



Topic: Animals including humans

Science Enquiries

- Classifying
- Pattern seeking
- Research

Prior Knowledge:

Year 1

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).

Year 2

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).

Key Learning for Y3

1. 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.
2. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Common Misconceptions

Some children might think the following:

- certain whole food groups like fats are 'bad' for you
- certain specific foods, like cheese are also 'bad' for you
- diet and fruit drinks are 'good' for you
- snakes are similar to worms, so they must also be invertebrates
- invertebrates have no form of skeleton.

Evidence/Activities for key learning

- Name the nutrients found in food and state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients
- Name some bones that make up their skeleton, giving examples that support, help them move or provide protection
- Describe how muscles and joints help them to move
- Give similarities and differences between skeletal systems *e.g. all animals have joints to help them move;*
- Plan a daily diet to contain a good balance of nutrients.

Evidence/Activities for science enquiries + science skills

- Classify food in a range of ways *e.g. those with high and low nutrients*
- Use secondary sources to find out the types of food that contain the different nutrients.
- Use secondary sources to research the parts and functions of the skeleton.
- Research the nutrients in fast food
- Investigate patterns by asking questions such as:
 - can people with longer legs run faster?
 - can people with bigger hands catch a ball better?

Use the results from investigations to look for patterns, when answering investigation questions.

- Compare, contrast and classify skeletons of different animals.
- Use food labels to ask and answer questions *e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?*

Progression/Future Learning

Year 4: Animals including humans

- 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.

Year 6: Animals including humans

- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

Topic: Rocks

Science Enquiries

- Classifying
- Observing over time
- Research

Prior Knowledge:

Year 1 - Everyday Materials

- 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.

Year 2 - Uses of everyday materials

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

Key Learning in Y3:

1. Compare and group together different kinds of rocks (including those from the locality) on the basis of their appearance and simple physical properties.
2. Describe in simple terms how fossils are formed when things that have lived are trapped within rock.
3. Recognise that soils are made from rocks and organic matter.

Common Misconceptions

Some children may think that:

- rocks are all hard in nature
- rock-like, man-made substances such as concrete or brick are rocks
- materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural'
- certain found artefacts, like old bits of pottery or coins, are fossils
- a fossil is an actual piece of the extinct animal or plant
- soil and compost are the same thing.

Evidence/Activities for Key learning

- Name some types of rock and give physical features of each
- Explain how a fossil is formed
- Explain that soils are made from rocks and also contain living/dead matter
- Link rocks changing over time with their properties e.g. soft rocks get worn away more easily

Evidence/Activities for science enquiries & science skills

- Observe rocks closely.
- Classify rocks in a range of ways, based on their appearance and use appropriate vocabulary.
- Observe how rocks change over time e.g. gravestones or old building and link this to their properties e.g. *soft rocks get worn away more easily*.
- *Research using secondary sources how fossils are formed and present their understanding in a range of different ways e.g. role-play, comic strip, non-chronological report, animation etc (cross-curricular links: ICT & English).*
- Observe soils closely.
- Classify soils in a range of ways based on their appearance.
- Observe how soil can be separated through sedimentation.
- Research the work of Mary Anning.
- Investigate: How hard rocks are; how much water soils retain; how much water different rocks absorb.

Progression/Future Learning

Year 6: Evolution & Inheritance

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

Topic: Forces & Magnets

Science Enquiries

- Classifying
- Fair Testing
- Researching

Prior Knowledge

Year 2: Use of everyday materials

- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Key Learning for Y3:

1. Compare how things move on different surfaces.
2. Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
3. Observe how magnets attract or repel each other and attract some materials and not others.
4. 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.
5. Describe magnets as having two poles.
6. Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Common misconceptions

- the bigger the magnet the stronger it is
- all metals are magnetic.

Evidence/Activities for Key Learning

- Give examples of forces in everyday life
- Give examples of objects moving differently on different surfaces
- Name a range of types of magnets and show how the poles attract and repel
- Draw diagrams using arrows to show the attraction and repulsion between the poles of magnets

Evidence/Activities for science enquiries and science skills

- Investigate how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc and use results to describe how objects move on different surfaces .
- Use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface
- Explore what materials are attracted to a magnet.
- Classify materials according to whether they are magnetic.
- Explore the way that magnets behave in relation to each other and show how like poles repel and opposite poles attract
- Use a marked magnet to find the unmarked poles on other types of magnets.

- Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.
- Investigate to test the strength of magnets and rank magnets based on strength.

Progression/Future Learning

Year 5: Forces

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces)
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces)
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces)

Topic: Light

Science Enquiries

- Classifying
- Fair Testing

Prior Learning

Year 1: Animals including humans

- Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Key Learning for Y3

1. Recognise that they need light in order to see things and that dark is the absence of light.
2. Notice that light is reflected from surfaces.
3. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
4. Recognise that shadows are formed when the light from a light source is blocked by a solid object.
5. Find patterns in the way that the size of shadows change.

Common Misconceptions

- we can still see even where there is an absence of any light
- our eyes 'get used to' the dark
- the moon and reflective surfaces are light sources
- a transparent object is a light source
- shadows contain details of the object, such as facial features on their own shadow
- shadows result from objects giving off darkness.

Evidence/Activities for Key Learning:

- Describe how we see objects in light and can describe dark as the absence of light and explain that it is dangerous to view the sun directly.
- Explain what precautions are needed to view the sun, *e.g. in eclipses*
- Define transparent, translucent and opaque
- Describe how shadows are formed

Evidence for science enquiries and science skills

- Explore how different objects are more or less visible in different levels of lighting and describe patterns in visibility of different. Predict which will be more or less visible as conditions change .
- Explore how objects with different surfaces, *e.g. shiny vs matt, are more or less visible*

- Describe and demonstrate how shadows are formed by blocking light.
- Explore how shadows vary as the distance between a light source and an object or surface is changed and make predictions about how shadows vary.
- Explore shadows which are connected to and disconnected from the object e.g. *shadows of clouds and children in the playground.*
- *Choose suitable materials to make shadow puppets. (cross-curricular link: DT)*
- *Create artwork using shadows (cross-curricular links: art*

Progression/Future Learning

Year 6: Light

- Recognise that light appears to travel in straight lines.
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Topic: Plants

Science Enquiries

- Classifying
- Observing
- Pattern Seeking
- Research

Prior Knowledge

Year 2 - Plants:

- Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants)
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Key Learning for Y3:

1. Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
2. 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.
3. Investigate the way in which water is transported within plants.
4. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
5. Know that plants make their own food.

Common Misconceptions

Some children may think that:

- plants eat food
- food comes from the soil via the roots
- flowers are merely decorative rather than a vital part of the life cycle in reproduction
- plants only need sunlight to keep them warm
- roots suck in water which is then sucked up the stem.

Evidence/Activities for Key Learning:

- Explain the function of the parts of a flowering plant
- Describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination
- Give different methods of pollination and seed dispersal.
- Create a new species of flowering plant.
- Look at the features of seeds to decide on their method of dispersal
- Draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal

Evidence/Activities for science enquiries + science skills

- Observe what happens to plants over time when the leaves or roots are removed and explain why this happens.
- Observe the effect of putting cut white carnations or celery in coloured water and explain why this happens.
- Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.
- Spot flowers, seeds, berries and fruits outside throughout the year.
- Observe flowers carefully to identify the pollen.
- Observe flowers being visited by pollinators *e.g. bees and butterflies in the summer.*
- Observe seeds being blown from the trees *e.g. sycamore seeds.*
- Research different types of seed dispersal.
- Classify seeds in a range of ways, including by how they are dispersed.

Progression/Future Learning

Year 5: Living things and their habitats

- Describe the life process of reproduction in some plants and animals.