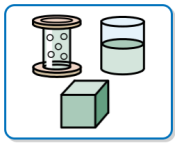
Year 4: Autumn

States of Matter

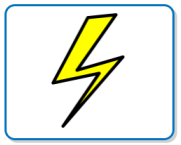


Enquiry Question	What are solids, liquids and gases and how can they be changed?	
	Required Prior Knowledge	**Knowledge to be taught**
Substantive Knowledge	Compare the suitability of different materials including wood, metal, plastic , glass, brick, rock, paper, cardboard, water. Know that shapes of solid objects can be changed by squashing, bending, twisting and stretching. Describe similarities and differences of materials. (Y2 Materials)	Name properties of solids, liquids and gasses. Explain the process of melting and freezing. Know the terms evaporation and condensation. Describe the water cycle. Know that materials have different melting points. Test a variety of materials to answer questions.
Disciplinary Knowledge		
Asking Questions		
Making Predictions	Make predictions using straightforward evidence and observations.	
Planning Enquiries	Set up tests to answer questions.	
Observation & Measuring	Make careful observations and identify similarities and differences. Use a thermometer to take accurate measurements.	
Recording Data	Record using diagrams what I know about the water system.	
Interpreting & Conclusions	Interpret what I have observed using my own scientific knowledge.	
Evaluation		
Vocabulary	**solid, liquid, gas, state, change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle, matter, air, oxygen, ice, water, water vapor, steam, heated, heat, cooled, cool, temperature, degrees Celsius, melt, melting point, freeze, freezing point, solidify, boil, boiling point, evaporate, evaporation, condense, condensation, precipitation, infiltration.**	

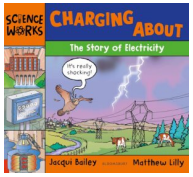
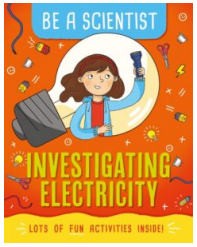
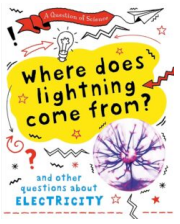
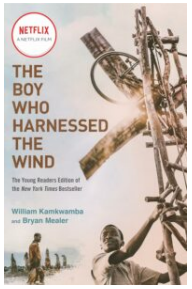
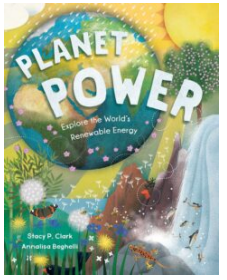
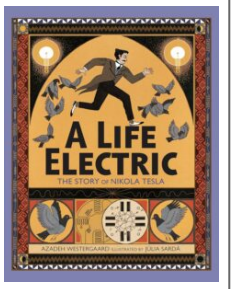
Science Capital	 **Dr Pearl Agyakwa**						
Teaching Sequence	*INTRODUCTION* • *Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.* • *Review or revisit related concepts.*	*INVESTIGATE AND RECORD* • *Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.* • *Guide pupils to understand the scientific concepts behind their exploration.*					*ASSESSMENT* • *Reflect on learning* • *Demonstrate their understanding*
Learning Questions	**What are solids, liquids and gases?**	**What can happen if you mix a solid with a liquid?**	**What happens if you heat materials?**	**What happens if you cool materials?**	**What is evaporation and condensation?**	**How does the water cycle work?**	**End of Topic Test**
Mastery Keys	➢ Can name properties of solids, liquids and gases. ➢ Can give everyday examples of melting, freezing, evaporation and condensation. ➢ Can describe the water cycle. ➢ Can give reasons to justify why something is a solid liquid or gas. ➢ Can measure temperatures using a thermometer.						

Year 4: Autumn

Electricity



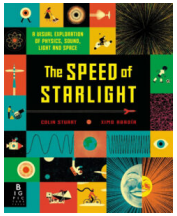
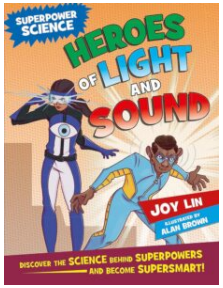
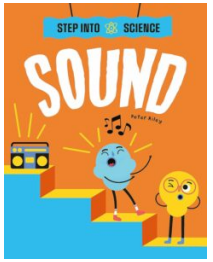
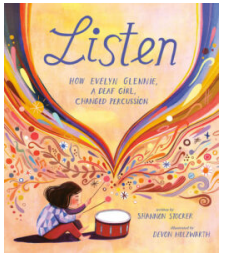
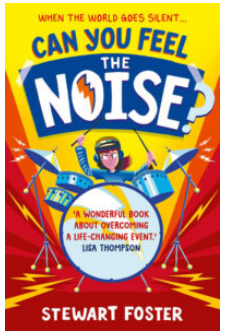
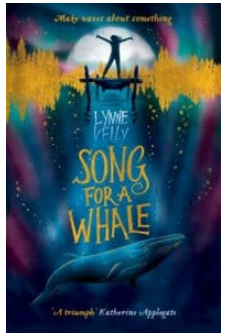
Enquiry Question	What is electricity and how does it work?	
	Required Prior Knowledge	**Knowledge to be taught**
Substantive Knowledge	Compare the suitability of different materials including wood, metal, plastic , glass, brick, rock, paper, cardboard, water. Describe similarities and differences of materials. (Y2 Materials)	Name the components in a circuit. Make a simple circuit. Control a circuit using a switch. Name some conductors and insulators. Use drawings to represent their circuits. Describe how a circuit works. Name some appliances that run on battery/mains. Know how to make a bulb brighter.
Disciplinary Knowledge		
Asking Questions	Pose scientific questions	
Making Predictions	Make predictions using scientific language.	
Planning Enquiries		
Observation & Measuring		
Recording Data	Record my work using labelled drawings. Record how electricity can help us.	
Interpreting & Conclusions	Interpret my results using my scientific knowledge.	
Evaluation	Identify the properties of different materials.	
Vocabulary	**electrical, appliance, mains, plug, circuit, component, cell, battery, positive, negative, connect/connectors, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol, voltage, current.**	

Science Capital	 **Alessandro Volta**  **Michael Faraday**  **Henry Snaith**						
Recommended Reading							
Teaching Sequence	*INTRODUCTION* • *Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.* • *Review or revisit related concepts.*	*INVESTIGATE AND RECORD* • *Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.* • *Guide pupils to understand the scientific concepts behind their exploration.*					*ASSESSMENT* • *Reflect on learning* • *Demonstrate their understanding*
Learning Questions	**How do we use electricity?**	**What is electricity?**	**What are conductors and insulators?**	**How do switches work?**	**What are the components of a circuit?**	**How is a circuit created?**	**End of Topic Test**
Mastery Keys	➢ Can name the components in a circuit. ➢ Can name some metals that are conductors. ➢ Can name materials that are insulators. ➢ Can communicate structures of circuits using drawings. ➢ Can incorporate a switch and describe how it works.						

Year 4: Spring

Sound

Enquiry Question	How do we hear sound?	
	Required Prior Knowledge	**Knowledge to be taught**
Substantive Knowledge		Describe different types of objects producing different sounds and that the sound is produced by vibration in the object. Describe sounds travelling through different mediums such as air, water, metal. Find patterns between pitch and volume and the features of the object producing it. Recognise that sounds get fainter as the distance from the sound source increases.
Disciplinary Knowledge		
Asking Questions		
Making Predictions		
Planning Enquiries	Set up tests based on animal ear shapes and to create the best string phone.	
Observation & Measuring	Observe vibrations which cause sound. Measure distance to the nearest cm. Observe how sounds are created.	
Recording Data	Record results in a table and spot patterns. Record sound measured in a table. Produce line graph.	
Interpreting & Conclusions		
Evaluation	Evaluate musical instruments based on sound and knowledge of pitch.	
Vocabulary	**sound, source, vibrate, vibration, travel, pitch, volume, faint, loud, insulation**	

Science Capital	 **Alexander Graham Bell**  **Formula 1 Engineer**						
Recommended Reading							
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Learning Questions	**How are sounds made?**	**Why does distance affect sound?**	**Does sound travel through water?**	**Which frequency sounds travel the furthest?**	**How are different sounds created?**	**How do we hear?**	**End of Topic Test**
Mastery Keys	➢ Can describe different types of objects producing different sounds and that the sound is produced by vibration in the object. ➢ Can describe sounds travelling through different mediums such as air, water, metal. ➢ Can recognise that sounds get fainter as the distance from the sound source increases. ➢ Demonstrates how to increase/decrease pitch and volume.						

Year 4: Spring

Animals including humans

Enquiry Question	How do animals and humans digest food?	
	Required Prior Knowledge	**Knowledge to be taught**
Substantive Knowledge	Name the main bones in the skeletal system such as skull, ribs, humerus, vertebrae, pelvis, ulna, carpals, radius, femur, phalanges, patella, tibia, tarsals, fibula, metatarsals. Know the function of the skeletal system. See similarities and differences in skeletons and classify into endoskeleton, exoskeleton and hydrostatic skeleton. Name different nutrients found in food, the different food groups and why we need to eat a balanced diet. (Y3 Animals incl. humans)	Identify and label and draw main parts of the digestive system and explain the process. Know the different types of teeth in their mouth: molars, pre molars, canines and incisors and their function. Identify animals and classify based on their teeth whether they are herbivore, omnivore and carnivore. Order and draw a range of lifecycles and food chains. Identify the producer, predators and prey.
Disciplinary Knowledge		
Asking Questions	Ask questions to find out what animals eat.	
Making Predictions	Make predictions based on science knowledge of liquids to decay teeth.	
Planning Enquiries	Set up own test to see the effects of different liquids on tooth decay.	
Observation & Measuring	Observe the similarities and differences in human/animal teeth.	
Recording Data	Record my results in a table and bar graph.	
Interpreting & Conclusions	Interpret and present learning of digestive system through models.	
Evaluation	Evaluate learning.	
Vocabulary	**digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, incisor, canine, herbivore, omnivore.**	

Science Capital	 **John Hams**  **Dentist**  **Scatologist**						
Teaching Sequence	*INTRODUCTION* • *Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.* • *Review or revisit related concepts.*	*INVESTIGATE AND RECORD* • *Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.* • *Guide pupils to understand the scientific concepts behind their exploration.*					*ASSESSMENT* • *Reflect on learning* • *Demonstrate their understanding*
Learning Questions	**How does the digestive system work in humans?**	**What would it be like to have no teeth?**	**How do we keep our teeth healthy?**	**How are animal teeth different to human teeth?**	**Why do different types of animals eat different foods?**	**What is a food chain?**	**End of Topic Test**
Mastery Keys	➢ Can sequence the main parts of the digestive system. ➢ Can draw the main parts of the digestive system onto a human outline. ➢ Can describe what happens in each part of the digestive system. ➢ Can point to three different types of teeth in their mouth and talk about what each is used for. ➢ Demonstrate the journey of food through the body. ➢ Can explain teeth in animals and if they are carnivores, herbivores or omnivores.						

Year 4: Summer Living things and their habitats

Enquiry Question	How can we protect the habitats of living things?	
	Required Prior Knowledge	**Knowledge to be taught**
Substantive Knowledge	Order the lifecycle of different animals e.g. butterfly. Explain what humans and animals need to survive e.g. food, sleep, exercise, water, shelter. Understand the term balanced , hygiene, microorganism, germs. diet and can identify some food groups. (Y2 Animals incl. Humans)	Name living things in a range of habitats, giving key features that helped identify them. Give examples of how an environment might change both naturally and due to human impact. Explain how changes in the environment can be dangerous to animals and lead to extinction. Know that some animals hibernate.
Disciplinary Knowledge		
Asking Questions	Ask relevant questions to classify things.	
Making Predictions		
Planning Enquiries		
Observation & Measuring	Observe characteristics of living things. Identify similarities and differences in characteristics.	
Recording Data	Gather and record data in a table. Record observations from scientific enquiry. Record findings about endangered species.	
Interpreting & Conclusions	Use evidence to answer questions and present findings.	
Evaluation		
Vocabulary	**classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate, fish, amphibian, reptile, bird, mammal, vertebrate, invertebrate, shelter, food, protection**	

<table>
<tr><td>Science Capital</td><td colspan="6"> 
Steve Irwin</td></tr>
<tr><td>Teaching Sequence</td><td>INTRODUCTION
• Begin with a question, demonstration or real-world example to spark curiosity and connect to the topic.
• Review or revisit related concepts</td><td colspan="4">INVESTIGATE AND RECORD
• Introduce new scientific ideas or concepts through hands-on activities, experiments or observations.
• Guide pupils to understand the scientific concepts behind their exploration.</td><td>ASSESSMENT
• Reflect on learning
• Demonstrate their understanding</td></tr>
<tr><td>Learning Questions</td><td>How can we group living things?</td><td>What is a classification key?</td><td>Which animals live where?</td><td>How do we classify living things?</td><td>How do environments change?</td><td>How is our wildlife in danger?</td><td>End of Topic Test</td></tr>
<tr><td>Mastery Keys</td><td colspan="6">➢ Can identify that animals and plants can be classified in a number of possible ways including vertebrates and invertebrates, flowering and non-flowering plants.
➢ Can ask yes/no characteristic questions to classify a small number of living things.
➢ Can name living things in a range of habitats, giving key features that helped identify them.
➢ Can give examples of how an environment may change both naturally and due to human impact.
➢ Can use classification keys to identify unknown plants and animals.</td></tr>
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