






Year 4 – Scientific Enquiry Skills

	Comparative Test	<ul style="list-style-type: none">• Asking relevant question and using different types of scientific enquiries to answer them.• Setting up simple, practical enquiries, comparative and fair tests.• Using results to draw simple conclusions, make predications for new values, suggest improvements and raise further questions.
	Identify & Classify	<ul style="list-style-type: none">• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
	Observation Over Time	<ul style="list-style-type: none">• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers, rulers and data loggers.
	Pattern Seeking	<ul style="list-style-type: none">• Identify differences, similarities or changes related to simple scientific ideas and processes.
	Research & Communication	<ul style="list-style-type: none">• Using straight forward scientific evidence to answer questions or to support their findings.• Record findings using simple scientific language, for example labelled diagrams and drawings, bar charts, tables and keys.• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Types of Scientific Enquiry

Comparative / fair testing

Changing one variable to see its effect on another, whilst keeping all others the same.



Research

Using secondary sources of information to answer scientific questions.



Observation over time

Observing changes that occur over a period of time ranging from minutes to months.



Pattern-seeking

Identifying patterns and looking for relationships in enquiries where variables are difficult to control.



Identifying, grouping and classifying

Making observations to name, sort and organise items.



Skill Statements

Asking questions

Asking questions that can be answered using a scientific enquiry.



Making predictions

Using prior knowledge to suggest what will happen in an enquiry.



Setting up tests

Deciding on the method and equipment to use to carry out an enquiry.



Observing and measuring

Using senses and measuring equipment to make observations about the enquiry.



Recording data

Using tables, drawings and other means to note observations and measurements.



Interpreting and communicating results

Using information from the data to say what you found out.



Evaluating

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.



Year 4

- ★ I can ask *relevant* questions about the world.
- ★ I can recognise that questions can be answered in different ways using the different types of Scientific Enquiry.
- ★ I can identify new questions arising from the data
- ★ I can make new predictions based on my results
- ★ I can set up simple practical enquiries, comparative and fair tests
- ★ I can perform these enquiries & tests
- ★ I can make systematic and careful observations
- ★ I can take accurate measurements using standard units and a range of equipment
- ★ I can gather, record, classify and present data in a variety of ways to answer questions
- ★ I can decide how best to record my findings
- ★ I can communicate my findings in a variety of ways.
- ★ I can use scientific evidence from my enquiry to answer questions
- ★ I am beginning to discuss my results in relation to my prediction.
- ★ I am beginning to say what I would change about my investigation and pose further questions.








Year 4 – Animals, including Humans

National Curriculum Objectives	Sticky Knowledge	Vocabulary					
<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"> Animals have teeth to help them eat. Different types of teeth do different jobs. Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body. Nutrients produced by plants move to primary consumers then to secondary consumers through food chains. 	<p>Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.</p> <p>Ensure children use scientific language i.e. throat = oesophagus, tummy = stomach and spit = saliva</p> <table border="1" data-bbox="1339 512 2148 710"> <tr> <td data-bbox="1339 512 1715 531">Key Scientists</td> <td data-bbox="1715 512 2148 531">Linked Texts</td> </tr> <tr> <td data-bbox="1339 531 1715 710"> <p>Lucy Wills Doctor</p> <p>Sylvia Earle Oceanographer</p> <p>Emma Camp Coral biologist and marine bio-geochemist</p> </td> <td data-bbox="1715 531 2148 710"> <p>Foxton Primary Science: Predators & Prey</p> <p>Reading for pleasure: Gut Garden: A journey into the wonderful world of your microbiome</p> </td> </tr> </table>		Key Scientists	Linked Texts	<p>Lucy Wills Doctor</p> <p>Sylvia Earle Oceanographer</p> <p>Emma Camp Coral biologist and marine bio-geochemist</p>	<p>Foxton Primary Science: Predators & Prey</p> <p>Reading for pleasure: Gut Garden: A journey into the wonderful world of your microbiome</p>
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Prior Learning	Key Question(s):	Future Learning
<p>In Year 3 children should:</p> <ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat. Know how nutrients, water and oxygen are transported within animals and humans. Know about the importance of a nutritious, balanced diet. Identify that humans and some other animals have skeletons and muscles for support, protection and movement 	<ul style="list-style-type: none"> What different types of food are there? Why do we need a variety of different foods? Do all organisms eat the same things? Why do some people need different diets? (weightlifter vs marathon runner) Why are teeth important? What happens to our food? What is our digestive system? How does our food turn into poo and wee? 	<p>In Year 5 children will:</p> <ul style="list-style-type: none"> Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird. Know the differences between different life cycles. Know the process of reproduction in plants. Know the process of reproduction in animals.

Teaching Ideas





Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	WOW experiment
<p>What are the parts of the digestive system?</p> 	<p>What are the functions of the digestive system?</p> 	<p>What are the types and functions of teeth?</p> 	<p>What are the effects of different liquids on teeth?</p> <p>COMPLETE EGG SHELL EXPERIMENT</p> 	<p>What is a food chain and food web?</p> 	<p>End of unit quiz</p>	<p>PRACTICAL DIGESTION LESSON seeing digestion move through tights. What is the process of digestion?</p> <p>https://www.reachoutcpd.com/how-parents-can-help/COMPLETE PRACTICAL DIGESTION LESSON</p>

Year 4 – Living Things & their Habitats

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<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 danger to living things. 	<ul style="list-style-type: none"> Living things can be divided into groups based upon their characteristics Environmental change affects different habitats differently Different organisms are affected differently by environmental change Different food chains occur in different habitats Human activity significantly affects the environment 	Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.	
		Key Scientists	Linked Texts
		Gladys West Mathematician and inventor Tristan Gooley Author, navigator, explorer	Foxton Primary Science: <i>Living things and their changing habitats</i>

Prior Learning	Key Question(s):	Future Learning
In Year 2, children should: <ul style="list-style-type: none"> Explore and compare the difference 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. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food. 	<ul style="list-style-type: none"> What food chains and webs are there in our local habitat? How does energy move through the food chain? How does removal of one species from an environment, affect others? (keystone species) How does environmental change affect different organisms? What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers) How does human activity affect our environment (ferries on the Solent? Sandown Airport? KFC?) 	In Year 5: <ul style="list-style-type: none"> 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.

Teaching Ideas






Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	WOW experiment
How can we group living things into the environment they are suited to? 	How can we describe habitats in the UK and the threats living things face? 	How can animals be organised into different classification groups? 	How can we create a complex classification key using a series of questions that group animals into sub-groups before identifying the species? 	End of unit quiz	https://www.sciencebuddies.org/stem-activities/mummification

Year 4 – Electricity

National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<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 the 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. Know the difference between a conductor and an insulator; giving examples of each. Safety when using electricity. 	<ul style="list-style-type: none"> A source of electricity (mains of battery) is needed for electrical devices to work. Electricity sources push electricity round a circuit. More batteries will push the electricity round the circuit faster. Devices work harder when more electricity goes through them. A complete circuit is needed for electricity to flow and devices to work. Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators. 	Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.	
		Key Scientists	Linked Texts
		Benjamin Frankdin Inventor Michael Faraday Physicist Niklta Hari Electrical Engineer	Foxton Primary Science: <i>Electricity</i>

Prior Learning	Key Question(s):	Future Learning	
In Early Years children: <ul style="list-style-type: none"> May have some understanding that objects need electricity to work. May understand that a switch will turn something on or off. 	<ul style="list-style-type: none"> What would life be like without electricity? What sorts of things use/need electricity? What electricity do I use? In which ways can we 'get' electricity? (mains/plugs/batteries/wireless) How do we make electricity? How do batteries work? How quickly can batteries run out? Does this make a difference depending on number of components? How does the number of batteries added to the circuit affect a device? What materials can carry electricity? (conductors/insulators) 	In Year 6 children will: <ul style="list-style-type: none"> 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. 	

Teaching Ideas





Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	WOW experiment
How is electricity generated? 	What appliances use electricity? 	What are complete and incomplete circuits? 	What are conductors and insulators? 	How do switches work and why are they needed? 	End of unit quiz	Mummification Maidstone Museum trip

Year 4 – (ENERGY) Sound







National Curriculum Objectives	Sticky Knowledge	Vocabulary	
<ul style="list-style-type: none"> • Know how sound is made associating some of them with vibrating. • Know what happens to a sound as it travels from its source to our ears. • Know the correlation between the volume of a sound and the strength of the vibrations that produced it. • Know how sound travels from a source to our ears. • Know the correlation between pitch and the object producing a sound. 	<ul style="list-style-type: none"> • Sound travel can be blocked. • Changing the shape, size and material of an object will change the sound it produces. • Sound is produced when an object vibrates. • Sound moves through all materials by making them vibrate. • Changing the way an object vibrates changes it's sound. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds 	Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave, distance, insulation, travel, vibrate.	
		Key Scientists	Linked Texts
		Christian Doppler Mathematician & physicist	Foxton Primary Science: Sound

Prior Learning	Key Question(s):	Future Learning
In KS1 children: <ul style="list-style-type: none"> • May have some understanding that objects make different sounds. • Some understanding that they use their ears to hear sounds. • Know about their different senses. 	<ul style="list-style-type: none"> • How can you change the volume of a sound? • How does the size of an ear trumpet affect the volume of sound detected? • How does the type of material affect how well it blocks a sound? • How does thickness of material affect how well it blocks a sound? • Which materials vibrate better and produce louder sounds? Can we identify any patterns? • Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic – predict and test) • How does length of the tube (when making a straw oboe) affect the pitch and volume? • Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water? 	In KS3 children will learn about: <ul style="list-style-type: none"> • frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound • sound needs a medium to travel, the speed of sound in air, in water, in solids • sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • auditory range of humans and animals.

Teaching Ideas

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	WOW experiment
How are sounds made? 	How does sound travel? 	How is pitch affected? How do vibrations affect volume? 	What happens to the sound when you move further away from the source? 	How can we make an instrument which changes volume and pitch? Communicating findings	End of unit Quiz	Make your own harmonica Make Your Own Harmonica! STEM Activity (sciencebuddies.org)

Year 4 – Materials - Solids, Liquids & Gases

Year 4 – Materials - Solids, Liquids & Gases						
National Curriculum Objectives		Sticky Knowledge		Vocabulary		
<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 heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. 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"> Solids, liquids and gases are described by observable properties. Materials can be divided into solids, liquids and gases. Heating causes solids to melt into liquids and liquids evaporate into gases. d) Cooling causes gases to condense into liquids and liquids to freeze into solids. The temperature at which given substances change state are always the same. 		Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection,		
				Key Scientists		Linked Texts
						Foxton Primary Science: <i>States of Matter: Solids, liquids and gases</i>
Prior Learning		Key Question(s):		Future Learning		
<p>In KS1 children should:</p> <ul style="list-style-type: none"> 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 on the basis of their simple physical properties. Identify and compare the suitability of a variety 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. 		<ul style="list-style-type: none"> What state is water in at room temperature? What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature? What is the melting temperature of ice and how does it compare with the freezing temperature of water? Is the melting temperature of wax the same as its freezing temperature? 		<p>In Year 5 children will:</p> <ul style="list-style-type: none"> 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 wood, metals 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 this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 		
Teaching Ideas						
Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	WOW experiment
<p>How can we group and compare materials?</p> 	<p>What fizzy drink has the most carbon dioxide?</p> 	<p>How does water change state?</p> 	<p>Create a water cycle in a bag</p> 	<p>Evaporation investigation</p> 	<p>Heating and cooling chocolate and wax</p> 	<p>Melting chocolate</p>