

VOCABULARY

Adaptation: a change in structure or function that improves the chance of survival for an animal or plant within a given environment.

Carnivore: an animal that eats meat.

Evolution: a process of change that takes place over many generations, during which species of animals, plants or insects slowly change some of their physical characteristics.

Habitat: the natural environment in which an animal or plant normally lives or grows.

Herbivore: an animal that only eats plants.

Invertebrate: a creature that does not have a spine, for example, an insect, a worm or an octopus.

Microhabitat: a small part of the environment that supports a habitat, such as a fallen log in a forest.

Microorganism: a very small living thing which you can only see if you use a microscope.

Minibeast: a small invertebrate animal such as an insect or spider.

Omnivore: person or animal that eats both meat and plants.

Organism: a living thing.

Predator: an animal that kills and eats other animals.

Prey: an animal hunted or captured by another for food.

Species: a class of plants or animals whose members have the same main characteristics and are able to breed with each other.



SCIENCE KNOWLEDGE MAT -Year 6

Living Things and Their Habitats

MAIN IDEA

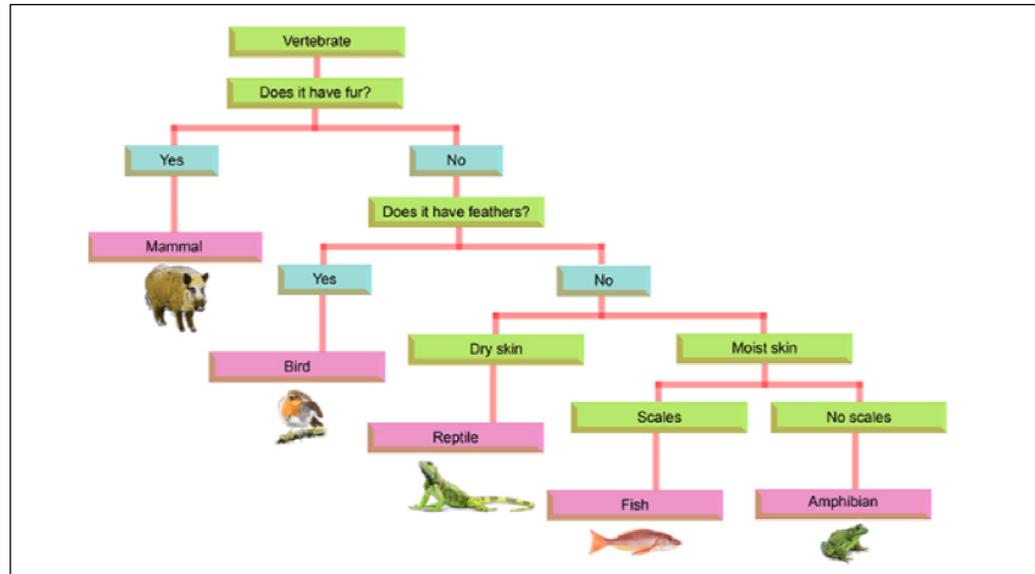
To describe how living things are classified into groups according to characteristics and based on similarities and differences. Children should be able to give reasons for classifying plants and animals.

WHAT CAME BEFORE

Year 5 – describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.

WHAT COMES NEXT

KS3 – to understand relationships in an ecosystem. To understand food webs and insect pollination.



WHAT YOU SHOULD ALREADY KNOW

- Animals can be grouped into carnivores, herbivores and omnivores. They can also be grouped into vertebrates and invertebrates.
- Organisms can be classified and we can use a classification key to identify them.
- Examples of habitats, including microhabitats, and the organisms that can be found there.
- Environments are changing, positively and negatively.
- The relationships between predators and prey.

KEY LEARNING

- Living things can be grouped according to different criteria, for example, where they live, what type of organism they are, what features they have.
- A classification key is a tool that is used to group living things to help us identify them using recognisable characteristics.
- The Linnaean system is named after Carl Linnaeus. It has different levels where the number of living things in each group gets smaller and smaller, until there is just one type of animal in the species group.
- Microorganisms are very tiny organisms where a microscope has to be used to see them. Some microorganisms can be helpful in certain situations, others can be harmful and their spread needs to be contained. Examples of microorganisms: dust mites, bacteria, and fungi.

INVESTIGATE / QUESTIONS

- Can you sort vertebrate and invertebrate animals into groups? Use a clarification key.
- A platypus is difficult to classify. Can you explain why?
- Research unfamiliar organisms from a broad range of other habitats.
- Research the work of Carl Linnaeus.

VOCABULARY

Aorta: the main artery through which blood leaves your heart before it flows through the rest of your body.

Arteries: a tube in your body that carries oxygenated blood from your heart to the rest of your body.

Atrium: one of the chambers in the heart.

Blood Vessels: the narrow tubes through which your blood flows.

Capillaries: the blood vessels in your body.

Circulatory System: the system responsible for circulating blood through the body, that supplies nutrients and oxygen to the body and removes waste products such as carbon dioxide.

Deoxygenated: blood that does not contain oxygen.

Nutrients: substances that help plants and animals grow.

Organ: a part of your body that has a particular purpose.

Oxygenated: blood that contains oxygen.

Respiration: process of respiring; breathing; inhaling and exhaling air.

Vena Cava: a large vein through which deoxygenated blood reaches your heart from the body.

Ventilation: the exchange of air between the lungs and the atmosphere so that oxygen can be exchanged for carbon dioxide.

Ventricle: one of the chambers in the heart.

Villi: structures in the small intestine which help absorb nutrients.

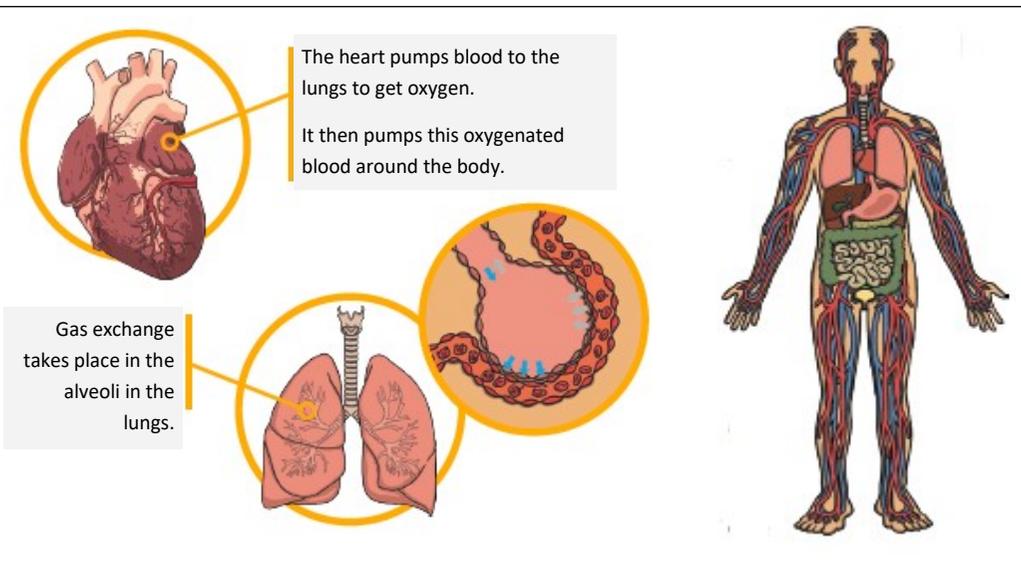


SCIENCE KNOWLEDGE MAT -Year 6

Animals Including Humans

MAIN IDEA

Children will be able to name the main parts of the human circulatory system and describe the functions of the heart. They will understand the impact of diet and exercise on the way human bodies function and ways in which nutrients are transported within the body.



WHAT CAME BEFORE

Year 5 – to describe the changes humans undergo as they develop into old age.

WHAT COMES NEXT

KS3—to understand the structure and function of living organisms.

KEY LEARNING

- The circulatory system is made of the heart, lungs and the blood vessels.
- The heart is composed of four chambers: the right atrium, the right ventricle, the left atrium and the left ventricle.
- How often your heart pumps is called a pulse.
- Arteries carry oxygenated blood from the heart to the rest of the body. Veins carry deoxygenated blood from the body to the heart.
- Nutrients pass through the villi and are absorbed into the blood vessels. Water is absorbed in the small intestine .
- Some choices, such as smoking and drinking alcohol can be harmful to our health. They carry short-term effects such as shortness of breath or less of control.
- Exercise is important because it can

INVESTIGATE / QUESTIONS

- How does your pulse change with exercise? Can you present the data efficiently?
- Which exercise produces the fastest pulse? How would you make this a fair test?
- Can you explain the importance of exercise?
- Can you identify the parts of the circulatory system and explain their functions?

WHAT YOU SHOULD ALREADY KNOW

- The classification of animals: amphibians, reptiles, birds, fish, mammals, invertebrates.
- The differences between carnivores, herbivores and omnivores.
- Animals get nutrition from what they eat.
- Some animals have skeletons for support, protection and movement.

VOCABULARY

Adaptation: any change in the structure or behaviour of a species which helps it to become better fitted to survive and reproduce in its environment.

Ancestors: a person from who one is descended.

Chromosomes: DNA molecules that contain the set of instructions required to build and maintain cells

Endangered: species at risk of extinction because of human activity and other changes such as environmental changes

Evolution: change in the gene pool of a population from generation to generation by such processes as mutation, natural selection, and genetic drift

Extinct: no longer in existence; that has ended or died out

Fossils: any remains, impression, or trace of a living thing of a former geologic age, as a skeleton or footprint



SCIENCE KNOWLEDGE MAT -Year 6

Evolution & Inheritance

MAIN IDEA

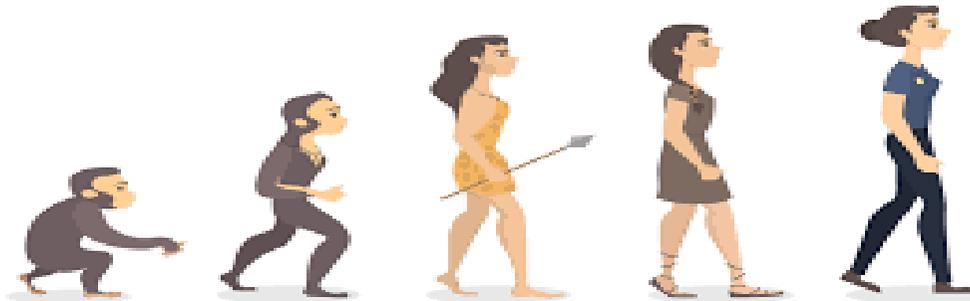
Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles.

WHAT CAME BEFORE

Year 3: fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter and tell us about plants and animals of the past.

WHAT COMES NEXT

KS3 Biology: Structure and function of living organisms, Cells and organisation, Skeletal and muscular systems, Nutrition and digestion, Gas exchange systems, Reproduction and Health



WHAT YOU SHOULD ALREADY KNOW

There are variations in animals and plants, even within the same species. The features of these living things help them to survive in varying conditions and protect against predators as well as help them in catching their prey. Fossils inform us as to how animals and plants have changed over time.

KEY LEARNING

Pupils will learn about how humans and animals have adapted over time to their environment in order to survive. They will learn that variation in offspring over time can make animals more or less able to survive in particular environments. Pupils will explore the work of palaeontologists such as Mary Anning, and discover how Charles Darwin and Alfred Wallace developed their ideas on evolution. Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.

INVESTIGATE / QUESTIONS

Explore the work of Mary Anning, prominent palaeontologist. What did she discover, and how is still significant today?

Think about the animals that live in different environments, such as the Artic or the Sahara Desert. How have they adapted in order to optimise their survival in the harsh conditions?

Research some fossils of the same species of plant or animal. How do you think they have adapted over time? Why?

VOCABULARY

Conductor: Some materials let electricity pass through them easily. These materials are known as electrical conductors.

Insulator: materials that don't let electricity pass through.

Socket: a safe device to plug your electrical items into at home. Almost every room at home will have at least one socket.

Series circuit: s one that has more than one resistor, but only one path through which the electricity (electrons) flows.

Cells: a device that is used to generate electricity, or one that is used to make chemical reactions possible by applying electricity.

Volts: Voltage is an electrical potential difference, the difference in electric potential between two places.

Generator: A machine that converts energy into electricity.

Turbine: A machine that creates continuous power in which a wheel, or something similar, moves round and round by fast moving water, steam, gas or air.

Fuses: These are safety devices. A fuse is a strip of wire that melts and breaks an electric circuit if it goes over a safe level.

Thomas Edison: inventor that came up with a way of making the electric light bulb accessible for homes, industry and outside in the streets.



SCIENCE KNOWLEDGE MAT -Year 6

Electricity

MAIN IDEA

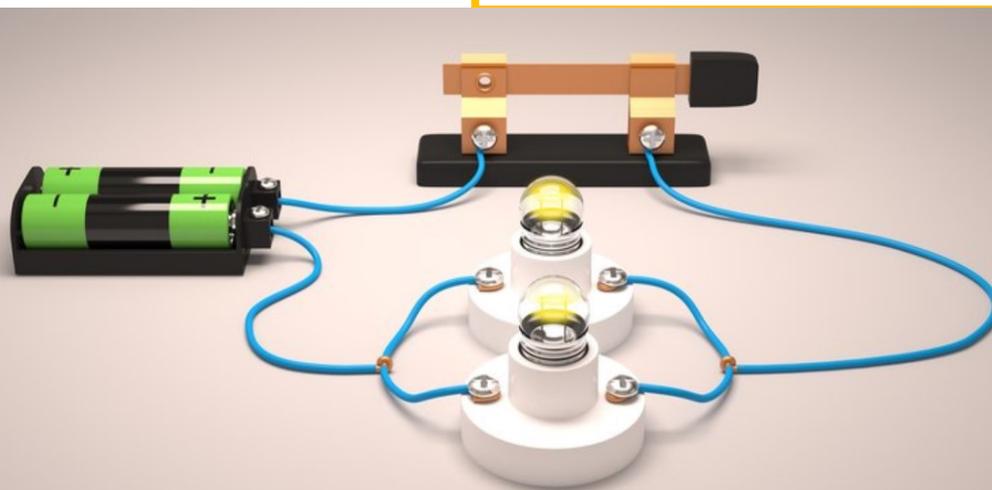
Learn how to construct a simple series circuit and represent it as a diagram using recognised symbols. Relate the brightness of a bulb to voltage, and compare and give reasons for how the different components function. Explore more sustainable energy,

WHAT CAME BEFORE

Year 4 - identify common appliances that run on electricity and construct simple series electrical circuits. Identify and name its basic parts, including cells, wires, bulbs, switches and buzzers. Draw simple electrical circuits without conventional symbols.

WHAT COMES NEXT

Key Stage 3: Electricity and electromagnetism



WHAT YOU SHOULD ALREADY KNOW

Construct simple electrical circuit and name its basic parts, including cells, wires, bulbs, switches and buzzers.

Draw simple electrical circuits and know the essential elements needed to make a circuit work.

KEY LEARNING

Compare and give reasons for variations in how components function, such as the loudness of buzzers or the on/off position of switches

Building on their work in year 4, pupils will construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors.

Pupils are taught to take the necessary precautions for working safely with electricity, and how to look for hazards in the home such as overloaded adapter switches.

Pupils will work apply their knowledge of series circuits by designing and making devices such as traffic lights or burglar alarms.

INVESTIGATE / QUESTIONS

How else can energy be generated?

How many volts of electricity can lighting generate? How many lightbulbs is this equivalent to?

How are electric fields and gravity similar?

VOCABULARY

Pupil: the small, dark opening in the center of the eye. Light passes through the pupil into the eye.

Iris: the coloured circle around the pupil of the eye. *A person with blue eyes has blue irises.*

Lens: a clear part of the eye that brings together the rays of light needed for sight. The lens focuses rays of light so that they form an image inside the eye on the retina.

Retina: the part of the eye at the back of the inside of the eyeball. The retina has cells that sense light and color. Images are formed on the retina and sent to the brain.

Reflection: light, or an image that bounces off an object or surface.

Refraction: the bending of rays or waves of light, heat, sound when passed from one medium to another such as from air to water.

Convex: having a surface or edge that curves outward like the outside of a ball.

Concave: curved inward like the inside of a bowl. Opposite to convex.

Kaleidoscope: a tube with small bits of colored glass and mirrors inside. The tube is held to the eye and turned to see changing forms.

Periscope: an instrument on a submarine that is made up of a long tube with mirrors and prisms that allow one to see above the surface of the water.

Prism: a solid glass or crystal object that splits a ray of light into the colors of the rainbow.



SCIENCE KNOWLEDGE MAT -Year 6

Light

MAIN IDEA

Exploring the way that light behaves, such as travelling in straight lines. Learn about light sources, reflection and shadows in more detail through investigations. Pupils will learn about how we see through the anatomy of the eye.

WHAT CAME BEFORE

How light and shadows affect each other, according to the position of the light source, including the Sun.

WHAT COMES NEXT

The similarities and differences between light waves and waves in matter. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.



WHAT YOU SHOULD ALREADY KNOW

Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Name the eight planets that orbit the sun, and their order in terms of position from it.

KEY LEARNING

- 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.

INVESTIGATE / QUESTIONS

Where would be a good place for rear-view mirrors on cars? Why do "blind spots" happen?

Design and make a periscope and using the idea that light appears to travel in straight lines to explain how it works.

What is the relationship between light sources, objects and shadows? Make some shadow puppets to find out.

How do rainbows happen? How can you make one?

Put a pen into a half filled glass of water. What appears to happen? What causes this?