

# KS3 Genetics

## Variation

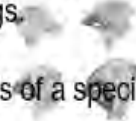
**Variation:** Is the difference amongst a species. This can be due to the environment or genetics or both.

**Characteristic:** Features on organisms e.g. eye/hair colour

**Species:** Individuals of the same species are able to interbreed to produce fertile offspring.

**Environment** Differences between individuals of a species due to factors in their surroundings.

**Inherited:** Differences between individuals of a species due to their genetic information.



## DNA

**DNA:** Deoxyribonucleic acid, found in the nucleus of cells, carrying the genetic information of a living being.

**Gene:** A gene is a section of DNA

**Chromosome:** The structure made of DNA that codes for all the characteristics of an organism



## Evolution

**Evolution:** Change over time resulting in the formation of a new species.

**Natural Selection:** Best-adapted individuals survive longer, have more offspring.

**Adaptation:** A feature of an organism's body which helps it to survive.



## Extinction

**Extinct:** A species that has completely died out

**Endangered Species:** Animals that are close to extinction because of their low numbers.

**Biodiversity:** The number and variety of organisms found in an area.

**Ecosystem:** a biological community of interacting organisms and their physical environment



## **Keywords**

Variation

Characteristic

Species

DNA

Gene

Inherited

Population

Evolution

Natural Selection

Adaptation

Extinction

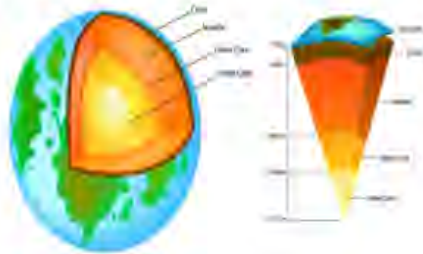
Endangered Species

Biodiversity

Ecosystem

# KS3 Earth resources

- The Earth's structure comprises:
  - The **crust** (the solid, outermost layer)
  - The **mantle** (a semi-solid which flows slowly)
  - The **outer core** (liquid iron and nickel which generates magnetic field)
  - The **inner core** (solid iron and nickel, very hot).
- The crust of the Earth is divided into **tectonic plates** which move on the surface of the mantle.
- Scientists study how seismic waves from earthquakes travel through the layers of the planet to work out the structure of Earth



**Weathering** is the process where rocks are **eroded** in 3 ways:

- Physical weathering:** Breakdown of rocks by temperature changes and mechanical forces.
- Chemical weathering:** Decomposition of rocks through chemical reactions which alter their mineral composition.
- Biological weathering:** Disintegration of rocks by plants, animals, and microbial activity.

There are 3 main types of rock:

- Igneous rocks:** Formed from cooled magma or lava; crystalline structure; example: granite.
- Sedimentary rocks:** Compressed sediments in layers (called **strata**); often porous; example: limestone.
- Metamorphic rocks:** Altered by heat and pressure; may appear to have a distorted strata structure; example: marble.

## Keywords

- Core
- Crust
- Erosion
- Igneous
- Lava
- Magma
- Mantle
- Metamorphic
- Rock cycle
- Sedimentary
- Strata
- Tectonic plates
- Weathering

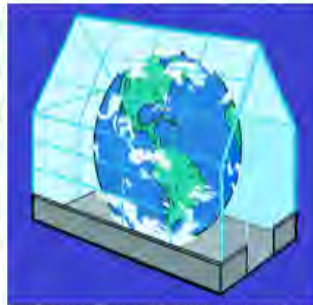
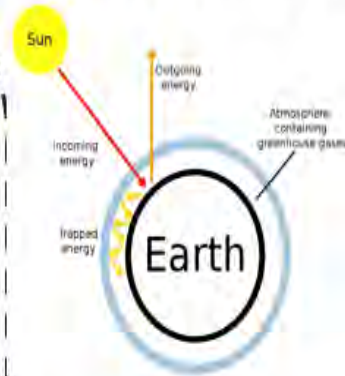
- The rocks within the crust are recycled from one type of rock to another through processes of weathering, sedimentation and metamorphosis.
- The **rock cycle** describes how rocks transform:
  - Lava or Magma cool to form **igneous** rocks
  - Rocks erode into sediments that compress into **sedimentary** rocks
  - Sedimentary rocks undergo heat and pressure to become **metamorphic** rocks
  - Metamorphic rocks can melt into magma, restarting the cycle





# KS3 Earth resources

- The greenhouse effect is caused mainly by human activities such as burning fossil fuels (coal, oil, gas), deforestation, and farming which releases **carbon dioxide** and **methane** gases into the atmosphere.
- Thermal energy from the sun is **absorbed** by the planet's surface and emitted back out towards space.
- Greenhouse gases absorb the escaping thermal energy and **re-radiate** it back towards the surface of the planet, leading to global warming.
- The greenhouse effect describes the similarities with how a greenhouse traps thermal energy.
- The 96% carbon dioxide atmosphere on Venus causes it to have an extreme version of the greenhouse effect, making it the hottest planet in the solar system
- Climate change is the term used to describe changes to the normal climate of the planet including more extreme **weather** patterns, melting ice caps leading to coastal flooding, and impacts on ecosystems and food chains.



The earth's atmosphere is a layer of gases between the Earth's crust and outer space.

The atmosphere is composed of 78% Nitrogen, 21% Oxygen with a final 1% Argon with other gases. A mere 0.04% Carbon dioxide in the atmosphere is in a delicate balance because of human activities.

Recycling conserves **finite** resources by reducing the need to extract raw materials, saving energy, and minimizing waste disposal.

Reduce, Reuse, Recycle are important to promote environmental sustainability

**Ceramics** are hard & brittle materials which are able to resist high temperatures

**Polymers** are large molecules made of repeating units.

**Composites** are materials made by combining two or more different materials to create a new material with enhanced properties

## Keywords

- Atmosphere
- Biomass
- Carbon cycle
- Carbon sink
- Ceramic
- Climate
- Combustion
- Composite
- Decomposition
- Finite
- Fossil fuel
- Global warming
- Greenhouse effect
- Polymer
- Radiate
- Recycle
- Sustainable
- Weather

The **carbon cycle** is the natural process where carbon atoms move between the atmosphere, oceans, the rocks of the Earth's crust and the biomass of living organisms. The processes of photosynthesis, respiration, decomposition, and combustion regulate the atmosphere's carbon balance and climate linked to the greenhouse effect.





# KS3 Space

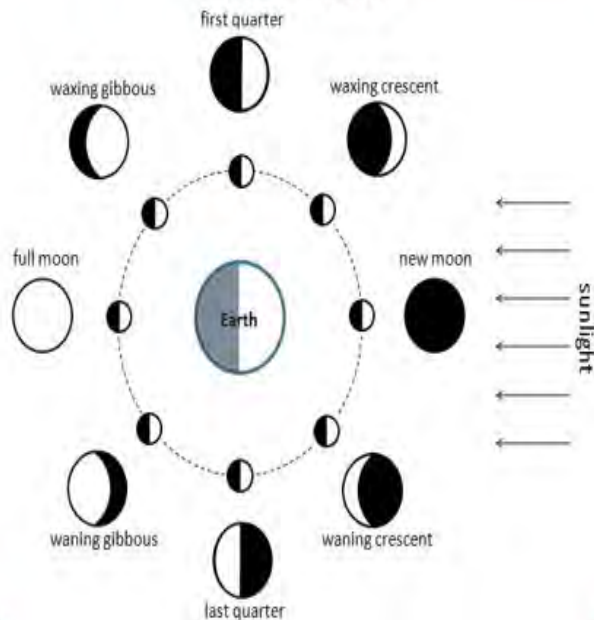
## The Night Sky

When we look up at the sky we can see:

- Stars (ball of fire)
- Constellations (groups of stars that make patterns)
- The Moon (Earth's **natural satellite**)
- Comets
- Planets



## Moon Phases



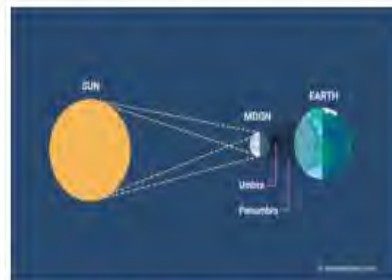
## The Moon (Luna)

The **Moon** orbits Earth every 29.5 days. The Moon rotates on its axis at the same speed as it revolves around the Earth.

A lunar eclipse is where the Earth is between the Sun and the Moon.



A solar eclipse is where the Moon casts a shadow on Earth.



## Keywords

- Astronomical unit
- Light Year
- Universe
- Big Bang
- Red Shift
- Galaxy
- Nebula
- Vacuum
- Big Crunch
- Explore
- Extra-terrestrials
- Radio waves
- NASA
- SETI
- Astronaut
- Atmosphere

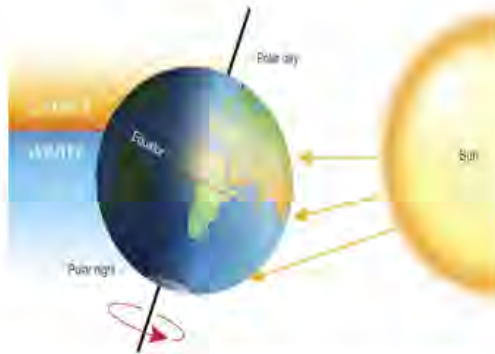
## Keywords

- Rotates
- Revolves
- Moon phase
- Orbit
- Eclipse
- Time Zones
- Axis
- Anticlockwise
- Equator
- Hemisphere
- Geocentric
- Heliocentric
- Gravity
- Comet
- Dwarf Planet
- Natural Satellite



# KS3 Space

## EARTH'S SEASONS



There are four seasons on Earth, Winter, Spring, Summer, and Autumn.

The Earth tilts at an angle of  $23.5^\circ$  allowing these four seasons. Summer in the northern hemisphere means the northern hemisphere of Earth is facing the Sun.

Winter is facing away from the Sun.

## Day and Night

Earth rotates anticlockwise on its axis every 24 hours.

Day time is when the Earth is facing the Sun. Nighttime is when the Earth is facing away from the Sun. 1/2 of the Earth is in Day at one time.

## The Universe and beyond

Dwarf planets (e.g Pluto) are smaller than planets.

Comets are balls of rock and ice that orbit the Sun, some (Haley's comet) with large orbits.

Natural Satellites are objects that orbit larger objects in space (e.g. moons).

Galaxies are large collections of stars (millions or billions). The Milky Way is our galaxy.

The Universe started with the Big Bang. The Universe is spreading out as a result (that is, expanding). Red shift is evidence that supports the Big Bang theory. The more red shifted the galaxy the further it is from Earth and the faster it is moving away.

## Exploration

Humans have explored the universe for centuries. Starting with their eyes, new technology has improved exploration.

- Red shift – elongation of light waves to show light is moving away
- Telescopes (land or orbital)
- Hubble and James Webb Telescopes
- SETI – is searching for intelligent life in space
- Mars rovers
- Space probes
- Manned missions (Moon 1969)
- Mission to Mars

## The Solar System

