

Diet – The food that someone normally eats

Carbohydrates – examples are bread and pasta

Fruits and vegetables – examples are apples and tomatoes

Protein – examples are fish and chicken

Dairy – examples are milk and cheese

Oils and spreads – examples are butter and sunflower oil

Sticky Knowledge – When food enters our bodies it is digested. Foods contain energy and nutrients, and these can be tested for.



1. Sort food groups

We need carbohydrates, fruits and vegetables, dairy, protein, and oils and spreads.



2. Test food for protein, starch, and sugar.

Food tests: Iodine = starch,
Benedicts = sugar,
Biuret = protein



3. Investigate which food contains the most energy

Some foods contain more energy than others and this can be released through burning.



4. Recognise the consequences of a poor diet

Poor diet can lead to rickets, kwashiorkor, scurvy, heart disease, diabetes



5. Identify parts of the digestive system

The mouth, oesophagus, stomach, small and large intestine make up the digestive system. Different parts are adapted to digest food at different points.



6. Make a model of the digestive system

Models can be used to show the journey of food through the digestive system.



Vocabulary

Cell - the smallest unit of life and the building blocks for all organisms

Cytoplasm – jelly like substance where reactions take place

Nucleus – controls the cell and contains genetic information

Cell membrane – controls what goes in and out of the cell

Vacuole – stores cell sap in plant cells

Chloroplast – where photosynthesis takes place

Mitochondria – where energy is released

Microscope – used to see very small objects like cells

Organisation- how multicellular organisms are arranged into tissues, organs and organ systems.

Sticky Knowledge – Cells are the building block of living things.



1. Identify what is living and why
Items can be sorted into two groups: living things, and non living things.

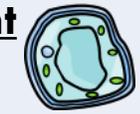


2. Use a microscope to observe an animal cell



All living things are made of cells. The basic cell consists of cytoplasm, cell membrane and a nucleus. The cell membrane controls what goes in and out of the cell, the nucleus controls the cell and contains DNA. The cytoplasm is where chemical reactions happen. A microscope can be used on different magnifications and focused to view cells.

3. Use a microscope to observe a plant cell



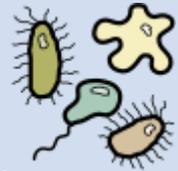
Both plants and animals are living things. The cells that make up plants and animals are different. Plant cells also contain chloroplasts, cells wall and a vacuole.

4. Name some specialised cells



Organisms contain specialised cells for a particular purpose. The red blood cell carries oxygen, nerve cells sends and receives messages, the sperm cell swims to fertilise the egg, the root hair cell absorbs water from the soil.

5. Sequence the order of organisation in and organism and name some major organs



Multicellular organisms are organised from simplest to complex – cells, tissue, organs, organ systems, organism.

6. Use and evaluate models of cells



Models are used in Science to help visualise and explain scientific concepts. Strengths and weaknesses of models can be identified (tricky skill)

Vocabulary

Breathe – take air in and out of the lungs

Lungs – organs where gas exchange takes place

Heart – the organ that pumps blood

Circulatory – goes around

Blood – transports materials around the body and protects against disease.

Oxygen – a gas needed for respiration

Energy – makes things happen in the body

Glucose – a sugar used for respiration

Diaphragm – a sheet of muscle under the lungs

Alveoli – an air sac in the lung

Gas exchange – oxygen enters the body and carbon dioxide leaves the body

Sticky Knowledge – oxygen is taken in from the air via our lungs and used to release energy in our cells



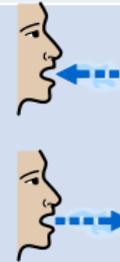
1. Describe how and why we breathe

Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing.



2. Describe inhalation and exhalation

Inhalation is the process that allows air to be sucked into the lungs.
Exhalation is the process that forces air out of the lungs.



3. Find out what respiration is

A chemical reaction happens in the cells of the body between oxygen and glucose to produce energy, carbon dioxide and water.



4. Understand the effect of smoking on breathing

Tobacco contains harmful substances, many of which are carcinogens (cancer causing). The tar can cause damage to the cilia and alveoli.



5. Investigate the effect of exercise on heart rate?

Exercise causes an increase in **pulse rate (heart rate)**. When **exercising** our muscles contract more often and require more energy. Energy is made during the process of respiration.



Vocabulary

Rock- solids which are made of grains of minerals which fit together.

Earth a rocky planet, home

Crust- the rocky outer layer of the Earth

Core- the centre of the Earth

Mantle- the semi-solid middle layer of Earth

Lava- molten magma on the Earth's surface

Molten- liquefied

Volcano- a vent in the ground which is caused by the upward movement of magma through cracks in the rock

Pressure- a force exerted on an area

Minerals- A solid compound which occurs naturally in rocks.

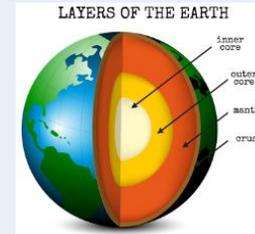
Sticky Knowledge – there are three types of rock, igneous, sedimentary and metamorphic.



1. A model of Earth's structure

The Earth is a rocky planet. It has three layers, from the outside, they are:

- the **crust**
- the **mantle**
- the **core**



2. How sedimentary rocks form

A sedimentary rock is a rock formed by small rock pieces being transported by rivers and laid down in layers.

Chalk, limestone, shale, and sandstone are sedimentary rocks.



3. How Metamorphic rocks form

Metamorphic rocks are formed when another rock is under heat and pressure.

Marble is a metamorphic rock, it is highly decorative and used for statues.



4. How igneous rock form

Igneous rocks are formed from molten (liquid) rock that has cooled and solidified.

Basalt and granite are igneous rocks



5. Weathering and erosion of rocks

Weathering breaks down rocks on the surface of the Earth. Erosion is the process of moving the small pieces of rock formed by weathering.

Erosion occurs from the action of water or wind.



6. The rock cycle

Rocks are continually changing due to processes such as weathering, erosion and large earth movements.

The rocks are gradually recycled over millions of years, changing between the different rock types.

Sticky Knowledge – heat is transferred from a hot object to its surroundings.



Temperature- A measure of the average kinetic energy of particles in a substance

Thermometer- device used to measure the temperature of a substance.

Energy- energy can be stored and transferred. Energy is a conserved quantity.

Conduction- Energy transfer by heating through a material due to collisions between particles.

Convection- The transfer of heat energy through a moving liquid or gas

Radiation- Electromagnetic wave emitted from a hot object.

Insulation- a material that reduces heat loss.

1. Temperature

Temperature is how hot a substance is.

Temperature is commonly measured in degrees Celsius ($^{\circ}\text{C}$) using a thermometer.

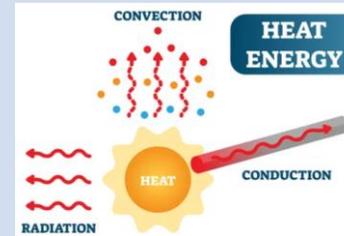


2. Heat transfer

Energy can transfer by heating from a hotter region to a cooler region.

Energy is transferred by heating by:

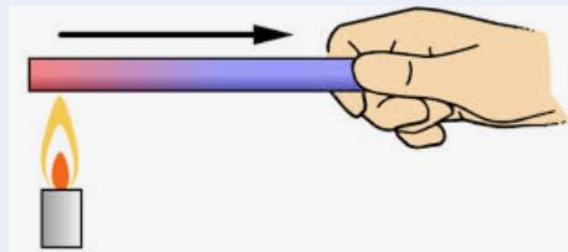
- radiation
- conduction
- convection



2. Conduction

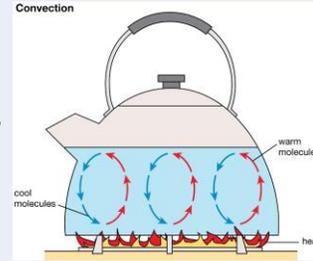
Conduction is where heat is transferred by the vibrating particles in a substance. The energy is transferred from a hotter region to a cooler region.

Conduction happens fastest in solids.



4. Convection

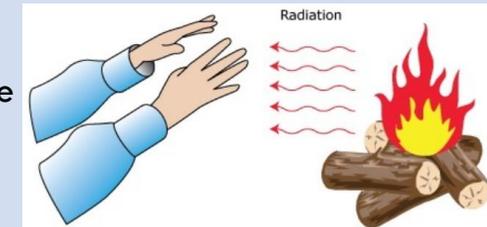
Convection occurs when particles with a lot of heat energy in a liquid or gas move and take the place of particles with less heat energy.



5. Radiation

All objects transfer energy to their surroundings by infrared radiation. The hotter the object, the more infrared radiation it emits.

Infrared radiation is a type of electromagnetic wave.



6. Insulation

Insulation is used to reduce unwanted thermal energy transfers and maintain the temperature of an object.

For example, an insulated picnic bag can keep your lunch cooler for longer. It can also keep hot food hotter for longer.



Ecosystem- A community and the habitat in which organisms live.

Habitat- The place where an organism lives.

Environment- All the conditions that surround a living organism

Food Chain- list of organisms in a habitat that shows feeding relationships and the energy which transfers from one to the next when eaten.

Living- alive

Non-living- not alive, soil, water etc

Invertebrate- animal with no backbone, e.g. insect

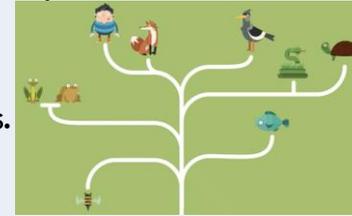
Vertebrate- animal with a backbone, e.g. birds, mammals, reptile, amphibian,

Sticky Knowledge –



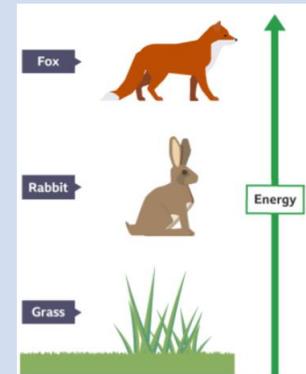
1. Animal groups

Animals are divided into two main groups. Animals that have a backbone (spine) are called vertebrates. Animals that don't have a backbone are called invertebrates.



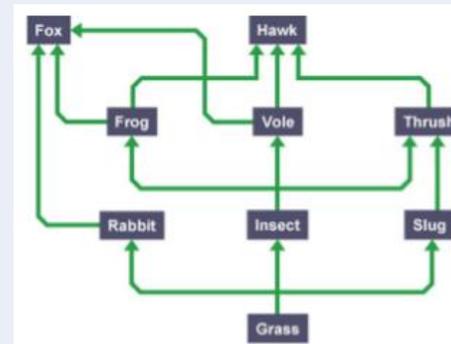
2. Food chains

A food chain shows how plants and animals get their energy. It always starts with a producer.



3. Foodwebs

A food web is made up of a number of food chains. It shows all the food chains in an ecosystem.

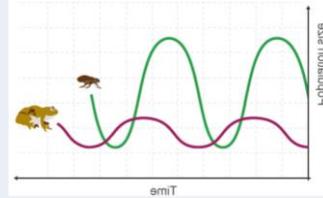


4. Predator prey relationships

A predator is an animal that eats other animals.

Prey are the animals that predators eat.

Predator-prey cycles show the natural rise and fall of numbers of predators and prey over time.



5. Interdependence

All organisms in a food web depend upon each other. This is interdependence. If one organism increases or decreases its numbers dramatically, this has consequences for others.

Food webs are able to flex and quickly bounce back to small changes in numbers. However big changes are more difficult for food webs to stabilise. These large changes are often due to human activity, such as deforestation, constructing roads and buildings, and the use of chemical pesticides.



Sticky Knowledge – magnets attract or repel magnetic objects. Magnetism is a non-contact force.



Vocabulary

Magnet – something that can pull a metal object towards itself.

North – the opposite of south.

South – the opposite of north.

Pole – the end of a magnet.

Attract – pull towards.

Repel – push away.

Magnetic – containing iron, nickel or cobalt.

Force – a push or a pull.

Strong – a large force.

Weak – a small force.

1. Find out what is magnetic and what is not magnetic



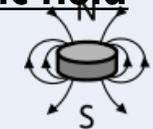
There are 3 magnetic metals – iron, nickel and cobalt.

2. Demonstrate magnetic attraction and repulsion



If you bring a north pole and a south pole together, they attract and the magnets stick together. If you bring two north poles together, or two south poles together, they repel and the magnets push each other away

3. Record observations of a magnetic field



A magnet creates a magnetic field around it. You cannot see a magnetic field, but you can observe its effects.

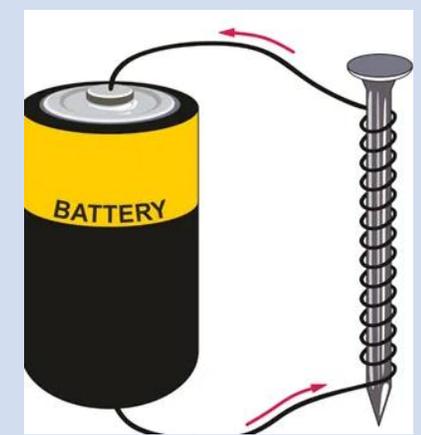
4. Recall that Earth has a magnetic North and South pole?



The outer core of the Earth contains a lot of iron in a molten state. As the Earth spins this molten iron moves and creates the Earth's magnetic field. The Earth behaves as if there is a huge bar magnet at its centre.

5. Investigate electromagnets

An electromagnet uses an electrical current to generate a magnetic field. You can strengthen an electromagnet by increasing current and increasing the number of turns of the coil.



Vocabulary

Skeleton- something to support and protect a body and to help it move

Muscle- pull on bones for movement.

Biceps and Triceps- A pair of muscles that act on elbow joint. As one muscle contracts the other relaxes

Contract and relax -Muscles get shorter by contracting and return to their original length when they relax. Muscles

Tendon- A strong cord-like tissue which connects muscles to bones.

Joint- Part of the body which allows movement including the neck, elbows, hips and knees.

Lever- A simple mechanism that helps something move more easily

Protection- keep safe

Sticky Knowledge – how the skeleton moves at its joints when muscles exert force on bones.



1. Recognise and name some different bones in the body



Recall bone names; skull, rib cage, pelvis, spine, shin, knee cap, collarbone, breast bone

2. Describe the role of the skeleton



Humans and some other animals have skeletons for support, protection and movement



3. Say what a joint is



Recognise that a joint is where the bone meets and there are different types; fixed, ball and socket, pivot or hinge.

4. Say what a muscle is



Identify most muscles are attached to bones and that the heart is made of muscle.

5. Make a model of antagonistic muscle pair



Recognise muscles work in pairs to move bones by relaxing or contracting.

6. Identify tendons, bones, and muscles in a chicken wing



That muscles are connected to bone joints by tendons. This allows bones to move.

7. Find out if resting affects muscle fatigue

The longer the rest period, the less fatigue in the antagonistic muscles of the arm.



Vocabulary

Seeds - Structure that contains the embryo of a new plant

Pollination - pollen from one flower needs to travel to another

Pollinators – insects which transfer pollen.

Stamen - the male reproductive organ of a flower

Ovary – where the seed is produced

Anther – where pollen is produced

Stigma - The top of the female part of the flower which collects pollen grains.

Leaf - produces food for the plant through a process called photosynthesis.

Root – hold plants in place as they grow and also absorb water and minerals from the soil

Dispersal – spread out

Sticky Knowledge – plants are adapted to reproduce. They produce seeds.

1. Name the parts of a green and flowering plant



Plants can be flowering or non-flowering. Parts include, roots, stem, leaves, petals, stamen, stigma, anther, ovary

2. Find out how seeds are dispersed

Seeds must be dispersed or spread away from each other to reduce competition between the parent plant and the new plants. This is done through wind or animals.



3. Describe how pollen is carried by insects, water, and wind?

Pollen is a fine powder produced by the anthers on the stamen of plants. During the spring and summer it is released into the air and picked up by the wind. The wind carries it to other plants so they can make seed.



4. Identify the flowers reproductive organs

Reproduction in flowering **plants** begins with pollination, the transfer of pollen from anther to stigma on the same flower or to the stigma of another flower on the same **plant** (self-pollination) or from the anther on one **plant** to the stigma of another **plant** (cross-pollination).

Sticky Knowledge – human reproduce sexually to have a baby.



Vocabulary

Reproduction- the creation of a new organism

Pregnancy- the period when a woman is carrying a developing baby

Menstruation- having a period

Sperm- the male sex cell

Egg- the female sex cell

Fetus- an unborn baby

1. Describe how a new life starts



Fertilisation is the successful joining of male and female sex cells.

2. Label male and female reproductive organs



Male reproductive system is made up of: Penis, testicle, scrotum, sperm cell.

Female reproductive system is made up of: vagina, oviduct, womb, cervix, ovaries

3. State what the menstrual cycle is

Oestrogen is the main female reproductive hormone produced in the ovary. At puberty eggs begin to mature and one is released approximately every 28 days. This is called ovulation. Several hormones are involved in the menstrual cycle of a woman.



4. Sequence and describe how a baby develops



After fertilisation, cells start to replicate and differentiate to form different types of cells to form an organism.

5. Find out how a mothers lifestyle affects a developing baby

The placenta is an organ that grows into the wall of the uterus and is joined to the fetus by the umbilical cord. It allows the exchange of materials such as oxygen and nutrients.



Sun- the star at the centre of our galaxy.

Moon – a natural satellite that orbits a planet

Earth – our planet

Orbit – go around

Axis – a fixed point in a shape

Spin – turn around/rotate

Rocky planet – a planet made of rock

Gas giant – a planet made of gas

Stars – a cloud of gas which releases energy and light.

Season- spring, summer, autumn, winter

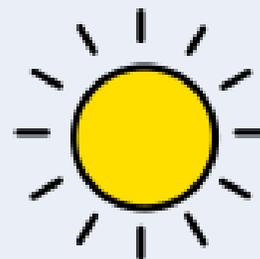
Gravity- a force that pulls things together.

Sticky Knowledge – the Earth is a planet in the Solar System. It orbits the Sun which is a star.



1. Recognise the sun is a star in our galaxy

A star produces its own energy. The closest largest star to us is 'the sun'. All energy on Earth comes from the sun.



2. Describe why we have night and day

Earth spins on its own axis which takes 24 hours for a full turn. As it spins it moves towards and away from the sun.



3. Find out why we have different seasons

This axis is tilted slightly compared with the way the Earth orbits the Sun. **We get different seasons** (winter, spring, summer and autumn) because the Earth's axis is tilted



4. Order and compare planets in our solar system

The solar system consists of the Sun, with planets and smaller objects such as asteroids and comets

in orbit around it. There are eight planets in the solar system. Starting with Mercury, which is the closest to the Sun, the planets are:

My Very Easy Method Just Speeds Up Naming



5. Find out what is beyond our solar system

Stars form immense groups called galaxies. A galaxy can contain many millions of stars, held together by the force of gravity.

