



**What are the aims and intentions of this curriculum?**

That children:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

**Curriculum Drivers -**

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year A Autumn	Animals, including humans (Y3 and Y4 units)	<p><b>(Y3)</b></p> <ul style="list-style-type: none"> <li>• Know that animals, including humans: need the right type and amount of nutrition, cannot make their own food, get nutrition from what they eat.</li> <li>• Know that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul> <p><b>(Y4)</b></p> <ul style="list-style-type: none"> <li>• Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added.</li> <li>• The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to</li> </ul>	<p>Research Classify Compare Ask – enquiry questions Devise Investigate Identify (patterns)</p>	<ul style="list-style-type: none"> <li>• Which is the longest bone in your body? Which is the smallest?</li> <li>• Are foods that are high in energy always high in sugar?</li> <li>• Can you sort these foods into the correct groups?</li> <li>• How does bending your elbow affect the circumference of your upper arm?</li> <li>• Are bigger hands more effective in catching a ball?</li> <li>• What would happen to your teeth if you ate only sugar?</li> </ul>	<p>Y3 Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine</p> <p>Y4 Digestive system, digestion, mouth, teeth, saliva, oesophagus,</p>

		<p>be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.</p> <ul style="list-style-type: none"> <li>Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</li> </ul>			<p>stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain</p>
--	--	---	--	--	---

**Working scientifically**

Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources
<ul style="list-style-type: none"> <li>How do the size of my bones change over the year?</li> <li>Digestive system experiment (tights – BBC Bitesize)</li> </ul>	<ul style="list-style-type: none"> <li>Are foods that are high in energy always high in sugar?</li> <li>Is there a pattern between different types of teeth?</li> </ul>	<ul style="list-style-type: none"> <li>Can you sort these foods into the correct food group?</li> <li>Which organ do you think has the most important job and why?</li> <li>How can we organise teeth into groups?</li> </ul>	<ul style="list-style-type: none"> <li>Which toothpaste is the most effective?</li> <li>How does bending your elbow affect the circumference of your upper arm?</li> <li>Are bigger hands more effective in catching a ball?</li> </ul>	<ul style="list-style-type: none"> <li>Bone names</li> <li>Diagrams of different animals' teeth</li> <li>BBC Bitesize digestion experiment</li> </ul>

<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Classify food in a range of ways.</li> <li>Use food labels to explore the nutritional content of a range of food items.</li> <li>Use secondary sources to find out the types of food that contain the different nutrients.</li> <li>Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?</li> <li>Plan a daily diet to contain a good balance of nutrients.</li> <li>Explore the nutrients contained in fast food.</li> <li>Use secondary sources to research the parts and functions of the skeleton.</li> <li>Investigate patterns asking questions such as: <ul style="list-style-type: none"> <li>Can people with longer legs run faster?</li> <li>Can people with bigger hands catch a ball better?</li> </ul> </li> <li>Compare, contrast and classify skeletons of different animals</li>   <li>Research the function of the parts of the digestive system.</li> </ul>
----------------------------	--

	<ul style="list-style-type: none"> <li>• Create a model of the digestive system using household objects.</li> <li>• Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing).</li> <li>• Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.</li> <li>• Use food chains to identify producers, predators and prey within a habitat.</li> <li>• Use secondary sources to identify animals in a habitat and find out what they eat.</li> </ul>
<b>Suggested investigation</b>	Boiled egg teeth decay experiment - <a href="https://www.twinkl.co.uk/resource/tp2-s-026-planit-science-year-4-animals-including-humans-lesson-4-tooth-decay-enquiry-part-1-lesson-pack#login">https://www.twinkl.co.uk/resource/tp2-s-026-planit-science-year-4-animals-including-humans-lesson-4-tooth-decay-enquiry-part-1-lesson-pack#login</a>
<b>Key Learning</b>	<p>(Y3)</p> <ul style="list-style-type: none"> <li>• Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients.</li> <li>• Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support</li> </ul> <p>(Y4)</p> <ul style="list-style-type: none"> <li>• Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added.</li> <li>• The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.</li> <li>• Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<p>Certain whole food groups like fats are ‘bad’ for you • certain specific foods, like cheese are also ‘bad’ for you • diet and fruit drinks are ‘good’ for you • snakes are similar to worms, so they must also be invertebrates • invertebrates have no form of skeleton.</p> <p>•Arrows in a food chains mean ‘eats’ • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes “poo” and the drink becomes “wee”.</p>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year A  Spring 1	Rocks (Y3)	<ul style="list-style-type: none"> <li>• Know how different rocks can be compared and grouped according to appearance and simple properties.</li> <li>• Know that fossils are formed when things that have lived are trapped within rock.</li> </ul>	<ul style="list-style-type: none"> <li>• Observe</li> <li>• Describe</li> <li>• Compare</li> <li>• Identify</li> <li>• Group/classify</li> <li>• Investigate</li> <li>• Research</li> </ul>	<ul style="list-style-type: none"> <li>• What happens when water keeps dripping on a sandcastle?</li> <li>• What happens to a dead animal over time?</li> </ul>	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil,

<p>Geography link</p>		<ul style="list-style-type: none"> <li>Know that soils are made from rocks and organic matter</li> </ul>		<ul style="list-style-type: none"> <li>Is there a pattern in where we find volcanoes on Planet Earth?</li> <li>How many different ways can you group your rock collection?</li> <li>Which soil absorbs the most water? Does adding different amounts of sand to soil affect how quickly water drains through it?</li> </ul>	<p>fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil</p>
<p><b>Working scientifically</b></p>					
<p>Observe changes over time</p>	<p>Notice patterns</p>	<p>Grouping and Classifying</p>	<p>Comparative tests</p>	<p>Secondary sources</p>	
<ul style="list-style-type: none"> <li>What happens when water keeps dripping on a sandcastle?</li> <li>What happens to a dead animal over time?</li> </ul>	<ul style="list-style-type: none"> <li>Is there a pattern in where we find volcanoes on planet Earth?</li> </ul>	<ul style="list-style-type: none"> <li>How many different ways can you group your rock collection?</li> </ul>	<ul style="list-style-type: none"> <li>Which soil absorbs the most water?</li> <li>Does adding different amounts of sand to soil affect how quickly water drains through it?</li> </ul>	<ul style="list-style-type: none"> <li>Fossil formation</li> </ul>	
<p><b>Possible Activities</b></p>	<ul style="list-style-type: none"> <li>Observe rocks closely.</li> <li>Classify rocks in a range of ways, based on their appearance.</li> <li>Devise a test to investigate the hardness of a range of rocks.</li> <li>Devise a test to investigate how much water different rocks absorb.</li> <li>Observe how rocks change over time e.g. gravestones or old building.</li> <li>Research using secondary sources how fossils are formed.</li> <li>Observe soils closely.</li> <li>Classify soils in a range of ways based on their appearance.</li> <li>Devise a test to investigate the water retention of soils.</li> <li>Observe how soil can be separated through sedimentation.</li> <li>Research the work of Mary Anning.</li> </ul>				
<p><b>Suggested investigation</b></p>	<p>Soil experiment - <a href="https://di4c76y7libww.cloudfront.net/documents/LKS2_Science_Y3_Spring_1_Rocks_and_Fossils_Session5_resource.pdf">https://di4c76y7libww.cloudfront.net/documents/LKS2_Science_Y3_Spring_1_Rocks_and_Fossils_Session5_resource.pdf</a></p>				

<b>Key Learning</b>	<ul style="list-style-type: none"> <li>Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.</li> <li>Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>Rocks are all hard in nature</li> <li>rock-like, man-made substances such as concrete or brick are rocks</li> <li>materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural'</li> <li>certain found artefacts, like old bits of pottery or coins, are fossils</li> <li>a fossil is an actual piece of the extinct animal or plant</li> <li>soil and compost are the same thing.</li> </ul>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year A  Spring 2	Forces and Magnets (Y3)	(Y3) <ul style="list-style-type: none"> <li>compare how things move on different surfaces</li> <li>notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</li> <li>observe how magnets attract or repel each other and attract some materials and not others</li> <li>compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li> <li>describe magnets as having 2 poles</li> </ul>	<ul style="list-style-type: none"> <li>Explore</li> <li>Notice</li> <li>Sort/classify</li> <li>Measure e.g. strength of magnet</li> <li>Record data</li> <li>Investigate</li> </ul>	<ul style="list-style-type: none"> <li>How long will a magnetised pin stay magnetised for?</li> <li>Which materials are magnetic?</li> <li>Can you sort materials into magnetic and non magnetic?</li> <li>How can you get a pile of eggs from the bottom of a hill to the top?</li> <li>Which surface is best to stop you slipping?</li> <li>Is the biggest magnet the strongest?</li> <li>Are all metals magnetic?</li> </ul>	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

		<ul style="list-style-type: none"> <li>predict whether 2 magnets will attract or repel each other, depending on which poles are facing</li> </ul>			
<b>Working scientifically</b>					
Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources	
<ul style="list-style-type: none"> <li>How long will a magnetised pin stay magnetised for?</li> </ul>	<ul style="list-style-type: none"> <li>Which materials are magnetic?</li> </ul>	<ul style="list-style-type: none"> <li>Which materials are magnetic?</li> </ul>	<ul style="list-style-type: none"> <li>Which surface is best to stop you slipping?</li> <li>Is the biggest magnet the strongest?</li> </ul>	<ul style="list-style-type: none"> <li>Are all metals magnetic?</li> </ul>	
<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc.</li> <li>Explore what materials are attracted to a magnet.</li> <li>Classify materials according to whether they are magnetic.</li> <li>Explore the way that magnets behave in relation to each other.</li> <li>Use a marked magnet to find the unmarked poles on other types of magnets.</li> <li>Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.</li> <li>Devise an investigation to test the strength of magnets.</li> </ul>				
<b>Suggested investigation</b>	BBC Bitesize clip - <a href="https://www.bbc.co.uk/bitesize/clips/zk9rkqt">https://www.bbc.co.uk/bitesize/clips/zk9rkqt</a> Experiment with magnets and various materials - <a href="https://www.hamilton-trust.org.uk/science/year-3-science/forces-and-magnets-amazing-magnets/">https://www.hamilton-trust.org.uk/science/year-3-science/forces-and-magnets-amazing-magnets/</a>				
<b>Key Learning</b>	<ul style="list-style-type: none"> <li>A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.</li> <li>A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.</li> </ul>				
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>The bigger the magnet the stronger it is</li> <li>all metals are magnetic.</li> </ul>				

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year A  Summer  Geography link – water cycle	States of Matter (Y4)	<ul style="list-style-type: none"> <li>compare and group materials together, according to whether they are solids, liquids or gases</li> <li>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</li> <li>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<ul style="list-style-type: none"> <li>Explore</li> <li>Observe</li> <li>Describe</li> <li>Classify (sources)</li> <li>Measure</li> <li>Notice (patterns)</li> <li>Ask (questions to be investigated)</li> </ul>	<ul style="list-style-type: none"> <li>How does an egg shell change when it is left in cola?</li> <li>How does the level of water in a glass change when left on a windowsill?</li> <li>Is there a pattern in how long it takes different sized ice lollies to melt?</li> <li>Can you group these materials into solids, liquids and gases?</li> <li>Does the mass of a block of ice affect how long it takes to melt?</li> <li>Food's journey through the digestive system video</li> </ul>	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle
<b>Working scientifically</b>					
Observe changes over time		Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources
<ul style="list-style-type: none"> <li>How does an egg shell change when it is left in cola?</li> <li>How does the level of water in a glass change when left on a windowsill?</li> </ul>		<ul style="list-style-type: none"> <li>Is there a pattern in how long it takes different sized ice lollies to melt?</li> </ul>	<ul style="list-style-type: none"> <li>Can you group these materials into solids, liquids and gases?</li> </ul>	<ul style="list-style-type: none"> <li>Does the mass of a block of ice affect how long it takes to melt?</li> </ul>	<ul style="list-style-type: none"> <li>Food's journey through the digestive system video</li> </ul>
Possible Activities	<ul style="list-style-type: none"> <li>Observe closely and classify a range of solids. Observe closely and classify a range of liquids.</li> <li>Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind.</li> <li>Classify materials according to whether they are solids, liquids and gases.</li> <li>Observe a range of materials melting e.g. ice, chocolate, butter.</li> <li>Investigate how to melt ice more quickly. • Observe the changes when making rocky road cakes or ice-cream.</li> <li>Investigate the melting point of different materials e.g. ice, margarine, butter and chocolate.</li> </ul>				

	<ul style="list-style-type: none"> <li>• Explore freezing different liquids e.g. tomato ketchup, oil, shampoo.</li> <li>• Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration).</li> <li>• Observe water evaporating and condensing e.g. on cups of icy water and hot water.</li> <li>• Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers.</li> <li>• Use secondary sources to find out about the water cycle.</li> </ul>
<b>Suggested investigation</b>	<a href="https://www.hamilton-trust.org.uk/science/year-4-science/states-matter-states-matter-scientists/">https://www.hamilton-trust.org.uk/science/year-4-science/states-matter-states-matter-scientists/</a> Water evaporation video - <a href="https://www.youtube.com/watch?v=kmmEV4ohSDA">https://www.youtube.com/watch?v=kmmEV4ohSDA</a>
<b>Key Learning</b>	<ul style="list-style-type: none"> <li>• A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid.</li> <li>• Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling.</li> <li>• Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>• ‘Solid’ is another word for hard or opaque</li> <li>• solids are hard and cannot break or change shape easily and are often in one piece</li> <li>• substances made of very small particles like sugar or sand cannot be solids</li> <li>• particles in liquids are further apart than in solids and they take up more space</li> <li>• when air is pumped into balloons, they become lighter</li> <li>• water in different forms – steam, water, ice – are all different substances</li> <li>• all liquids boil at the same temperature as water (100 degrees)</li> <li>• melting, as a change of state, is the same as dissolving</li> <li>• steam is visible water vapour (only the condensing water droplets can be seen)</li> </ul>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year B  Autumn  (???) WEEKS???)	Light (Y3)	<ul style="list-style-type: none"> <li>recognise that they need light in order to see things and that dark is the absence of light</li> <li>notice that light is reflected from surfaces</li> <li>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>find patterns in the way that the size of shadows change</li> </ul>	<ul style="list-style-type: none"> <li>Explore</li> <li>Observe</li> <li>Sort (transparent, translucent, opaque)</li> <li>Notice (patterns)</li> <li>Describe</li> <li>Ask (questions to be investigated)</li> <li>Measure</li> <li>Record</li> <li>Conclude</li> <li>Report</li> <li>Investigate</li> </ul>	<ul style="list-style-type: none"> <li>How do our shadows change over time?</li> <li>Which materials are opaque? (shadow puppets)</li> <li>How would you organise these light sources into natural and artificial sources?</li> <li>Which pair of sunglasses will be best at protecting our eyes?</li> <li>How does a shadow change when the light source moves?</li> </ul>	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous
<b>Working scientifically</b>					
Observe changes over time		Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources
<ul style="list-style-type: none"> <li>How do our shadows change over time?</li> <li>Would our shadow look the same at 2:00 in the afternoon all year?</li> </ul>		<ul style="list-style-type: none"> <li>Which materials are opaque?</li> <li>Shadow puppets</li> </ul>	<ul style="list-style-type: none"> <li>How would you organise these light sources into natural and artificial sources?</li> </ul>	<ul style="list-style-type: none"> <li>Which pair of sunglasses will be best at protecting our eyes?</li> <li>How does a shadow change when the light source moves?</li> </ul>	<ul style="list-style-type: none"> <li>More reflective surfaces</li> </ul>
<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Explore how different objects are more or less visible in different levels of lighting.</li> <li>Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible.</li> <li>Explore how shadows vary as the distance between a light source and an object or surface is changed.</li> <li>Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground.</li> <li>Choose suitable materials to make shadow puppets.</li> <li>Create artwork using shadows.</li> </ul>				
<b>Suggested investigation</b>	Light experiment - <a href="https://handsonaswegrow.com/simple-light-experiments-for-kids/">https://handsonaswegrow.com/simple-light-experiments-for-kids/</a> Brian Cox Speed of Light video - <a href="https://www.youtube.com/watch?v=DMKE5YGLnmc">https://www.youtube.com/watch?v=DMKE5YGLnmc</a> Light videos and resources (BBC Bitesize) - <a href="https://www.bbc.co.uk/bitesize/topics/zbssgk7/articles/z2s4xfr">https://www.bbc.co.uk/bitesize/topics/zbssgk7/articles/z2s4xfr</a>				

<b>Key Learning</b>	<ul style="list-style-type: none"> <li>We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective.</li> <li>The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light.</li> <li>Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>We can still see even where there is an absence of any light</li> <li>our eyes 'get used to' the dark</li> <li>the moon and reflective surfaces are light sources</li> <li>a transparent object is a light source</li> <li>shadows contain details of the object, such as facial features on their own shadow</li> <li>shadows result from objects giving off darkness.</li> </ul>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year B  Autumn  (???) WEEKS???)	Sound (Y4)	<ul style="list-style-type: none"> <li>identify how sounds are made, associating some of them with something vibrating</li> <li>recognise that vibrations from sounds travel through a medium to the ear</li> <li>find patterns between the pitch of a sound and features of the object that produced it</li> <li>find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>recognise that sounds get fainter as the distance from the sound source increases</li> </ul>	<ul style="list-style-type: none"> <li>Explore</li> <li>Observe</li> <li>Describe</li> <li>Classify (sources)</li> <li>Measure</li> <li>Notice (patterns)</li> <li>Ask (questions to be investigated)</li> </ul>	<ul style="list-style-type: none"> <li>When is our classroom the quietest?</li> <li>Is there a link between how loud it is in school and the time of day?</li> <li>Can you group these sounds based on pitch?</li> <li>Can different sounds be made by different objects? How?</li> <li>Which material is best for ear defenders?</li> <li>How does the volume of a drum change as you move further away from it?</li> </ul>	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

				<ul style="list-style-type: none"> <li>What are the parts of the ear?</li> </ul>	
<b>Working scientifically</b>					
Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources	
<ul style="list-style-type: none"> <li>When is our classroom the quietest?</li> </ul>	<ul style="list-style-type: none"> <li>Is there a link between how loud it is school and the time of day?</li> </ul>	<ul style="list-style-type: none"> <li>Can you group these sounds based on pitch?</li> </ul>	<ul style="list-style-type: none"> <li>Which material is best for ear defenders?</li> <li>How does the volume of a drum change as you move further away from it?</li> </ul>	<ul style="list-style-type: none"> <li>Parts of the ear</li> <li>Video on how we hear a sound</li> </ul>	
<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Classify sound sources.</li> <li>Explore making sounds with a range of objects, such as musical instruments and other household objects.</li> <li>Explore how string telephones or ear gongs work.</li> <li>Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks.</li> <li>Measure sounds over different distances.</li> <li>Measure sounds through different insulation materials.</li> </ul>				
<b>Suggested investigation</b>	Sound investigation - <a href="https://www.hamilton-trust.org.uk/science/year-4-science/sound-listen/">https://www.hamilton-trust.org.uk/science/year-4-science/sound-listen/</a> (several lessons to choose from) Brian Cox sound video - <a href="https://www.youtube.com/watch?v=nrCox6AeCvw">https://www.youtube.com/watch?v=nrCox6AeCvw</a>				
<b>Key Learning</b>	<ul style="list-style-type: none"> <li>A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound.</li> <li>The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively.</li> <li>Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</li> </ul>				
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>Pitch and volume are frequently confused, as both can be described as high or low</li> <li>sound is only heard by the listener</li> <li>sound only travels in one direction from the source</li> <li>sound can't travel through solids and liquids</li> <li>high sounds are loud and low sounds are quiet.</li> </ul>				

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year B  Autumn  (???) WEEKS???)	Electricity (Y4)	<ul style="list-style-type: none"> <li>identify common appliances that run on electricity</li> <li>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li> <li>identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</li> <li>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>recognise some common conductors and insulators, and associate metals with being good conductors</li> </ul>	<ul style="list-style-type: none"> <li>Observe</li> <li>Notice</li> <li>Predict</li> <li>Collect evidence</li> <li>Record information</li> <li>Notice patterns</li> <li>Draw a conclusion (with support)</li> </ul>	<ul style="list-style-type: none"> <li>How long does a battery light a torch for?</li> <li>What would happen if we had a day without electricity?</li> <li>Which room in the school has the most electrical sockets?</li> </ul>	Electricity, electrical appliance / device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

**Working scientifically**

Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources
<ul style="list-style-type: none"> <li>How long does a battery light a torch for?</li> </ul>	<ul style="list-style-type: none"> <li>Which room has the most electrical sockets in a house?</li> </ul>	<ul style="list-style-type: none"> <li>How would you group these electrical devices based on where the electricity comes from?</li> </ul>	<ul style="list-style-type: none"> <li>Which metal is the best conductor of electricity?</li> <li>How does the thickness of a conducting material affect how bright the bulb is?</li> </ul>	<ul style="list-style-type: none"> <li>Uses of circuit in real objects</li> </ul>

<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Construct a range of circuits.</li> <li>Explore which materials can be used instead of wires to make a circuit.</li> <li>Classify the materials that were suitable/not suitable for wires.</li> <li>Explore how to connect a range of different switches and investigate how they function in different ways.</li> <li>Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm.</li> </ul>
----------------------------	--

	<ul style="list-style-type: none"> <li>• Apply their knowledge of conductors and insulators to design and make different types of switch.</li> <li>• Make circuits that can be controlled as part of a DT project.</li> </ul>
<b>Suggested investigation</b>	Twinkl Investigating Light Switches - <a href="https://www.twinkl.co.uk/resource/tp2-s-142-new-planit-science-year-4-electricity-lesson-5-splendid-switches-lesson-pack">https://www.twinkl.co.uk/resource/tp2-s-142-new-planit-science-year-4-electricity-lesson-5-splendid-switches-lesson-pack</a>
<b>Key Learning</b>	<ul style="list-style-type: none"> <li>• Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off.</li> <li>• Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>•Electricity flows to bulbs, not through them</li> <li>• electricity flows out of both ends of a battery</li> <li>• electricity works by simply coming out of one end of a battery into the component.</li> </ul>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year B  Spring  Geography Link – land use and Lake District	Plants (Y3)	<ul style="list-style-type: none"> <li>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li> <li>investigate the way in which water is transported within plants</li> <li>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</li> </ul>	<ul style="list-style-type: none"> <li>Observe</li> <li>Notice</li> <li>Describe</li> <li>Classify</li> <li>Identify</li> <li>Predict</li> <li>Devise (set -up)</li> <li>Measure</li> <li>Record</li> <li>Report</li> <li>Present</li> <li>Research</li> </ul>	<ul style="list-style-type: none"> <li>What happens to celery when it is left in a glass of coloured water?</li> <li>What colour flowers do pollinating insects prefer?</li> <li>Does the length of a carnation stem affect how long it takes for the food colouring to dye the petals?</li> </ul>	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)
<b>Working scientifically</b>					
Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources	
<ul style="list-style-type: none"> <li>What happens to celery when it is left in a glass of coloured water?</li> </ul>	<ul style="list-style-type: none"> <li>What colour flowers do pollinating insects prefer?</li> </ul>	<ul style="list-style-type: none"> <li>How many different ways can you group our seed collection?</li> </ul>	<ul style="list-style-type: none"> <li>Which conditions help seeds germinate faster?</li> <li>Does the length of a carnation stem affect how long it takes for the food colouring to dye the petals?</li> </ul>	<ul style="list-style-type: none"> <li>Flower and tree diagrams -Functions of flowers, stem, leaves and roots</li> </ul>	
<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>Observe what happens to plants over time when the leaves or roots are removed.</li> <li>Observe the effect of putting cut white carnations or celery in coloured water.</li> <li>Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.</li> <li>Spot flowers, seeds, berries and fruits outside throughout the year.</li> <li>Observe flowers carefully to identify the pollen.</li> <li>Observe flowers being visited by pollinators e.g. bees and butterflies in the summer.</li> <li>Observe seeds being blown from the trees e.g. sycamore seeds.</li> <li>Research different types of seed dispersal.</li> <li>Classify seeds in a range of ways, including by how they are dispersed.</li> <li>Create a new species of flowering plant</li> </ul>				

<b>Suggested investigation</b>	Plant investigation ( a few to choose from) - <a href="https://www.hamilton-trust.org.uk/science/year-3-science/plants-roots-and-shoots/">https://www.hamilton-trust.org.uk/science/year-3-science/plants-roots-and-shoots/</a> YouTube timelapse video (plant resurrected by drinking water - <a href="https://www.youtube.com/watch?v=SNueDB29cwM">https://www.youtube.com/watch?v=SNueDB29cwM</a> )
<b>Key Learning</b>	<ul style="list-style-type: none"> <li>• Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food.</li> <li>• Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways.</li> <li>• Different plants require different conditions for germination and growth.</li> </ul>
<b>COMMON MISCONCEPTIONS</b>	<ul style="list-style-type: none"> <li>• Plants eat food</li> <li>• food comes from the soil via the roots</li> <li>• flowers are merely decorative rather than a vital part of the life cycle in reproduction</li> <li>• plants only need sunlight to keep them warm</li> <li>• roots suck in water which is then sucked up the stem.</li> </ul>

Term	Topic/Unit	Knowledge	Skills	Enquiry Questions	Vocabulary
Year B Summer	Living things and their habitats (Y4)	<ul style="list-style-type: none"> <li>• recognise that living things can be grouped in a variety of ways</li> <li>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>• recognise that environments can change and that this can sometimes pose dangers to living things</li> </ul>	<ul style="list-style-type: none"> <li>• Observe</li> <li>• Notice</li> <li>• Describe</li> <li>• Classify</li> <li>• Identify</li> <li>• Predict</li> <li>• Devise (set -up)</li> <li>• Measure</li> <li>• Record</li> <li>• Report</li> <li>• Present</li> <li>• Research</li> </ul>	<ul style="list-style-type: none"> <li>• How are these animals similar?</li> <li>• How does the variety of invertebrates on the school field change over the year?</li> <li>• Can we use classification keys to identify all the animals we found on the field?</li> <li>• Can we use classification keys to identify animals/minibeasts from different countries?</li> <li>• Does the amount of light affect how</li> </ul>	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

				woodlice move around? <ul style="list-style-type: none"> <li>• Design an ideal habitat for a ladybird – an African tree frog – a polar bear.</li> <li>• Different microhabitats</li> <li>• Write to Greenpeace</li> <li>• Environmental issues/change</li> </ul>	
<b>Working scientifically</b>					
Observe changes over time	Notice patterns	Grouping and Classifying	Comparative tests	Secondary sources	
<ul style="list-style-type: none"> <li>• How does the variety of invertebrates on the school field change over the year?</li> </ul>	-How are these animals similar?	<ul style="list-style-type: none"> <li>• Can we use classification keys to identify all the animals we found on the field?</li> <li>• Can we use classification keys to identify animals/minibeasts from different countries?</li> </ul>	<ul style="list-style-type: none"> <li>• Design an ideal habitat for a ladybird – an African tree frog – a polar bear.</li> <li>• Different microhabitats</li> </ul>	<ul style="list-style-type: none"> <li>• Write to Greenpeace</li> <li>• Environmental issues/change</li> </ul>	
<b>Possible Activities</b>	<ul style="list-style-type: none"> <li>• Observe plants and animals in different habitats throughout the year.</li> <li>• Compare and contrast the living things observed.</li> <li>• Use classification keys to name unknown living things.</li> <li>• Classify living things found in different habitats based on their features.</li> <li>• Create a simple identification key based on observable features.</li> <li>• Use fieldwork to explore human impact on the local environment e.g. litter, tree planting.</li> <li>• Use secondary sources to find out about how environments may naturally change.</li> <li>• Use secondary sources to find out about human impact, both positive and negative, on environments.</li> </ul>				
<b>Suggested investigation</b>	<a href="https://www.outstandingscience.co.uk/index.php?action=view_page&amp;page=view_unit&amp;unit=4a">https://www.outstandingscience.co.uk/index.php?action=view_page&amp;page=view_unit&amp;unit=4a</a> Habitats clips BBC Bitesize - <a href="https://www.bbc.co.uk/bitesize/clips/z2bygk7">https://www.bbc.co.uk/bitesize/clips/z2bygk7</a> Help our habitat task - <a href="https://www.hamilton-trust.org.uk/science/year-4-science/living-things-and-their-habitats-help-our-habitats/">https://www.hamilton-trust.org.uk/science/year-4-science/living-things-and-their-habitats-help-our-habitats/</a>				

<p><b>Key Learning</b></p>	<ul style="list-style-type: none"> <li>• Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.</li> </ul>
<p><b>COMMON MISCONCEPTIONS</b></p>	<ul style="list-style-type: none"> <li>• The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain</li> <li>• there is always plenty of food for wild animals</li> <li>• animals are only land-living creatures</li> <li>• animals and plants can adapt to their habitats, however they change</li> <li>• all changes to habitats are negative.</li> </ul>