4.1 Respecting our Environment

This unit is intended to be taught across the whole year with at least two lessons in each term. Pupils look at the area within and near the school grounds and at the impact of humans on the environment. They discuss the need to balance human requirements against those of the environment.

Children working below age-related expectations will be able to:	▪ Know that humans can have an effect on the environment ▪ Use everyday terms to describe simple features living things or events they observe ▪ Present evidence they have collected in simple ▪ Communicate simple features or components of living things or events they have observed in appropriate forms
Children working at age-related expectations will be able to:	▪ Identify where humans have had an impact on an environment ▪ Identify ways that humans can damage an environment ▪ Identify ways in which humans can protect and improve environments ▪ Present their ideas and evidence in appropriate ways ▪ Use simple scientific vocabulary to describe their ideas and observations
Children working above age-related expectations will be able to:	▪ Describe examples of the impact of humans on their environment ▪ Discuss some moral and social aspects of the impact of humans on their environment Use scientific forms of language when communicating simple scientific ideas, processes or phenomena

Resources required for this unit:

Clipboard, cameras, litter picking sticks (optional)

4.2 Classification

Pupils learn about the variety of living things and how they can be grouped according to shared characteristics. They use and construct keys to identify unfamiliar animals and plants. They study the life of Carl Linnaeus who developed the system of classification used today.

Children working below age-related expectations will:	▪ Name some common British plants and animals ▪ Know that some animals have a backbone and others do not ▪ Know that some plants have flowers and some do not
Children working at age-related expectations will:	▪ Recognise that living things can be grouped in a variety of ways (plants: trees, grasses, flowers, ferns and mosses, vertebrates: fish, amphibians, reptiles, birds, and mammals. Invertebrates: snails and slugs, worms, spiders, and insects ▪ 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.
Children working above age-related expectations will:	▪ Classify vertebrates beyond basic classes ▪ Understand the importance of classification systems

Lesson	Learning objectives
1	**Life of Carl Linnaeus** ▪ Describe the main events in the life of Carl Linnaeus ▪ Describe the contribution Carl Linnaeus made to our understanding of classification
2	**Using and making keys** ▪ Use a key to identify an unknown plant or animal ▪ Understand how keys are constructed ▪ Create a key to identify a number of plants or animals
3	**Classification of animals – vertebrates** ▪ Describe the classification of vertebrates into fish, amphibians, reptiles, birds, and mammals ▪ Identify the characteristics of each class ▪ Correctly place unfamiliar vertebrates into one of these classes
4	**Classification of animals – invertebrates** ▪ Describe the classification of invertebrates into snails/slugs, worms, insects, crabs and spiders ▪ Identify the characteristics of each class ▪ Correctly place unfamiliar invertebrates into one of these classes
5	**Classification of plants** ▪ Recognise that some flowers such as grasses and some tree flowers do not have petals ▪ Describe the classification of plants into flowering plants (including grasses) and non-flowering plants such as ferns and mosses ▪ Identify the characteristics of each class ▪ Correctly place unfamiliar plants into one of these classes
6	**Plants and animals in the locality** ▪ Identify, using support materials where necessary, the common animals and plants in the local area ▪ Recognise that these animals and plants vary widely but that they can be sorted into different groups ▪ recognise that environments can change and that this can sometimes pose dangers to living things.

Resources required for this unit:

Software for making keys (optional), examples of different sorts of flowering and non-flowering plants, cameras, identification guides

4.3 Digestion

In this unit pupils learn about the structure of the mouth and about how to care for their teeth, investigating which drink stains teeth the most. They learn about the structure of the digestive system and building a model of the digestive process and making "poo" then using their knowledge to produce a piece of creative writing. The explore interrelationships in food, constructing food chains and food webs.

Children working below age-related expectations will:	▪ Know that food is broken down by the digestive system so our bodies can use it ▪ Name the basic parts of the mouth
Children working at age-related expectations will:	▪ 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.
Children working above age-related expectations will:	▪ describe in detail the simple functions of the digestive system ▪ construct and interpret food webs

Lesson	Learning objectives
1	**The mouth** ▪ Describe the human teeth and their positions in the mouth ▪ Name the different sorts of teeth found in humans
2	**Looking after your teeth** ▪ Know that children have milk teeth that are lost as adult teeth develop ▪ Understand the need to take care of your teeth and how to do this ▪ Describe the differences in teeth that have been cared for and those that have not ▪ Know that the tongue is the organ for taste and that it helps to move food into the oesophagus
3	**The digestive system** ▪ Name the different parts of the digestive system ▪ Outline the basic function of each part of the digestive system
4	**Build a digestive system** ▪ Create a model of a digestive system ▪ Identify in the model each part of the digestive system and describe its basic function
5	**Food chains** ▪ Know that all food chains start with plants that create their own food using energy from the Sun ▪ Know that some animals are predators and some are prey, ▪ Understand food chains and use them to describe feeding relationships
6	**Predators and prey** - Identify animals that are predators, those that are prey and those that are both - Link the use of the terms predator and prey to the terms herbivore, omnivore and carnivore - Construct a food web to show more complex feeding relationships

Resources required for this unit:

Small dental mirrors, disposable toothbrushes, model of digestive system (optional – you may be able to borrow one from a secondary school), blender (optional), white trays or plates, Blood, Bones and Body Bits by Nick Arnold, cameras,

4.4 Electricity

Pupils learn that some materials allow electricity through them and others do not. They learn about the history of electricity and they make and test electrical circuits with a variety of components. They use their knowledge of electricity to design and build a model of a burglar alarm for a house.

Children working below age-related expectations will:	▪ Construct a simple working circuit, and explain why some circuits work and others do not.
Children working at age-related expectations will:	▪ 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.
Children working above age-related expectations will:	▪ Explain how they matched different components for a particular circuit and describe what may happen if the components are not matched.

Lesson	Learning objectives
1	**Electrical Appliances and Electrical Supplies** ▪ Identify that a number of common appliances and pieces of equipment use electricity ▪ Know that some appliances use mains electricity and some use batteries ▪ Associate the use of batteries with the need for less power ▪ Know the dangers of mains electricity and how to avoid them
2	**Simple circuits** ▪ Understand that a flow of electricity (electric current) is only possible when there is a complete loop of conducting material ▪ Construct a simple circuit involving batteries
3	**Conductors and insulators** ▪ Know that some materials let electricity flow through them and others do not ▪ Recognise that all metals are conductors and most non-metals are insulators ▪ Know that air is an insulator ▪ Relate some incidents in the history of electricity
4	**Different circuits** ▪ Investigate the effect of changing components in a series circuit ▪ Describe the purpose of different components in a circuit components, including switches and buzzers
5	**Changing the brightness of bulbs** ▪ Describe the relationship between the numbers of batteries, the numbers of bulbs and the brightness of bulbs ▪ Know that too much current will cause the bulb to blow ▪ make systematic and careful observations
6	**Build a model burglar alarm for the door of a house** ▪ Using their knowledge of electricity, construct and test a burglar alarm for a house

Resources required for this unit:

Electrical apparatus: batteries, bulbs, wires, crocodile clips, bulb holders, battery holders, fans, switches, buzzers etc. Voltmeter, ammeter or multi-meter to measure small voltages(optional for lemon battery experiment)

4.5 Sound

Pupils listen to and identify sounds and learn how our ears work to detect sounds. They carry out experime nts to help them learn about loudness and pitch and use data loggers to investigate the best material for muffling sound. They make and play musical instruments.

Children working below age-related expectations will:	▪ recognise and describe many sounds and make and record observations of sounds ▪ relate their sense of hearing to their ears; ▪ know how to use the terms pitch and volume ▪ associate increased volume with greater force
Children working at age-related expectations will:	▪ 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.
Children working above age-related expectations will:	▪ describe ways in which the pitch of a sound made by a particular instrument or vibrating object can be raised or lowered and identify what is vibrating in a range of musical instruments ▪ describe ways in which the pitch of a sound made by a particular instrument or vibrating object can be raised or lowered ▪ identify what is vibrating in a range of musical instruments

Lesson	Learning objectives
1	**Introduction to sound** ▪ Associate sound with vibrating objects ▪ Describe a range of ways of getting things to vibrate ▪ Create sounds in a variety of ways
2	**How we hear** ▪ Use their ears to listen to and identify sounds ▪ Describe how the shape of our ears helps us hear ▪ Describe the basic structure of the ear
3	**Louder and quieter** ▪ Establish that sounds get fainter as the distance increases ▪ Know that sound travels through solids and liquids as well as air ▪ Associate loudness with stronger vibrations
4	**Muffling Sound** ▪ Investigate the effectiveness of different materials to muffle sound
5	**Changing Pitch** ▪ understand what pitch is ▪ describe some ways of changing the pitch of a vibrating object
6	**Making musical instruments** ▪ Use their knowledge of how sound is made to make and play a musical instrument

Resources required for this unit:

Ear muffs, slinky spring, torch, waterproof radio, funnels, a set of data loggers with sound sensors, sound sources such as kitchen timers,

4.6 States of Matter

Pupils learn that materials come in three states of matter: solid, liquid or gas. They identify materials as solids, liquids or gases, including some that are harder to classify such as sand or sponge. They learn how to use a thermometer and investigate changes of state. They learn about the water cycle.

Children working below age-related expectations will:	▪ name some solids and liquids ▪ Know that some materials can change from solid to liquid and vice versa, e.g. ice to water ▪ Know that gases are materials
Children working at age-related expectations will:	▪ 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.
Children working above age-related expectations will:	▪ understand that some materials., e.g. metals, change state at very high temperatures ▪ use correct scientific terms to describe states of matter and changes of state

Lesson	Learning objectives
1	**Introducing solids, liquids and gases** ▪ Identify materials as solids, liquids or gases ▪ Begin to assign properties to different states of matter
2	**Solids and liquids** ▪ Describe the properties of solids, liquids and gases ▪ Know that solids consisting of very small pieces (e.g. sand) behave like liquids in some ways
3	**Gases** ▪ Know that there are gases all around us but they are invisible ▪ State the properties of gases
4	**Melting and freezing** ▪ Know how to use a thermometer ▪ Know that the same material can exist as both solid and liquid ▪ Name the changes of state
5	**Evaporation** ▪ Set up simple comparative and fair tests to establish the factors that affect evaporation ▪ Record findings using simple scientific language, bar charts and/or tables ▪ Use results to draw simple conclusions
6	**The water cycle** ▪ Describe the water cycle in terms of changes of state

Resources required for this unit:

Syringe, sets of solids and liquids, digital microscope, thermometers, measuring cylinders, sensitive weighing scales, test tubes