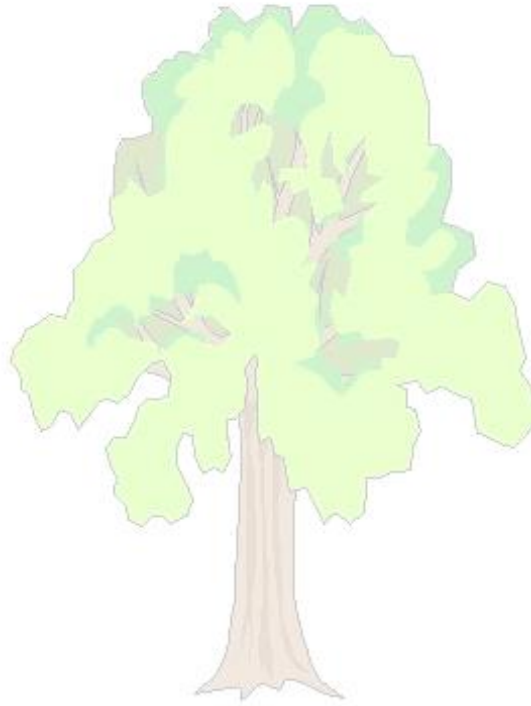


Year 4 Science Long Term Plan

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
How can we hear sound? Sound	How does a lightbulb work? Electricity	What happens when animals eat food? Animals, Including Humans	How are animals adapted to their habitats? Living Things and Their Habitats	Where does a puddle go? States of Matter	



Year 4 Medium Term Plan

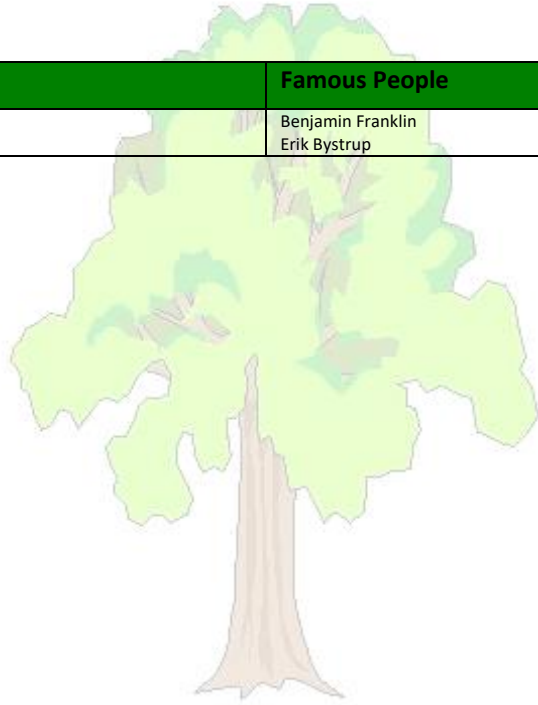
Unit 1 Science – How can we hear sound?		
National Curriculum Links	Disciplinary Knowledge	Key Vocabulary
Sound <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find 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 	<ul style="list-style-type: none"> Identify differences, similarities or changes related to simple scientific ideas and processes Independently plan a method for a fair test Record using a data logger Use repeated measurements when recording 	<p>Tier 2: sound, vibrate/ vibrations, medium, volume, distance, decrease, insulation</p> <p>Tier 3: energy, sound wave, sound source, insulator, pitch</p>
Pupil Offer		Famous People
		Jaap Haartsen Alexander Graham Bell

Unit 1	Week 1	Week 1	Week 2	Week 3	
Lesson Overview including Substantive knowledge	<p>Pattern Seeking How Do We Hear Sounds?</p> <ul style="list-style-type: none"> Know that sounds are caused by vibrations which travel as waves through solids, liquids or gasses. <p>Retrieval: Y3 - How are we able to see light? Listen to sounds in classroom and explain that sounds are made when objects vibrate. Tap tables with head in air and compare to laying on table or with finger in ear. Tap a tuning fork on table and compare to in water. Discuss how sound travels fastest through solid materials, quite fast through water and more slowly through gasses. Sound does not travel at all when there is no air. Complete activity for children to describe what they see, hear and feel with different sound vibrations/energy.</p>	<p>Working Scientifically TAPS String Telephone</p> <p>Explore how to use a string telephone. Discuss how this works; vibrations in air, vibrations in string, the cup amplifies the vibrations, vibrations travel to ear. Provide a range of pots (yoghurt pots, paper/plastic beakers, polystyrene cups etc) and different types of string/wool. In groups, ask children to investigate what makes the best string telephone, supporting with questioning as necessary. Give time for the children to reflect and test their designs so that they can be modified and improved. After the investigation, children demonstrate their telephones to the class and explain why their telephone is/is not good. Discuss how their research has informed their design – detailing improvements they have made and reasons for making those improvements.</p>	<p>Pattern Seeking What Patterns Can You Find Between the Strength of Vibrations and Volume of a Sound?</p> <ul style="list-style-type: none"> Know that the volume of a sound depends on the strength (size) of vibrations. Stronger vibrations make louder sounds. Weak vibrations make quieter sounds. <p>Retrieval: What sounds can we make? Show examples of sound waves, some showing loud noises and some showing quiet. Watch video showing how we can ‘see’ sound waves. Children to suggest ways in which they might be able to make louder noises by producing stronger vibrations. Show children a range of musical instruments they can use to test how to make stronger vibrations and louder sounds. Share ideas of how to do this. Decide on method to measure their hypothesis. Teacher to model the experiment before children complete it. Share results at the end and answer true or false questions.</p>	<p>Comparative/fair testing What Happens to Sound as The Distance from The Sound Source Increases?</p> <ul style="list-style-type: none"> Know that sound decreases in volume as they get further from the sound source because vibrations decrease as they travel through the medium <p>Retrieval: Sound travels through vibrations. Why do vibrations decrease as we move further away? Sound spreads out, energy gets diluted, quieter sound and no change in how it sounds are all answers to be discussed. Have children decide on how we can test this. ok at how this will be measure using data-loggers.</p>	
	Working Scientifically	Make careful observations about how we see, hear and feel sound (vibrations)	Identify differences, similarities or changes related to simple scientific ideas and processes	Set up a comparative test to identify how the strength of vibrations affect the volume of a sound. Use data loggers with teacher support to measure the sound. Use these results to draw simple conclusions, make links and identify patterns. Understand that there are science museums around the world which provide us with valuable learning opportunities. These museums conduct research but also share with us existing findings	Make systematic and careful measurements with a data logger. Conduct a fair test with control variables.
	Organisation & Communication	Photographs with captions or a grid to show see, hear, feel	Videos of presentations	Hypothesis sentences Recording method for the experiment.	Hypothesis sentences Recording method for the experiment.
	Reading & Maths Opportunities				

Unit 1	Week 4	Week 5	Week 6	Week 7
Lesson Overview including Substantive knowledge	<p>Comparative/fair testing</p> <p>Which Material Provides the Best Insulation Against Sound?</p> <ul style="list-style-type: none"> Know that some materials absorb sound well e.g. materials with air/space in them as sound vibrations cannot move as quickly or easily through it. <p>Retrieval: Quiz on learning so far. Explain term sound insulator. Children to suggest when sound insulators would be helpful. Revisit sound travelling through solid/liquid/gas and explain there are some exceptions. Children will be given a variety of materials to test and two plastic cups (to put material in and place over ears). Discuss fair test and reliability of results before starting. Discuss most and least effective afterwards. Can they spot a pattern between which ones these are? Explain that soft materials absorb sound energy and dense materials block sound waves. What materials would we use to make a room quieter?</p>	<p>Pattern seeking</p> <p>How Do the Features of An Object Affect the Pitch of The Sound It Makes?</p> <ul style="list-style-type: none"> Know that different objects produce sounds of different pitches – some objects make higher sounds, and some objects make lower sounds. When vibrations are quick, they produce high sounds and when vibrations are slow, they produce low sounds. <p>Retrieval: Links between strength of sound and size of vibration Talk about pitch from music lessons. Look at sound waves from high and low sounds. Complete different experiments to explore how different features make high or low sounds, such as the straw flute, different sized drainpipes, tuning forks or bottles with different amounts of liquid in them.</p>	<p><u>BIG QUESTION ANSWER</u></p> <p>Children to create a poster with prompt questions supplied, ensuring misconceptions are addressed. Children to work in groups of three, each completing their own poster. This will allow there to be Advisor (give next steps including missing vocabulary), Presenter (shows work) and encourager (compliments) when stopping for mini-plenaries. Children should be shown an example poster in order to create success criteria before completing their own.</p> <p>Children should be given to opportunity to present their answers in an interesting way, <u>such as an informative poster</u>, rather than writing sentences.</p>	<p><u>REVIEWING</u></p> <p>Teachers to plan one additional week to address missing knowledge or remaining misconceptions. This lesson content and outcomes will vary between classes.</p>
Working Scientifically	<p>Independently plan the method and create a results table for a comparative test. Conduct a fair test. Carry out an experiment three times to increase reliability</p>	<p>Use scientific language about pitch and sound waves to explain how to change the pitch of a sound. Draw conclusions about what affects the pitch of a sound. Create models of headphones to identify materials which act as the best insulators for sound. Scientists may create prototypes like these before creating a final product. Find patterns between the pitch of a sound and features of the object that produced it.</p>		
Organisation & Communication	<p>Photographs Hypothesis sentences Recording method</p>	<p>Annotated pictures – including the word vibration</p>	<p>Posters</p>	
Reading & Maths Opportunities				

Unit 2 Science – How Does a Lightbulb Work?

National Curriculum Links	Disciplinary Knowledge	Key Vocabulary
<p>Electricity</p> <ul style="list-style-type: none">• identify common appliances that run on electricity• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers• identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit• recognise some common conductors and insulators, and associate metals with being good conductors.	<ul style="list-style-type: none">• Make systematic and careful observations about how appliances convert electrical energy.• Use straightforward scientific evidence to answer questions• Set up and conduct an experiment to answer a given question	<p>Tier 2: appliance, mains electricity, battery, generated, power station, electrical energy, pylon, plug, socket</p> <p>Tier 3: convert, series circuit, component, bulb (lamp), lamp holder, buzzer, cell, battery, wire, crocodile clip, electrical conductor, electrical insulator</p>
Pupil Offer	Famous People	
	Benjamin Franklin Erik Bystrup	

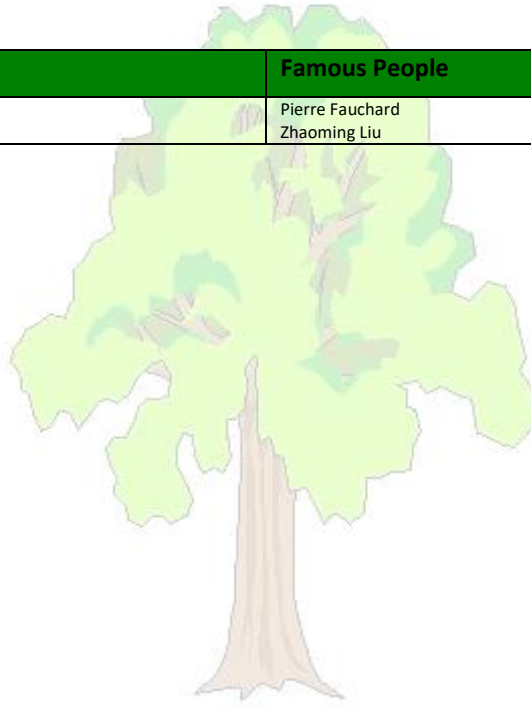


Unit 2	Week 1	Week 2	Week 3	Week 3
Lesson Overview including Substantive knowledge	<p>Identification, Classification and Grouping Where Does Electricity Come from And What Is It Used For?</p> <ul style="list-style-type: none"> Know the precautions we should take for working safely with electricity. Know where electricity comes from and how it is used. Identify common appliances that run on electricity. <p>Retrieval: Y2 light sources Pupils to identify common appliances that they know and that run on electricity. Discuss safety around electricity, creating class agreed rules. Children to classify appliances by main electricity and those using batteries, resulting in a class Venn Diagram. Explain briefly that main electricity is generated in power stations and travel through power lines to homes. Talk about gas, coal, oil, wind and solar power. Tell pupils that appliances can convert electrical energy into other types of energy: light, heat, movement and sound. Link these to appliances on the Venn Diagram.</p>	<p>Problem Solving How Can We Light a Bulb Using a Simple, Series Electrical Circuit?</p> <ul style="list-style-type: none"> Know how to construct a simple series circuit, identifying and naming its basic parts, including a cell, wire, bulb, bulb holder. Identify whether 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. <p>Retrieval: Electricity and its uses Give children electrical components and give children challenge of making the light bulb turn on. Children to understand that electricity flows around the circuit and this must be complete. After this has been discussed, children should explore whether the order of components matter and what happens if the circuit is broken.</p>	<p>Problem Solving How Does a Simple Switch Work?</p> <ul style="list-style-type: none"> Know that a switch opens and closes a circuit and associate this with whether or not a bulb lights in a simple, series circuit. <p>Retrieval: Circuit with buzzer Demonstrate turning a torch on or off, or other obvious switches. What do the children think is happening to the circuit? Children to explore making different switches, including ones using paper clips and split pins. These should be added to a circuit to test if they work.</p>	<p>Working Scientifically TAPS Does it conduct electricity?</p> <p>Introduce the terms conductors and insulators. Example context: soldiers wear 'smart' clothing which conducts electricity: http://www.bbc.co.uk/news/technology-17580666 E.g. a soldier in the desert that has ripped part of 'smart' clothing losing part of the GPS circuit, so unable to provide location for rescue. Explain that the soldier has a pack containing a variety of objects: which could be used to complete a circuit to activate the GPS? Provide each group with a 'soldier's backpack' containing a collection of objects/ materials (including different metals and plastics). Discuss how to find out whether electricity can pass through the materials. Groups test by putting materials into a gap in a circuit with a bulb/buzzer. Focus pupil recording/presenting on explaining what the results show. E.g. they could produce a radio or video message to send to the soldier explaining how to produce a working circuit and why they are confident that this will work, providing scientific evidence and a list of all possible conductors (in case some are damaged). Recap on the terms insulators and conductors.</p>
Working Scientifically	<p>Make systematic and careful observations about how appliances convert electrical energy. <i>Identify scientific evidence that has been used to support or refute ideas or arguments (Erik Bystrup).</i> <i>Know how to be safe around electricity.</i> Identify how science helps engineers improve the world around us. Sort devices according to whether they use mains or battery electricity.</p>	<p>Set up a simple, practical investigation – using all components to light a bulb. Verbally report on findings. Investigate questions e.g. does the order of the components matter? Scientists use their knowledge and experience to form hypotheses and they then test them out.</p>	<p>Use straightforward scientific evidence to answer questions e.g. how do switches work?</p>	
Organisation & Communication	<p>Class Venn Diagram Grids showing appliance and type of energy</p>	<p>Will it light or not prediction and testing grid</p>	<p>Photographs of making and testing switches</p>	
Reading & Maths Opportunities				

Unit 2	Week 4	Week 5	Week 6	Week 7
Lesson Overview including Substantive knowledge	<p>Comparative / Fair Testing What Material Is the Best Conductor Of Electricity?</p> <ul style="list-style-type: none"> Recognise some common conductors and insulators, and associate metals with being good conductors <p>Retrieval: Open and closed switches – will it work? Introduce that some materials allow electricity to pass through easily and some do not. Use terms conductor and insulator. Children to look at a range of materials and make predictions as to whether they would be insulators or conductors. Ask children how they might test this. Children to go around the classroom to complete their chosen test, e.g. see if the lightbulb lights when connected into the circuit. Children to compare results and make conclusions about the most conductive materials and which insulated best.</p>	<p>Observation over time Pattern Seeking What Components Are Needed To Make a Working Circuit?</p> <ul style="list-style-type: none"> Know that a correctly built simple, series circuit creates a working device. <p>Retrieval: Components Children to create an everyday object that lights up such as a torch or an electrical card. Children will draw the diagram of their circuit, explaining how it works, in addition to building it.</p>	<p>BIG QUESTION ANSWER</p> <p>Children to conduct an interview in pairs. Children to be given some questions to answer, but will be allowed to add in additional questions. There will additionally be an 'editor' role who must listen to the interview and check that the information being recorded is correct.</p>	<p>REVIEWING</p> <p>Teachers to plan one additional week to address missing knowledge or remaining misconceptions. This lesson content and outcomes will vary between classes.</p>
Working Scientifically	<p>Set up a comparative test to identify which materials make good electrical conductors and which make good electrical insulators. Use these results to draw simple conclusions, make links and identify patterns. <i>Use what they know to make a prediction.</i> <i>Learn how scientists have explored, sought proof and used electricity (Benjamin Franklin) and how this has helped people (attracting lightning).</i> <i>Pupils record the method and table they are going to use.</i> <i>Use findings to answer further questions, as scientists do.</i></p>	<p>Use scientific language and knowledge of circuits to design diagrams and create functional objects.</p>		
Organisation & Communication	<p>Recording grids Concluding sentences</p>	<p>Photograph of object made with circuit drawn and explained in conjunction</p>	<p>Children should be given to opportunity to present their answers in an interesting way, such as a in scientific interview or TV show, rather than writing sentences.</p>	
Reading & Maths Opportunities	<p>Benjamin Franklin</p>			

Unit 3 Science – What happens when animals eat food?

National Curriculum Links	Disciplinary Knowledge	Key Vocabulary
<p>Animals including Humans</p> <ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey 	<ul style="list-style-type: none"> Make a conclusion based on research evidence provided (diet and teeth type) Sort animals using multiple criterion 	<p>Tier 2: teeth, digestive system, mouth, tongue, stomach, adaptation, energy, prey, predator</p> <p>Tier 3: incisor, canine, molar, premolar, <i>carnivore</i>, <i>omnivore</i>, <i>herbivore</i>, oesophagus, small and large intestine, food chain, producer, primary/secondary/ tertiary consumer</p>
Pupil Offer		Famous People
		Pierre Fauchard Zhaoming Liu



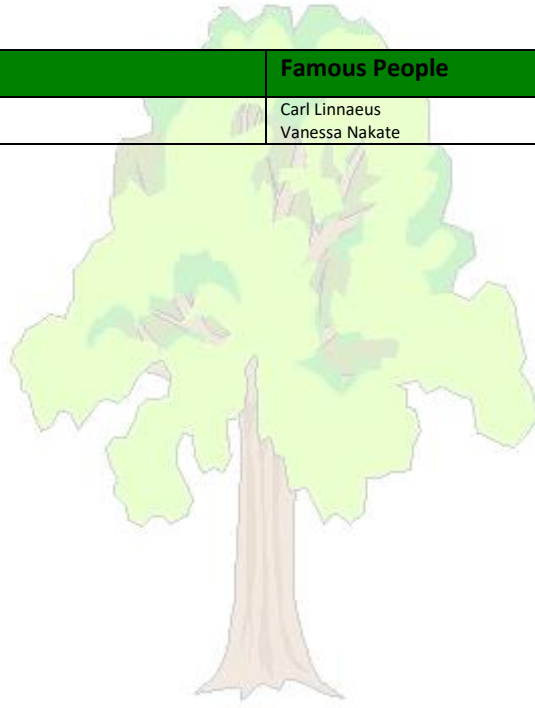
Senhaglo Wood
Primary School

Unit 3	Week 1	Week 2	Week 3
Lesson Overview including Substantive knowledge	<p>Pattern Seeking Observation over time</p> <p>Why Do We Have Different Shaped Teeth?</p> <ul style="list-style-type: none"> Know the different types of teeth in humans (incisor, canine, molar, pre-molar) and their simple functions <p>Retrieval: Y2 - carnivores, herbivores and omnivores and Y3 – balanced diets of different animals</p> <p>Use dental mirrors for children to look at teeth and describe what they see. Show picture of different teeth types for humans. Children to try and locate them using the dental mirrors before finding them on a picture. Explain different purposes. Discuss 'what if' statements about missing teeth.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p><u>Working Scientifically TAPS</u></p> <p>Teeth in liquid (Review)</p> <p>Discuss how children look after their teeth. Explain that we will be using hard boiled eggs to represent teeth to investigate tooth decay. As a class set up a fair test to investigate the effects that different liquids have on teeth e.g. cola, water, vinegar, milk, sports drink and orange juice. Discuss how they can make the comparison fair, i.e. as to quantity of liquid, types of containers, time and location (if using milk do they all need to be in the fridge?)</p> <p>Leave for one week, although children can check on the experiment daily to see if they can notice and changes. After one week, unveil the eggs by tipping into a white bowl and photograph. Children to record their observations (look, feel, smell, etc.) and rate the eggs in order of damage to shell observed. Children to consider how they could improve the test and what further questions arise that they could investigate</p> </div> <p>When completing the teeth in liquid activity, children will also discuss the importance of toothpaste. Teacher to explain that the decay is caused by acid.</p>	<p>Pattern Seeking</p> <p>What Can We Tell About an Animal from Looking at Its Teeth?</p> <ul style="list-style-type: none"> Know the different types of teeth (incisor, canine, molar, pre-molar) in different animals (carnivore, herbivore, omnivore) and their simple functions <p>Retrieval: review egg shell experiment</p> <p>Discuss diets of different animals. Look at pictures of animal teeth and skulls and compare them. Explain that different animals are adapted to each different food types. Children to attempt classifying the teeth by herbivore, omnivore and carnivore. Show answers and discuss any surprises.</p> <p>Children to think of animals they know and what teeth they might have. They should explain their reasoning, and use research to see if they are correct.</p> <p>Children to be given animal skull pictures and will record in their books what they know about their diets, linking their answers to the teeth types</p>	<p>Research</p> <p>What Happens to Our Food When We Eat It?</p> <ul style="list-style-type: none"> Know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, and small and large intestine) <p>Retrieval: matching teeth to animals</p> <p>Why do we need a digestive system? Using videos and discussion, children to learn about the different parts and their functions. Use a labelled diagram for children to explain different parts to their partners. Children to use plastic bags to model an empty and full stomach, to understand how a stomach will stretch to accommodate more food. Children to create their own labelled digestive system diagram.</p>
	Working Scientifically	<p>Know that scientists make careful observations over time to monitor changes and draw conclusions. Collectively set up and monitor an experiment to see how different liquids affect our teeth.</p> <p>Set up simple practical enquiries, comparatives and fair tests (eggshells in different liquids but kept in same place). Collectively observe over time and draw conclusions</p> <p>Use results to draw simple conclusions, suggest improvements and raise further questions.</p>	<p>Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</p> <p>Make a judgement about an animal's diet by looking at its teeth.</p>
Organisation & Communication	Labelled mouth diagram	Explanation sentences linked to skill photographs	Photographs of stomach investigation Labelled digestive system diagram (with explanations)
Reading & Maths Opportunities			

Unit 3	Week 4	Week 5	Week 6	Week 3
Lesson Overview including Substantive knowledge	<p>Other</p> <p>Can Models Help Us Understand Human Processes?</p> <ul style="list-style-type: none"> Know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, and small and large intestine) <p>Retrieval: what is the digestive system and what role do the different parts have?</p> <p>Explain that scientists often create models to understand scientific processes. Children are to make a digestive system model, following instructions given by the teacher.</p> <p>After finishing the model, children to explain which parts showed the process well and if there were any parts that were missing.</p>	<p>Other</p> <p>Why Are Food Chains Important?</p> <ul style="list-style-type: none"> Know the simple functions of the basic parts of the digestive system in humans (mouth, tongue, teeth, oesophagus, stomach, and small and large intestine) <p>Retrieval: what do we eat? Link to digestion, teeth and omnivores. Year 2 – food chains</p> <p>Explain that we are part of a food chain. Show a number of food chains to see if children remember that it starts with a plant. Explain the link to gaining energy. Introduce terms primary producer, secondary consumer and review predator and prey.</p> <p>Children to use pictures to make a food chain with at least 3 living things. They should add labels for the different roles.</p> <p>Challenge children with true or false questions such as 'small animals cannot be predators'.</p>	<p><u>BIG QUESTION ANSWER</u></p> <p>Children to explore the local area and look for plants and animals. Discuss in the classroom about how these may link together in a food chain. Ensure children look at different microhabitats to get a range across the area.</p> <p>Children to use their findings to create a lift-the-flap food chain poster about animals eating food. Give children vocabulary to include. Each food chain should be labelled with explanations of which teeth help them and their role. One food chain must include a human, so they can explain the digestive system.</p>	<p><u>REVIEWING</u></p> <p>Teachers to plan one additional week to address missing knowledge or remaining misconceptions. This lesson content and outcomes will vary between classes.</p>
Working Scientifically	<p>Set up a simple practical enquiry</p> <p>Make systematic and careful observations</p> <p>Report on findings from enquiries, including oral/written explanations</p> <p>Create a model to show and explain a process (the digestive system)</p>	<p>Sort living things according to their role in a food chain and then according to their habitat</p>		
Organisation & Communication	<p>Photographs of stomach investigation</p>	<p>Labelled food chain</p>	<p>Children should be given to opportunity to present their answers in an interesting way, such as a lift-the-flap poster, rather than writing sentences.</p>	
Reading & Maths Opportunities				

Unit 4 Science – How are animals adapted to their environment?

National Curriculum Links	Disciplinary Knowledge	Key Vocabulary
<p>Living things and their habitats</p> <ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things 	<ul style="list-style-type: none"> Use a simple classification key to draw conclusions or answer questions Use knowledge and simple research to discuss positive and negative impacts in the future 	<p>Tier 2: group, category, key, flowering, non-flowering, environment, surroundings, conditions, natural, human-made, endangered, extinct, positive, negative, indifferent, protect, manage, impact</p> <p>Tier 3: classification, vertebrate, invertebrate, spores, dichotomous key, urbanisation, deforestation, pollution, climate change, population, fossil fuels, natural disaster, human impact, Venn diagram, conservation</p>
Pupil Offer		Famous People
		Carl Linnaeus Vanessa Nakate

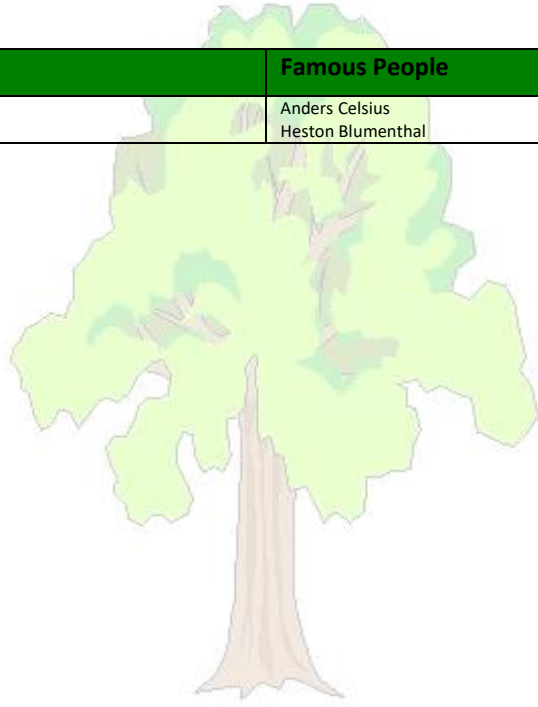


Senhad Primary School

Unit 4	Week 1	Week 2	Week 2	Week 3
Lesson Overview including Substantive knowledge	<p>Identification, Classification and Grouping Is It Helpful to Group Living Things?</p> <ul style="list-style-type: none"> Know that classification diagrams can be used to group animals with similar characteristics. Know that animals can be grouped into vertebrate and invertebrate groups. Know that plants can be grouped into flowering and nonflowering groups. <p>Retrieval: Y1 animal characteristics, Y1 and Y4 – carnivore, herbivore, omnivore Introduced concept of classification. Provide children with a mixture of photographs of living things and give them free rein on how to classify them, comparing methods afterwards. Discuss reasons for classifying and give simple example with fruit. Explain terms vertebrates and invertebrates. Give children animals to be classified into these two groups. Revisit different animal types. Children to be shown a classification key and spend some time trying to classify some different animals. Provide opportunities for vertebrates, invertebrates and plants.</p>	<p>Working Scientifically TAPS</p> <p>Local Survey (Do)</p> <p>Recap previous work on classifying and habitats. Consider school grounds/local area as a habitat and go on a search for living things (incl. plants) in the grounds. Take a camera/draw/make lists of larger things and collect smaller things. Classify the living things into groups e.g. vertebrates / invertebrates / plants. Create subsets within groups e.g. flowering / non-flowering plants, birds / mammals/ invertebrates etc</p>	<p>Identification, Classification and Grouping What Types of Plants and Animals Living in The Local Area?</p> <ul style="list-style-type: none"> Know the names of invertebrates and vertebrates that can be found in the school grounds. Know the purpose of a dichotomous keys (to help identify and classify living things). <p>Retrieval: Classification key Discuss diversity of animals in local area. Show children a simplified dichotomous key and have children work through it to identify the animals provided. After completing this with provided animals in the classroom, children should take this outside and classify the animals they find in different areas of the grounds. Children will play guess who for animals to practise their yes, no question skills. They will then be provided with a small number of animals to make their own small classification key.</p>	<p>Identification, Classification and Grouping What Is Special About Our Local Environment?</p> <ul style="list-style-type: none"> Know that an environment is made up of natural and human-made features <p>Retrieval: Animals and plants in the local area Discuss meaning of environment. Briefly talk about different environments that the children know. Then discuss the plants, animals, fungi, water, soil, rocks, minerals, air, climate, buildings, parks, waste and pollution found in different environments. Children to work in small groups to complete a guide covering all of these ideas about the environment surrounding our school.</p>
Working Scientifically	Use classification diagrams and careful observation to group living things according to their characteristics. Reflect on why this is a process followed in the world of science.	Gather, record and classify data	Use dichotomous keys to identify living things and draw conclusions about what they are. Ensure to leave habitats as they were found. Use observation and tools such as magnifying glasses to identify living things.	Identify from observation and reading how environments change over time. Produce a guide book to inform people about the local area and threats it faces. Scientists are often committed to protecting the planet from the danger posed by human behaviour
Organisation & Communication	Photographs of using classification keys Animals/plants labelled on classification key after use		Pictures labelled with classification Photograph of practical, short classification key	Group posters of our local environment.
Reading & Maths Opportunities				

Unit 4	Week 4	Week 5	Week 6	Week 7
Lesson Overview including Substantive knowledge	<p>Research</p> <p>What Dangers Are Posed to Habitats and The Environment?</p> <ul style="list-style-type: none"> Know that environments are dependent on different factors (natural and human). Know that humans can have a negative impact on the planet; know that humans can act to protect the planet. Know that the planet is under threat from climate change due to deforestation, urbanisation, pollution etc. <p>Retrieval: Year 1- Seasonal change and Year 2 – what living things need to survive</p> <p>Discuss how important environments are and what factors can change the conditions of different environment and how that can affect the things living in them. Explain the environment must provide living things with what they need. Discuss natural and human made changes, including climate change. Some living things adapt to these changes and some don't. Talk in more detail about deforestation, urbanisation, pollution and the introduction of invasive species.</p> <p>Children to be given different animals, which are all endangered. Children to research what might have caused this.</p>	<p>Problem Solving</p> <p>How Can We Develop the Local Area to Protect Living Things?</p> <ul style="list-style-type: none"> Know that conservation is the protection and preservation of living things. Know that we can take positive action to aid conservation in our own localities. <p>Retrieval: global dangers to the planet and positive and negative impact humans have on living things</p> <p>Discuss possible ideas for helping with the damage that changes to the environment have made. Take a walk around the local area and take photos or make notes of any issues that might be seen, e.g. new homes being built, litter, no recycling bins.</p> <p>Children to decide what they biggest threat is to our local area and whether this is different to elsewhere. Introduce concept of conservation.</p> <p>Children to be given some 'news' about the local area. They will then discuss the positive and negative effects. Children should then make a plan on how to decrease the negative effects.</p>	<p><u>BIG QUESTION ANSWER</u></p> <p>Children to complete 3 activities, which could be in the form of a carousel. Activity one will have children group animals and plants in multiple ways. Activity two will ask children to use a classification key to name a small selection of animals. Activity three will provide children with a picture to identify the potential dangers to animals in the local area. They should also discuss how this may affect the living things.</p>	<p><u>REVIEWING</u></p> <p>Teachers to plan one additional week to address missing knowledge or remaining misconceptions. This lesson content and outcomes will vary between classes.</p>
Working Scientifically	Use research and findings from the scientific community to understand how humans are negatively impacting the planet	Explore the local area, using knowledge of pollution and urbanisation to identify issues that need resolving. Devise a plan of action to protect living things in the local area.		
Organisation & Communication	Notes or paragraph of findings about endangered animals	Paragraph to accompany 'news' with what effects are and additional measures suggested	Written answers to each activity.	
Reading & Maths Opportunities				

Unit 5 Science – Where does a puddle go?		
National Curriculum Links	Disciplinary Knowledge	Key Vocabulary
<p>States of Matter</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Choose an appropriate way to gather and record data to help in answering questions and draw simple conclusions. Take measurements using thermometers Discuss changes over time using a graph of data recorded 	<p>Tier 2: melt, temperature, freeze, melt</p> <p>Tier 3: states of matter, solid, liquid, gas, matter, mass, volume, particles, properties, water vapour, melting point, freezing point, condensation, evaporation, water cycle, precipitation, water vapour</p>
Pupil Offer		Famous People
		<p>Anders Celsius Heston Blumenthal</p>



Unit 5	Week 1	Week 2	Week 3	Week 3
Lesson Overview including Substantive knowledge	<p>Identification, Classification and Grouping How Many States of Matter Are There?</p> <ul style="list-style-type: none"> Know that everything that exists is called matter; mass is the amount of matter in an object. Know that all matter on earth exists in one of three states: solid, liquid or gas; the particles in each object behave determines whether they are a solid, liquid or gas. <ul style="list-style-type: none"> <i>Solids have a fixed shape and volume that can't be changed unless a force is exerted on them.</i> <i>Liquids flow to take the shape of the container they are in. They have a fixed volume. They can be poured.</i> <i>Gases can fill up the container they are in and do not stay the same shape. Gas has weight and can escape from an unsealed container.</i> <p>Retrieval: Y2 changing shape and forces Y3 Explain that all matter on earth exists as a solid, liquid or gas. Explain vocabulary matter, mass and particles. Children to sort everyday objects into the categories. Look at diagrams of matter types and discuss key properties. Children to explore gases practically, e.g. by squeezing a sponge underwater. Children should be exposed to small solids such as salt to ensure they do not consider them liquids.</p>	<p>Comparative / Fair Testing Can Temperature Change the State of An Object?</p> <ul style="list-style-type: none"> Know that water can come in solid, liquid or gas form. Know that temperature has an effect on substances; heating substances causes them to melt and this is called the melting point. <p>Retrieval: definitions of solids, liquids and gases Show children water and expect classification of liquid. Show children ice cube and define as solid. Discuss freezing. Boil a kettle so children can see steam and discuss gas and boiling. Model experiment to find out the melting point of water, butter and chocolate, before completing themselves and recording their findings. Show children plastic bottles in warm water and let a balloon inflate as the air is warmed. Discuss what they see and why.</p>	<p>Pattern Seeking Can All Liquids Be Frozen to Become Solids?</p> <ul style="list-style-type: none"> Know most liquids can be frozen to become solids. Know that some substances freeze more quickly than others. <p>Retrieval: Freezing Look at different liquids e.g. ketchup, lemonade and predict if they can be frozen. Children to discuss possible ways to investigate this. Complete investigation and record findings, using research to answer anything further. Ask children how we could make this occur faster. Children to conduct experiment, comparing results with groups who chose a different idea. Ensure children know the difference between melting and freezing points.</p>	<p><u>Working Scientifically TAPS</u></p> <p>Measuring Temperature</p> <p>Ask children to put one hand in cold and one hand in warm water, then put both in tap water. What do you think the temperature of the water is for this hand, for that hand? How accurate is your hand? Need a thermometer.</p> <p>Demonstrate accurate reading: keeping thermometer in the water, head down to the level, explain how to use the scale, how to estimate numbers between lines and what accuracy to aim for (e.g to nearest 1 or 5 degrees C.)</p> <p>Carousel of measuring temperature - explore different ways to measure temperature e.g. thermometer in water, digital thermometer, forehead thermometer, data logger. Observe children's measurement using thermometers in water. Children could work in pairs and peer assess each other's measurements. NB. Ensure that you do not use boiling, or very hot water (max. 50°C).</p>
	Working Scientifically	<p>Group and classify a variety of different materials according to whether they are a solid, liquid or gas. Present simple scientific definitions.</p>	<p>Set up simple comparative and fair tests - explore the effect of temperature on some substances by investigating the temperature at which a range of solids change state and become liquids. Make systematic and careful observations and take accurate measurements using standard units, using a range of equipment: thermometers or data loggers to measure the temperature of melting points. Gather and record data in a table, using the correct unit of measure. Report on findings from enquiries in the form of a written conclusion. Use results to draw simple conclusions and raise further question e.g. What further experiments could be done to explore the changing state of these items?</p>	<p>Set up a simple practical enquiry, ensuring it is a fair test, to find out the answer to whether all liquids can change state to become a solid. Make careful observations of freezing over time. Choose an appropriate way to gather and record data to help in answering questions and draw simple conclusions.</p>
Organisation & Communication	Table of objects after being classified Definitions of property types	Table for recording results Written conclusion sentence	Concluding sentences	
Reading & Maths Opportunities				

Unit 5	Week 4	Week 5	Week 6	Week 7
Lesson Overview including Substantive knowledge	<p>Research Observation over time What Are the Stages of The Water Cycle?</p> <ul style="list-style-type: none"> Know the four stages of the water cycle: <ol style="list-style-type: none"> Warmth from the sun causes water to evaporate from rivers, oceans etc., rise and become water vapour (evaporation) As the water rises, it cools, turning into liquid again. These water droplets form clouds. (condensation) When the water droplets become too heavy, they fall from the sky (precipitation) This water lands on the earth or in rivers, lakes and seas. Some flows back to the sea. <p>Retrieval: How temperature changes the state of an object. Introduce terms evaporation and condensation. Discuss all places water can be found on earth. Explain water cycle and make links to being recycled. Set up experiment for children to see water cycle in action using small plastic bags.</p>	<p>Observation over time Pattern Seeking Does Temperature/Location Affect Rates of Evaporation?</p> <ul style="list-style-type: none"> Know that warmer temperatures speed up the evaporation process – warmer temperatures lead to quicker evaporation. <p>Retrieval: Water cycle Further talk about evaporation and water vapour. Children to discuss how to investigate whether location makes a difference to evaporation. Teacher to provide options that are plausible. Children to take measurements across the day and conclude at the end of the day. Which groups were similar? Where evaporated the fastest?</p>	<p><u>BIG QUESTION ANSWER</u></p> <p>Children to be provided with pictures from the experiments they have conducted in this unit. Children to understand links to big ideas. They should explain what they have learned, and might be guided by the smaller enquiry questions. They will make paper chains to connect ideas together to match the different content areas of this unit.</p> <p>Children should be given to opportunity to present their answers in an interesting way, <u>such as a in scientific interview</u>, rather than writing sentences.</p>	<p><u>REVIEWING</u></p> <p>Teachers to plan one additional week to address missing knowledge or remaining misconceptions. This lesson content and outcomes will vary between classes.</p>
Working Scientifically	Create a model of the water cycle to understand how condensation forms.	Set up comparative and fair tests to determine the effect of temperature on rates of evaporation. Make systematic and careful observations and take accurate measurements using standard units by measuring the amount of water in ml or the space taken up by the water in cm. Gather and record data in a table and line graph to show changes over time. Report on results by presenting them to the class. Use results to draw simple conclusions.	Photographs of paper chains	
Organisation & Communication	Diagrams of the water cycle.	Measurements of evaporation Concluding sentences		
Reading & Maths Opportunities				