A Level Chemistry

Transition Pack

Moving from GCSE to A Level

Please bring for the first lesson in September

Chemistry Revision - TYPES OF EQUATION (Higher)

As part of your revision you should learn the general equations for the reactions studied across all topics, which you can apply to the examples. Note, Salts are named from the acids that form them, hydroCHLORIC acid makes CHLORIDES, Sulfuric acid makes Sulfates, **nitric** acids make **nitrates,** ethanoic acid makes ethanoates The reactions you should learn are:

1. Metal and acid

Metal + Acid → Salt + Hydrogen

$Mg + 2HCl \longrightarrow MgCl_2 + H_2$

2. Metal and water

Metal + Water → Metal Hydroxide + Hydrogen

$2Na + 2H_2O \longrightarrow 2NaOH + H_2$

3. Metal carbonate and acid

Metal Carbonate + Acid → Salt + Water + Carbon Dioxide

$CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$

4. Metal hydroxide and acid

Metal Hydroxide + Acid → Salt + Water

$NaOH + HCl \longrightarrow NaCl + H_2O$

$2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$

5. Metal oxide and acid

Metal Oxide + Acid → Salt + Water

$CuO + H_2SO_4 \longrightarrow CuSO_4 + H_2O$

6. Precipitation –when 2 soluble salts react together to form an *insoluble salt (solid)* which is a precipitate, the <u>ions swap</u> places

Sodium Chloride(aq) + Silver nitrate (aq) → Silver Chloride (s) + Sodium Nitrate (aq)

$NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$

7. Metal and halogen

Metal + Halogen → Metal Halide

$2Fe + 3Cl_2 \longrightarrow 2FeCl_3$

$2Al + 3Br_2 \longrightarrow 2AlBr_3$

8. Hydrogen and Halogen

Hydrogen + Halogen → Hydrogen Halide

$H_2 + Cl_2 \longrightarrow 2HCl$ × dissolves in water. hydrochloric acid

$H_2 + I_2 \longrightarrow 2HI$ × hydroiodic acid in (aq)

9. Displacement reactions of a (more reactive) metal and metal compound (salt)

E.g Magnesium + Copper Sulfate → Magnesium Sulfate + Copper

$Mg + CuSO_4 \rightarrow MgSO_4 + Cu$

10. Displacement reactions of (more reactive) halogen with metal halide

E.g Fluorine + Sodium Iodide → Sodium Fluoride + Iodine

$F_2 + 2NaI \rightarrow 2NaF + I_2$

11. Complete combustion of a (hydrocarbon) fuel

Fuel + Oxygen → Carbon Dioxide + Water

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

12. Incomplete combustion of a (hydrocarbon) fuel

Fuel + Oxygen → Carbon Monoxide + Carbon + Water

$C_3H_8 + 3O_2 \rightarrow 2CO + C + 4H_2O$

13. Heating a metal oxide with carbon (extraction)

Metal Oxide + Carbon → Carbon Dioxide + Metal

$2Fe_2O_3 + 3C \rightarrow 3CO_2 + 4Fe$

HT ONLY Ionic Equations

You may be asked to show **neutralisation** by **ionic equations.**

Metal hydroxide and acid: $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$

Metal carbonate and acid: $2H^+(aq) + CO_3^{2-}(aq) \rightarrow H_2O(l) + CO_2(g)$

Metal Oxide and acid: $2H^+(aq) + O^{2-}(aq) \rightarrow H_2O(l)$

Metal and acid: $2H^+(aq) + M(s) \rightarrow M^{2+}(aq) + H_2$

$2H^+ + Mg \rightarrow Mg^{2+} + H_2$

$6H^+ + 2Al \rightarrow 2Al^{3+} + H_2$

How am I expected to know all the chemical formulae?

Some you just have to learn:

Ionic substances

Magnesium chloride	$MgCl_2$
Calcium chloride	$CaCl_2$
Magnesium oxide	MgO
Copper sulfate	$CuSO_4$
Sodium chloride	$NaCl$
Potassium chloride	KCl

Simple molecular covalent / Simple molecules

Water	H_2O
Carbon dioxide	CO_2
Carbon monoxide	CO
Oxygen	O_2
Hydrogen	H_2
Methane	CH_4
Ethane	C_2H_6
Propane	C_3H_8
Butane	C_4H_{10}

Acids (ionic when aqueous)

When dissociated ions present:

Nitric acid	HNO_3 → $H^+ + NO_3^-$
Sulfuric acid	H_2SO_4 → $2H^+ + SO_4^{2-}$
Hydrochloric acid	HCl → $H^+ + Cl^-$

Alkalis (ionic)

Sodium hydroxide	$NaOH$ → $Na^+ + OH^-$
Calcium hydroxide	$Ca(OH)_2$ → $Ca^{2+} + 2OH^-$

Bases (ionic)

Copper oxide	CuO
Calcium carbonate	$CaCO_3$
Copper carbonate	$CuCO_3$

Cont.

Other substances you can figure out

Hydrocarbons / organic substances. Learn the general formula of the homologous series and use the number of carbons to figure it out

Alkanes C_nH_{2n+2} e.g CH_4 C_2H_6 C_4H_{10} $C_{22}H_{46}$
Alkenes C_nH_{2n} e.g C_2H_4 C_4H_8 $C_{22}H_{44}$
(Triple) Alcohols $C_nH_{2n+1}OH$ e.g CH_3OH C_2H_5OH C_4H_9OH $C_{22}H_{45}OH$
(Triple) Carboxylic acids $C_nH_{2n+1}COOH$ e.g CH_3COOH C_2H_5COOH C_4H_9COOH

Ionic substances

Learn the **charges on the ions,** choose the correct ratio to cancel out and then have the correct formula. Learn these

Positive Ions		Negative Ions	
*Hydrogen	H^+	Fluoride	F^-
Lithium	Li^+	Chloride	Cl^-
Sodium	Na^+	Bromide	Br^-
Potassium	K^+	Iodide	I^-
Magnesium	Mg^{2+}	Oxide	O^{2-}
Calcium	Ca^{2+}	Hydroxide	OH^-
Aluminium	Al^{3+}	Nitrate	NO_3^-
Silver	Ag^+	Sulphate	SO_4^{2-}
Copper	Cu^{2+}	Phosphate	PO_4^{3-}
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Iron	Fe^{2+} & Fe^{3+}		

in acids

Zinc Zn^{2+}

Work out the formula of

Copper nitrate (1) write ions Cu^{2+} NO_3 (2) Use charges to get ratio $Cu(NO_3)_2$

Lithium Oxide Li^+ O^{2-} Li_2O

Sodium sulfate

Calcium carbonate

(molecular ions may need brackets)

TASK 1 – WRITING FORMULAS OF IONIC COMPOUNDS

1)	silver bromide	.....	9)	lead (II) oxide	.....
2)	sodium carbonate	.....	10)	sodium phosphate	.....
3)	potassium oxide	.....	11)	zinc hydrogencarbonate	.....
4)	iron (III) oxide	.....	12)	ammonium sulphate	.....
5)	chromium (III) chloride	.....	13)	gallium hydroxide	.....
6)	calcium hydroxide	.....	14)	strontium selenide	.....
7)	aluminium nitrate	.....	15)	radium sulfate	.....
8)	sodium sulfate	.....	16)	sodium nitride	.....

TASK 2 – WRITING FORMULAS 1

1)	lead (IV) oxide	.....	11)	barium hydroxide	.....
2)	copper	.....	12)	tin (IV) chloride	.....
3)	sodium	.....	13)	silver nitrate	.....
4)	ammonium chloride	.....	14)	iodine	.....
5)	ammonia	.....	15)	nickel	.....
6)	sulfur	.....	16)	hydrogen sulfide	.....
7)	sulfuric acid	.....	17)	titanium (IV) oxide	.....
8)	neon	.....	18)	lead	.....
9)	silica	.....	19)	strontium sulfate	.....
10)	silicon	.....	20)	lithium	.....

TASK 3 – WRITING FORMULAS 2

1)	silver carbonate	.....	11)	barium hydroxide	.....
2)	gold	.....	12)	ammonia	.....
3)	platinum (II) fluoride	.....	13)	hydrochloric acid	.....
4)	nitric acid	.....	14)	fluorine	.....
5)	ammonia	.....	15)	silicon	.....
6)	silicon (IV) hydride	.....	16)	calcium phosphate	.....
7)	phosphorus	.....	17)	rubidium	.....
8)	diamond	.....	18)	germanium (IV) oxide	.....
9)	vanadium (V) oxide	.....	19)	magnesium astatide	.....
10)	cobalt (II) hydroxide	.....	20)	nitrogen oxide	.....

All the different types of equation – explained

Type 1 – Full balanced equation

When a more reactive halogen displaces a less reactive halogen

E.g $2NaBr(aq) + Cl_2(g) \rightarrow 2NaCl(aq) + Br_2(l)$

The numbers in front are called big balancing numbers and are there because of conservation of mass, the same number of atoms should be the same on the left (reactants) as there are on the right (products). They are not part of the chemical formula.

Type 2 – Ionic equation

These only include the ions that change in the reaction and ignore the spectator ions. Use the state symbols to help. In the equation above Na^+ is (aq) at the start and the end so we leave this out. We need to recall that NaBr is in fact an ionic compound made of Na^+ and Br- ions so we must include charge!

The ionic equation would become:

$2Br^-(aq) + Cl_2(g) \rightarrow 2Cl^-(aq) + Br_2(l)$

Another example would be a precipitation reaction between 2 soluble salts to make an insoluble salt- ions swap places!

Full equation: $AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

To turn this into an ionic equation we need to spot that Na^+ and NO_3^- are (aq) at the start and end, so we only focus on the ions that change from (aq) to (s). These are Ag^+ and Cl^-. So the ionic equation would be:

$Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$

Another example of a precipitation

Full : $2NaOH(aq) + CuSO_4(aq) \rightarrow Cu(OH)_2(s) + Na_2SO_4(aq)$
Ionic: $2OH^-(aq) + Cu^{2+}(aq) \rightarrow Cu(OH)_2(s)$

You may be asked to show **neutralisation** by ionic equations.

E.g Metal hydroxide and acid: $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
E.g. Metal carbonate and acid: $2H^+(aq) + CO_3^{2-}(aq) \rightarrow H_2O(l) + CO_2(g)$
Or Metal and acid $2H^+(aq) + M(aq) \rightarrow M^{2+} + H_2$

metal oxide + acid
$O^{2-} + 2H^+ \rightarrow H_2O$
also

e.g
$2H^+ + Zn \rightarrow Zn^{2+} + H_2$
$6H^+ + 2Al \rightarrow 2Al^{3+} + 3H_2$

The ionic equations for neutralisation are the same no matter which combination of acid or base you use. Note M can represent any metal ion with a 2+ charge, e.g Mg^{2+}

Type 3 – Half equations Redox !!

These are used to show oxidation and reduction (OIL RIG), when one atom or ion loses electrons, while another gains electrons. We split an ionic equation into 2 half equations; one for oxidation, the other for reduction.

Ionic equation: $2Br^-$ (aq) + Cl_2 (g) → 2Cl - (aq) + Br_2 (l)
Reduction half equation: Cl_2 (g) + 2e- → 2Cl - (aq)
Oxidation half equation: $2Br^-$ (aq) → Br_2 (l) + 2e-

Tip: When Reduction happens, electrons are Gained so electrons go on the left. When Oxidation happens electrons are Lost and go on the right. The total charge on the left should be equal to the total charge on the right for both ionic and half equations.

Electrolysis involves reduction and oxidation at the anode and cathode so you might be asked about half equations here too. Common examples:

Reduction of aluminium oxide by electrolysis Al^{3+} + 3e- → Al (s)
Reduction of copper sulfate solution by electrolysis Cu^{2+} + 2e- → Cu (s)

Make sure you revise the other examples of redox reactions

1) Displacement reactions of metals

Magnesium + Copper Sulfate → Copper + Magnesium Sulfate

Reduction half equation: Cu^{2+} + 2e- → Cu (s)
Oxidation half equation: Mg → Mg^{2+} + 2e-

2) Group 1 metals with water:

Potassium atoms lose electrons easily when they react to become K+ ions:

K (s) → K^+ (aq) + e^-

3) Halogen displacement reactions. When IodIDE I^- becomes a brown solution of IodiNE, I_2 when it reacts with ChlorINE Cl_2

Reduction half equation: Cl_2 (g) + 2e- → 2Cl - (aq)
Oxidation half equation: 2 I^- (aq) → I_2 (aq) + 2e-

YOUR TURN: Having studied the previous pages use the descriptions to figure out the products to construct chemical equations Use the ion charges – if needed to figure out formulae that you don't know.

Balanced

A. Lithium reacts with water

B. Bromine and hydrogen react with each other to form a gas that fully dissociates into H+ ions in aqueous solution

C. Complete combustion of propane

D. Calcium hydroxide is neutralised by nitric acid

E. Hydrogen peroxide (H_2O_2) decomposes into water and oxygen

F. Iron metal reacts violently with fluorine gas F_2 to form iron fluoride (FeF_3)

G. Magnesium oxide is used as a solid base to neutralise hydrochloric acid

H. A displacement happens when grey Magnesium ribbon is added to a blue copper sulfate solution

Ionic Equations (ignore spectator ions – usually NO_3^- SO_4^{2-} Na^+)

A. The neutralisation of hydrochloric acid with sodium hydroxide

B. The neutralisation of sodium carbonate with hydrochloric acid

C. The reaction that happens when magnesium is added to acid to make hydrogen

D. Chlorine displaces bromide ions in aqueous solution to make orange bromine solution.

Half equations for redox reactions – electrons needed- say whether it is oxidation or reduction

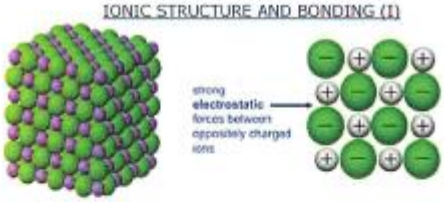
A. Hydrogen gas is formed at the cathode during electrolysis of Sodium chloride solution NaCl (aq)

B. Sodium metal is formed from sodium ions at the cathode in molten electrolysis

C. Bromide ions are oxidised to bromine molecules Br_2 during a halogen displacement reaction

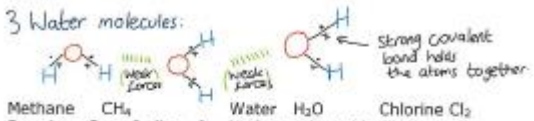
D. Chloride ions in sodium chloride solution form chlorine gas ($Cl_{2)}$ at the anode in electrolysis

IONIC STRUCTURE AND BONDING (I)



- Sodium Chloride NaCl Magnesium Chloride $MgCl_2$ Magnesium Oxide MgO all salts from the acids topic
- Formed by the *transfer* of electrons to produce positive ions and negative ions. The metal atoms lose electrons, the non-metal atom gains electrons-electrons are NOT SHARED!
- A 3D lattice structure consisting of a regular arrangement of ions held together by strong electrostatic forces between the positive and negative ions
- Always occurs between a metal and a non-metal
- High melting point (solid at room temperature 25 °C)
- A lot of ***energy*** is required to overcome /break the attraction between the positive ions and negative ions within the solid lattice
- Only conducts electricity when molten or dissolved in solution (aqueous –aq)
- When molten or dissolved (in solution) the **charged** particles (ions) can **flow** and carry current

SIMPLE MOLECULAR COVALENT (SMC)



Methane CH_4 Water H_2O Chlorine Cl_2 Bromine Br_2 Iodine I_2 Hydrogen bromide HBr, Hydrogen Chloride HCl, Fullerene C60 all hydrocarbons in crude oil

Occurs between non-metal atoms ONLY

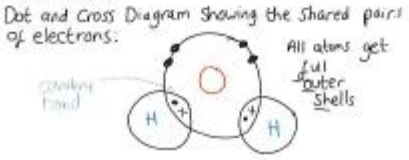
Individual Molecules are held together (bonded) by a covalent bond- this is a shared pair of electrons

Low melting point (Liquid or gas at 25°C)

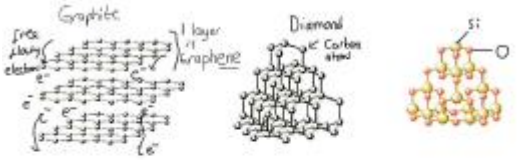
Despite STRONG covalent bonds within the molecules there are WEAK FORCES **between** molecules which don't require MUCH ENERGY to overcome. When these substances melt, the covalent bonds DON'T break

Never conducts electricity

There are no charged particles that can flow.
No ions to flow
No free electrons

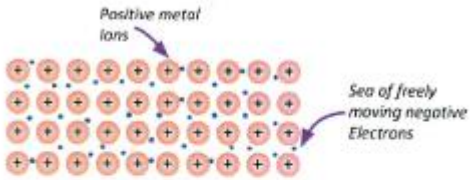


GIANT MOLECULAR COVALENT (GMC)



- Graphite C Diamond C Silicon dioxide SiO_2
- Occurs between PARTICULAR non-metal atoms ONLY
- Held together (bonded) by a pair of electrons shared between two atoms –this is a covalent bond
- Very high melting point
- To melt **a lot of energy** is required to overcome **many, strong**, covalent bonds.
- Never conducts electricity (EXCEPT graphite-this has free electrons between layers)
- There are no charged particles that can flow. No ions, no free electrons(except in graphite and graphene*)

METALLIC (M)



- Iron Fe Aluminium Al Copper Cu Sodium Na and all alloys
- Occurs between metal atoms
- A regular arrangement of positive ions surrounded by a sea of free electrons
- High melting point (solid at room temperature 25 °C)
- A lot of ***energy*** *is required to* ***overcome*** *the attraction between the positive ions and the surrounding free electrons* (or metallic bonds are very strong)
- Conducts electricity when solid
- Good conductor of heat when solid
- When solid, *free electrons can flow* and carry thermal energy and charge throughout the solid material so it's a good conductor
- Malleable - Atoms are able to *slide over each other* without breaking the metallic bonds

Structure and Bonding 6 Marks Write on Paper -Apply Knowledge of 4 types of Structure and Bonding

Q1.

Explain the difference in the ability of solid sodium chloride and molten sodium chloride to conduct electricity in terms of their structures.

(6

Q2.

* Chlorine, Cl_2, is a simple molecular, covalent substance.

Diamond is a giant molecular, covalent substance.
Sodium chloride is an ionic substance.
Zinc is metallic.

As a result of their different structures these substances have the following different properties.

- Solid chlorine has a very low melting point but diamond, sodium chloride and zinc have high melting points.
- Diamond and sodium chloride have different solubilities in water.

In terms of the structure and bonding of these substances, explain these properties.

(6)

Q3.

* Sodium chloride and water have very different properties.

Sodium chloride is an ionic substance.
It is a crystalline solid at room temperature.
It has a high melting point.
It conducts electricity when molten or in aqueous solution.

Water is a covalent substance.
It is a liquid at room temperature.
It is a very poor conductor of electricity.

Explain these properties of sodium chloride and water in terms of the particles present and the forces between them.

(6)

Q5

*(c) Methane is a gas at room temperature.
It exists as molecules, CH_4.
Methane has a low boiling point.
It does not conduct electricity.
Explain, in terms of the nature of its molecules and the forces between its molecules, why methane has a low boiling point and does not conduct electricity.

(6)

Organic chemistry – functional groups

At GCSE you would have come across **hydrocarbons** such as alkanes (ethane etc) and alkenes (ethene etc). You may have come across molecules such as alcohols and carboxylic acids. At A level you will learn about a wide range of molecules that have had atoms added to the carbon chain. These are called functional groups, they give the molecule certain physical and chemical properties that can make them incredibly useful to us.

Here you are going to meet a selection of the functional groups, learn a little about their properties and how we give them logical names.

You will find a menu for organic compounds here:

http://www.chemguide.co.uk/orgpropsmenu.html#top

And how to name organic compounds here:

http://www.chemguide.co.uk/basicorg/conventions/names.html#top

Organic chemistry

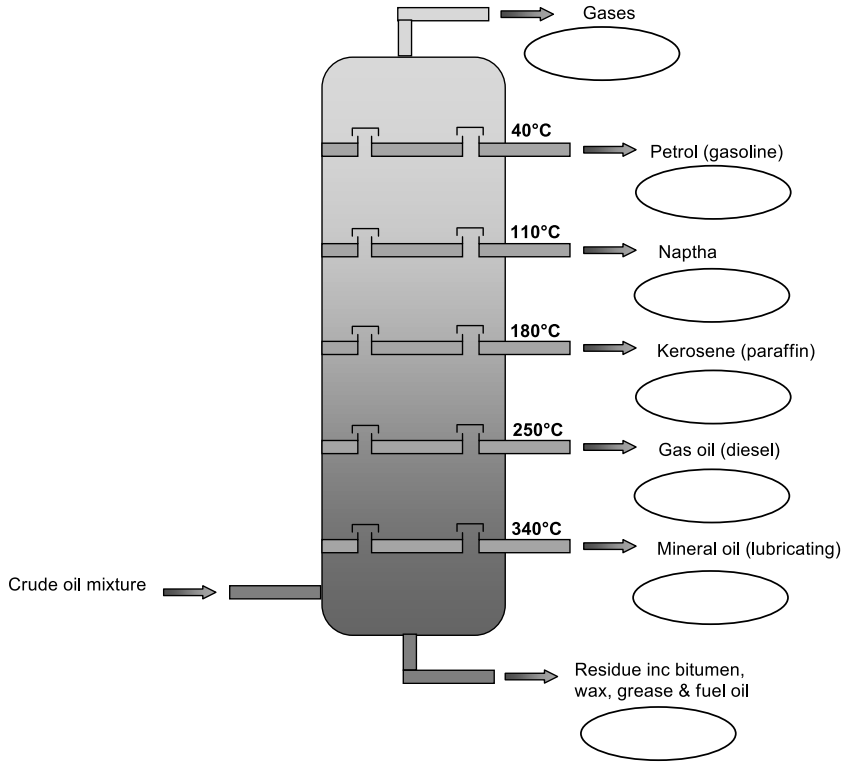
Alkanes

Alkanes are saturated hydrocarbons often used as fuels. Alkanes from pentane to octane are generally refined to form petrol and those from nonane to hexadecane refined to form diesel fuel and kerosene.

1. What is the meaning of the term saturated? (1 mark)
2. State the general formula for alkanes (1 mark)
3. Give the molecular formula for octane (1 mark)
4. Write an equation for the complete combustion of hexane (1 mark)
5. Write an equation for the incomplete combustion of hexane and state an environmental problem associated with this (2 marks)

Fractional distillation and cracking

Fractional distillation is used to separate the components in a mixture of crude oil



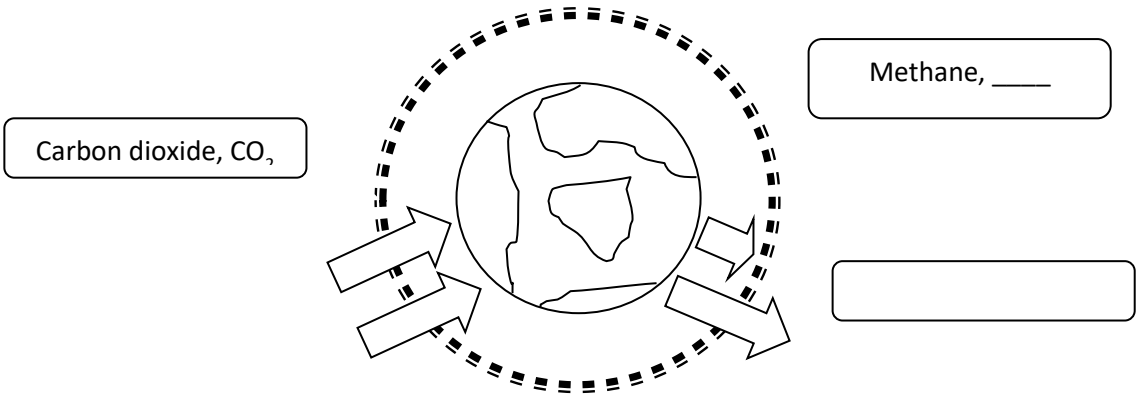
CH_4	Octane	LPG (propane/butane mix)	C_{20}-C_{30}	Fuel for ships

1. The diagram shows a fractioning column.

(a) Place the formulae and words in the appropriate places on the column (5 marks)

Greenhouse effect

Most scientists now believe that global warming is caused by increased levels of greenhouse gases in the atmosphere. The most widely publicised of these is carbon dioxide, CO_2.



1. Complete the diagram with the names and formulae of the other greenhouse gases (2 marks)
2. Explain how carbon dioxide contributes to global warming by explaining its contribution to the greenhouse effect. (6 marks)

Measuring chemicals – the mole

From this point on you need to be using an A level periodic table, not a GCSE one you can view one here:

http://bit.ly/pixlpertab

https://secondaryscience4all.files.wordpress.com/2014/08/filestore_aqa_org_uk_subjects_aqa-2420-w-trb-ptds_pdf.png

Now that we have our chemical equations balanced, we need to be able to use them in order to work out masses of chemicals we need or we can produce.

The ***mole*** is the chemists equivalent of a dozen, atoms are so small that we cannot count them out individually, we weigh out chemicals.

For example: magnesium + sulfur → magnesium sulfide

Mg + S → MgS

We can see that one atom of magnesium will react with one atom of sulfur, if we had to weigh out the atoms we need to know how heavy each atom is.

From the periodic table: Mg = 24.3 and S = 32.1

If I weigh out exactly 24.3g of magnesium this will be 1 mole of magnesium, if we counted how many atoms were present in this mass it would be a huge number (6.02×10^{23}!!!!), if I weigh out 32.1g of sulfur then I would have 1 mole of sulfur atoms.

So 24.3g of Mg will react precisely with 32.1g of sulfur, and will make 56.4g of magnesium sulfide.

Here is a comprehensive page on measuring moles, there are a number of descriptions, videos and practice problems.

You will find the first 6 tutorials of most use here, and problem sets 1 to 3.

http://bit.ly/pixlchem9

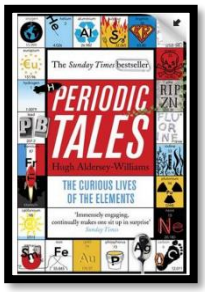
http://www.chemteam.info/Mole/Mole.html

Q6.1 Answer the following questions on moles. (ON PAPER SHOWING WORKING)

a) How many moles of phosphorus pentoxide (P_4O_{10}) are in 85.2g?
b) How many moles of potassium in 73.56g of potassium chlorate (V) ($KClO_3$)?
c) How many moles of water are in 249.6g of hydrated copper sulfate(VI) ($CuSO_4.5H_2O$)? For this one, you need to be aware the dot followed by $5H_2O$ means that the molecule comes with 5 water molecules so these have to be counted in as part of the molecules mass.
d) What is the mass of 0.125 moles of tin sulfate ($SnSO_4$)?
e) If I have 2.4g of magnesium, how many g of oxygen(O_2) will I need to react completely with the magnesium? $2Mg + O_2 \rightarrow MgO$

Book Recommendations

Periodic Tales: The Curious Lives of the Elements (Paperback) Hugh Aldersey-Williams

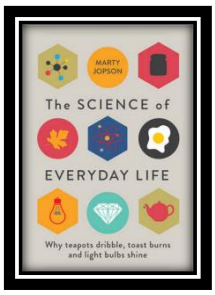


ISBN-10: 0141041455

http://bit.ly/pixlchembook1

This book covers the chemical elements, where they come from and how they are used. There are loads of fascinating insights into uses for chemicals you would have never even thought about.

The Science of Everyday Life: Why Teapots Dribble, Toast Burns and Light Bulbs Shine (Hardback) Marty Jopson

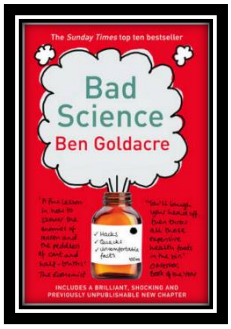


ISBN-10: 1782434186

http://bit.ly/pixlchembook2

The title says it all really, lots of interesting stuff about the things around you home!

Bad Science (Paperback) Ben Goldacre

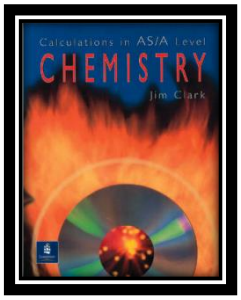


ISBN-10: 000728487X

http://bit.ly/pixlchembook3

Here Ben Goldacre takes apart anyone who published bad / misleading or dodgy science – this book will make you think about everything the advertising industry tries to sell you by making it sound 'sciency'.

Calculations in AS/A Level Chemistry (Paperback) Jim Clark



ISBN-10: 0582411270

http://bit.ly/pixlchembook4

If you struggle with the calculations side of chemistry, this is the book for you. Covers all the possible calculations you are ever likely to come across. Brought to you by the same guy who wrote the excellent chemguide.co.uk website.

Salters' Advanced Chemistry: Chemical Storylines

Do not feel you need to buy the latest edition (unless you are doing Salters chemistry!) You can pick up an old edition for a few pounds on ebay, gives you a real insight into how chemistry is used to solve everyday problems from global pollution through feeding to world to making new medicines to treat disease.

Videos to watch online

Rough science – the Open University – 34 episodes available

Real scientists are 'stranded' on an island and are given scientific problems to solve using only what they can find on the island.

Great fun if you like to see how science is used in solving problems.

There are six series in total

http://bit.ly/pixlchemvid1a

http://www.dailymotion.com/playlist/x2igjq_Rough-Science_rough-science-full-series/1#video=xxw6pr

or

http://bit.ly/pixlchemvid1b

https://www.youtube.com/watch?v=lUoDWAt259I

A thread of quicksilver – The Open University

A brilliant history of the most mysterious of elements – mercury. This program shows you how a single substance led to empires and war, as well as showing you come of the cooler properties of mercury.

http://bit.ly/pixlchemvid2

https://www.youtube.com/watch?v=t46lvTxHHTA

10 weird and wonderful chemical reactions

10 good demonstration reactions, can you work out the chemistry of …. any… of them?

http://bit.ly/pixlchemvid3

https://www.youtube.com/watch?v=0Bt6RPP2ANI

Chemistry in the Movies

Dantes Peak 1997: Volcano disaster movie.

Use the link to look at the Science of acids and how this links to the movie. http://www.open.edu/openlearn/science-maths-technology/science/chemistry/dantes-peak

http://www.flickclip.com/flicks/dantespeak1.html

http://www.flickclip.com/flicks/dantespeak5.html

Fantastic 4 2005 &2015: Superhero movie

Michio Kaku explains the "real" science behind fantastic four http://nerdist.com/michio-kaku-explains-the-real-science-behind-fantastic-four/

http://www.flickclip.com/flicks/fantastic4.html