A progression in Science from Reception to KS3

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Working Scientifically	*Comments and asks questions about aspects of their familiar world, such as the place where they live or the natural world. *Can talk about some of the things they have observed, such s plants, animals, natural and found objects. *Shows care and concern for living things and the environment. *Looks closely at similarities, differences, patterns and change. *Talks about why things happen and how things work. *Develop an understanding of decay and changes over time. *Looks closely at similarities, differences, patterns and change. ***Children know about similarities and differences in relation to places, objects, materials and living things.** *Understands that equipment and tools have to be used safely. *Shows understanding of the need for safety when tackling new challenges,	***Ask simple questions and recognise that they can be answered in different ways** *They should experience different types of scientific enquiry including practical activities. * The children should be involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. ***Observing closely, using simple equipment** *Children make careful observations to support identification, comparison and noticing change. *They make observations over time and with guidance they begin to notice patterns and relationships. *They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. *They begin to take measurements, initially by comparisons, then using non-standard units.	***Ask relevant questions and use different types of scientific enquiries to answer them** *children consider their prior knowledge when asking questions. They should raise their own questions about the world around them. *They independently use a range of question stems. Where appropriate, they answer these questions. *The children answer questions posed by the teacher. *Given a range of resources, the children decide for themselves how to gather evidence to answer the question. *They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. *They identify the most appropriate type of scientific enquiry that they might use to answer their questions. ***Set up simple practical enquiries, comparative and fair tests** *They should recognise when a simple fair test is necessary and help to decide how to set it up. *They should decide which data to collect. *The children select from a range of practical resources to gather	***Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary** *Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. *Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of scientific enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work. They recognise when and how to set up comparative and fair tests. *The children select from a range of practical resources to gather evidence to answer their questions. *They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. *They look for patterns and relationships using a suitable sample. ***Take measurements, using a range of scientific equipment, with increasing accuracy and precision,**	*Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience *Make predictions using scientific knowledge and understanding select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety *make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements *Present observations and data using appropriate methods, including tables and graphs interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions

	and considers and manages some risks Shows understanding of how to transport and store equipment safely. *Practises some appropriate safety measures without direct supervision *Finding out and exploring: Showing curiosity about objects, events and people. Using senses to explore the world around them Engaging in an open-ended activity Showing interests Having their own ideas: Thinking of ideas Finding ways to solve problems Finding new ways of doing things *Make comments about what they have heard and ask questions to clarify their understanding Communication and language *learn new vocabulary *Ask questions to find out more and to check what has been said to them. *Articulate their ideas and thoughts in well-formed sentences. *Describe events in some detail. *Use talk to help work out problems and organise	***Perform simple tests** *The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. *They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time. *** Identifying and classifying** *Children use their observations and testing to compare objects, materials and living things. They use simple features to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. *They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. * using their observations and ideas to suggest answers to questions *Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. *The children recognise 'biggest and smallest', 'best and worst' etc. from their data.	evidence to answer questions generated by themselves or the teacher. *They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. ***Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** *They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. *They should 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. ***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** *Children sometimes decide how to record and present evidence.	**taking repeat readings when appropriate** *The children select measuring equipment to give the most precise results *They should 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. *During an enquiry, they make decisions on changing or developing them. ***Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** *children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. * They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. *They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. *Children present the same data in different ways in order to help with answering the question.	*Present reasoned explanations, including explaining data in relation to predictions and hypotheses *Evaluate data, showing awareness of potential sources of random and systematic error *Identify further questions arising from their results.

	thinking and activities, and to explain how things work and why they might happen. *Use new vocabulary in different contexts.	*** Gathering and recording data to help in answering questions** *The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. *They record their measurements e.g. using prepared tables, pictograms, tally charts and bar charts. *They classify using simple prepared tables and sorting rings. *Talk about what they have found out and how they found it out. *With help they record and communicate their findings in a range of ways and begin to use simple scientific language.	*They should talk about criteria for grouping, sorting and classifying. They should use simple keys. *They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. *They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). *They record classifications e.g. using tables, venn diagrams, carroll diagrams. ***Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** *They draw conclusions based on their evidence and current subject knowledge. *With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. *They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. *Children use their evidence to suggest values for different items tested using the same method *Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry. *With support, they should identify new questions arising from the data,	***Use test results to make predictions to set up further comparative and fair tests** *Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests. ***Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations** *children identify causal relationships and patterns from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge. *They should decide how to record data. *They should look for different causal relationships in their data and identify evidence that refutes or supports their ideas. *They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. *They identify any limitations that reduce the trust they have in their data. *They should use their results to identify further test and observations and begin to separate opinion form fact	

			making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. ***Identify differences, similarities or changes related to simple scientific ideas and processes** *Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. ***Use straightforward scientific evidence to answer questions or to support his/her findings** *Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources.	*They communicate and justify their findings to an audience using relevant scientific language and illustrations. *They should talk about how scientific ideas have developed over time ***Identifying scientific evidence that has been used to support or refute ideas or arguments** *Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. *They talk about how their scientific ideas change due to new evidence that they have gathered. *They talk about how new discoveries change scientific understanding.	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Animals including Humans (Biology)	*Children know about similarities and differences in relation to places, objects, materials and living things. *They talk about the features of their own immediate environment and how environments might vary from one another. *They make observations of animals and plants and explain why some things occur and talk about changes *Describe what they see hear and feel whilst outside *Talk about members of their immediate family and community. *Name and describe people who are familiar to them. *Recognise some environments that are different to the one in which they live. PSHE *Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity -healthy eating -toothbrushing -sensible amounts of 'screen time'. -having a good sleep routine - being a safe pedestrian (Rec)	* Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals *Identify and name a variety of common animals that are carnivores, herbivores and omnivores *Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) *Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense (Y1) *Understand that animals, including humans, have offspring which grow into adults *Describe the basic needs of animals, including humans, for survival (water, food and air) *Describe the importance for humans to exercise, eating the right amounts of different types of food, and hygiene (Y2)	* Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat * Identify that humans and some other animals have skeletons and muscles for support, protection and movement (Y3) * Describe the simple functions of the basic parts of the digestive system in humans *Identify the different types of teeth in humans and their simple functions *Construct and interpret a variety of food chains, identifying producers, predators and prey (Y4)	*Describe the changes as humans develop to old age (Y5) * Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood *Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function *Describe the ways in which nutrients and water are transported within animals, including humans (Y6)	*Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. *The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. *The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. *The structure and functions of the gas exchange system in humans, including adaptations to function. *The mechanism of breathing to move air in and out of the lungs. The impact of exercise, asthma and smoking on the human gas exchange system

	* Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of heathy food choices. (ELG)				
Comparative and fair testing		How does changing the colour of a food affect the number of birds visiting a bird table? Is our sense of smell better when we can't see? What food do snails prefer? Why do we exercise? What happens to our body when we exercise? Can we recognise objects by touch, sound, taste, smell?	Which drinks are the most harmful to our teeth? Which bread contains the most fibre?	How does changing duration and intensity of exercise affect our pulse rates and recovery time? Which type of exercise has the greatest effect on our heart rate?	
Identifying, classifying and grouping	Sort images of people according to their characteristics. Sort animals according to where they live	What criteria can we use to sort animals into groups? How many different ways can we sort animals? Can we identify everyone in class by their fingerprints? Can we sort food using our own criteria? Match offspring to parent.	Compare and contrast different types of teeth e.g. recognise what eats plants and what eats animals by looking at their teeth. How do the skeletons of different animals compare? (eg. what they eat) *Identifying and grouping animals with and without skeletons Classify food items	Identify all the stages in the human life cycle?	
Research	Find out information from visitors (dentist, nurse etc.). Learn how animals from a different habitat are cared for.. Learn about animals in a different habitat.	What food do you need in a healthy diet and why? What do you need to do to look after a pet/animal?	Why do different types of vitamins keep us healthy and which foods can we find them in? Research teeth of different animals Research different food groups and how they keep us healthy.	The gestation period of different mammals.	
Pattern seeking	Are our hands and feet the same size? Who can pick up the most?	Do people with longer arms have longer legs? Can more people identify prawn cocktail crisps than cheese and onion?	How does the skull circumference of a girl compare with that of a boy? Do people with long arms throw further? Or Can people with short legs jump higher? Or Can people with longer legs run faster? Or	How does age affect a human's reaction time? Do larger mammals have longer gestation periods?	

			Can people with bigger hands catch a ball more easily?		
Observation over time		How have we changed as we've grown? (From baby to now) Observe animals in the local environment throughout the year. How much food and drink do I have over a week? Observe a life cycle (e.g. caterpillars, chicks, tadpole, farm animals). Observe how height changes over the year.	How does an egg shell change when it is left in cola?	How does our body change as we age? How much exercise do I do in a week? How does heart rate change over the day?	
Key Scientists		Florence Nightingale - Pioneer of modern nursing in GB or Elizabeth Garrett Anderson - First British woman doctor *Robert Winston (Human Scientist) *Joe Wicks (Personal Trainer)	Marie Curie (Radiation / X-Rays) Ivan Pavlov (Digestive System Mechanisms) Adelle Davis (Nutritionist)	Leonardo Da Vinci (Anatomy) Marie M. Daly – Blood Richard Doll – links between smoking and health	
Key Vocabulary	names of animals, live, land, water, jungle, desert, North Pole, South Pole, dry, snow, ice, light, blonde, ginger, grey, white, long, short, straight, curly, baby, child, adult, toddler, big/tall, aunt, bigger/ smaller, old person, young, brother, sister, uncle, female,mother,father, male, cousin, grandmother, family grandfather, friend, bald, elderly, wrinkles, freckles	head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, sight, hearing, touch, taste, smell, Amphibians, birds, fish, mammals, reptiles, arnivores, herbivore, omnivore, Living/ dead/ never alive, habitats, micro-habitats, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade,	Nutrients, carbohydrates, fat, protein,vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles, contract, relax, Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, liver, pancreas, large intestine, tooth, canine, incisor, molar, premolar, producer, consumer.	Foetus, Embryo, Womb, Gestation, Toddler, Teenager, Elderly, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, reproduction, cell, fertilisation, pregnancy, Oxygenated, Deoxygenated, Valve, oxygen, Respiration, Circulatory system, blood vessels, artery, vein, alveoli, pulmonary, capillary, digestive, transport, gas exchange, villi, nutrients, alcohol, drugs, tobacco.	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Living things and their habitats (Biology)	Draw information from a simple map. Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live. Understand need to respect and care for natural environment	*Explore and compare the differences between things that are living, dead, and things that have never been alive *Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other *Identify and name a variety of plants and animals in their habitats, including micro-habitats *Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify & name different sources of food (Y2)	*Recognise that living things can be grouped in a variety of ways *Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment *Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things (Y4)	*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 (Y5) *Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals *Give reasons for classifying plants and animals based on specific characteristics (Y6)	Relationships in an ecosystem the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops the importance of plant reproduction through insect pollination in human food security How organisms affect, and are affected by, their environment, including the accumulation of toxic materials. Differences between species
Comparative and fair testing		Which pets are the easiest to look after?	Do woodlice mover more in dark or light conditions? Do more organisms live in the wild area or in school field?	How does changing the amount of water, sugar or the temperature affect the amount bread rises?	
Identifying, classifying and grouping	Name and describe plants and animals they find in the school grounds.	Group things to show which are living, dead, or have never been alive. Classify minibeasts and plants found in the environment based on physical structure.	Can we use identification keys and charts to identify animals? How can we use the way minibeasts move to group them? What lives in the grass? What lives in the trees?	How would you make a classification key for vertebrates/invertebrates or microorganisms? Create an identification key to sort animals?	
Research		Research into animals' diets to create simple food chains. Use secondary sources to name plants and animals seen in the local environment	Research global environmental issues and their impact on living things. Research dangers posed on habitats Research and be able to name plants and animals in the wider environment e.g. polar, desert, jungle, etc.	Research the difference between bacteria, virus and fungi to give reasons why these are not plants or animals. Or Research how micro-organisms can be helpful or harmful.	
Pattern seeking	Look for minibeasts in different areas of the		What colour flowers do insects prefer to pollinate?		

	school grounds. • Look for plants in different areas of the school grounds.				
Observation over time		Explore plants or animals in micro-habitats throughout the year (under a rock, under a log, in a pond, in a bush, in the long grass).		What happens to a piece of bread if you leave it on the windowsill for two weeks? Grow plants from cuttings Observe butterflies hatching from chrysalis.	
Key Scientists		Chris Packham or Liz Bonnin (Animal Conservationist) *Rachel Carson	Research different figures who are trying to help the environment: *Sarah Fowler OBE – global threat to sharks *Malaika Vaz *Dr. Paula Kahumbu- wildlife conservationist Jaques Cousteau (Marine Biologist) Eva Crane	Carl Linnaeus (Identifying, Naming and Classifying Organisms) Jane Goodall David Attenborough (Naturalist and Nature Documentary Broadcaster)	
Key Vocabulary	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment	Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade,	Environment, flowering, non-flowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation, classification keys, classify, environment, habitat, human impact, positive, negative, migrate, hibernate	Sexual, asexual, reproduce, fertilisation, pollination, male, cell, female, pregnancy, gestation, young, mammal, metamorphosis, insect, amphibian, egg, embryo, bird, plant, Life cycle, live young, runners, bulbs, egg, fertilises, plantlets, runners, bulbs, cuttings Life cycle, Variation Organisms Classification, non-flowering, human impact, nature reserves, microorganism, organism, Linnaean. bacteria, characteristics,	

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Plants (Biology)	Explore the natural world around them, making observations and drawing pictures of animals and plants. Understand need to respect and care for natural environment (forest Friday) Draw information from a simple map. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.	*Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees *Identify and describe the basic structure of a variety of common flowering plants, including trees (Y1) *Observe and describe how seeds and bulbs grow into mature plants *Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (Y2)	*Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers *Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant *Investigate the way in which water is transported within plants *Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal (Y3)	*Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)* *• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.* *• Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)*	Functions of cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts *similarities & differences between plant & animal cells reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some mechanisms. *plants making carbohydrates in their leaves by photosynthesis & gaining mineral nutrients & water from the soil via their roots. *the role of leaf stomata in gas exchange in plants.
Comparative and fair testing		Which type of compost grows the tallest sunflower? Which tree has the biggest leaves? What do plants need to grow well?	How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? Which conditions help seeds germinate faster?		
Identifying, classifying and grouping		Allow children to sort leaves, which they collect, according to their own criteria. Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Use an identification key to identify a plant		
Research		Name trees based on observations of leaves, seeds, flowers, buds and bark	Research the functions of the parts of flowering plants. Research different methods of seed dispersal.		

Pattern seeking		Is there a pattern in where we find moss growing in the school grounds? Based on observations, encourage children to identify patterns e.g. after comparing size of leaves on different plants, children may suggest 'bigger plants have bigger leaves'.	Investigate what happens when growing/ germination conditions are changed e.g. more/less light/water, change in temperature, nutrients		
Observation over time		How does the oak tree or a daffodil bulb change over the year? Observe a patch to identify how plants change through the year. How does a seed (sunflower, pumpkin) change each week?	What happens to celery/white carnation when it is left in a glass of coloured water? How do flowers in a vase change over time?		
Key Scientists		Beatrix Potter (Author & Botanist) Alan Titchmarsh (Botanist & Gardener)	Ahmed Mumin Warfa Joseph Banks (Botanists)		
Key Vocabulary		Leaves,blossom,petals,buds, roots, bulb, trunk, branches, stem, Trunk, root, branch, bulb, flower, evergreen, garden plants, wild plants, seeds, wild plants, garden plants, Deciduous, grain, evergreen, temperature, predict, measure, diagram, observe, germinate, warmth, sunlight. compare, record, bulbs, predict, diagram, comparative tests, life cycle, life process, germinate	Air, light, water, nutrients, soil, support, anchor, reproduction, pollination, transportation, flower, energy, growth, sugar, seedling, carbon dioxide, oxygen, material, photosynthesis, chlorophyll pollen, life cycle, dispersal, fertilisation, germination, ovary, ovule, sepal, stamen, anther, filament, stigma, style, Photosynthesis, insect/wind pollination, seed formation, seed dispersal – wind, animal, water.		

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Seasonal Change (Biology)	Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them. Understand some important processes and changes in the natural world around them, including the seasons	* Observe changes across the four seasons * Observe and describe weather associated with the seasons and how day length varies. (Y1)	*Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)*	*Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space)*	The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.
Comparative and fair testing					
Identifying, classifying and grouping	Which clothes are suitable for each season?				
Research	• Find out about how animals behave in different seasons. • Find out about the weather and seasons.				
Pattern seeking					
Observation over time	• How does a puddle change over time? • How does a snowman change as it melts? • How does the natural world change with the seasons?	How does a tree change over a year? Take weather measurements and make observations over time - day/month/year. Record/Photograph what children are wearing over the year.			
Key Scientists		Holly Green (Meteorologist)			
Key Vocabulary	spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, hibernate, migrate, snowflake	windy, sunny, overcast, snow, rain, temperature			

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Evolution and Adaptation (Biology)	Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.	*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.* *• Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)*	*Describe in simple terms how fossils are formed when things that have lived are trapped within rock.* *• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)* *• Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)*	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution (Y6)	Heredity as process by which genetic information is transmitted from one generation to next. •Simple model of chromosomes, genes and DNA in heredity, including part played by Watson, Crick, Wilkins and Franklin in development of DNA model. • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. • Changes in environment may leave individuals within a species, & some entire species, less well adapted to compete successfully & reproduce, which in turn may lead to extinction.
Comparative and fair testing				What is the most common eye colour in our class?	
Identifying, classifying and grouping					
Research				Research different types of a species and their characteristics to find out what makes them suitable for different habitats Research Charles Darwin and/or Alfred Wallace	
Pattern seeking				Is there a pattern between the size and shape of a bird's beak and the food it will eat?	
Observation over time				How has the skeleton of the horse changed over time? How has the bird/ whale evolved over time?	

Key Scientists				Charles Darwin and Alfred Russel Wallace (Theory of Evolution by Natural Selection) Rosalind Franklin - DNA	
Key Vocabulary				Offspring, genetics, variation, sexual reproduction, suited characteristics, competition, adapted, adaptation, mutation, environment, inherited, species, fossils, evolution, Inherited, Survival of the Fittest,	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Properties of Materials and States of Matter (Chemistry)	* Talk about the differences between materials and changes they notice. * Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	*Distinguish between an object and the material from which it is made *Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock *Describe the simple physical properties of a variety of everyday materials *Compare and group together a variety of everyday materials on the basis of their simple physical properties (Y1) *Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses *Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (Y2)	*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 (Y4)	*Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets *Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution *Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating *Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic *Demonstrate that dissolving, mixing and changes of 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 (Y5)	Chemical reactions as the rearrangement of atoms. • Representing chemical reactions using formulae and using equations. • Combustion, thermal decomposition, oxidation and displacement reactions. • Defining acids and alkalis in terms of neutralisation reactions. • The pH scale for measuring acidity/alkalinity; and indicators.
Comparative and fair testing	• How quickly do ice cubes melt in different areas of the playground? • How do cupcakes cook if they have different amounts of mixture	Which material would be best for the roof of the little pig's house? Or Which material makes the best umbrella/ raincoat? Which sponge is the best for mopping up spills?	How does the mass of a block of ice affect how long it takes to melt? Test the 'runniness' of liquids. How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water? Which substance flows down a slope most quickly?	Which materials are best thermal insulator? How does the brand of washing up liquid affect the size of bubbles? How does the temperature of tea affect how long it takes for a sugar cube to dissolve? Use series of tests to compare and sort materials.	

Identifying, classifying and grouping		Which materials will float and which will sink? Based on the children's own criteria, classify materials Classify objects made from the same material (e.g. lots of things made from plastic).	Group materials and objects into solids, liquids, and gases?	identify and classify reactions and changes into reversible and irreversible Based on the children's own criteria classify materials	
Research		Which materials can be recycled? How are plastics made? What are all the different materials used to make coats?	Research the water cycle. Research temperature at which materials change state, eg. iron melts, oxygen condenses.	What are micro plastics and why are they harming the planet?	
Pattern seeking			Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?	How does amount of water affect the strength of a kitchen towel? Do all stretchy materials stretch in the same way? How does temperature affect how much solute we can dissolve?	
Observation over time	How does the block of ice change over time? How does a snowman change over time? How does cake mixture/bread dough change as it is cooked?	What happens to shaving foam over time? What happens to materials if they are left in the sun or in water?	Observe the evaporation of water from different places in the school linked with temperature Watch ice melt (ice hands). Watch frozen liquids melt. Use data logger	Observe rusting with uncoated nails in different liquids. (remove coating with sandpaper.) Investigate dissolving of salt/sugar use different temperatures/sizes of sugar/ stirring or not stirring. Use data logger	
Key Scientists		John Dunlop Charles Mackintosh (Waterproof coat)	Daniel Fahrenheit George Washington Carver- chemist	Spencer Silver/ Arthur Fry (Sticky notes) Walter Lincoln Hawkins Stephanie Kwolek	
Key Vocabulary	ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, Names of materials – wood, metal, plastic, glass, brick, rock, paper, fabric, rubber, cardboard. reflective, non-reflective, flexible, rigid, twisting, squashing, bend	Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection, change, melting point, boiling point, water cycle	Hardness, Solubility, absorbent, opaque Transparency, Conductivity, Magnetic, Filter, Evaporation, dissolve, insoluble, suspension, mixture, chemical, physical, irreversible, solution, reversible, separate, insulator, transparent, flexible, permeable, soluble, property.	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Electricity (Physics)			*Identify common appliances that run on electricity *Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers *Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery *Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit *Recognise some common conductors and insulators, and associate metals with being good conductors (Y4)	*Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit *Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches *Use recognised symbols when representing a simple circuit in a diagram (Y6)	Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. • Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. • Differences in resistance between conducting and insulating components (quantitative). • Static electricity.
Comparative and fair testing			Investigate which materials are conductors and which are insulators	How does the voltage of the batteries in a circuit affect the brightness of a bulb or sound of a buzzer? Which type of fruit makes the best fruity battery? Does the number of cells affect the brightness of a bulb in the circuit?	
Identifying, classifying and grouping			Based on children's own criteria, classify household appliances (leading to electrical/not electrical, batteries/mains).		
Research			How has electricity changed the way we live?	How has our understanding of electricity changed over time?	
Pattern seeking			Which room has the most electrical sockets in a house?		
Observation over time					
Key Scientists			Michael Faraday Thomas Edison	Alessandro Volta (Electrical Battery) Edith Clarke -Electrical engineer	

Key Vocabulary			electric current, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, component., insulator, appliance/device, mains, plug, complete circuit, component, positive, loose, negative, connections,	electrons, Nikola Tesla, Alessandro Volta, alternating current, direct current, voltage, brightness, loudness. Circuit, complete circuit, circuit diagram, circuit symbol,	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Earth and Space (Physics)	*Explore the natural world around them. *Describe what they see, hear and feel whilst outside.	*• Observe changes across the four seasons.* *• Observe and describe weather associated with the seasons and how day length varies. (Y1 – Seasonal changes)*		*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 (Y5)	Composition and structure of the Earth * the rock cycle and the formation of igneous, sedimentary and metamorphic rocks Earth as a source of limited resources and the efficacy of recycling * the production of carbon dioxide by human activity and the impact on climate. gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) * our Sun as a star, other stars in our galaxy, other galaxies * seasons and the Earth's tilt, day length at different times of year, in different hemispheres * light year as a unit of astronomical distance.
Comparative and fair testing	• Compare how different objects move when falling and bouncing.			How does the length of daylight hours change in each season? How change height of a rocket mouse? How can we change distance travelled by a balloon rocket?	
Identifying, classifying and grouping				Group planets based on their size/atmosphere/orbit time/ rotational period etc.	

Research	• Find out about the Solar System, stars and space travel. • Find out about nocturnal animals.			How have our ideas about the solar system changed over time?	
Pattern seeking	• Find simple patterns in how light levels and temperature change with the movement, or obscuring of, the Sun.			Is there a pattern between the size of a planet and the time it takes to travel around the Sun?	
Observation over time				Observe and identify all the phases in the cycle of the Moon? How have ideas about solar system changed over time? How do shadows change over course of a day?	
Key Scientists				Claudius Ptolemy and Nicolaus Copernicus (Heliocentric vs Geocentric Universe) Neil Armstrong, Tim Peake, Helen Sharman, Mae Jemison Stephen Hawking- Black Holes	
Key Vocabulary	Sun, Moon, Earth, star, planet, sky, day, night, space, round, light, heavy, fall, bounce, float, rise, fall, air sunrise, sunset, astronaut, astronomer			Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Forces and Magnets (Physics)	*Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	*Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)*	*Compare how things move on different surfaces *Notice that some forces need contact between two objects, but magnetic forces can act at a distance *observe how magnets attract or repel each other and attract some materials and not others *Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials *Describe magnets as having two poles *Predict whether two magnets will attract or repel each other, depending on which poles are facing (Y3)	*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 (y5)	Magnetic fields by plotting with compass, representation by field lines. • Earth's magnetism, compass and navigation. • Forces as pushes or pulls, arising from the interaction between two objects. • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. • Moment as the turning effect of a force. • Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. • Forces measured in Newtons, measurements of stretch or compression as force is changed
Comparative and fair testing	• How many cubes/small plastic animals can fit in different 'boats'? • Compare how cars move down ramps/gutters. • Compare how wheels turn when sand or water is poured through. • Compare how different balls bounce. • Compare how things move when blown.		Test how objects move on different surfaces e.g. cars, spinning tops, wind-up/clockwork toys. Test the strength of different magnets.	How does the surface area of an object affect the time it takes to sink? Designing and making a variety of parachutes Compare friction, water resistance, air resistance e.g. spinners, parachutes, Compare levers, pulleys and gears	

Identifying, classifying and grouping			Based on the children's own criteria, sort materials (leading towards metal/non-metal and magnetic/not magnetic) sort toys (leading to what makes them move e.g. push/pull).		
Research			Find out how magnets are used in everyday life	How do submarines sink if they are full of air?	
Pattern seeking			Does the size and shape of a magnet affect how strong it is?	Do all objects fall through water in the same way? How does surface area of parachute affect the time it takes to fall?	
Observation over time			If we magnetise a pin, how long does it stay magnetised for?	How long does a pendulum swing for before it stops?	
Key Scientists			William Gilbert (Theories on Magnetism) Andre Marie Ampere (Founder of Electro-Magnetism) John McAdam- Compare different surfaces for movement	Isaac Newton (Gravitation) Archimedes of Syracuse (Levers)	
Key Vocabulary	float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow force,		Force, push, pull, friction, twist, contact force, non-contact, magnetic force, magnet, metal, strength, bar magnet, magnetic field, button magnet, iron, compass, horseshoe magnet, attract, repel, magnetic material, steel, north pole, south pole,	Opposing, gravity, air resistance, water resistance, friction, streamline, brake, gear, mechanism, lever, cog, pulley, machine. gravity, Earth, mechanisms, simple machines, Newton,	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Light (Physics)	*Describe what they see, hear and feel whilst outside.	*Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)* • *Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)*	*Recognise that he/she needs light in order to see things and that dark is the absence of light *Notice that light is reflected from surfaces *Recognise that light from the sun can be dangerous and that there are ways to protect eyes *Recognise that shadows are formed when the light from a light source is blocked by an opaque object. *Find patterns in the way that the size of shadows change (Y3)	*Recognise that light appears to travel in straight lines *Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye *Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes *Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (Y6)	The similarities and differences between light waves and waves in matter. • Light waves travelling through a vacuum; speed of light. • The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. • Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. • Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. • Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.
Comparative and fair testing	Compare the shape of shadows made by different objects. Classification Which objects/materials make dark shadows?		Test materials for reflectiveness/ transparency Which pair of sunglasses will be best at protecting our eyes? How does the colour of a filter affect the colour of white/blue/ red/green/yellow light? What factors affect the size/ shape of a shadow?	How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?	

Identifying, classifying and grouping			Based on the children's own criteria: Classify light sources *classify materials (leading to reflective/non-reflective, transparent/translucent/opaque).		
Research	Find out about shadows.& rainbows				
Pattern seeking			Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.		
Observation over time	How do the Sun and shade change during the day? • How does a toy's shadow change during the day?		How does the colour of a UV bead change over the day? How does my shadow change over the day?		
Key Scientists			James Clerk Maxwell Percy Shaw (The Cats Eye) Thomas Edison - electric light bulb	Thomas Young, Ibn al-Haytham Patricia Bath	
Key Vocabulary	Sun, sunny, light, shadow, shady, clouds, torch, see-through, non-seethrough, source, light source casting a shadow, pale, dark,		Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent.	filter, colour, absorb, refract, spectrum, wavelength, prism, visible, lens, angle, incidence, straight, ray, beam, wave, photon, energy, absence of light, sunlight, dangerous, straight lines, light rays.	

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Sound (Physics)	*Describe what they see, hear and feel whilst outside.	*• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)*	*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 (Y4)		*Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. • Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. • Sound needs a medium to travel, the speed of sound in air, in water, in solids. • Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. • Auditory range of humans and animals. • Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. • Waves transferring information for conversion to electrical signals by microphone.
Comparative and fair testing	How does rain sound different when it lands in different containers?		How does the length of a guitar string/tuning fork affect the pitch of the sound? Explore pitch e.g. through a carousel of activities using milk bottles, straw pipes, rulers, elastic band guitars. Investigate which material provides the best insulation against sound?		
Identifying, classifying and grouping			Based on the children's own criteria, sort musical instruments		
Research			Do all animals have the same hearing range?		

Pattern seeking			Finding patterns in the sounds that are made by different size/length/thickness of elastic bands		
Observation over time	Listen to the siren of an emergency vehicle as it approaches and moves away.				
Key Scientists			Evelyn Glennie – Deaf musician Galileo Galilei – Pendulum		
Key Vocabulary	sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar,		Amplitude, volume, pitch, high, low, particles, instruments, wave, source, crescendo, vibration,		

	EYFS	Key Stage one	Lower Key Stage two	Upper Key Stage two	Key Stage three
Rocks (Physics)	*Explore the natural world around them.* *• Describe what they see, hear and feel whilst outside.*	*• Distinguish between an object and the material from which it is made.* *• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.* *• Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)* *Compare and group together a variety of everyday materials on the basis of their simple physical properties.* *• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)*	* 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 (Y3)	* Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago	*The composition of the Earth. *The structure of the Earth. *The rock cycle and the formation of igneous, sedimentary and metamorphic rocks
Comparative and fair testing			How quickly does water drains through different types of soil? Test the hardness of different rocks. Test what happens when rocks are put in water.		
Identifying, classifying and grouping			Use identification key to name rocks. Based on the children's own criteria, classify rocks.		
Research			Research Mary Anning		
Pattern seeking					

Observation over time			Observe how soil separates into different layers in water		
Key Scientists			Katia Krafft - Geologist and Volcanologist Mary Anning & Holly Betts Palaeontologist & Palaeobiologist		
Key Vocabulary			Rocks, igneous, metamorphic, sedimentary, permeable, impermeable, body fossil, trace fossil, cast fossil, mould fossil, replacement fossil, extinct, organic matter, top soil, sub soil, base rock.		