Science Progression of Learning

Wootton St Peter's CE Primary School

"The important thing is to never stop questioning" Albert Einstein

EYFS Understanding the World

Seasonal Changes

Pupils should be taught to

- Identify and discuss patterns and change
- Identify similarities and differences in relation to objects, materials and living things.

Observe the natural world and how animals behave differently as the seasons change.

Bright Idea – If it was hot all year round what would you miss about Autumn? How do we know it's Autumn?

Key Knowledge – name some autumnal changes.

Disciplinary Knowledge – Making Observations.

Diet

Pupils should be taught to

Understand the importance of physical exercise and a healthy diet to maintain good health.

Discuss ways to keep healthy and safe.

Bright Idea

Odd one out

Running, walking, sleeping

Key Knowledge

Ways to keep our bodies healthy.

Disciplinary Knowledge

Collecting and recording data

Materials

Provide children with opportunities to change materials from one state to another, e.g. melting ice cubes, the sun, combining different materials and then cooling or heating them.

Bright Idea

Odd one out water, milk, ice

Key Knowledge

Materials can change state.

Disciplinary Knowledge

Making Observations

Light

Pupils should be taught to

Identify sources of light.

Explore shadows and reflection

Understand about visibility and its importance in the dark

Explore how you can shine light through some materials and not others.

Investigate shadows

Bright Idea

Zoom in zoom out - In an emergency

Key Knowledge

Know shadows are caused by objects blocking light

Disciplinary Knowledge

Making Obsee vations

Living Things and their Habitats

Pupils should be taught to

Understand the importance conservation – wildlife in the garden.

Begin to understand the respect and care for the natural environment and all living things.

Understand contrasting environments locally and nationally.

Bright Idea

Odd one out frog, bee, snail?

Key Knowledge

Know that animals have lifecycles

Disciplinary Knowledge

Making Observations

Scientific Drawings

Measuring/identifying

Forces (Flotation)

Pupils should be taught to

Explore and talk about different forces they can feel. Such as stretching elastic, snapping a twig but not being able to bend a need to metal rod.

Explore and discover why some things sink or float.

Whether something floats depends on the material it is made of, not its weight.

Learn about magnetic attraction and repulsion. Explore how things work such as wind-up toys.

Bright Idea

Discovery Dog Floating and Sinking Experiment.

Key Knowledge

Understand the words float and sink.

Disciplinary Knowledge

Making Observations

Use of simple equipment

Collect/record data

Plants

Pupils should be taught to

Label parts of a plant (stem, flower, shoot, bud and root)

Understand the lifecycle of a bean

Identify the main things a plant needs to grow (light, water and soil)

Observe an apple core going brown and mouldy over time.

Bright Idea

What just happened – Yellow weeds

Key Knowledge

The main thing a plant needs to grow are light. Water and soil

Disciplinary Knowledge

Making Observations

Scientific Drawings

Comparing Objects

Animals (Minibeasts)

Pupils should be taught to

Understand how to attract bugs and insects into the garden

Understand the lifecycle of an animal

Bright idea

What just happened - Caterpillar changes

Key Knowledge

Understand the lifecycle of a butterfly

Disciplinary Knowledge

Making observations

Identifying

KEY STAGE 1: Years 1 & 2			
KS1	**Y1: Plants** **Pupils should be taught to:** • 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. **Pupils should be taught to:** • Observe and describe how seeds and bulbs grow into mature plants	**Y2: Living Things & Habitats** **Pupils should be taught to:** • 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	**Y2: Sound (exploratory unit)** **Pupils should be taught to:** • Understand and that sounds are heard when they enter the ear. • Explore the many kinds of sound and sources of sound. • Understand that sounds travel away from sources, getting fainter as it gets further **Bright Idea** https://explorify.uk/en/activities/listen-what-can-you-hear/lets-get-physical https://explorify.uk/en/activities/whats-going-on/born-to-dance

	• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. **Bright Idea** **PMI** https://explorify.uk/en/activities/what-if/plants-could-move-from-one-place-to-another https://explorify.uk/en/activities/what-if/all-plants-were-the-same **Odd one out** https://explorify.uk/en/activities/odd-one-out/autumn-leaves https://explorify.uk/en/activities/odd-one-out/evergreen https://explorify.uk/en/activities/odd-one-out/types-of-leaves **Zoom in zoom out** https://explorify.uk/en/activities/zoom-in-zoom-out/brown-shapes https://explorify.uk/en/activities/zoom-in-zoom-out/craggy-surface **Key Knowledge** Parts of a plant Evergreen or Deciduous Germination Know the name and identifying features of common wild and garden plants, including trees Know the names of simple parts of a flowering plant (root, stem, leaf, flower) and trees (crown, bark, trunk, leaves, branches, roots) Know the conditions necessary for plant growth Know how seeds grow into mature plants understand how seeds grow into mature plants **Disciplinary Knowledge** **Growing plants from seeds in different places** I can use my observations and ideas to suggest answers to questions I can reflect on the success of an enquiry I can say what I found out **Tree hunt** I can identify and classify Investigation questions How can we sort the leaves that we collected on our walk? How can we identify the trees that we observed on our tree hunt? (Identifying and classifying) **Investigation Question** Do bigger seeds grow into bigger plants? (Pattern seeking) What do plants need to grow? (comparative and fair testing)	• Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. **Bright Idea** https://explorify.uk/en/activities/whats-going-on/spinning-a-yarn https://explorify.uk/en/activities/odd-one-out/living-moving https://explorify.uk/en/activities/zoom-in-zoom-out/brown-and-bumpy https://explorify.uk/en/activities/have-you-ever/gone-to-bed-when-it-is-still-light-outside https://explorify.uk/en/activities/whats-going-on/hungry-snails https://explorify.uk/en/activities/whats-going-on/muddy-meal **Key Knowledge** Know that all objects are either living, dead or have never been alive. Know that animals and plants live in a habitat to which they are suited. Know that within a habitat there are different micro-habitats These micro-habitats have different conditions e.g. light or dark, damp or dry. Understand how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Know that the way that animals obtain their food from plants and other animals can be shown in a food chain. Know that within a habitat there are different micro-habitats These micro-habitats have different conditions e.g. light or dark, damp or dry. **Disciplinary Knowledge** Choose a tree (Review / ongoing) Observe closely using simple equipment. **Investigation Question** What happens to trees in each season? What is the weather like in each season? (Observing over time) Alive, dead or never been alive Identify, classify and group items things that are living, dead, and things that have never been alive Investigation **Question** How would you group things to show which are living, dead, or have never been alive? (identify and classify) How do you know if something is or has ever been alive? (Pattern seeking) Use my observations and ideas to suggest answers to questions **Investigation Question** What animals live in a (different habitat) and why? (Research using secondary sources) **Investigation Question** What do humans need to survive? Why do we need food and water? If you were stuck on a boat what essentials would you need? (Research using secondary sources.) Habitats use my observations and ideas to suggest answers to questions What do plants and animals give each other in a habitat?	**Key Knowledge** Sounds are vibrations. When we speak, our vocal cords vibrate. These vibrations usually travel through the air until it reaches the ear and we hear this sound. Vibrations can also pass through solids, so they travel around the balloon into the recipient's ear. **Disciplinary Knowledge** **Make a telephone** **Variables in practical work** Did the length of string make a difference as to whether you heard your partner's voice? Was having the string taut important? How do you think your partner heard your voice? What do you think would happen if you used cotton instead of string? **Y2: Light (exploratory unit)** Pupils should be taught to: • Identify different light sources, including the Sun. • Understand that darkness is the absence of light **Bright Idea** https://explorify.uk/en/activities/odd-one-out/through-the-looking-glass **Key Knowledge** The sun, stars, lightning and bush fires are natural sources of light. Fire light bulbs, torches, screens and fireworks are artificial sources of light. **Disciplinary Knowledge** https://www.twinkl.co.uk/resource/t-t-15817-light-experiments-awe-and-wonder-science-activity Observing/How scientific questions can be answered.

		(Identifying and Classifying)	

Y1: Seasonal Changes (Ongoing) Pupils should be taught to:

- Observe changes across the four seasons
- Observe and describe weather associated with the seasons and how day length varies.
- Observe and talk about changes in the weather and the seasons.

Bright Idea

https://explorify.uk/en/activities/whats-going-on/seasons
https://explorify.uk/en/activities/whats-going-on/shooting-sprouts
https://explorify.uk/en/activities/whats-going-on/wonderful-weather

Key Knowledge

Observe changes across the four seasons
Observe and describe weather associated with the seasons and how day length varies.
Observe and talk about changes in the weather and the seasons

Disciplinary Knowledge

Measure the Rain
I can gather and record data to help in answering questions.
Investigation Question In which season / which country does it rain the most?
(Research using secondary sources)

Natural objects
Fill a metal tray with natural found objects and water, then freeze.
Place the tray outside and time how long it takes to melt.
Record the data in a table. Repeat each term.
Present the data in graphical format. How do the leaves look different in autumn to spring?
Make a season disk for each season and compare.
Investigation Question How long does it take to melt in winter compared to summer? (Observing over time)

	Y1: Animals **Pupils should be taught to:** • 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) **Bright Idea** https://explorify.uk/en/activities/zoom-in-zoom-out/prints Odd One Out - - A dog, a bird, a fly, a frog **Key Knowledge** Know that there are types of animals and know the names for these types (fish, amphibians, reptiles, birds and mammals) Know the basic parts of animals. Know that animals eat different foods and these groups are called: carnivores, herbivores and omnivores understand the physical features of a carnivore, herbivore and omnivore Know the 5 senses and which body part is associated with them Know that animals have live young or eggs and understand these grow into adult animals Know the parts of a human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) recognising similarities and differences with those of animals **Disciplinary Knowledge** **Pet shop box** I can ask simple questions and recognise that they can be answered in different ways Investigation Questions What do you need to do to look after a pet dog/cat/lizard and keep it healthy? How are the animals in Australia different to the ones that we find in Britain? (Research using secondary sources) I can identify and classify Investigation Questions How can we organise all the zoo animals? Which offspring belongs to which animal? (Identifying and classifying) Cold blooded investigation I can reflect on the success of an enquiry and identify further questions. I can use information from the data to say what I found out Investigation Questions How does a reptile keep warm?	**Y1: Forces (exploratory unit)** **Pupils should be taught to:** • Explore and describe the movement of, familiar things (for example, cars going faster, slowing down, changing direction) • Understand that pushes and pulls are examples of forces. • Recognise that when things speed up, slow down or change direction, there is a cause (for example, a push or a pull) **Bright Idea** **https://explorify.uk/en/activities/whats-going-on/flexible-wheel** **https://explorify.uk/en/activities/whats-going-on/scarf-shooter** **https://explorify.uk/en/activities/odd-one-out/types-of-car** **Key Knowledge** I can compare how things move on different surfaces I know a push or pull is an example of a force I know that if something slows down, speeds up or changes direction this is caused by a push or a pull. **Disciplinary Knowledge** Forces investigations Friction Slide and toy car experiment: I can ask relevant questions and use different types of scientific enquiries to answer them I can collect data to answer my questions (gathering, recording, classifying and presenting data in a variety of ways to help in answering questions) **Y1 & Y2: Everyday Materials and their Uses** Pupils should be taught to: • 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 based on their simple physical properties. **Pupils should be taught to:** • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Explore how the shape of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **Bright Idea** https://explorify.uk/en/activities/what-if/all-materials-were-transparent https://explorify.uk/en/activities/odd-one-out/fit-for-purpose https://explorify.uk/en/activities/zoom-in-zoom-out/hooks-and-loops https://explorify.uk/en/activities/whats-going-on/season **Key Knowledge** Know that all objects are made of one or more materials	**Y1 & Y2: Animals, including Humans** **Pupils should be taught to:** • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **Pupils should be taught to:** • Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. **Bright Idea** https://explorify.uk/en/activities/odd-one-out/whats-for-dinner https://explorify.uk/en/activities/the-big-question/what-is-a-balanced-diet-for-us-and-the-planet https://explorify.uk/en/activities/have-you-ever/smelt-something-that-made-you-happy **Key Knowledge** Know that animals have live young or eggs and understand these grow into adult animals Know the parts of a human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth)recognising similarities and differences with those of animals understand the importance for humans of exercise, healthy eating and good hygiene Know the basic needs of animals, including humans, for survival (water, food and air) Understand the importance for humans of exercise, healthy eating and good hygiene Know the basic needs of animals, including humans, for survival (water, food and air) **Disciplinary Knowledge** Seasonal Changes (STEM trail seasonal changes - and 'Back to classroom activity.') I can observe closely, using simple equipment Investigation question How are different environments affected by seasonal changes? (Observing over time) **Food diaries** I can gather and record data to help in answering questions. Investigation Questions How much food and drink do I have over a week? (Observing over time) What food do you need in a healthy diet and why? (Research using secondary sources) Mouldy Bread I can predict the outcome of a practical and explain my reasoning I can reflect on the success of an enquiry and identify further questions.

		Know the names of everyday materials. know that materials can be described by their properties Sort materials by their properties. Know that all objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. Know that materials can be changed in shape by bending, stretching, squashing and twisting **Disciplinary Knowledge** Identify and classify Investigation Question What materials is the school built from? (Identifying and classifying) Building Castles Ask simple questions and recognising that they can be answered in different ways Perform simple tests Make simple predictions Investigation Question What materials make the best castle? (Comparative and fair testing) **Investigation Question** What materials keep a liquid warm the longest? (Comparative and fair test) **Baking Bread** I can perform simple tests Investigation questions Is our sense of smell / taste better when we can't see? (comparative and fair testing)	I can use information from the data to say what I found out Investigation Question What happens when we don't wash our hands? (Comparative and fair testing) (Observing over time)

KEY STAGE 2: Years 3 & 4

KS2 Y3&4				
		Y3 & Y4 ANIMALS, INCLUDING HUMANS (Health & Nutrition & Food Chains) **Pupils should be taught to:** • 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 **Pupils should be taught to:** • Construct and interpret a variety of food chains, identifying producers, predators and prey. • 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 **Bright Idea** What if you could only eat one food for the rest of your life? https://explorify.uk/en/activities/what-if/we-had-no-teeth https://explorify.uk/en/activities/odd-one-out/bite-size https://explorify.uk/en/activities/the-big-question/what-food-helps-to-keep-us-healthy https://www.thoughtco.com/kid-friendly-elephant-toothpaste-demo-604164#:~:text=Make%20Elephant%20Toothpaste, mind%20getting%20wet%20foam%20everywhere **Key Knowledge** Know how the digestive system works. Know that humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). **Disciplinary Knowledge** Digestive system demonstration Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and table Investigation **Question What happens to our food?** (Observing over time / research using secondary sources) Egg-namel Investigation: Predict the outcome of a practical and explain my reasoning Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers **Investigation question** Why do we have different teeth? (Identifying, classifying and grouping) Are foods that are high in energy always high in sugar? (Pattern seeking) **Y3: PLANTS** **Pupils should be taught to:**	**Y3: ANIMALS, INCLUDING HUMANS (Skeletons & Muscles)** **Y3: Pupils should be taught to:** • Identify that humans and some other animals have skeletons and muscles for support, protection and movement **Bright Idea** https://explorify.uk/en/activities/odd-one-out/funny-bones https://explorify.uk/en/activities/odd-one-out/get-a-backbone **Key Knowledge** Know that animals cannot make food, and that they get their nutrition from what they eat Know that some animals have skeletons and muscles for support protection and movement Understand and can create simple food chains including and naming the producer, predator and prey **Disciplinary Knowledge** **Muscles and skeletons:** I can use straightforward scientific evidence to answer questions or to support my findings. Investigation Questions How does my hand work? (Research using secondary sources) https://www.stem.org.uk/system/files/elibrary-resources/2018/11/PR34_Bionic_hand.pdf **Y3: FORCES & MAGNETS** **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.wellcome.ac.uk/en/activities/odd-one-out/battery-bonanza https://explorify.uk/en/activities/whats-going-on/attract-and-repel **Key Knowledge** Know that some forces need contact between 2 objects, but magnetic forces can act at a distance Be able to group a variety of everyday materials according to their magnetic properties Know that magnets have 2 poles Understand why 2 magnets will attract or repel each other, depending on which poles are facing	**Y4: SOUND** **Pupils should be taught to:** • 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 **Bright Idea** https://explorify.uk/en/activities/listen-what-can-you-hear/keeping-track https://explorify.uk/en/activities/whats-going-on/lyre-liar **Key Knowledge** Know how sounds are made Know that vibrations from sounds travel through a medium to the ear Understand how differences in vibrations are linked to loudness and pitch Understand how a range of sounds are made. Know that sounds get fainter as the distance from the sound source increases **Disciplinary Knowledge** Sound investigations Investigating vibrations through tuning fork and water, tuning fork and ping pong ball, elastic bands on a box, rice on a drum, pebbles in water: I can put forward my own ideas about how to answer a question. I can use information from the data to say what I found out Bottles experiment (pitch) I can carry out a fair test and explain why it is fair. **Making telephones using cups and string:** I use scientific vocabulary to describe my observations. Investigation questions / types of investigations Which bottle has the higher pitch - most or least water/ air? Some of these may be to cover the knowledge rather than the working scientifically skills so although they are practical they might not need to be included in this section. If they are one of the 5 types of enquiry : comparative / fair testing. research observation over time. pattern seeking identifying, grouping and classifying. they can go

		• 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. **Bright Idea** https://explorify.uk/en/activities/whats-going-on/sensitive-plant **Key Knowledge** know the function of the parts of a flowering plant (roots, stem, leaf, stamen, carpel) Know the requirements for plant growth (air, light, water, nutrients from soil, room) and how they vary from plant to plant Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Animals, including pollination, seed formation and seed dispersal. **Disciplinary Knowledge** **4 plant investigation** - (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - grown from seeds I can make measurements and observations using simple equipment to complete a simple graph or chart. I can predict the outcome of a practical and begin to explain my reasoning I can reflect on the success of an enquiry I can identify differences, similarities or changes related to simple scientific ideas and processes **Investigation question** Which plant will grow the best in this environment? (comparative and fair testing) Food colouring investigation https://www.sciencefun.org/kidszone/experimen ts/dyed-flowers/ I can identify differences, similarities or changes related to simple scientific ideas and processes I can use straightforward scientific evidence to answer questions or to support their findings. **Investigation Question** How and why does water travel through a plant? Is this the same for every plant? (Observing over time)	Be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. Understand some of the factors which increase/reduce how fast or slow things move. **Disciplinary Knowledge** Forces investigations Friction Slide and toy car experiment: I can ask relevant questions and use different types of scientific enquiries to answer them I can collect data to answer my questions.(gathering, recording, classifying and presenting data in a variety of ways to help in answering questions) I can make measurements and observations using simple equipment to complete a simple graph or chart. (making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers) **Investigation questions** Which surface is best to stop slipping? (Comparative and fair testing) How have our ideas about forces changed over time? (research using secondary sources) Gravity investigation: I can carry out a fair test and explain why it is fair. (setting up simple practical enquiries, comparative and fair tests) **Air resistance investigation:** I can suggest ways of improving my work. (using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	
			KEY STAGE 2: Years 3 & 4 cont-	

Y3: ROCKS

Pupils should be taught to:

- Compare and group together different kinds of rocks based on 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.

Bright Idea

https://explorify.uk/en/activities/odd-one-out/erupting-rocks
https://explorify.uk/en/activities/zoom-in-zoom-out/glowing-depths

PMI

What if…The Earth was square What if…We dug a hole through the earth

Key Knowledge

Know that rock is a naturally occurring material.
Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter).
Know that some rocks contain fossils and how fossils are formed.

Disciplinary Knowledge

Ask relevant questions and using different types of scientific enquiries to answer them
Gather, record, classify and present data in a variety of ways to help answer questions.
Identify differences, similarities or changes related to simple scientific ideas and processes.

Investigation Question

What is special about fish and amphibians?
(Identifying and classifying)
Recognise that soils are made from rocks and organic matter.
WORKING SCIENTIFICALLY Compare rocks through observations - touch, appearance, weight - categorise
Identify differences, similarities or changes related to simple scientific ideas and processes
Use straightforward scientific evidence to answer questions or to support their findings. Investigation Question What is soil made from? What is a fossil and how is it formed?
(Research using secondary sources)

Y4: LIVING THINGS & THEIR HABITATS

Pupils should be taught to:

- Recognise that living things can be grouped in a variety of ways

Y4: STATES OF MATTER

Pupils should be taught to:

- 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.

Bright Idea

https://explorify.uk/en/activities/odd-one-out/is-it-a-liquid
https://explorify.uk/en/activities/odd-one-out/states-in-the-kitchen
https://explorify.uk/en/activities/odd-one-out/melting-materials

Key Knowledge

Know how to explain if something is a a gas, liquid and a solid
Know that melting is a state change from solid to liquid.
Freezing is a state change from liquid to solid.
Explain what freezing, melting, evaporation and condensing are and the temperature at which they occur for water.

Disciplinary Knowledge

Heating and cooling
Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Investigation Question

How would you sort these objects/materials based on their temperature? (identifying and classifying)

Y3: LIGHT

Pupils should be taught to:

- 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 a solid object
- Find patterns in the way that the size of shadows changes

Bright Idea

What if we didn't have mirrors?
Have you ever been somewhere where you couldn't see naything?
https://explorify.uk/en/activities/zoom-in-zoom-out/can-you-see-me
https://explorify.uk/en/activities/odd-one-out/see-you
https://explorify.uk/en/activities/odd-one-out/shadow-fun

Key Knowledge

We see objects because our eyes can sense light. Dark is the absence of light.
LIght sources.
Reflection
Eyes and how to protect them from the sun. Shadows

Disciplinary Knowledge

Measure shadow position at different times of the day.
Knowledge of data analysis and presentation

Y4: ELECTRICITY

Pupils should be taught to:

- 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 a lamp will light in a simple series circuit, based on whether 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 a lamp lights in a simple series circuit
- Recognise some common conductors and insulators, and associate metals with being good conductors.

Bright Idea

What's the question? If the answer is electricity…
https://explorify.uk/en/activities/start-with-art/circuits

		• 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. **Bright Idea** https://explorify.uk/en/activities/whats-going-on/to-flee-or-not-to-flee https://explorify.uk/en/activities/who-is/mya-rose-craig https://explorify.uk/en/activities/have-you-ever/seen-lots-of-birds-flying-together-across-the-sky https://explorify.uk/en/activities/have-you-ever/found-it-difficult-to-spot-an-animal-because-of-its-colour **Key Knowledge** Know that living things can be grouped (classified) in different ways according to their features. Know that environments may change naturally. Humans also cause the environment to change. These environments also change with the seasons. **Disciplinary Knowledge** **Investigation Question** What is special about fish and amphibians? (Identifying and classifying)		https://explorify.uk/en/activities/have-you-ever/seen-a-wind-turbine **Key Knowledge** Understand how a simple series electrical circuit works and name the basic parts of cells, wires, bulbs, switches and buzzers Know 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 Know that a switch opens and closes a circuit and am able to associate this with whether or not a lamp lights in a simple series circuit Know the name of some common conductors and insulators and know that metals are good conductors **Disciplinary Knowledge** Complete/Incomplete circuits **Investigation Questions** Which metal is the best conductor of electricity? (Comparative and fair testing) Complete/Incomplete circuits I can predict the outcome of a practical and begin to explain my reasoning Investigation Questions How would you group these electrical devices based on where the electricity comes from? (Identifying and classifying) Conductors vs Insulators I use scientific vocabulary to describe my observations. (recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables) **Investigation Questions** Which metal is the best conductor of electricity? (Comparative and fair testing)

KEY STAGE 2: Years 5 & 6

KS2 Y5&6	**Y6: EVOLUTION & INHERITANCE** **Pupils should be taught to:** • 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 **Bright Idea** https://explorify.uk/en/activities/odd-one-out/blackbird-variation https://explorify.uk/en/activities/odd-one-out/brilliant-brain-case https://explorify.uk/en/activities/zoom-in-zoom-out/black-stripes https://explorify.uk/en/activities/whats-going-on/takeaway-dinner **Key Knowledge** Understand how animals have adapted to their environment Know that fossils provide information about living things that inhabited the Earth millions of years ago Understand that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (dominant / recessive genes) Understand how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **Disciplinary Knowledge** **Bird Beak Investigation Extended investigation (Thinking, Doing Talking Science)** I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. I can record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. I can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate I can use test results to make predictions to set up further comparative and fair tests - after using tweezers then predict using a different beak Investigation Question Is there a pattern between the size and shape of a bird's beak and the food it will eat? (pattern seeking) (comparative and fair testing) DNA extraction	**Y5: PROPERTIES & CHANGES OF MATERIALS** **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.uk/en/activities/have-you-ever/warmed-yourself-by-a-real-fire https://explorify.uk/en/activities/whats-going-on/hot-or-cold Odd One Out - Plastic Spoon, Ball of Wool, Wooden Block - Bubble wrap, aluminium foil, tissue https://explorify.uk/en/activities/zoom-in-zoom-out/red-and-flaky **Key Knowledge** Know the properties of materials including hardness, transparency, electrical and thermal conductivity and attraction to magnets. Know that some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Know that mixtures can be separated by filtering, sieving and evaporation. Know that some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible. Know that materials have different uses depending on their properties and state (liquid, solid, gas) **Disciplinary Knowledge** **Investigation Question**	**Y5&Y6: LIVING THINGS & THEIR HABITATS** **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.uk/en/activities/odd-one-out/looking-after-baby https://explorify.uk/en/activities/have-you-ever/cared-for-a-baby-animal **Key Knowledge** Know the differences in the life cycles of a mammal, an amphibian, an insect and a bird Understand the life process of reproduction in some plants and animals **Disciplinary Knowledge** **Y6: ELECTRICITY** **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.uk/en/activities/whats-going-on/super-spinning-wire https://explorify.uk/en/activities/have-you-ever/not-been-able-to-find-a-battery-when-you-need-one https://explorify.uk/en/activities/have-you-ever/tried-to-turn-something-on-when-it-wasnt-turned-on-at-the-plug https://explorify.uk/en/activities/the-big-question/how-much-electricity-do-we-use **Key Knowledge** Know the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit Understand and give reasons for variations in how components function in circuits (switches, buzzers, motors, bulbs) Know the recognised symbols to draw accurate circuit diagrams **Disciplinary Knowledge** Electronic christmas card or Victorian House

	I can report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations Investigation Question What does DNA look like? (Research using secondary sources)	Which of the following experiments (give some reversible and some irreversible) can be reversed? (Observing over time) A fireproof house Predict the outcome of a practical and explain my reasoning Reflect on the success of an enquiry and identify further questions take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Investigation questions Can we design a fireproof house? What materials would it be made from? Why do you think houses aren't made of fireproof materials? (comparative and fair testing)	I can identify scientific evidence that has been used to support or refute ideas or arguments Investigation question How do you make light from electricity? to make a lightbulb? (pattern seeking) How do components function in an electrical circuit? - different voltage of battery etc (pattern seeking)
	Y5&Y6: LIVING THINGS & THEIR HABITATS **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.uk/en/activities/who-is/milly-hennayake https://explorify.uk/en/activities/odd-one-out/three-weeds https://explorify.uk/en/activities/whats-going-on/beavering-away **Key Knowledge** Know that living things can be formally grouped according to characteristics, including microorganisms, plants and animals **Disciplinary Knowledge** **Investigation question** How would you make a classification key for vertebrates/invertebrates or microorganisms? Can you present your findings in a different way? (identifying and classifying) **Y6: LIGHT** **Pupils should be taught to:** • 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	**Y5: EARTH & SPACE** **Pupils should be taught to:** • 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 **Bright Idea** https://explorify.uk/en/activities/odd-one-out/celestial-objects https://explorify.uk/en/activities/odd-one-out/space-rocks https://explorify.uk/en/activities/start-with-art/moons-and-planets **Key Knowledge** Know and describe the movement of the Earth and other planets relative to the sun - that they move around the sun in fixed orbits. Know and describe the movement of the moon and the Earth Know the shape of the Earth, sun and moon Know and explain the process of day and night Understand how gravity affects objects on Earth **Disciplinary Knowledge** Identify scientific evidence that has been used to support or refute ideas or arguments. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary **Investigation question** How have our ideas about the solar system changed over time? (research using secondary sources) Is there a pattern between the	**Y5 & Y6: ANIMALS, INCLUDING HUMANS** **Pupils should be taught to:** • Describe the changes as humans develop to old age. **Pupils should be taught to:** • 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. **Bright Idea** Big Question - What if the average lifespan was 200 years old? https://explorify.uk/en/activities/listen-what-can-you-hear/skip-a-beat https://explorify.uk/en/activities/whats-going-on/bottoms-up **Key Knowledge** Name the parts of the human circulatory system Know the function of the heart, blood vessels and flow of blood (journey through the heart and blood vessels - VR headset?) Design a fair test to measure the impact of exercise on the brain (reaction/ruler investigation) understand how water is transported through the body (poster persuading others to drink water) Understand the changes as humans develop to old age (I can engage in sessions with the school nurse (puberty, healthy relationships, Sex Ed) **Disciplinary Knowledge**

	• 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 **Bright Idea** https://explorify.uk/en/activities/the-big-question/can-you-mix-coloured-lights-in-the-same-way-as-paint https://explorify.uk/en/activities/who-is/patricia-bath https://explorify.uk/en/activities/start-with-art/shadows **Key Knowledge** Understand that light travels in straight lines Understand that we see things because light travels from light sources to our eyes (or via reflections) Understand the way the Sun's (and shadows) position changes through the day Know that shadows have the same shape as the objects that cast them **Disciplinary Knowledge** **Investigation Question** How does the position of a light source affect the size of a shadow? (comparative and fair testing) How does my shadow change over the day? (Observing over time)	size of a planet and the time it takes to travel around the Sun? (Pattern seeking) Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Mars has many craters that have been formed by meteorites. The larger, heavier and faster the meteorite, the bigger the crater it creates when it crashes into the planet. 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 **Investigation questions** How does the size of objects affect the size of a crater? How can we measure the size of the craters? Does the surface a meteorite lands on affect the size of the crater? Can we present our findings as a graph? (pattern seeking) Research significant individuals including Galileo, Aristotle, Copernicus, Armstrong, Mae Jemison	**Mummified orange** I can predict the outcome of a practical and explain my reasoning I can use information from the data to say what I found out I can reflect on the success of an enquiry and identify further questions **Investigation Question** How does mummification preserve things? (Observing over time) **Y5: FORCES** **Pupils should be taught to:** • 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. **Bright Idea** https://explorify.uk/en/activities/the-big-question/how-do-racing-cyclists-reduce-friction https://explorify.uk/en/activities/have-you-ever/tried-running-through-water https://explorify.uk/en/activities/start-with-art/levers-and-pulleys **Key Knowledge** Understand the effects of a variety of forces e.g. magnetism, friction and gravity Understand the effects of air and water resistance and friction Understand that some mechanisms allow a smaller force to have a greater effect. **Disciplinary Knowledge** Write a report on simple machines: the lever, the wheel and axle, the pulley, the inclined plane, the wedge and the screw. I can report and present findings from enquiries in oral and written forms such as displays and other presentations.

Science Long Term Overview

EYFS			
	AUTUMN TERM	**SPRING TERM**	**SUMMER TERM**
A	Changes in the weather Rainbows The dark/shadows Rationale; To inspire and excite To acquire knowledge To be proactive in their responsibility towards their world Link to; topics on 'me and my family'	Lifecycles The weather Changes over time Seasons ***Rationale;*** To inspire and excite To acquire knowledge To be proactive in their responsibility towards their world Link to; topics on 'space' and 'dinosaurs'	Animal habitats The climate Weather over time Floating and sinking ***Rationale;*** To inspire and excite To acquire knowledge To be proactive in their responsibility towards their world Link to; topics on 'construction' and 'on the farm'
B	Light and dark Changing seasons	Planting and caring for beans Life cycles of plants and animals Care for natural world and animals Live caterpillars ***Rationale;*** *To inspire and excite* *To acquire knowledge* *To be proactive in their responsibility towards their world* *Link to; topics on 'Fairytales' and 'Minibeasts'*	Different states of matter – ice Forces – floating and sinking, magnetism Shadows Animal groups – fish, mammals ***Rationale;*** *To inspire and excite* *To encourage creativity* *To acquire knowledge* *To open eyes to world beyond immediate environment* *Link to; topics on 'On Safari' and 'At the Seaside'*

KEY STAGE 1: YEARS 1 & 2

	AUTUMN TERM	SPRING TERM	SUMMER TERM
	Animals including humans Photos of the back of children's heads – Can we recognise each other? **Seasonal Changes** Seasons and change Harvest and Vegetables **Rationale:** September is a good month to be outside looking at the changes happening. It is Harvest Festival which we celebrate in the church with families attending. Linked to art and drawing fruit and vegetables	**Seasonal Changes (Spring)** **Plants** – story of corn/ flour Bread Making How is bread made? Ingredients, Growing corn. Irreversible changes Melting Chocolate **Rationale:** This is a great opportunity for children to learn about how wheat growths and what it's journey is to become bread. The children will also make bread and we can look at irreversible changes and the effect of yeast. There is lots of farm land locally so chn will see corn being grown. It links into our topic the Great Fire of London. This will appeal to a wide range of chn.	**Materials** Investigate different materials to decide which is best for a Circus tent. (Strong/Waterproof) Describe how things move and use comparisions such as faster/slower describe pushes and pulls. Describe how circus performers move introduce terms force/push/pull look at magnets. **Animals including humans** **Healthy Eating & Exercise** What do Circus Performers need to perform – exercise/healthy diet Food groups /Food Pyramid Activity Name and label parts of the human body Which part links to which sense? Design a healthy meal for a Circus Performer. Make Fruit Salad. **Rationale:** Our Topic is the Circus. So we use the opportunity to link to real life – what materials are best for a circus tent. Circus performers also need to be fit and healthy so gives us the opportunity to visit healthy eating and exercise. There are lots of practical activities and tasting sessions the lesson encourage self-belief and gives knowledge about healthy lifestyles for their future lives.
A	**Living Things and their Habitats** Identify/name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates Describe and compare the structure of a variety of common animals. Label a picture of an owl. What do Owls eat? What do Owl's prey eat? Owl Pellets simple food chain Where do Owls Live? What are their homes made out of? What are our homes made out of? How are they different? **Rationale:** This links in to our book Owl Babies. It's a good opportunity for chn to do hands on science dissecting Owl Pellets early in the year – it has wow factor for the children. It inspires and excites children and provides knowledge of our local environment.	**Habitats** Children design a habitat for their Wild thing suitable for it to live in. **Everyday Materials** Explore different materials What are they made of? What do they look like? Floating and Sinking Which materials float? Which sink? Design a boat for Max as a result of the investigation. **Rationale:** This links to our book Where the Wild Things are. It encourages creativity in the children as they test materials ready to design a boat then we test the boats and learn about floating and sinking. It encourages children to be independent in their learning.	**Living Things and their Habitats** **Sea Animals** Study of Sealife animals **The Weather** Weather study **Rationale:** It is good to study the weather in the summer months and it is unpredictable. Links in with maths and creating charts. Our topic is the seaside and chn have the opportunity to investigate about a sea creature of their choice creating independent learners.

KEY STAGE 1: YEARS 1 & 2

	AUTUMN TERM	SPRING TERM	SUMMER TERM
B	**Seasonal Changes (Autumn & Winter)** Which Season are we in Trees – How they change Measuring hot and cold using a thermometer and reading temperatures Which season was I born in Make a rain gauge Length of day and day length around the world Why is it warmer in day time? Weather around the world **Rationale:** Each year it's good to learn about the different seasons and look at our changing environment, we like to use our outside are for learning. It's an accessible topic for all chn to access and start questioning and using their enquiring minds.	**Animals including humans** Identify that humans and some animals have skeletons for support protection and movement Identify how animals and plants adapt to their environment in different ways – hibernation **Uses of Materials** Which materials keep things warm/cold for the longest time? How can you melt ice? What would a polar Explorer wear to keep warm? **Rationale:** Linked to our Topic Polar Explorers and regions. Gives the opportunity to look at Polar animals and their habitat and investigates materials that stop ice melting. Children work together to find solutions when investigating.	**Animals including Humans** Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Identify, name draw and label basic parts of a mouse and the human body and say which part of the body is associated with which sense. Find out about the basic needs of animals, including Humans for survival (Water/Food/Air) Hygiene and Exercise Describe the importance to humans of exercise eating the right amounts of different types of food. **Rationale:** This links to our book Hermelin. We look at exercise and body parts and our senses. What do humans need to survive. Provides chn with knowledge they will need to survive in life and help their physical development and wellness.
	Living Things and their habitats Facts about Meerkats Identify that most living things live in Habitats to which they are suited and each habitat provides for the basic needs of each animal and plant Describe how animals obtain their food from plants and other animals and look at **Food Chains.** **Rationale:** This links in with our Book Meerkat Mail. and provides a good opportunity to learn about Food Chains.	**Materials** Identify and compare suitability of everyday materials including wood, metal, plastic, glass brick, rock paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching **Rationale:** This topic gives the children lots of opportunity for scientific investigation and designing their own experiments. It encourages the children to become independent thinkers.	**Plants** **Biodiversity – Minibeasts** Explore our school grounds to compare with what is found in the Rainforest. **Habitats** Explore the features of the Rainforest and learn about the animals that live there. Research facts about Rainforest Animals Mini Information books about which animals live in which layer if the Rainforest Create Playdoh animal to match habitat Touch/Smell/Eyesight/Hearing Rainforest potions. **Rationale:** Our Topic is rainforests so provides an ideal opportunity to look at plants and parts of plants. We also compare Mini-beasts that we find in our school grounds (This encourages the chn to be curious) with what is found in the rainforest. We look at animals and their habitats and act scientifically by making Rainforest potions.

KEY STAGE 2: YEARS 3 & 4

CYCLE	AUTUMN TERM	SPRING TERM	SUMMER TERM
A	**Living things and their habitats** In this unit the children use the local environment to raise and answer questions that help them to identify and study animals in their habitat. They identify how the habitat changes throughout the year. We explore possible ways of grouping a wide selection of living things. The children 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. We also 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. The children work scientifically by using and making simple guides or keys to explore animals; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched. Rationale: This unit complements our long summer unit on plants in LKS2. In both units the children are able to look at our local area and identify living things within it. It also builds on lots of work done on animals and their habitats in KS1. It also leads on to work on evolution and inheritance in UKS2.	**States of matter** In this term-long unit the children learn about the differences between solid, liquids and gases and how they can be identified. Using the particle model, children learn about the different states of matter (solids, liquids, and gases). Children learn that many materials other than water will melt if heated to a high enough temperature. They then use this knowledge scientifically when, for example, investigating the melting point of (ice, chocolate and butter). Children also learn about thermal insulation and investigate the thermal insulation properties of different materials. This longer unit also teaches the children condensation, evaporation, precipitation and the water cycle in the second half of the Spring term. Rationale: This unit again relates directly to the children's life experience. The content of the topic builds on work on the seasons in EYFS and KS1 (e.g. changing state of water) and leads up to further work on properties and changes of materials in UKS2. As in other units of the science curriculum, results are recorded in tables and presented using graphs, supporting learning in the maths curriculum. Furthermore, this science unit – in common with others – enables children to develop their ability to predict, devise fair tests and draw conclusions based on evidence. The water cycle elements of this unit supports and deepens our overarching class topic (Rivers and the water cycle). This is then another science unit that shows the interaction and inter-relationship between science and geography. There are enrichment opportunities in the creation of models of the water cycle, trips to a local body of water, alongside the other practical activities of the unit. Knowledge from this unit also feeds into our English book *Oliver and the Seawigs*.	**Electricity** In this unit the children construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. They draw the circuit as a pictorial representation. We work scientifically by 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. Rationale: This unit leads on to further work with electricity, for example using formalised terminology (current, voltage) and pictorial representations, as well as more complex circuits in UKS2. This unit in the first half of the summer term also feeds into the following topic of light in the latter part of the summer term across the curriculum. Here the children learn about the operation of electric light bulbs, before moving on to look at light specifically, while in other areas using electric light as part of shadow puppet theatre.
	Rocks This unit is linked very much with work in geography. The children explore different kinds of rocks and soils, including those in the local environment. This is enriched by a trip to our local nature reserve (Dry Sandford Pit), where the children can observe stratified geological deposits and fossilised remains *in situ*. The children work scientifically by observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; 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. Pupils also research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Furthermore, they explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what	**States of matter** Long unit over two half-terms (as above, though focussing on water and the water cycle in the second half term)	**Light** In this unit the children 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. They think about why it is important to protect their eyes from bright lights. They look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. The children work scientifically by looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes. **Rationale:** This unit forms a part of our 'Light and Shadows' topic. In the previous half term, the children learn about electricity and powered electric light bulbs. In this half-term, they looks specifically at light as part of the whole class topic. This includes the book they will work with in English – *How the stars came to be*. This science topic therefore works in a mutually supportive way, encouraging the

	changes occur when they are in water. They can raise and answer questions about the way soils are formed. **Rationale:** This unit is part of a wider class topic ('Rocks and Rumbles') looking at volcanoes, earthquakes, rocks and soils. Therefore, the work in this science unit very much links with work in Geography ('Extreme Earth'), as well as elsewhere in the foundation curriculum. In Art the children make volcano art, while building earthquake-resistant structures in Design and Technology. This wider curriculum theme also reinforces our English work, which is based around the books *Pebble in my pocket* and *The Stone Trolls*, thereby supporting the development of background knowledge, deepening understanding and giving ideas for writing.		development of background knowledge and understanding, as well as providing a stimulus for writing.
B	**Animals including humans (the circle of life)** In this unit the children continue to learn about the importance of nutrition and are introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. The children work scientifically by identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They research different food groups and how they keep us healthy and design meals based on what they find out. **Rationale:** This unit supports further work on 'animals including humans' - specifically the digestive system – in the latter part of the Spring term. It also builds on several KS1 units that explore animals. This unit also enhances our English work based on the book *Mouse, bird, snake, wolf*, providing a deeper understanding of the animal world to create more informed discussion and comprehension, as well as providing ideas for creative writing.	**Sound** In this unit the children explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. The children work scientifically by finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They also make and play their own instruments by using what they have found out about pitch and volume. **Rationale:** This unit links to our music in this term, in which the children play ukeleles and recorders. Indeed, the work in this unit gives a good underpinning to musical knowledge generally. The topic is designed to relate to the children's own experience of the world around them and inspire greater curiosity to find out why things are as they are.	**Plants** This is a long unit which runs through the summer term. This length of time gives scope for a great deal of experimentation and investigation, including ongoing observations of plant growth and development. The children are introduced to the relationship between structure and function: the idea that every part has a job to do. They explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. The children work scientifically by comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; 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. They observe how water is transported in plants, for example, by putting cut, white carnations or celery into coloured water and observing how water travels up the stem (to the flowers, in the case of carnations). **Rationale:** This unit supports our English work on using the book *Quill Soup* as part of our topic 'Feast of flowers, fruits and seeds'. Growing tomatoes and cress in class provides and opportunity to wonder and enjoy the process of caring for food plants and acts as an inspiration for writing. The children are introduced here to the idea that plants can make their own food, but this is fleshed out more fully and formally in UKS2 with work on farming in Science and Geography.
	Forces and magnets In this unit the children 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). They explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). The children work scientifically by 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 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	**Animals including humans (digestive system)** In this unit the children should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. They work scientifically by comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They draw and discuss their ideas about the digestive system and compare them with models or images. **Rationale:** This unit builds on units in KS1 on healthy eating and is related to earlier work on the human and animal anatomy in the earlier part of the Autumn term of LSK2. This is another science unit that relates directly to the children's own life experience. There is	**Plants** Long unit over two half-terms (as above).

	another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets. **Rationale:** This unit is another highly practical Science topic which relates very much to the children's experience. However, it is designed to push beyond their familiarity with certain magnetic applications to wonder at the operation and possibilities of this peculiar force. Work in this unit leads on to further work on forces in UKS2, as well as linking to work on space.	excitement in the creation of a model of the digestive system and practical insight in the study of healthy eating.	

KEY STAGE 2: YEARS 5 & 6

AUTUMN TERM	SPRING TERM	SUMMER TERM
Evolution and Inheritance x2 **Rationale:** Links to RE topic of creation vs science – conflicting or complimentary, where the children will explore how creation and evolution could both be possible to Christians – thinking of our school Christian community. The children can use their scientific knowledge of evolution to help them in their RE lessons.	**Properties and Changes of Materials** x2 **Rationale:** Inspire awe and wonder. The children will be creative and curious to compete different experiments, thinking about the world around them.	**Living Things and Their Habitats** **Rationale:** Working scientifically. The children will enjoy seeing how different organisms are adapted to living in their habitats, as they love learning about animals and nature. **Electricity** **Rationale:** Working scientifically. The children will enjoy using the equipment to create different types of circuits in series and in parallel and to investigate what happens by changing the components.
Living Things and Their Habitats **Rationale:** Link to class text of 'The Explorer' and Geography topic of South America. They will enjoy creating classification keys thinking about the characteristics of different animals. They can use their favourite animals for enjoyment. **Light** **Rationale:** Links to DT topic of creating a light up Victorian house. The children will be able to use their knowledge and skills, acquired in science to create a light up Victorian house.	**Earth and Space** x2 **Rationale:** Links to class text 'Cosmic'. Links to art topic of Peter Thorpe space themed art. This is an exciting topic. Great hook to excite the children by seeing the actual dinosaur that went up in the Space X rocket first launch. They will be fascinated to learn about all the galaxies and be curious to find out what space is like and see the vastness of space through different experiments. We will also look at the first female astronauts to inspire the next generation of female scientists.	**Animals Including Humans** **Rationale:** Links to PE. Links to Geography topic on sustainable farming – investigating the amount of fat in crisps. They will be able to think about their own bodies and what they can do to keep their heart and lungs fit and healthy. **Forces** **Rationale:** Links to DT topic of creating fairground rides. Children to be inspired to carry out different investigations using newton meters. They will enjoy learning about Isacc Newton, who discovered gravity through an apple.