Chemistry

Group 1 Alkali Metal

- You can guess how an element will behave by looking at its place in the periodic table
- Elements in the same group react in similar ways
- Now we look at the group 1

Group 1 metals are called alkali metals

- Group 1 metals are lithium, sodium, Potassium, rubidium, cesium and francium
- All alkali metals have 1 electron in their outer shell So they have similar chemical properties

They all have these physical properties

- Low melting points and low boiling points
- they are very soft
- they can be cut with the knife

Alkali metals form ionic compounds

- They lose their single outer electron very easily
- They do not share electrons so they do not form covalent bonds

Group 1 metals are very reactive

- Group 1 metals easily lose their single outer electron

- **The form a 1+ Ion with the stable electron structure**
- **The easier a metal loses its outer electron the more reactive it is**

Why metals become more reactive When You Go Down the group

As You Go Down group one the metals become more reactive ,
Because The outer electron is further away from the nucleus this mean

- **The attraction to the nucleus is weaker and less energy is needed to remove the electron**

Reaction with cold water

- **When alkali metals are put into water they react vigorously**
- **The reaction produces hydrogen gas and metal hydroxide (Which is an alkali)**
- **Example reaction with sodium**
- **$2Na+2H20= 2NaOH +H2$**
- **Reactivity with water and dilute acid increases down the group**
- **This is because the outer electron is lost more easily**
- **So the reaction becomes more violent**

- Lithium moves on the surface and fizzes
- Sodium and potassium move and melt because of heat
- Potassium gets hot enough to burn the hydrogen gas
- Because you know the reactivity trend you can predict the reactions
- rubidium and caesium react more violently than potassium they often explode when they touch water

Group 7 halogen

- Group 7 elements are called halogens
- the halogens are fluorine, chlorine, bromine, Iodine and astatine
- All group 7 elements have 7 electrons in their outer shell so they have similar chemical properties
- halogens exist in diatomic molecules for example cl2 br2 I2
- They share one pair of electrons in covalent bond giving both atoms a full shell
- As You Go Down group 7 melting points and boiling points increases

So at room temperature

- chlorine is a poisonous green gas
- bromine is a poisonous Red Brown liquid and gives Orange vapour

- iodine is a dark grey solid and gives purple vapour when heated

You can use these friends to predict properties of halogens lower in the group

Test for the chlorine gas

- Hold their blue Litmus Paper in the gas
- chlorine will turn the paper white
- it may turn red first because chlorine solution is acidic

Reactivity of group 7

- a halogen atom needs to gain one electron to form 1- Ion
- The easier is it to gain an electron the more reactive the halogen is
- as you go down group 7 halogen become less reactive
- the outer shell is further from the nucleus so attraction is weaker

Reactions of halogens

- Halogens reacts with metals to form metal halides

Example

$2Na + CL2 = 2NaCl$

- More reactive halogens attract electrons more from metals more easily
- Metal lose electrons and form positive points

- halogens also react with hydrogen to form hydrogen halides hydrogen halides dissolve in water to form acidic solution

Example

H2+Cl2= 2HCL

- Hydrogen chloride dissolves in water to form hydrochloric acid
- all halogens have similar reactions because they have same number of outer electron
- you can use known reaction to predict reactions of fluorine

