Y3 SCIENCE KNOWLEDGE - ORGANISER AUTUMN 1: HOW DOES ONE ROCK COMPARE TO ANOTHER?
THRESHOLD CONCEPT: CHEMISTRY – INVESTIGATE MATERIALS

Key Vocabulary			
rock	made up of grains (solid mineral material) that are packed together forming part of the surface of the earth.	Magma / lava	Hot liquid which flows out of a volcano below (magma) or above (lava) the earth's surface.
permeable	allowing liquid (e.g. water) or gases to pass through.	metamorphic	an igneous of sedimentary rock that has been changed by extreme heat or pressure.
impermeable	Not allowing liquid (e.g. water) to pass through.	fossil	the remains or impressions of a prehistoric plant or animal embedded in rock.
igneous	lava or magma that has turned from liquid to solid (forming a rock).	sediment	dead animals, plants or pieces of rock that settles to the bottom of a liquid.
minerals	solid chemical substances that occur naturally.	sedimentary	a rock formed from the build-up of sediment deposited by water or air.

How are rocks different?
Rocks on earth were made billions of years ago from stars in space
Rocks are found inside the Earth's crust

Different rocks have different characteristics because of their minerals, the ways in which the rocks were formed, and the processes that acted on the rocks since they were formed.
Rocks can be similar or different in colour, shape, size, texture and appearance.

What is rock hardness?
Hardness (H) is the resistance of a mineral to scratching. The hardness of rocks can be measured on the Mohs Scale of hardness
Hard rocks – granite and precious stones
Soft rocks – talc, chalk and limestone

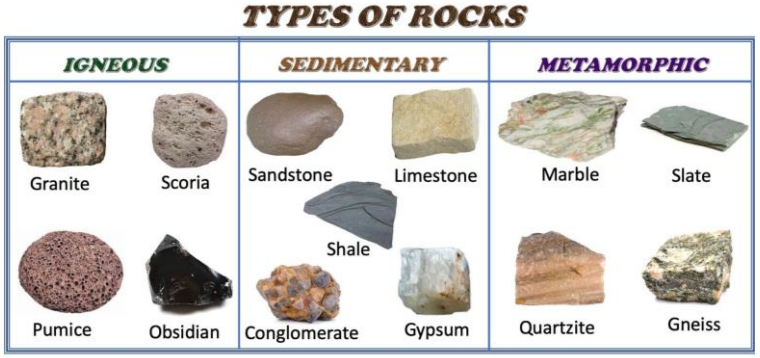
How are rocks formed?
There are three main types of rocks: sedimentary, igneous, and metamorphic. Each of these rocks are formed by physical changes—such as melting, cooling, eroding, compacting, or deforming—that are part of the rock cycle.

Types of rocks
Igneous rocks are very hard, dark and heavy. They are formed when molten magma from a volcano cools down. They tend to have interlocking grains giving the rock a crystalline appearance.
Metamorphic rocks are rocks, which have been changed over time by pressure or heat. Fossils can be found in metamorphic rocks if plants and animals have been trapped in the rocks.
Sedimentary rocks are formed by sediment (which includes minerals, small pieces of plants and other organic matter) that is deposited over time. The sediment is compressed over a long period of time before it becomes solid layers of rock.

What is soil made from?
Soil is a mixture of tiny particles of rock, dead plants and animals, air and water. Different soils have different properties depending on their composition.

Super Scientist
Carl Friedrich Christian Mohs was a German geologist and mineralogist. He was the creator of the Mohs scale of mineral hardness.

Geologists are scientists who study the Earth: its history, nature, materials and processes.



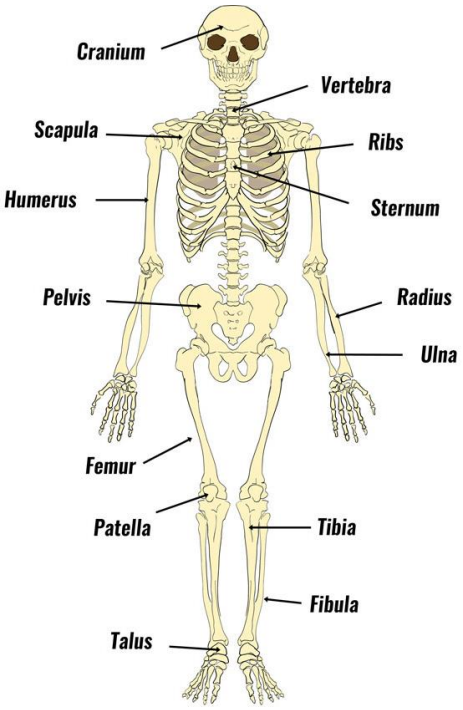
Fossils
When an animal or plant dies, it usually decays quickly or can be eaten. However, sometimes an animal's body sinks into thick mud where there is oxygen so the remains don't decay or aren't disturbed. The remains rest here for thousands/millions of years with more mud and pressure on them. Minerals in the mud turn the remains to stone.

Y3 SCIENCE KNOWLEDGE - ORGANISER AUTUMN 2: WHY DO WE NEED BONES?
THRESHOLD CONCEPT: BIOLOGY – UNDERSTAND ANIMALS AND HUMANS

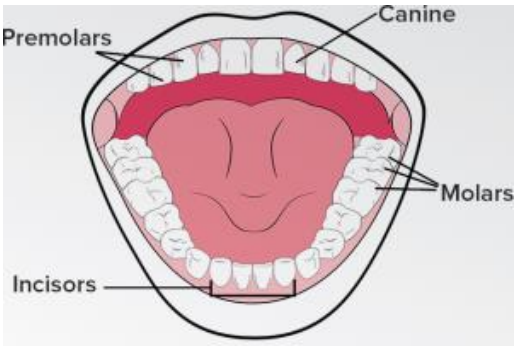
Key Vocabulary			
nutrition	food necessary for health and growth.	skeleton	A structural frame that supports an animal body.
carnivore	an animal that feeds on another animal.	vertebrate	animals with backbones
herbivore	an animal that feeds on plants.	invertebrate	animals without back bones
omnivore	an animal that feeds on both plants and animals	cranium	the skull especially the part enclosing the brain.
teeth	hard, bony structures in the jaws of most vertebrates, which are used for eating.	ribs	curved bones articulated protecting the internal organs.
joint	part of the skeleton that allows movement.	spine	vertebrae extending from the skull and down the back.

Why do I need a skeleton?
Humans can move because their body is supported by an internal skeleton. That's right - you are just a bag of bones!

Our skeleton allows us to **move** (joints like elbow, knee and hip), it offers us **protection** (soft organs like the brain and heart) and it **supports** our body.



Types of human teeth
Different teeth do different jobs.
Incisors (say in-si-zors)
These teeth are immensely important since we use them to take the first bite of food. These are for cutting.
Canines (say cay-nines)
There are four canine teeth in our mouth and these are the sharpest of all. These teeth must stay in healthy form because they are used to tear and wear your food and plays an important part in the digestion process.
Molars and premolars (say mow-lers):
These teeth are used for chewing and grinding food so that it becomes totally in a semi-liquid form helping food particles to gulp down the throat and digest smoothly.



Super Scientist Leonardo da Vinci
(1452-1519), The famous Italian Renaissance artist and scientist, is credited as the first anatomist to correctly illustrate the skeleton with its 206 bones.

Do all animals have skeletons?
All animals have skeletons of one sort or another. Mammals, birds, reptiles, amphibians and fish have bony skeletons. These skeletons come in all shapes and sizes, but they also share common features.

Animal skeletons have adapted to different forms of movement. Fish swim with long, flexible backs and strong fins while frogs hop using their strong back legs. Birds are light because their bones are hollow. They are **vertebrates** because they have a backbone. Some animals, like insects and crabs, have an external (outside of their bodies) skeleton. These are called **invertebrates** because they do not have a backbone.

Y3 SCIENCE KNOWLEDGE - ORGANISER SPRING 1: WHAT CAN I SEE AND HOW CAN I SEE IT?
THRESHOLD CONCEPT: PHYSICS UNDERSTAND LIGHT AND SEEING

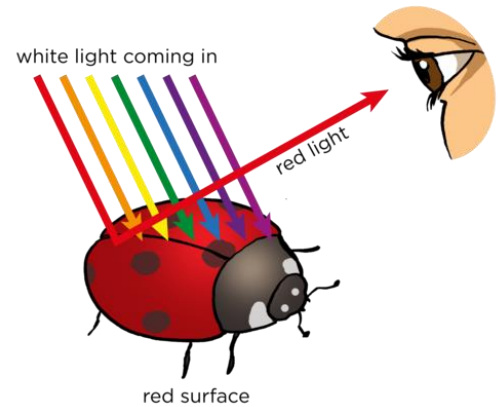
Key Vocabulary			
light	the invisible waves that make things visible.	absorb	take in or soak up energy (like light).
light source	an object that produces its own light (sun, fire).	reflect	throw back (heat or light)
opaque	does not allow light to pass through it.	eye	a spherical organ of sight in the head of humans and animals.
Transparent	allowing light to pass through it.	shadow	q dark shape produced by an opaque object blocking rays of light.
Translucent	allowing light, but not detailed shapes, to pass through; semi-transparent.	artificial light	light made from a man-made object (torch, lamp).

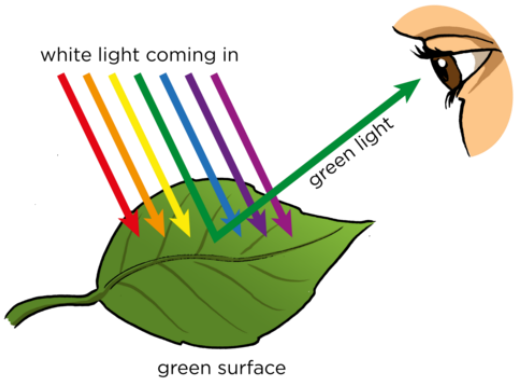
What is a light source?
Light is a form of energy that enables us to see the world around us. Light comes from different sources. Our main source of natural light is the Sun. Even at night, the moon reflects the Sun's light creating moonlight.

Light sources include the sun , light bulbs and stars. They are called natural light sources because they emit light naturally.
Reflectors, such as the moon, cat's eyes and mirrors, do not produce light; they reflect it from another source.

Why do we need light?
Light helps us see things.
Light warms us up.
Light can keep us healthy.

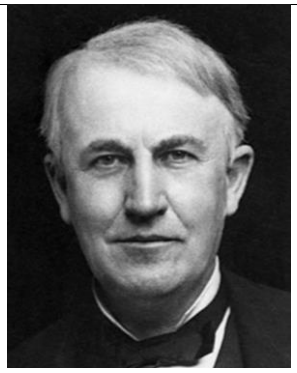
How do we see?
Light waves come in lots of different colours such as red, green and yellow. You can see some of these colours in a rainbow.
1. Light from a source hits an opaque object.
2. Some colours are absorbed by the object.
3. One colour is reflected from the object.
4. Your eyes see the colour that is reflected.





Super Scientist
Thomas Edison is believed to have developed and improved the **incandescent** light bulb in order to create a more practical, efficient, and affordable model of electric lamps.

incandescent - emitting light as a result of being heated.

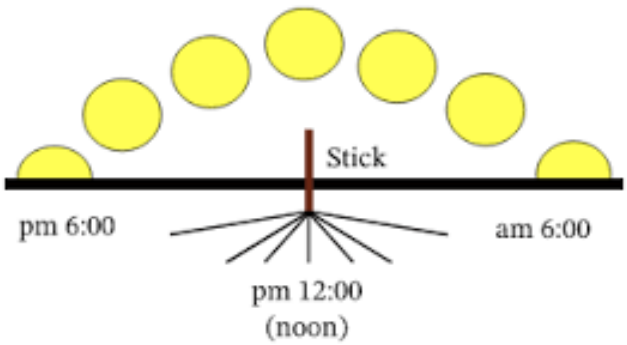


Why do shadows move though the day?
When we are outside on a sunny day, we can see how our shadows change throughout the day. When the sun is low on the horizon, the shadows are long. When the sun is high in the sky, the shadows are much shorter.

How is a shadow made?
Shadows are formed when an opaque object blocks the path of light; light can only travel in straight lines. This opaque object stops the light from passing through it. It creates a dark area on a surface – a shadow.

Shadows change depending on the distance the object is from the light source and the position of the light source.

The shadow stick



Did you know? Light travels faster than anything in the universe. Light travels at a speed of 299,792,458 miles per second and it takes sunlight only 8.20 minutes to reach the Earth, which is 92.96 million miles away.

Y3 SCIENCE KNOWLEDGE - ORGANISER SPRING 2: HOW DOES MY GARDEN GROW?
THRESHOLD CONCEPT: BIOLOGY – UNDERSTAND PLANTS

Key Vocabulary			
root	part of a plant which sits underground to support and feed it.	nutrients	substances that provide nourishment for life and growth.
stem	the main body or stalk of a plant.	dispersal	the action of distributing or spreading things over a wide area.
flower	the reproducing, seed-bearing part of a plant typically surrounded by coloured petals.	pollen	a yellow powder from the stamen (male part of the flower).
leaf	A flat, green blade structure of a plant, that is attached to a stem.	anther	a small sac that holds pollen.
seed	a small pip capable of developing into a new plant.	pistil	the female part of the plant, which consists of the stigma and ovary.
fruit	the fleshy product of a plant that contains the seed. It can be eaten.		

What are plants?
Plants are living organisms that cover much of the land of planet Earth. You see them everywhere. They include grass, trees, flowers, bushes, ferns, mosses, and more. Plants are members of the kingdom Plantae.

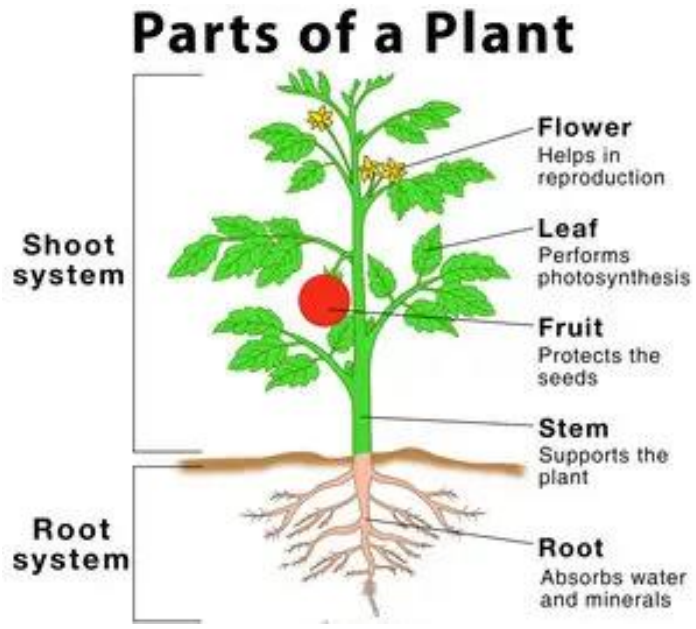
The basic parts of most flowering plants are **roots, stems, leaves, flowers, fruits and seeds.**
Each of these parts perform a very important function. These functions help the plant grow and reproduce.

Functions of a plant
Roots
1. Absorbe minerals and water.
2. Anchors the plant to the ground.

Stems
1. Supports the plant.
2. Takes minerals to the leaf.

Leaves
1. Makes food for the plant.
2. Absorbs carbon dioxide.

Flowers
1. Holds the seeds for new growth.
2. Attracts insects for pollination.
3. Flowers can have colourful, fragrant petals. They attract insects. The insects pollinate the flower so it can produce seeds on the flower or inside the fruit.

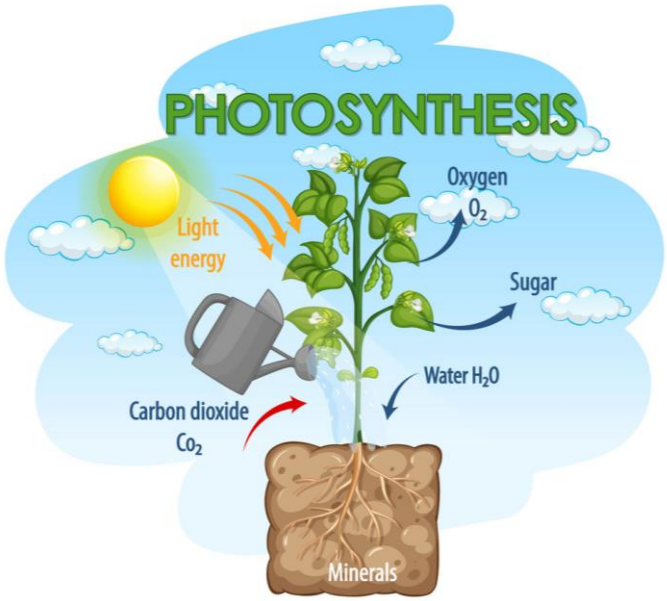


A **botanist** is a scientist who studies plants.
Botanists are important scientists. Their work helps us decide which plants to grow where, safe ways to grow plants and how to grow plants for food and medicine.

Super Scientist
Jeanne Baret is thought to have introduced approximately 70 plants to Europe.

How is water transported within plants?
Roots absorb water from the soil where the plant is planted. Water is sucked up through the stem (just like the way you suck up a drink through a straw!) where there are small tubes called **xylem.** They carry water up to the leaves and flowers. This is called **capillary action.**

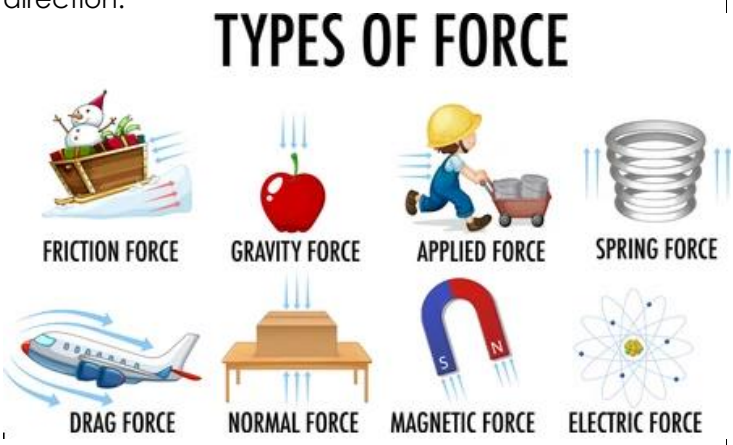
What does a plant require for growth?
Plants need certain requirements to grow: sunlight, temperature, water, air and nutirents. These five things are provided by the natural environment where plants live.
If any of these requirements are missing, the plant might not grow properly.



Y3 SCIENCE KNOWLEDGE - ORGANISER SUMMER 1: WHAT IS A MAGNET AND WHAT CAN IT DO?
THRESHOLD CONCEPT: PHYSICS - UNDERSTAND MOVEMENT, FORCES AND MAGNETS

Key Vocabulary			
force	a push, pull, twist or turn that changes the movement or shape of an object.	repel	To push away (the opposite of attract).
magnet	a material or object that produces a magnetic field, it attracts or repels magnetic objects.	attract	The pull by a physical force causing the object to draw closer (opposite of repel).
magnetic	Having the power to attract other magnetic objects.	magnetic pole	Region at each end of a magnet where the magnetic field is strongest.
non-magnetic	Not being attracted by other magnetic objects.	metal	Material that can be polished and shaped. Metals conduct electricity and heat.
gravity	a pushing force exerted by the Earth, it attracts objects towards the centre of the Earth.		

What is a force?
Forces are pushes, pulls or twists in a particular direction.



Balanced forces
If two forces are balanced, it means the forces are the same size but are acting in opposite directions.
If two balanced forces are acting on an object, that object will not change its motion. If it is still, the object will stay still or if it is moving, it will continue moving in the same direction and at the same speed.

Unbalanced forces
When two forces acting on an object are not equal in size, we say that they are unbalanced forces.
Unbalanced forces do change the way something is moving.
They can make objects start to move, speed up, slow down or change direction.

What are magnets?
Magnets are objects or materials that produce a magnetic field and attract or repel magnetic objects.

Magnets have 2 poles: north and south.
If you put magnets towards each other:
- 1 south pole and 1 north pole will attract
- 1 south pole and another south pole will repel
- 1 north pole and another north pole will repel

Super Scientist
Born in 1643, **Sir Isaac Newton** was famous for his work on Gravity and his three laws of motion.

He studied maths and physics, and is perhaps best known for discovering gravity.

He described it as a 'pulling force', and even deduced that it was responsible for keeping the Moon in orbit.

Not all materials are magnetic. **Magnetic** refers to something that attracts metal – like iron or steel.
Which materials are non-magnetic?
Non-magnetic refers to materials that do not attract metal such as wood, fabrics, glass, plastic and paper.