

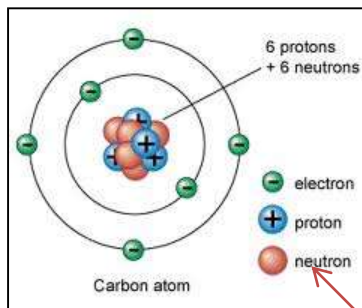
## Definitions

**Atom** – Particles that make up all substances.

**Element** – A substance made up of only one kind of atom.

**Compound** – A substance made of different types of atoms joined together.

**Mixture** – A substance existing of atoms that can be easily separated as they are not joined together.



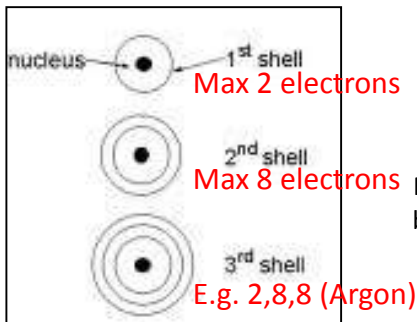
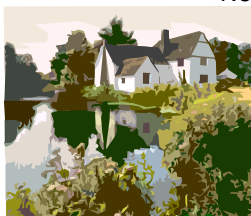
## Periodic Table of the Elements

Group 0 or 8 are **UNREACTIVE**  
They have a full outer shell of electrons

Periodic table arranges elements by **ATOMIC NUMBER** (proton number/the small one)

No charge

The number of outer shell electrons match the group the element is found in.  
E.g. Lithium 2,1 is a group 1 element.

Used for building

## LIMESTONE

Calcium Carbonate **CaCO<sub>3</sub>**



Limewater

The test for CO<sub>2</sub>



Or Calcium Hydroxide comes from adding water to CaO

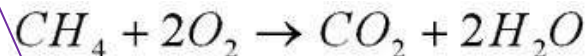
**HEAT**  
(thermal decomposition)



**Carbonates**  
Decompose when heated  
= Oxide + CO<sub>2</sub>  
React with acid  
= Salt + water + CO<sub>2</sub>

Each side should also weigh the same. Nothing is lost and nothing extra is made.

## Balanced Equations



A balanced equation has the **same number of atoms** of each element **on both sides**

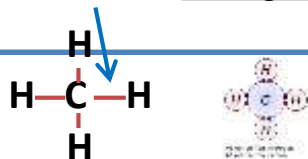
Using **Molecules**: In this equation, the large number in front of the chemical symbol tells use the molecules needed.

e.g. 1 CH<sub>4</sub> molecule reacts with 2 O<sub>2</sub> molecules

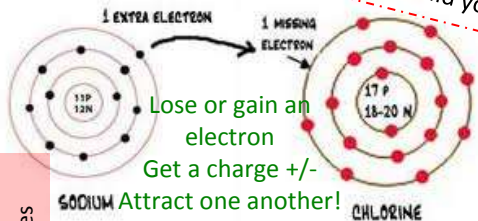
The number of electrons an atom has effect the way it reacts

## Covalent Bonding

**Non-metals** sharing electrons



## Ionic Bonding



**Good**: More jobs  
**QUARRYING**  
**Bad**: Destroy habitats and Landscape  
Would you want to live next to one?

## TRANSITION METALS

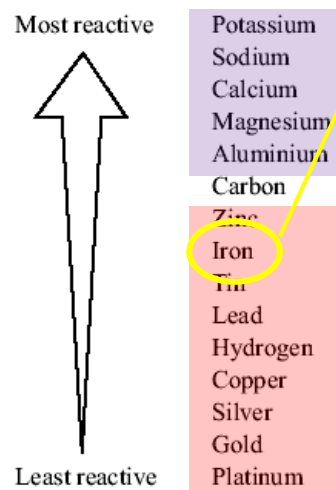
**Metals – Very useful**  
e.g. Copper wires conduct well  
Most need to be **ALLOYED** to make them harder

Metals which are un-reactive are found in their **NATIVE STATE** e.g. **GOLD**  
More reactive metals are found as **METALS ORES** and need to be **EXTRACTED**



# C1 CHEMISTRY

ION  
Charged particles



**Reactivity Series**  
 This helps you decide how to extract a metal from its ORE.  
 If its below CARBON it can be reduced in a BLAST Furnace.  
 If its a metal above it CARBON cannot help extract it.

**IRON**  
 Pure iron is *too soft* to be useful.  
 Adding small amounts of other elements can improve its properties.  
 This is **ALLOYING**.  
**IRON + 'other elements' → STEEL**  
 e.g. More easily shaped, harder, resistant to corrosion

**VEGETABLE OIL**  
 •Are extracted by **pressing or distillation**  
 •Are **high in energy**  
 •Can be used as fuels  
 •Are **UNSATURATED**  
 Unsaturated fats are better for you than Saturated fats

Can be **HARDENED** by adding **HYDROGEN** making them solid at room temperature for things like spreads and margarines  
**High Boiling Point**  
 So useful for cooking → (frying instead of boiling)  
 Gives a different flavour, texture and loads more energy (too much will make you obese)

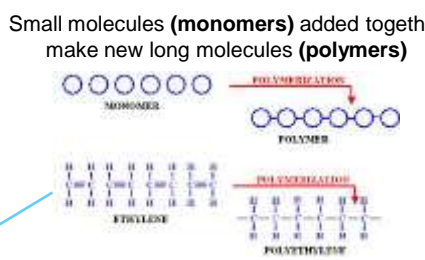
To harden you will need:  
 •**Nickel Catalyst**  
 •60°C  
 •Hydrogen to be added and break double bonds

**RECYCLING**  
 •Saves energy  
 •Saves natural resources  
 •Less pollution

**CRACKING HYDROCARBONS**  
 Make big molecules into small ones!  
 -heat them with steam and a catalyst  
 Products: Alkanes (used for fuel) + Alkenes (used for plastics, medicines, dyes and explosives)

You can make **ETHANOL** using **ETHENE** and **STEAM** with a catalyst (from crude oil)  
**OR**  
 You can make **ETHANOL** using **YEAST** enzymes. (from plants)  
 •Made from vegetable oils  
 •Less harmful to environment  
 •CARBON NEUTRAL  
 •Lose farming land  
 •Disruption of habitats  
**RENEWABLE ENERGY**  
 e.g. ethanol from sugar

**Non-Biodegradable plastics are BAD!**  
 They don't rot away.  
**Biodegradable plastics will decompose = less rubbish!**



**CRUDE OIL**  
 A mixture of hydrocarbon compounds

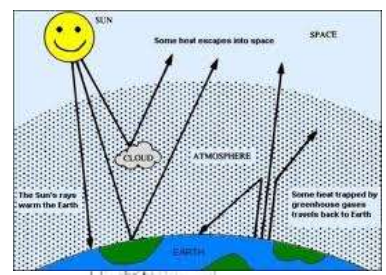
**FRACTIONAL DISTILLATION**  
 Size effects **BOILING POINT**

**Test for double bonds:**  
**Bromine water** (iodine water will also work)  
 Alkenes (with double bonds) go **CLEAR!**

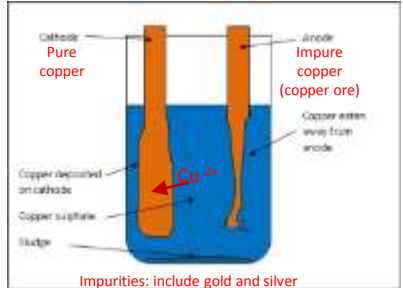
**Test it!**

Make it useful  
 New polymers are designed to work for specific jobs. **SMART POLYMERS** can change in different temperatures and light.  
 We are also able to recycle plastics to find more uses for them.

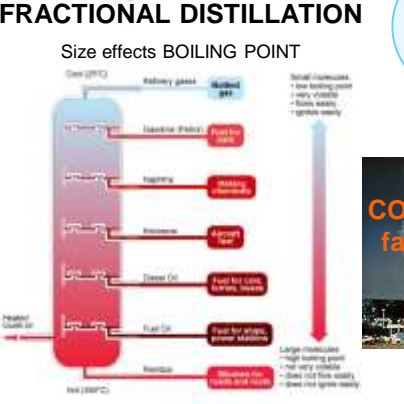
**Carbon Dioxide made from burning fuels is a GREEN HOUSE GAS adding to GLOBAL WARMING**



**Extracting reactive metals**  
 You might need to *smelt or roast* the ore and then use **electrolysis** to make it pure



**BIOLEACHING or PHYTOMINING**  
 Getting clever!  
 Scientist are using **bacteria and plants** to remove copper from ores where its too small to mine.



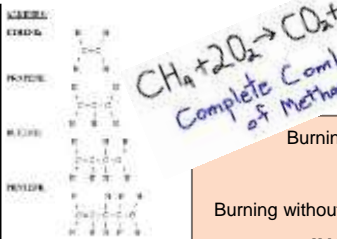
**Filters and CATALYTIS CONVERTERS can be fitted to factories and cars to reduce pollution**

**You can also get PARTICULATES or Soot!**  
**Bad for you and the environment (Global Dimming)**

**Electrolysis can be expensive but will help extract Copper, Aluminium and Titanium**  
**Very useful and NON-CORROSIVE (wont rust away)**



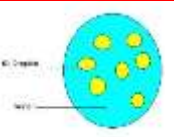
**Alkanes** – Saturated hydrocarbons.  
 No **double bonds**, Maximum Hydrogen, Formula: C<sub>n</sub>H<sub>2n+2</sub>  
**Alkenes** – Unsaturated hydrocarbons.  
**Double bonds**, Less Hydrogen  
 Formula: C<sub>n</sub>H<sub>2n</sub>



**Acid Rain**  
 High temperatures in engines can also cause the nitrogen from the air to form acid rain.

# OIL DOES NOT DISSOLVE IN WATER

But they can be spread out in each other to make an **EMULSION**



- Emulsions are used in: **Adding an EMULSIFIER stops the oil and water separating – it will also improve texture**
- Food  
e.g. Mayonnaise, salad dressings & ice creams
  - Cosmetics
  - Paints

**Yummy!**

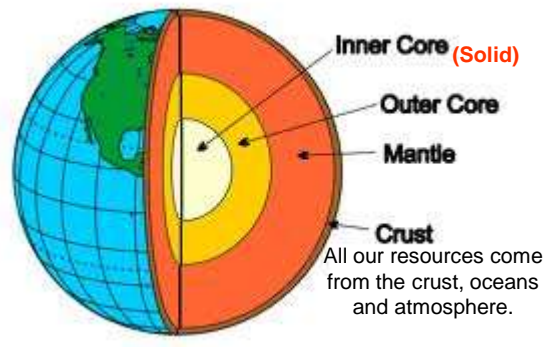
## Wegener's Big Idea



Alfred Wegener suggested the idea of continental drift (moving plates) but people found it hard to believe, they couldn't see it and had other ideas like land bridges, sinking continents and the crust shrinking. Also he couldn't explain **HOW** it worked. It took **fossils and rocks evidence** to convince people.



## Earth Structure



The crust is made up of **tectonic plates** which are always moving... Very very very .. Slowly.

## Experimental Variables

**Independent Variable** – the one

**I CHANGE**

**Dependent Variable** – the one you **RECORD**

**Control Variables** – the ones you **KEEP CONSTANT** (the same)

### Calculating an average

Add up all your results (except any anomalies you are leaving out)

$$10 + 11 + 12 + 14 = 47$$

Divide your answer by the number of values you added together.

Here 4 values were used..

$$\text{So } \frac{47}{4}$$

$$= 11.75$$

**Just a reminder!**



## Earths Early Atmosphere

- Formed by volcanoes added CO<sub>2</sub>, Water and Nitrogen
- Which cooled and condensed into oceans
- **Plants** then appeared and changes CO<sub>2</sub> to **oxygen!** (photosynthesis)



Radiation in the mantle causes **CONVECTION CURRENTS** which move the plates

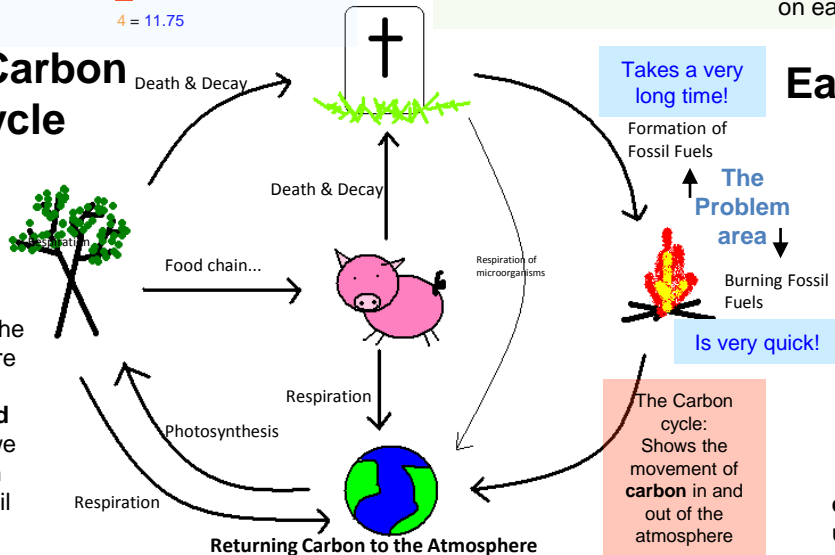
When tectonic plates meet and collide or rub against one another we get natural disasters



The Primordial soup experiment suggested that life started with a lightning spark, others suggested a meteorite or the deep ocean event. Without a time machine **we just don't know** what started life on earth!

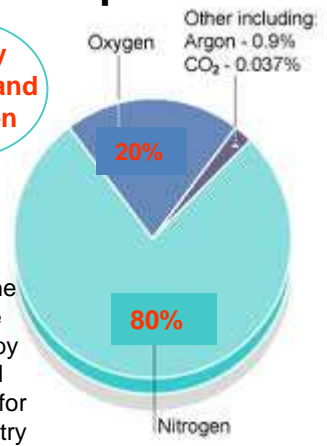
## The Carbon Cycle

Carbon in the atmosphere has **increased** because we now burn more fossil fuels!



## Earths Atmosphere Now

**Mostly oxygen and nitrogen**



Gases in the air can be separated by **fractional distillation** for use in industry

## Answering Evaluation questions

You must give a **balanced argument** if you can!

**2 reasons** why you might agree or think something is good.

**2 reasons** why you might disagree or think something is bad.

And a **conclusive statement**.

(your end opinion)

**ALWAYS** read the information you have been given. *Sometimes the answer is hidden in the question.*