Year 4: Science

Autumn Term – Biology
Living Things and their Habitats

Scientist Focus: Libbie Hyman

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 4, pupils should be taught to recognise that living things can be grouped in a variety of ways and to explore and use classification keys to help group, identify and name a variety of living things within their local and wider environment. Pupils should also be taught to recognise that environments can change and that this can sometimes pose dangers to living things. Within this unit, a statement from the Year 4 'animals, including humans' thread is taught alongside the classification of animals within habitats. Pupils are also taught to construct and interpret a variety of food chains, identifying producers, predators and prey.	• a habitat is the natural home of an organism • all living organisms display the seven characteristics of life • organisms within a habitat or ecosystem are interdependent • the relationships between organisms can be represented by food chains and food webs • the difference between a vertebrate and an invertebrate • vertebrates can be classified into five different groups • invertebrates can be classified into seven different groups • characteristics of animals supports us with classification • we can use a key to identify and classify animals • plants can be classified as flowering or non-flowering • non-flowering plants can be classified into three groups • who Libbie Hyman was and why she is considered significant • that environments can change due to natural causes and through the actions of humans and that these changes can be both positive and negative • the organisms and habitats found within their own local environment and how these are changing	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

Sequence:

This is the second biology unit for Year 4. This unit sees pupils revisit habitats and living things. Pupils apply their knowledge of common plants and animals from Year 1, the needs that animals have, food chains and habitats from Year 2 and the needs that plants have and the difference between a vertebrate and an invertebrate from Year 3. Earlier in Year 4, pupils also revisited the idea of carnivores, herbivores, and omnivores. In addition,

pupils also bring with them additional knowledge from Year 2: the environment, how environments can change and the ways in which environments can be protected from.

Spring Term – Physics
Electricity

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 4, pupils should be taught to identify common appliances that run on electricity. It states that they should also be taught to construct a simple series electrical circuit, identifying, and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Pupils should also be able to 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, and to recognise that a switch opens and closes a circuit whilst associating this with whether or not a lamp lights in a simple series circuit. In addition, pupils should be taught to recognise some common conductors and insulators and to associate metals with being good conductors.	• electricity is a form of energy which powers many things we use everyday • an electric current is a flowing charge of electricity • there are renewable and non-renewable methods of producing electricity • some appliances use electricity and others do not • it is important to be safe and sensible around electricity • what a circuit is and which components are needed to construct a circuit • the difference between a complete and incomplete circuit • how the brightness of a bulb can change within a circuit • the function of a simple switch within a circuit • which materials are conductors and insulators of electricity and how to investigate this property	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

Sequence:

This unit is the first time pupils study electricity however, prior to this unit, pupils have studied two other forms of energy: light and sound. This unit therefore adds to their understanding of different forms of energy including how they are formed or produced, how they travel and how they behave. The knowledge in this unit also builds on pupils' understanding of the properties of materials and the different ways that materials can be grouped or classified – adding the terms conductor and insulator to pupils' vocabularies.

Spring Term – Physics
Sound

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 4, pupils should be taught to identify how sounds are made, associating some of them with something vibrating and to recognise that vibrations from sounds travel through a medium to the ear. Pupils should also be taught to find patterns between the pitch of a sound and features of the object that made it in addition to finding patterns between the volume of a sound and the strength of the vibrations that produced it. Pupils should also be taught to recognise that sounds get fainter as the distance from the sound source increases	• sound is a form of energy which is produced when something vibrates • different instruments make sound in different ways • sound travels in waves • how sound travels through solids, liquids and gases • what makes up the inside of our ears • how we hear and how we can protect our hearing • volume is the intensity of sound and is determined by the strength of vibrations • pitch is how high or low a sound is and is controlled by the speed of vibrations • the distance we are from a sound impacts the volume at which we hear the sound	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

<u>Sequence:</u>

This is the first time that pupils have studied sound in science and will be the only time they study sound in science in both Key Stage 1 and Key Stage 2. Previous knowledge that this unit builds upon is that of solids, liquids and gases, Pupils discovered the difference between solids, liquids and gases earlier in Year 4 and within this unit, they find out how sound can travel through them. Understanding the formation of matter within each will support pupils in accessing this content. This unit also builds on pupils' knowledge of the human body and how it works – in particular their knowledge of one of the five senses – hearing. In addition, this unit will link to pupils' work within music and from this subject, pupils may bring with them

an understanding of the terms pitch and volume as well as an understanding of how instruments produce sounds.

Summer Term – Biology
Animals including Humans – teeth and digestion

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 4, pupils should be taught to describe the simple functions of the basic parts of the digestive system in humans and to identify the different types of teeth in humans and their simple functions.	• the names of the different types of human teeth and the function of each type • the importance of looking after teeth and what can happen if we do not look after our teeth • how eating and drinking can damage teeth over time • that not all animals have the same teeth • the teeth that animals have greatly depend on whether that animal is a carnivore, an omnivore or an herbivore • the different organs that make up the digestive system • how the digestive system functions as a whole system	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

<u>Sequence:</u>

In Year 3, pupils learned about the skeleton, muscles and nutrition. This unit adds a further layer to pupils' knowledge of the human body – human teeth and the human digestive system. In addition to this, across a range of biology units, pupils have learnt about the classification of animals into different groups and they also know what carnivores, herbivores and omnivores are. Pupils also add a further layer to their understanding of animal bodies by discovering the different types of teeth animals have.

Summer Term – Chemistry
States of matter

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 4, pupils should be taught to compare and group materials together, according to whether they are solids, liquids or gases. Pupils should also 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. In addition to this, pupils should identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• what the three states of matter are and the properties of each one. • the processes of melting and freezing and how these processes affect the properties and state of a substance • some of the conditions that can affect melting and freezing for example temperature • what the processes of evaporation and condensation are • what the water cycle is • where the processes of evaporation and condensation fit into the water cycle • the importance of the water cycle for plants and animals	• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.

Sequence:

Pupils have classified and sorted materials according to their properties from EYFS, through Key Stage 1 and in Year 3. For example, pupils have been taught that materials can be hard, soft, shiny, dull, waterproof, absorbent, opaque, transparent, translucent, or magnetic. Pupils have also considered and investigated how the properties of different materials mean that those materials have certain uses. In Year 3, pupils compared and grouped different kind of rocks based on their appearance and physical properties. Through this unit pupils add the terms solid, liquid and gas to their understanding of how objects can be grouped and classified.