

## Glossary

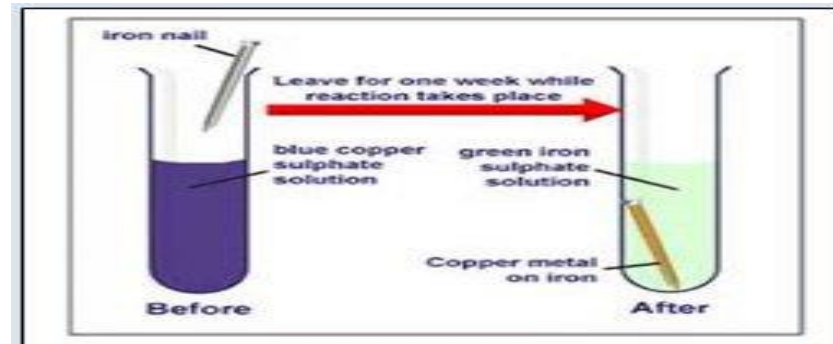
Term	Definition
Catalyst	A substance that speeds up a chemical reaction by providing an alternative pathway that has a lower activation energy.
Composite	A material made up of different parts – eg concrete, bone, wood.
Nanoscience	The study of very tiny particles or structures between 1 and 100 nanometers in size – where 1nanometer = $10^{-9}$ metres
Neutralisation	The chemical reaction of an acid with a base in which a salt and water are formed. If the base is a carbonate or hydrogen carbonate, carbon dioxide is also produced in the reaction.
Oxidation	Reaction where oxygen is added to a substance/or when electrons are lost
Polymer	A large molecules made up of a very long chain of smaller molecules.
Reduction	Reaction in which oxygen is removed or electrons are gained.

## Reactivity Series

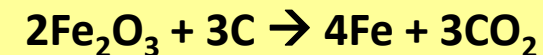
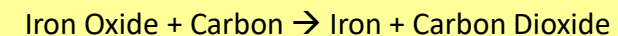
### How to remember the Reactivity Series?

<b>P</b> lease	<b>P</b> otassium	
<b>S</b> top	<b>S</b> odium	
<b>C</b> alling	<b>C</b> alcium	
<b>M</b> e	<b>M</b> agnesium	
<b>A</b>	<b>A</b> luminium	
<b>C</b> areless	<b>(C)</b> arbon	
<b>Z</b> ebra	<b>Z</b> inc	
<b>I</b> nstead	<b>I</b> ron	
<b>T</b> ry	<b>T</b> in	
<b>L</b> earning	<b>L</b> ead	
<b>H</b> ow	<b>(H)</b> ydrogen	Least reactive
<b>C</b> opper	<b>C</b> opper	
<b>S</b> aves	<b>S</b> ilver	
<b>G</b> old	<b>G</b> old	

## Displacement Reaction

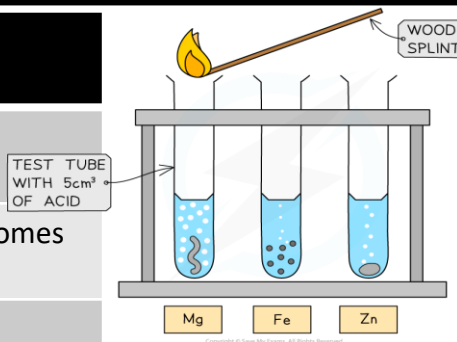


A reaction in which a more reactive element takes the place of a less reactive element in one of its compounds or solution. Chemical changes take place.



## Understanding Reactivity

Name of Metal	Observations with Acid
Sodium	Explosive reaction occurs, any hydrogen produced catches fire spontaneously
Magnesium	Vigorous production of hydrogen bubbles (fizzes); test tube becomes hot quickly (exothermic); Magnesium disappears (dissolves)
Copper	No visible change occurs



Some metals react with water, acid and oxygen. The speed in which they react can be used to put the metals in order of their **REACTIVITY**.

## NanoScience

### Recall Question

### Answer

What property is different for nanoparticles compared to other materials?

High surface area to volume ratio. Smaller quantities required.

Uses of nanoparticles

Sunscreen, catalysts

### Video Links

<https://www.bbc.co.uk/bitesize/topics/zn6hvcw/articles/zvfxxbk>

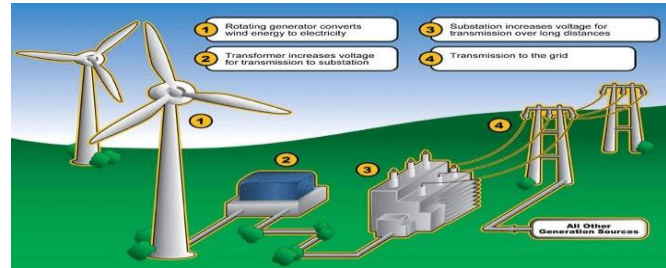
<https://www.physicsandmathstutor.com/chemistry-revision/gcse-aqa/chemical-changes/>

**Glossary**

Term	Definition
Carbon Neutral	A biofuel from a living organism that takes in as much carbon dioxide from the atmosphere as is released when the fuel is burnt.
Finite	A non-renewable energy resource is one with a <b>finite</b> amount. It will eventually run out when all reserves have been used up.
Fuel	A material that is combusted for the purpose of producing heat.
Geothermal	Energy that comes from energy released by radioactive substances deep within the Earth.
National Grid	The network of cables and transformers used to transfer electricity from power stations to consumers.
Nuclear Fuel	Substance used in nuclear reactors that releases energy due to nuclear fission.
Renewable Energy	Energy from natural sources that is always being replenished so it never runs out.

**Wind energy (renewable)**

Wind turbines produce more power in the winter months when the demand is higher, but they have some drawbacks: They do not produce power when it is not windy or it is too windy; they can harm wildlife, especially birds; they are considered an eyesore by many people.

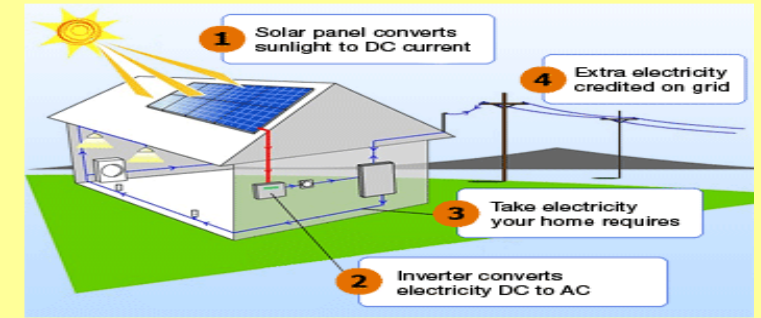


**Tidal energy (renewable)**

Tidal energy devices rely on the movement of water to turn turbines which drive the generators that produce electricity. The benefit of tidal energy is that it is more predictable and consistent than wind and solar. Disadvantages are the harsh conditions, making repair and maintenance difficult. There may also be problems related to the loss of habitat for birds.

**Solar energy (renewable)**

Solar cells capture the sun's rays and convert them into electrical energy. The cells only produce energy during the daytime and in the winter months production is reduced, owing to the shorter daytime length and the reduced angle of the sun's.



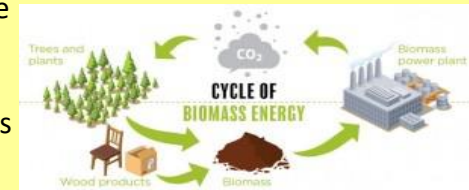
**Hydroelectric Power (renewable)**

This is a very reliable source of energy. It has high initial setup costs, both financially and environmentally, as vast areas need to be flooded to create a reservoir. However, the reservoirs usually become leisure facilities such as boating lakes and nature reserves which can have a positive effect on the local area.

Finite Energy Resource	Energy Store	Environmental Impacts	Power Output	Uses
Coal	Chemical	Releases Sulphur – Acid Rain	High	Heating, Electricity generation
Oil	Chemical	Releases Carbon Dioxide – Global Warming	High	Transport, Polymers
Natural Gas	Chemical	Releases Carbon Dioxide – Global Warming	High	Heating, Electricity generation
Nuclear	Nuclear	Radioactive waste needs to be disposed of carefully	Very high	Electricity generation

**Biomass (renewable)**

Biomass involves burning waste wood or crop material to turn water into steam which turns turbines and generates electricity.



**Video Links**

<https://www.bbc.co.uk/bitesize/guides/z2wxf/r/revision/1>

<https://classroom.thenational.academy/lessons/renewable-energy-resources-ccu6cr?activity=video&step=2&view=1>

## Microscopes

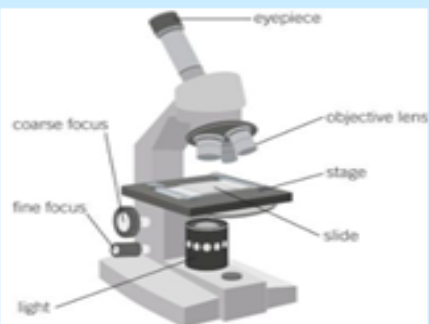


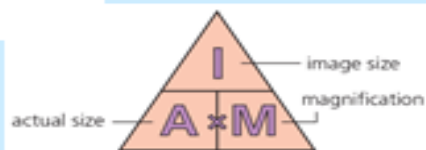
Figure 1 A light microscope

A cell under x400 magnification looks 24mm long.

Actual size =  $I \div M$

$24 \div 400 = 0.06\text{mm}$

$0.06 \times 1000 = 60\mu\text{m}$

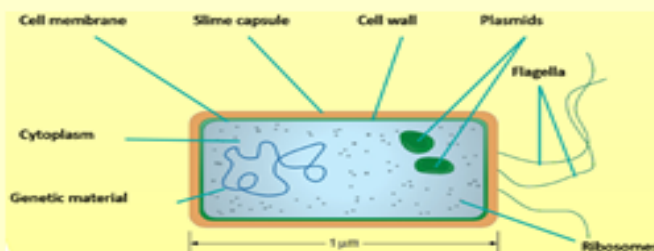
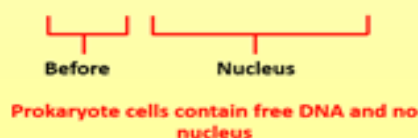


The cell is 60μm long.

## Prokaryote cells

E.g. bacteria and algae

### Prokaryote

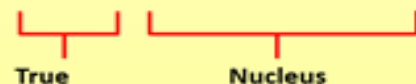


Bacteria contain no nucleus or large organelles as they are too small. They have plasmids to store unique genetics and slime capsules to stop them drying out.

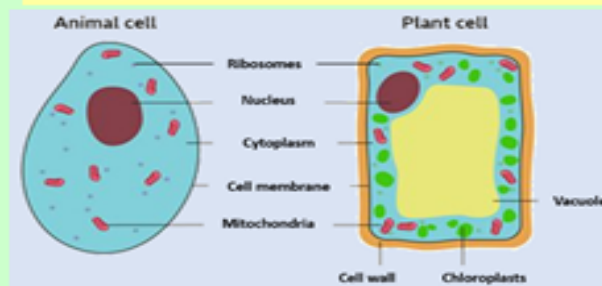
## Eukaryote cells

E.g. plants and animals

### Eukaryote



Eukaryote cells contain DNA within a nucleus

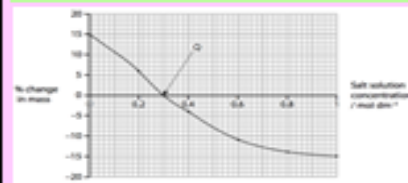
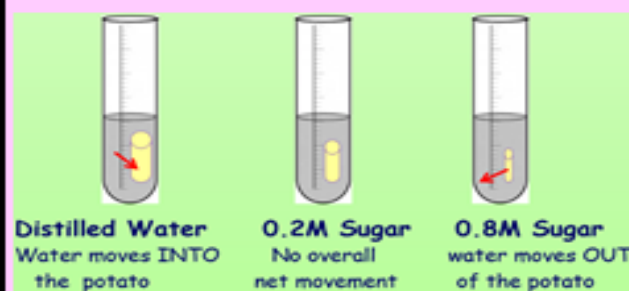


You need to know the functions of all organelles labelled above.

## Osmosis Required Practical

Osmosis is the movement of water from an area of high concentration to an area of low concentration.

Using potatoes, find the concentration inside the cells:



Plot a graph of percentage change in mass against solution concentration. Where the % change in mass is zero. That is the concentration in the cells.

## Y9 GCSE Biology B1—

### Cell structure and transport



## Diffusion and Active Transport

Diffusion is the movement of particles from an area of high concentration to low concentration until equilibrium is reached.

Factors that affect diffusion are: diffusion distance, temperature and concentration gradient.

Active Transport is the movement of particles from an area of low concentration to an area of high concentration with an input of energy.

Cells which do Active Transport require lots of mitochondria for respiration to release energy. E.g. Root hair cells for mineral ions.

