Engaging Science: Year 3 overview

Unit 3.1 Animal Homes

Pupils look at the "homes" that insects and birds need and make the school friendlier towards these creatures. They evaluate the success of the measures they have taken. Pupils also observe plants over time to explore the development of seeds and the life cycle of plants.

Children working below age-related expectations will be able to:	▪ Identify places where animals can live in the school grounds ▪ Use everyday terms to describe simple features living things or events they observe
Children working at age-related expectations will be able to:	▪ Observe closely and identify animal homes ▪ Suggest suitable sites for animal homes, providing simple explanations for their choices using simple scientific vocabulary ▪ Provide homes and other methods to attract animals
Children working above age-related expectations will be able to:	▪ Identify measures that will attract insects and birds to the area ▪ Explain why such measures are not always successful

Resources required for this unit:

Clipboards, cameras, materials for making animal homes

Optional: commercial nest boxes or feeding tables. Remote webcams

Unit 3.2 Animals and skeletons

Pupils revisit the classification of animals according to diet as carnivores, herbivores or omnivores, researching the diets of animals in more detail. They look at human dietary requirements and begin to identify different food types and their different uses in the body. Dissecting an owl pellet provides a link between learning about diets and the study of skeletons. Pupils learn about external and internal skeletons, making a life size skeleton cut-out and studying the names and functions of the major bones and muscles in the human body.

Children working below age-related expectations will:	▪ know that animals need to eat to stay alive ▪ know that different animals eat different things ▪ know that animals digest their food so their bodies can use it
Children working at age-related expectations will:	▪ identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat ▪ identify that humans and some animals have skeletons and muscles for support, protection and movement.
Children working above age-related expectations will:	▪ describe the diets of typical herbivores, carnivores and omnivores, giving examples ▪ describe in simple terms how food is digested and what it is used for in the body ▪ explain the difference between an internal skeleton and an exoskeleton ▪ in simple terms, state the functions of different parts of a human skeleton

Lesson	Learning Outcomes
1	**Researching animal diets** ▪ Using research methods, identify the diets of a number of animals including birds ▪ Classify animals as omnivores, herbivores and carnivores ▪ Know that animals need to eat because they do not make their own food as plants do.
2	**Grouping foods** - Develop a classification system for foods - Understand and use the terms variable and value
3	**Why do we need to eat different kinds of food – food for energy, growth and repair** ▪ Know that the digested food is used for energy, to help us grow and to repair the body ▪ Know that different kinds of food are used for different things: protein for growth and repair, fat and carbohydrate for energy
4	**What do owls eat? Investigating an owl pellet.** ▪ Investigate an owl pellet, making notes and observations ▪ Come to a conclusion about the diet of an owl as a result of their findings
5	**Skeletons inside the body and outside the body** ▪ Know that some animals have skeletons inside their bodies and others, such as insects and crustaceans, have a skeleton outside their bodies ▪ Classify animals as vertebrates or invertebrates ▪ Note some differences in movement between animals with a skeleton and animals without a skeleton
6	**The human skeleton** ▪ Know the main parts of the body associated with the muscular and skeletal system Know that different parts of the muscular-skeletal system have different functions
7	**Muscles** ▪ Know that muscles are attached to the skeleton and help us move

Resources required for this unit:

Lifelike skeleton costume – child sized

Owl pellets – these can be bought on the Internet

Tweezers (1 between 2 pupils as a minimum), magnifying glasses and trays for owl pellet dissection

Unit 3.3 Forces and Magnets

Pupils explore magnetism and non-contact forces, suspending magnetic items in mid-air under the influence of magnetic forces. They test materials for magnetic properties and think about what materials are magnetic. They describe the properties of a magnet in simple terms and learn about the uses of magnets.

Children working below age-related expectations will:	▪ know that some materials are attracted to magnets ▪ know that sometimes it is easy to stick magnets together but sometimes it is not
Children working at age-related expectations will:	▪ compare how things move on different surfaces ▪ notice that some forces need contact between two objects, but magnetic forces can act at a distance ▪ observe how magnets attract or repel each other and attract some materials and not others ▪ compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ▪ describe magnets as having two poles ▪ predict whether two magnets will attract or repel each other, depending on which poles are facing.
Children working above age-related expectations will:	▪ Know that there is a magnetic field that exerts a force round a magnet ▪ Explain the laws of attraction and repulsion of magnets

Lesson	Learning objectives
1	**What is a force?** ▪ Identify forces as pushes, pulls or twists ▪ Know that a force can change the speed, direction or shape of an object ▪ Know that force is measured using a force meter and that the units of measurement are Newtons. ▪ Recognise that many forces require a contact between them for the force to take effect
2	**What is friction?** ▪ Know that friction is a force between two surfaces that slows objects down ▪ Describe some factors that affect friction ▪ Provide examples of useful and non-useful friction in everyday life
3	**What is a magnet?** ▪ Describe what a magnet is ▪ Know that magnets can exert forces at a distance ▪ Know that magnets have two ends called poles that attract or repel each other depending on how they are arranged ▪ Describe some everyday uses for magnets
4	**What materials are attracted to magnets?** ▪ Classify materials as magnetic or non-magnetic ▪ Determine a general rule for predicting which materials are magnetic
5	**Investigating the strength of magnets** ▪ Investigate the relationship between the size of a magnet and its strength
6	**Uses of magnets- optional lesson** ▪ Describe some uses of magnets ▪ Summarise their learning about magnetism

Resources required for this unit:
Dice bomb, Magnetic ring toy, Force meters of different strengths, Sample surfaces for friction Neodymium magnet (teacher use only), Darning needles, Sets of bar magnets plus other magnets of different size and strength with some small but strong and some large but weak magnets

3.4 Plants

Pupils will carry out a long-term investigation of the factors that affect the growth of plants, observing and measuring their plants for the course of the unit. They will learn about the main functions of the different parts of a plant and will study the life cycle of a flowering plant, including studying the structure of a flower and the different methods of seed dispersal.

Children working below age-related expectations will:	▪ identify the main parts of a flowering plant ▪ know that plants need water and light to grow ▪ know that new plants grow from seeds
Children working at age-related expectations will:	▪ **identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers** ▪ **explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant** ▪ **investigate the way in which water is transported within plants** ▪ **explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.**
Children working above age-related expectations will:	▪ begin to link the structure of plant parts to the function ▪ explain why plants need water, air and nutrients ▪ describe the part that insects play in the life cycle of plants

Lesson	Learning objectives
1	**Setting up an investigation: What plants need for growth** ▪ use their knowledge of plants to plan and set up an investigation into plant growth ▪ set up a simple experiment ▪ take careful measurements and make systematic observations
2	**Structure of a flowering plant** ▪ recording findings using simple scientific language and measurements ▪ describe the structure of a flowering plant
3	**How water is transported within plants** ▪ observe the movement of food dye through a flower ▪ explain that water moves from the roots through branches and stems to leaves and flowers
4	**Seed dispersal** ▪ describe some methods of seed dispersal ▪ explain why seeds need to be dispersed
5	**Life cycle of a flowering plant** ▪ describe the life cycle of a flowering plant ▪ describe the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
6	**What do plants need for growth** ▪ generate oral and written reports on the findings of their investigation ▪ use results to draw simple conclusions, suggest improvements and raise further questions ▪ use straightforward scientific evidence to support their findings. ▪ explain that plants do not need to eat food because they make their own ▪ describe why plants need water, light, space and nutrients for growth

Resources required for this unit:
Pots for growing plants, potting compost, seeds, cameras , data loggers with light sensors, table lamp, clear coloured plastic of different colours, thermometers, electrically heated propagator, range of seeds

Unit 3.5 Light

Pupils learn to distinguish a light source from reflected light. They learn that light travels in straight lines, study how we see and are taught how to protect their eyes. They investigate the transparency of fabrics using data loggers and carry out some experiments to find out about shadow formation.

Children working below age-related expectations will:	▪ name a number of light sources including the Sun; ▪ recognise that they cannot see in the dark and know that it is dangerous to look at the Sun ▪ make observations of changes in shadows and recognise that shadows are similar in shape to the objects forming them ▪ know that some materials allow light to pass through them ▪ make observations of light reflected from shiny surfaces
Children working at age-related expectations will:	▪ **state the difference between light sources and other shiny objects and name a number of light sources including the Sun** ▪ **recognise that they need light in order to see things and that dark is the absence of light** ▪ **notice that light is reflected from surfaces** ▪ **recognise that light from the sun can be dangerous and that there are ways to protect their eyes** ▪ **recognise that shadows are formed when the light from a light source is blocked by a solid object** ▪ **find patterns in the way that the size of shadows change.**
Children working above age-related expectations will:	▪ name a number of light sources including the Sun; ▪ know that it is dangerous to look at the Sun ▪ explain the difference between light sources and other shiny objects ▪ Describe the relationship between the position of a light source and the length of a shadow

Lesson	Learning objectives
1	**Introduction to light** ▪ know that some objects produce light energy and that these are light sources ▪ know that some surfaces reflect light ▪ distinguish between light sources and objects that reflect light ▪ know that the Sun is a light source but the Moon is not
2	**Reflected light** ▪ know that some surfaces reflect light ▪ know which surfaces have the best reflective properties
3	**How do we see?** ▪ know that the eyes are the organs of sight ▪ recognise that they need light in order to see things and that dark is the absence of light ▪ know how to protect their eyesight, including protection from sun damage
4	**What materials let light through?** ▪ know that some substances allow light to pass through completely or partially and use the terms transparent, translucent and opaque ▪ set up a simple comparative and fair test ▪ make measurements using data loggers ▪ record findings using simple scientific language, bar charts, and tables ▪ reporting on findings and draw conclusions
5	**Exploring shadows** ▪ know how shadows are formed ▪ know what determines the length of shadows

Resources required for this unit: Torches – one per group – plus spare bulbs and batteries (if you have alternative light sources in school already these can be used instead.) Mirrors. Set of data loggers and light sensors

Unit 3.6 Rocks

Pupils explore the characteristics of rocks and learn their names. They carry out simple tests on different rocks and use chocolate to model how rocks are made. They explore the composition of soil and think about how soil is made. They learn about the formation of fossils and make their own model fossils. They look at pictures of dinosaur fossils and try to come to some conclusions about the living dinosaurs the fossils came from.

Children working below age-related expectations will be able to:	▪ name one or two rocks ▪ know that there are rocks under the ground ▪ know that rocks were not all made the same way
Children working at age-related expectations will be able to:	▪ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ▪ describe in simple terms how fossils are formed when things that have lived are trapped within rock ▪ recognise that soils are made from rocks and organic matter.
Children working above age-related expectations will be able to:	▪ describe the characteristics of named rocks and relate them to how they were formed ▪ describe the composition of soil and recognise that soil composition varies according to the local rock

Lesson	Learning objectives
1	**Looking at rocks** ▪ examine and describe different specimens of rock ▪ classify rocks according to their own criteria
2	**Investigating rocks** ▪ name some of the most common rocks ▪ investigate the properties of igneous and sedimentary rocks ▪ carry out simple tests on rocks, recording results and drawing conclusions
3	**How rocks are formed** ▪ describe in simple terms how igneous, sedimentary and metamorphic rocks are formed
4	**Investigating soil** ▪ investigate the composition of soil ▪ use the investigation to come up with a model of how soil is formed
5	**Fossils** ▪ describe how fossils are made ▪ explain how the fossil record helps us learn about life millions of years ago
6	**Dinosaur fossils** ▪ use fossil pictures to draw conclusions about dinosaurs

Resources needed for this unit

Range of rock samples to include igneous, sedimentary and metamorphic rocks, permeable and impermeable rocks, hard and soft rocks

Examples of different fossils