<b>Energy Circuits, batteries &amp; switches</b> <ul style="list-style-type: none"> <li>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</li> <li>Use recognised symbols when representing a simple circuit in a diagram</li> </ul>	<b>Living Things Classifying Big &amp; Small</b> <ul style="list-style-type: none"> <li>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (<i>Extends y3 – requirements for life and growth</i>)</li> <li>Classifying plants (Linked to Year 4 learning)</li> <li>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>		<b>Living Things Evolution and Inheritance</b> <ul style="list-style-type: none"> <li>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul>	<b>Energy Light &amp; Reflection</b> <ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines</li> <li>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</li> <li>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> </ul>
	Justus Von Liebig		Leonardo Da Vinci		Charles Darwin	
WS	pattern seeking	identifying, classifying/grouping	researching using secondary sources		comparative/fair testing	observing over time

Vocab	Addiction, aorta, artery, atrium, blood, bronchi, capillaries, carbon dioxide, circulatory system, de-oxygenated, diaphragm, lifestyle, lungs, nicotine, oxygen, oxygenated, plasma, pulmonary vein/artery, pulse, red blood cells, respiration, vein, ventricles, white blood cells	Current, electrons, filament, fuse, resistance series circuit, terminal, voltage volume, <i>parallel circuit</i>	classification, mammals, birds, amphibians, fish, reptiles, insects vertebrates, invertebrates, micro-organisms, bacteria, fungi	Adaptation, chromosomes, competition, DNA, evolution, evolutionary change features, environmental conditions, environmental variations, fossil records, genes, natural selection, reproduction, survival of the fittest, variation	Absorption, cornea, lenses, iris, light ray, optics, pupil, prism, rainbow, refraction, symmetry, spectrum, transmission
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## Working Scientifically Progression

Key Area	EYFS	Y1	Y2	KS2			
<b>Observing Overtime</b>	<p>Know that observation is a key skill of a scientist.</p> <p>Know that comparisons can be made through observation.</p>	<p>Know that observations can be made using simple equipment.</p> <p>Know that changes can be recorded through observation.</p>	<p>Know that equipment can be selected to observe change over time.</p> <p>Know that observations can be measured.</p>	<p>Know that observations need to be careful and systematic.</p>	<p>Know that choices can be made on what to observe and how to measure it.</p> <p>Know that standard units of time in minutes and seconds can be used when accurately observing.</p>	<p>Know that observations can be made on a variety of scientific activities.</p> <p>Know that times of observation will vary according to the requirements each experiment.</p>	<p>Know that observations require: identifying the measurements required, selecting the equipment needed and taking precise readings.</p> <p>Know that the interval and range can be taken from a set of observations.</p>
<b>Pattern Seeking</b>	<p>Know that patterns exist within scientific phenomena.</p>	<p>Know that patterns can be identified within scientific phenomena.</p>	<p>Know that relationships can be identified within scientific phenomena.</p>	<p>Know that patterns can be naturally occurring.</p> <p>Know that conclusions can be formed based on findings.</p>	<p>Know that patterns can be identified in results.</p>	<p>Know that causal relationships can be identified.</p> <p>Know that data can be interpreted to find patterns.</p>	<p>Know that patterns can be found in the natural environment.</p>

				Know that a range of bar charts, tables and pictograms are used to show measurements.	Know that patterns can be identified through data collection.	Know that data can be gathered, recorded, classified and presented in a variety of ways which include scientific diagrams, labels, keys, graphs and tables.	Know that evidence can support / refute causal relationships.
<b>Identifying, Classifying and Grouping</b>	Know that living and non-living things can be classified.	Know that living and non-living things can be classified and compared.	Know that living and non-living things can be classified and compared through methods of sorting and grouping.	Know that identified criteria will determine how living and non-living things are classified. Know that keys can be used when grouping, sorting and classifying.	Know that scientific ideas and processes determine how living and non-living things are classified and sorted.	Know that scientific ideas and processes determine how living and non-living things are classified and sorted.	Know that own classification methods can be chosen and developed in order to sort living and non-living things.
<b>Comparative/Fair Testing</b>	<p>Know that we can investigate different areas of science practically.</p> <p>Know that objects, materials and living things can be explored scientifically.</p> <p>Know that simple predictions can be made.</p>	Know that patterns can be found in the natural environment. Know that evidence can support / refute causal relationships.	<p>Know that explanations can be made based on what has happened during an investigation.</p> <p>Know that simple tests can be carried out independently.</p>	<p>Know that an investigation includes simple, practical enquiries.</p> <p>Know that measurements can be taken using a range of equipment. Know that comparative tests can be carried out.</p>	<p>Know that there is more than one variable.</p> <p>Know that fair tests can be carried out.</p>	<p>Know that some variables need to be controlled.</p> <p>Know that results can lead to further prediction and the design of further comparative tests.</p> <p>Know that methods can be improved.</p>	<p>Know that there are explanations behind needing to control variables.</p> <p>Know that there are reasons for improving methods.</p> <p>Know that the correct units must be used when measuring accurately and precisely.</p>



Researching Using Secondary Sources	Know that questions can be asked to find answers.	Know that simple secondary sources can be used to find answers.	Know that questions can be researched to find answers.	Know that questions can be researched to find answers using secondary sources	Know that answers to questions using secondary sources can be reported in different ways.	Know that repeated and precise recordings must be taken.  Know that research can be presented in different formats.	Know that research can be presented using different formats, selecting the best format for the information being shared.
End Points	<p>A Reception child working at the expected standard can:</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>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.</p> <p>Understand some important processes and changes in the</p>	<p>A Year 1 child working at the expected standard can ask simple questions. They can observe closely, using simple equipment performing simple tests. They can identify and classify using their observations and ideas to suggest answers to questions. They can gather and record data to help in answering questions.</p>	<p>A Year 2 child working at the expected standard can ask questions and recognise that they can be answered in different ways. They can observe closely, using simple equipment performing simple tests. They can identify and classify using their observations and ideas to suggest answers to questions. They can gather and record data to help in answering questions.</p>	<p>A Year 3 child working at the expected standard can ask relevant questions and use different types of scientific enquiries to answer them. They can set up simple practical enquiries. They can set up fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units. They can use a range of equipment, including thermometers. They can gather, record, classify and present data in a variety of</p>	<p>A Year 4 child working at the expected standard can: ask relevant questions and use different types of scientific enquiries to answer them. They can set up simple practical enquiries. They can set up comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units. They can use a range of equipment, including thermometers, gathering, recording, classifying and presenting data in a</p>	<p>A Year 5 child working at the expected standard can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. They can take measurements, using a range of scientific equipment, taking repeat readings when appropriate. They can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. They can use test results to make predictions to set up further comparative</p>	<p>A Year 6 child working at the expected standard can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. They can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They can record data and results (of increasing complexity) using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line</p>

	<p>natural world around them, including the seasons and changing states of matter.</p> <p>(ELG's: Understanding the World)</p>			<p>ways to help in answering questions. They can record findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. They can report on findings from enquiries, including oral and written explanations. They can use results to draw simple conclusions, make predictions, suggest improvements, and raise further questions.</p>	<p>variety of ways to help in answering questions. They can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. They can report on findings from enquiries, including oral and written explanations, displays or presentations of results. They can use results to draw simple conclusions, make predictions, suggest improvements, and raise further questions. They can identify differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>and fair tests. They can report and present findings from enquiries, including conclusions and explanations of results. They can present results in oral and written forms such as displays and other presentations. They can identify scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>graphs. They can use test results to make predictions to set up further comparative and fair tests. They can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results. They can present results in oral and written forms such as displays and other presentations. They can identify scientific evidence that has been used to support or refute ideas or arguments.</p>
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