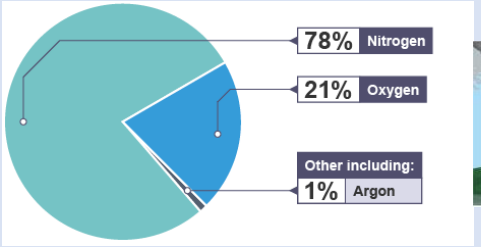
KS3 Science
Earth – Resources

Additional keywords: Composition, abundant, nitrogen, carbon dioxide, oxygen, photosynthesis, carbon cycle, carbon sink, greenhouse gas, respiration, decomposition, combustion. Global warming, greenhouse effect, climate change, weather, climate

Composition of Earth's atmosphere



Earth's early atmosphere was different to its atmosphere today. The most abundant gas in Earth's early atmosphere was carbon dioxide, because of volcanic activity and lack of life. The most abundant gas in Earth's atmosphere today is nitrogen, because it is vital for living things. Oxygen has also increased because plants photosynthesise and release oxygen into the atmosphere.

Climate change

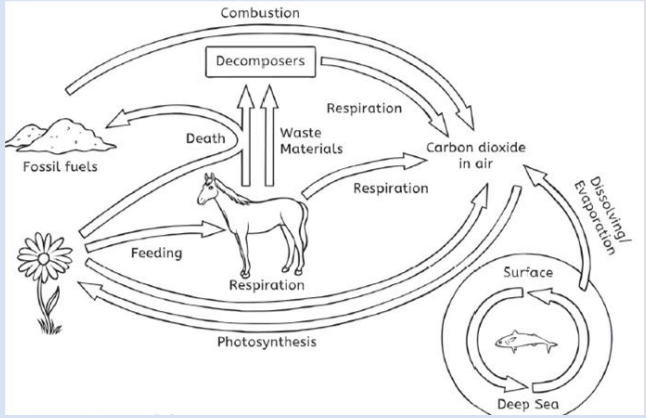
The weather includes the wind, sunshine and rain you see from day to day. The climate average weather seen over years and decades.

Some effects of climate change are; rising sea levels, rising average global temperature, glaciers are retreating, and habitat loss.

The key piece of evidence to suggest that humans are causing climate change is a correlation between increase in global average temperature and rise in CO_2 levels.

The Carbon Cycle

Carbon dioxide is a greenhouse gas. Carbon is recycled through natural processes – respiration, photosynthesis and decomposition. Carbon is also recycled through human activities, such as the combustion (burning) of fuels.



Photosynthesis - process used by plants to convert energy from the Sun, carbon dioxide and water into sugar and oxygen

Respiration - Process that converts chemical energy and oxygen into water, carbon dioxide and energy

Decomposition - Process where organisms breakdown into organic compounds

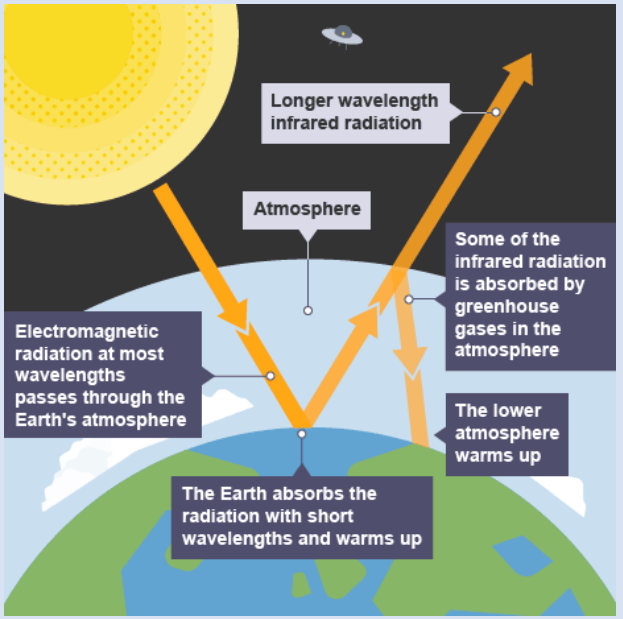
Combustion - Process where carbon dioxide is released from fossil fuels

The Greenhouse Effect

Carbon dioxide, methane, sulfur dioxide, water vapour, nitrous oxides are greenhouse gases.

Combustion of fuels at power plants and in vehicles produces greenhouse gases. They are also produced by mass farming, animals, volcanoes and deforestation.

The greenhouse effect is when thermal energy from the Sun is transferred to the thermal energy store of gases in Earth's atmosphere. It leads to global warming.



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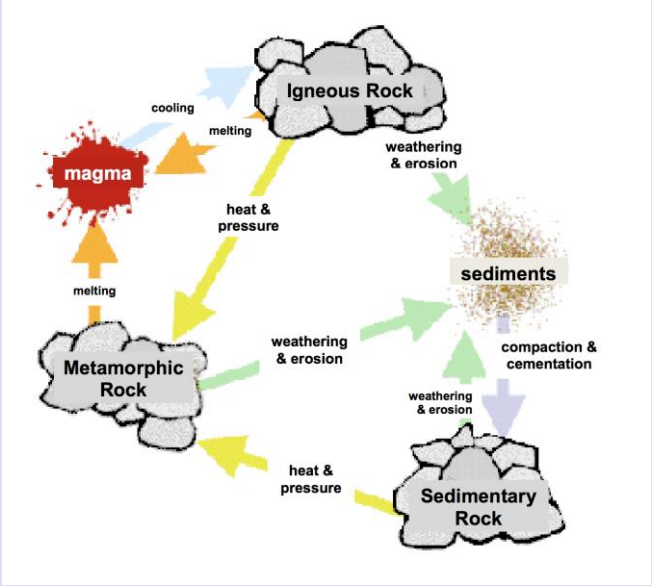
Additional keywords: Rock cycle, igneous, sedimentary, metamorphic, ore, mineral, native, extraction, displacement, reactivity series, electrolysis

The rock cycle

Igneous rocks are formed by magma leaving a volcano and cooling. Metamorphic rocks are formed by many years of extreme pressure and heat. Sedimentary rocks are formed by small pieces of sediment compacted into layers.



Extracting metal using carbon

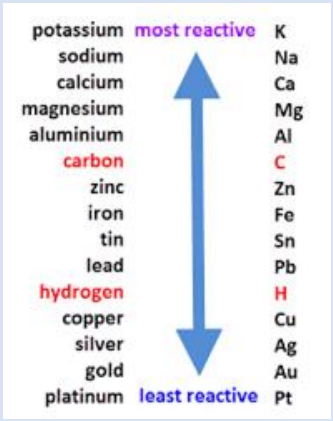
- Extraction is the separation of a metal from a metal compound
- The more reactive a metal, the more difficult it is to separate it from its compound.
- Carbon displaces less reactive metals.
- There is only a certain quantity of any resource on Earth, so the faster it is extracted, the sooner it will run out

Metal	Method	Reactivity
Potassium	Electrolysis of molten compounds	Most reactive
Sodium		
Calcium		
Magnesium		
Aluminium		
(Carbon)		
Zinc	Heating with carbon	
Iron		
Copper		
Silver	Various chemical reactions	
Gold		Least reactive

Extracting metal using electrolysis

Electrolysis is using electricity to split up compound into its elements. Electrolysis is needed for more reactive metals.

To decide which method of metal extraction is best, find the metal's position in the reactivity series. If it's above carbon, it is more reactive than carbon, so electrolysis is used.



What is an ore?

Natural resources – Materials from the earth which act as raw materials for making a variety of products. Mineral – Naturally occurring rock containing sufficient mineral for extraction. Ore – Naturally occurring rock containing sufficient minerals for extraction.

Some metals, like gold, are very unreactive and are found as elements, in their native state. Metals such as zinc, lead and iron are found combined with oxygen in compounds. These metals can be extracted using chemical reactions.

Recycling

Biodegradable – can be broken down
Sustainable – causing little or no damage to the environment and therefore able to continue for a long time
Recycling – processing a material so that it can be used again
Finite resources – resources that will run out

There is a **finite** amount of resources on Earth.

Recycling reduces the need for extracting, refining and processing raw materials all of which create air and water pollution and use up energy. Recycling also reduces the need for deforestation and reduces global warming.