Science LKS2 Curriculum Intention

Working scientifically (Year 3 and4):

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

	TOPIC	National Curriculum	Knowledge *What do we want the children to know? Personalised to our topics/local area*	Vocabulary	Resources:
Year 3	**Plants**	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.	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)	https://www.plaassessment.com/plants-y3

	Animals including humans	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.	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	https://www.planassessment.com/animals-including-humans-y3
	Rocks	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter	Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	https://www.planassessment.com/rocks-y3
	Light	Recognise that they need light in order to see things, and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.	We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sun hats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous	https://www.planassessment.com/light-y3

			blocks some of the light. The size of the shadow depends on the position of the source, object and surface.		
	Forces and magnets	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.	A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	https://www.planassessment.com/forces-and-magnets-y3
Year 4	**Living things and their habitats**	Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.	Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	https://www.planassessment.com/living-things-y4
	Animals including humans	Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and	Digestive system, digestion, mouth, teeth, saliva,	https://www.planassessment.com/animals-incl

		humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.	passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Living things can be classified as producers, predators and prey according to their place in the food chain.	oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	uding-humans-y4
	States of matter	Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	https://www.planassessment.com/states-of-matter-y4

			forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.		
	Sound	Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.	A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation	https://www.planassessment.com/sound-y4
	Electricity	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.	Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. **N.B.** Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol	https://www.planassessment.com/electricity-y4

Lower Key Stage Two

Lower Key Stage Two Enquiry Map

	Observe changes over time	Notice patterns	Grouping and classifying	Fair and comparative tests	Secondary sources
Plants	Observe what happens to plants over time when the leaves or roots are removed Observe the effect of putting cut white carnations or celery in coloured water. Observe flowers being visited by pollinators e.g. bees and butterflies in the summer	Observe flowers carefully to identify the pollen Observe seeds being blown from the trees e.g. sycamore seeds.	Classify seeds in a range of ways, including by how they are dispersed.	Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space	Research different types of seed dispersal
Animals including humans			Classify food in a range of ways Compare, contrast and classify skeletons of different animals.	Use food labels to answer enquiry questions Investigate patterns: Can people with longer legs run faster? Can people with bigger hands catch a ball better?	Use food labels to explore the nutritional content of a range of food items. Use secondary sources to find out the types of food that contain the different nutrients Use secondary sources to research the parts and functions of the skeleton
Rocks	Observe how rocks change over time e.g. gravestones or old building.	Observe rocks closely Observe soils closely Classify soils in a range of ways based on their appearance Observe how soil can be separated through sedimentation	Classify rocks in a range of ways, based on their appearance	Devise a test to investigate the hardness of a range of rocks Devise a test to investigate how much water different rocks absorb Devise a test to investigate the water retention of soils	Research using secondary sources how fossils are formed. Research the work of Mary Anning

Lower Key Stage Two

	Observe changes over time	Notice patterns	Grouping and classifying	Fair and comparative tests	Secondary sources
Light	Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground.	Explore how different objects are more or less visible in different levels of lighting Explore how objects with different surfaces (e.g. shiny vs matt) are more or less visible Explore how shadows vary as the distance between a light source and an object or surface is changed			
Forces and magnets		Explore what materials are attracted to a magnet Explore the way that magnets behave in relation to each other Explore how magnets work at a distance	Classify materials according to whether they are magnetic	Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. Devise an investigation to test the strength of magnets.	
Living things and their habitats	Observe plants and animals in different habitats throughout the year	Create a simple identification key based on observable features Use fieldwork to explore human impact on the local environment e.g. litter, tree planting	Use classification keys to name unknown living things Classify living things found in different habitats based on their features	Compare and contrast the living things observed.	Use secondary sources to find out about how environments may naturally change Use secondary sources to find out about human impacton environments
Animals including humans			Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls Use food chains to identify producers, predators and prey within a habitat.		Research the function of the parts of the digestive system Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing) Use secondary sources to identify animals in a habitat and find out what they eat.

Lower Key Stage Two

	Observe changes over time	Notice patterns	Grouping and classifying	Fair and comparative tests	Secondary sources
States of matter	Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind.	Observe closely and classify a range of solids. Observe closely and classify a range of liquids. Explore freezing different liquids e.g. tomato ketchup, oil, shampoo Observe water evaporating and condensing e.g. on cups of icy water and hot water	Classify materials according to whether they are solids, liquids and gases.	Observe a range of materials melting e.g. ice, chocolate, butter Investigate how to melt ice more quickly Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers.	Use secondary sources to find out about the water cycle
Sound	Measure sounds over different distances	Explore making sounds with a range of objects, such as musical instruments and other household objects. Explore how string telephones or ear gongs work	Classify sound sources.	Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. Measure sounds through different insulation materials.	
Electricity		Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm	Classify the materials that were suitable/not suitable for wires.	Explore which materials can be used instead of wires to make a circuit Explore how to connect a range of different switches and investigate how they function in different ways.	

Other resources:

- **Assessment materials** - https://pstt.org.uk/resources/curriculum-materials/assessment
- **CIEC Interactive planning tool (supportive template for planning investigations)** https://www.york.ac.uk/ciec/resources/primary/skills-for-science/
- **CIEC: how stories can support science teaching** http://www.ciec.org.uk/resources/pencils-poems-and-princesses.html http://www.ciec.org.uk/primary/new-for-2020-2021.html
- **Role badges:** https://www.york.ac.uk/media/ciec/skillsforscience/rolebadges/role-badges.pdf
- **Primary Science Teaching Trust (PSTT) resources** - https://pstt.org.uk/resources/curriculum-materials
- **Scientific vocabulary from STEM**- https://www.stem.org.uk/elibrary/resource/34636
- **4-7 years Investigation posters** - https://www.primarilyscience.co.uk/resource/7-11-years-investigation-posters-a4/
- **BBC Terrific Science** - https://www.bbc.co.uk/teach/terrific-scientific
- **Reach out CPD (FREE)**- https://www.reachoutcpd.com/
- **Explorify - https://explorify.uk/en/activities**