Larkhill Primary – Science				
Cycle A Year 3/4			Cycle B Year 3/4	
Programme of study	**Rocks and soils** **Changes of State**	**Plants** **Animals incl humans** **Living things and their habitats**	**Light** **Electricity** **Sound**	**Forces** **Magnets**
Coverage	✓ Types of rocks, rock cycle, properties of rocks, soil make up, fossils ✓ Solid, liquid and gas, evaporation, condensation, (ir)reversible change, water cycle	✓ Parts and functions of plants, requirements for plants to live, water in plants, life cycle of plants ✓ Animals – skeletons, adaptation, diets Humans – skeletons, muscles, diet Digestive system and teeth	✓ Shadows, reflection, sources of light, the sun. ✓ Constructing simple circuits, using switches, insulators and conductors ✓ Sound and vibration, transmission in different media, pitch and loudness	✓ Movement, magnetism
Content (NC Objectives)	✓ 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. ✓ 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	✓ 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. ✓ 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. ✓ 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. ✓ 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	✓ 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 ✓ 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.	✓ 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 attra or repel each other, depending on whi poles are facing.

	of evaporation with temperature. ✓	✓ construct and interpret a variety of food chains, identifying producers, predators and prey. ✓ 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. ✓ explore possible ways of grouping a wide selection of living things that include flowering and non-flowering plants. ✓ *Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.* ✓	✓ 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.	
Notes and guidance	✓ linked with work in geography, explore different kinds of rocks and soils, including those in the local environment. ✓ explore a variety of everyday materials and develop simple descriptions of the states of matter *(solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container)*. ✓ observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled. ✓ *Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.* ✓ explore a variety of everyday materials and develop simple descriptions of the states of matter *(solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container)*.	✓ be introduced to the relationship between structure and function: the idea that every part has a job to do. ✓ explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. *Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.* ✓ continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. ✓ *Use focus on muscles and skeleton to talk about and find out about pushes and pulls in readiness for magnetism* ✓ continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. ✓ *Use focus on muscles and skeleton to talk about and find out about pushes and pulls in readiness for magnetism* ✓ be introduced to the main body parts associated with the digestive system, for	✓ explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. ✓ think about why it is important to protect their eyes from bright lights. look for, and measure shadows, and find out how they are formed and what might cause the shadows to change. ✓ *Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.* ✓ construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. ✓ draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; *these will be introduced in year 6.* ✓ *Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage.* ✓ be taught about precautions for working safely with electricity.	✓ observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). ✓ explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).

	✓ observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled. ✓ *Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.*	example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. ✓ Use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. ✓ identify how the habitat changes throughout the year. ✓ explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. ✓ *Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.* ✓ begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. ✓ explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.	✓ explore and identify the way sound is made through vibration in a range of different musical instruments from around the world ✓ find out how the pitch and volume of sounds can be changed in a variety of ways.	
Working Scientifically	✓ 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.			
	✓ observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time	✓ comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser	✓ Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes	✓ comparing how different things move and grouping them ✓ raising questions and carrying out tests to find out how far things move on different surfaces and gathering

	✓ using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. ✓ research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. ✓ explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. ✓ raise and answer questions about the way soils are formed. ✓ grouping and classifying a variety of different materials ✓ exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). ✓ research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. ✓ observe and record evaporation over a period of time, for example, a	✓ discovering how seeds are formed by observing the different stages of plant life cycles over a period of time ✓ looking for patterns in the structure of fruits that relate to how the seeds are dispersed. ✓ observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. I ✓ dentifying and grouping animals with and without skeletons and observing and comparing their movement ✓ compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. ✓ exploring ideas about what would happen if humans did not have skeletons. ✓ research different food groups and how they keep us healthy and design meals based on what they find out. ✓ comparing the teeth of carnivores and herbivores, and suggesting reasons for differences ✓ finding out what damages teeth and how to look after them. ✓ draw and discuss their ideas about the digestive system and compare them with models or images. using and making simple guides or keys to explore and identify ✓ local plants and animals ✓ making a guide to local living things ✓ raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.	✓ observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.. ✓ finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. ✓ make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. ✓ make and play their own instruments by using what they have found out about pitch and volume.	and recording data to find answers their questions ✓ exploring the strengths of different magnets and finding a fair way to compare them ✓ sorting materials into those that are magnetic and those that are not ✓ looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another ✓ identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets. *Eg building Stonehenge!*

	puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.			
Identifying and Classifying	✓ Regularly revisit KS1 skills: Focus on asking questions about the similarities and differences between things. ✓ Go outside to explore the world around them at all times of the year. ✓ Increased focus on measuring and using data to answer 'big questions'. ✓ Continue to build on their observational skills, becoming more independent in identifying, through the use of increasingly complex tools, as well as developing higher order skills in reasoning and justification when explaining how they have chosen to group things. ✓ Design simple tests to help them classify materials, as well as independently using a range of secondary sources to support them in identifying a range of living things.			
	✓ Can you use the identification key to find out the name of each of the rocks in your collection? ✓ Can you group these materials and objects into solids, liquids, and gases?	✓ How many different ways can you sort our seed collection? ✓ How do the skeletons of different animals compare? ✓ How can we group the food that we eat? ✓ What are the names for all the organs involved in the digestive system? ✓ How can we organise teeth into groups? ✓ Can we use the classification keys to identify all the animals that we caught pond dipping?	✓ How would you organise these light sources into natural and artificial sources? ✓ How would you group these electrical devices based on where the electricity comes from? ✓ How would you sort these objects/materials based on their temperature? ✓ How would you group these instruments based on how they produce sound? ✓ How would you group these instruments based on how they change pitch or volume?	✓ Which materials are magnetic?
Comparative testing	✓ Use an increasingly wide range of equipment to make measurements. ✓ Learn what it means to measure accurately and check for reliability. ✓ Learn to independently plan how to record and analyse the data, using tables, pictograms, and bar charts to compare the measurements they make. Use the bar charts to draw conclusions about what they have found out to be the answer to their 'big question' ✓ Evaluate the procedure they used and the quality of their data, suggesting ways they could improve their test.			
	✓ How does the skull circumference of a girl compare with that of a boy? ✓ Does seawater evaporate quicker than fresh water?	✓ Which soil absorbs the most water? ✓ Which conditions can help seeds germinate faster? ✓ In our class, are omnivores taller than vegetarians? ✓ How does the average temperature of the pond water change in each season?	✓ Which pair of sunglasses will be best at protecting our eyes? ✓ Which metal is the best conductor of electricity? ✓ Which material is best to use for muffling sound in ear defenders? ✓ Are two ears better than one?	✓ Which magnet is strongest? ✓ Which surface is best to stop you slipping?
Fair Testing	✓ Plan their own tests to collect data. ✓ Through fair testing learn to understand the different types of variables:			

<table>
<tr><td></td><td colspan="4">✓ the dependent variable that they will change in their test,
✓ the independent variable that they are going to measure so that they can find out how the dependent variable affects it,
✓ the control variables which the children will need to keep the same so that they don't affect their results.
✓ Measure and record data that can then be displayed in a scatter graph or line graph.
✓ Use their data to draw conclusions that identify a causal relationship eg 'when you increase X, Y will always decrease'.
✓ Throughout KS2, become progressively more systematic in how they approach fair tests and increasingly independent.
✓ Written conclusions to become increasingly sophisticated, with more focus on scientific explanations.
✓ Focus on their skills in evaluating their scientific enquiries.
✓ Learn to critique not just their experimental methods but also their data by reflecting on reliability and accuracy.</td></tr>
<tr><td></td><td>✓ How does adding different amounts of sand to soil affect how quickly water drains through it?
✓ How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?</td><td>✓ How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh?
✓ Does the amount of light affect how many woodlice move around?</td><td>✓ How does the number of layers of transparent plastic affect how much light can pass through?
✓ How does the distance between the shadow puppet and the screen affect the size of the shadow?
✓ How does the thickness of a conducting material affect how bright the lamp is? How does the volume of a drum change as you move further away from it?
✓ How does the length of a guitar string/tuning fork affect the pitch of the sound?</td><td>✓ How does the mass of an object affect how much force is needed to make it move?
✓ How does the mass of a block of ice affect how long it takes to melt?
✓ How does the surface area of a container of water affect how long it takes to evaporate?</td></tr>
<tr><td>Research</td><td colspan="4">✓ Reading for information and note-taking.
✓ Learn to interpret the information they find and critically consider its relevance in answering their 'big questions'.
✓ Use a range of secondary sources, including books, websites, and video to find their information.
✓ Listen to presentations from experts and science professionals to get their information, or ask them questions in interviews and letters
✓ Find more data in their research and use this to help answer questions
✓ Start to collect their own data through questionnaires and interviews.
✓ Begin to evaluate the quality of the information they have found and how well it has enabled them to draw conclusions and answer their 'big question'.</td></tr>
<tr><td></td><td>✓ Who was Mary Anning and what did she discover?
✓ What are hurricanes, and why do they happen?</td><td>✓ Why do different types of vitamins keep us healthy and which foods can we find them in?
✓ What are all the different ways that seeds disperse?
✓ How do dentists fix broken teeth? Why are people cutting down the rainforests and what effect does that have?</td><td>✓ How does the Sun make light?
✓ How has electricity changed the way we live?
✓ How does a light bulb work?
✓ Do all animals have the same hearing range?</td><td>✓ How have our ideas about forces changed over time?
✓ How does a compass work?</td></tr>
<tr><td>Ideas over time</td><td colspan="4">✓ Explore and talk about their own and other people's scientific ideas.
✓ Begin to recognise how scientific ideas change and develop over time.
✓ Use a range of secondary sources of information.
✓ Develop their use of scientific language.</td></tr>
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	✓ Explain ideas using their scientific knowledge and understanding. ✓ Evaluate the significance, strengths and weaknesses of different scientists' ideas.			
	✓ What were James Hutton's ideas about how rocks were made and what was his evidence? ✓ How did Mary Anning's work help us to understand prehistoric life?	✓ How did chemist, Marie Maynard Daly, use science to help us improve our diets? ✓ How did James Lind explain the cause of scurvy and what was his evidence?	✓ How have our ideas about eclipses changed over time?	✓ How have our ideas about magnets changed over time?
Pattern seeking	✓ Begin to think for themselves when deciding what they should measure and observe. ✓ Begin to make decisions about the most appropriate equipment to use to collect data. ✓ Use a data logger to collect the most accurate data they can. ✓ Using data analysis techniques to spot patterns, including using tabulated data and a variety of charts and graphs. ✓ Use data and graphs to support their explanations when describing relationships. ✓ Use pattern seeking as a preliminary test; use their findings to form and justify their own predictions, then propose further investigations to test these predictions.			
	✓ Is there a pattern in where we find volcanos on planet Earth? ✓ Is there a pattern in how long it takes different sized ice lollies to melt? ✓ How have scientific tests for predicting the weather changed over time?	✓ Do male humans have larger skulls that female humans? ✓ Are you more likely to have bad eye sight and to wear glasses if you are older? ✓ What colour flowers do pollinating insects prefer? ✓ Are foods that are high in energy always high in sugar? ✓ How has the use of insecticides affected bee population? ✓ How has a visit to the dentist changed since ancient times? ✓ How did Jane Goodall learn about the habits and behaviours of chimpanzees and why does she still need to work to protect their habitat?	✓ Which room has the most electrical sockets in a house? ✓ Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school? ✓ Who actually invented the light bulb, Thomas Edison or Joseph Swan? ✓ How has our understanding and use of ultrasound changed over time? ✓ Since the 1800s, how has science helped people who are deaf?	✓ Does the size and shape of a magnet affect how strong it is?
End of Unit TAPS Assessments	✓ **Reporting on rocks** ✓ Can children group rocks based on properties? ✓ Can children talk about / draw a diagram / write about their findings? ✓ Can children draw conclusions about the least / most wearing rock? ✓	✓ **How much water do plants need?** ✓ Can children use simple apparatus to measure water/height? ✓ Can children record their measurements? ✓ **Function of a plant stem** ✓ Can children make careful observations? ✓ Can children use observations to suggest how water is transported? ✓ **Teeth (eggs in liquids)** ✓ Can children use results to draw conclusions?	✓ **Can everything make a shadow?** ✓ Can children make a series of careful observations? ✓ Can children record their observations in a systematic way that relates to the question? **Does it conduct electricity?** ✓ Can children explain results and their conclusions? ✓ Can children recognise common conductors and insulators, and	✓ **Balloon rockets** ✓ Can children use results to predict and explain what may happen on the next attempt? ✓ Can children suggest improvements? ✓ **Forces – car ramps** ✓ Can children make an accurate record of their measurements? ✓ Can children use their results to explain how the car moves on different surfaces?

		✓ Can children suggest explanations for their findings? ✓ **Local environment study** ✓ Can children group living things in different ways?	associate metals with being good conductors? ✓ **Investigating pitch** ✓ Can children suggest how to alter the pitch? ✓ Can children carry out simple tests of these ideas? ✓ **String telephones** ✓ Can children recognise that vibrations from sounds travel through a medium to the ear?	✓ **Shoe grip** ✓ Can children plan and set up a fair test? ✓ **What is the strongest magnet?** ✓ Can children decide on an approach to compare magnet strength? ✓ Can children recognise and control variables where necessary? ✓ **Drying materials** ✓ Can children identify what is to be changed and what is to be kept the same? ✓ Can children identify what to observe/measure to see if there is a difference? ✓ **Measuring temperature** ✓ Can children use a thermometer to measure temperature accurately?
Additional TAPS activities	✓ Describe in simple terms how fossils are formed when things that have lived are trapped within rock. ✓ Compare and group together different kinds of rocks on the basis of their simple physical properties. ✓ Describe the simple functions of the basic parts of the digestive system in humans. ✓ Function of teeth – to find out about what damages teeth and how to look after them. ✓ Rate of evaporation. ✓ Observe that some materials change state when they are heated or cooled. ✓ Observe that some materials change state when they are heated.	✓ Identify that animals have skeletons and muscles. ✓ Identify that humans have skeletons and muscles for support, protection and movement. ✓ Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ✓ Explore seed dispersal. ✓ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ✓ 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 they need light in order to see things and notice that light is reflected from surfaces. ✓ Find patterns in the way that the size of shadows change. ✓ Recognise some common conductors and insulators, and associate metals with being good conductors. ✓ 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 that vibrations from sounds travel through a medium to the ear.	✓ Compare how things move on different surfaces. ✓ Magnetic forces can act a distance.
Scientists to research	✓ **Mary Anning** (Discovery of Fossils)	✓ **Adelle Davis** (20th Century Nutritionist)	✓ **James Clerk Maxwell** (Visible and Invisible Waves of Light)	✓ **William Gilbert** (Theories on Magnetism)

	✓ **Inge Lehmann** (Earth's Mantle) ✓ **Anders Celcius** (Celcius Temperature Scale) ✓ **Daniel Fahrenheit** (Fahrenheit Temperature Scale / Invention of the Thermometer)	✓ **Marie Curie** (Radiation / X-Rays) ✓ **Jan Ingenhousz** (Photosynthesis) ✓ **Joseph Banks** (Botanist) ✓ **Ivan Pavlov** (Digestive System Mechanisms) ✓ **Joseph Lister** (Discovered Antiseptics) ✓ **Cindy Looy** (Environmental Change and Extinction) ✓ **Jaques Cousteau** (Marine Biologist)	✓ **Thomas Eddison** (First Working Lightbulb) ✓ **Joseph Swan** (Incadesecant Light Bulb) ✓ **Aristotle** (Sound Waves) ✓ **Gailileo Galilei** (Frequency and Pitch of Sound Waves) ✓ **Alexander Graham Bell** (Invented the Telephone)	✓ **Andre Marie Ampere** (Founder of Electro-Magnetism)
Investigations that work well	✓	✓	✓	✓