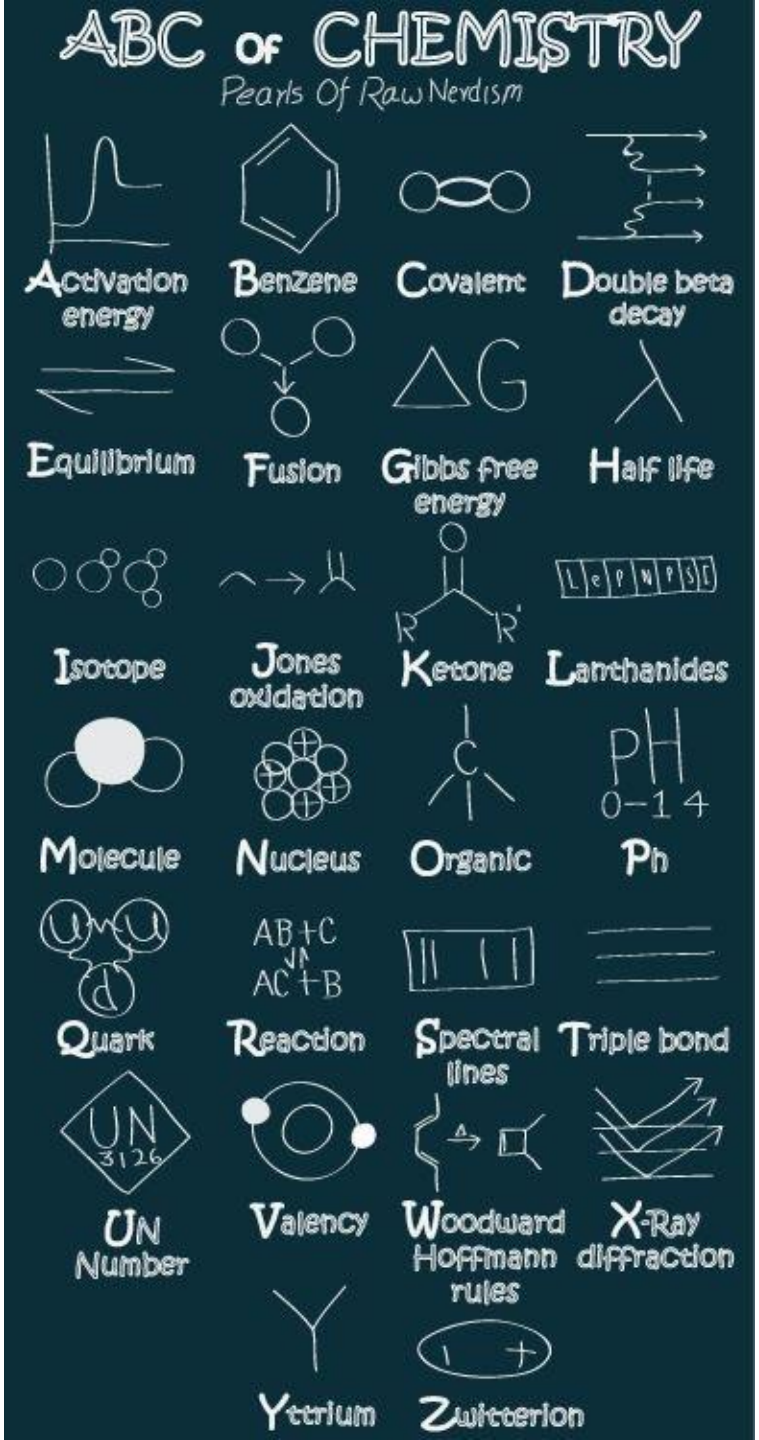
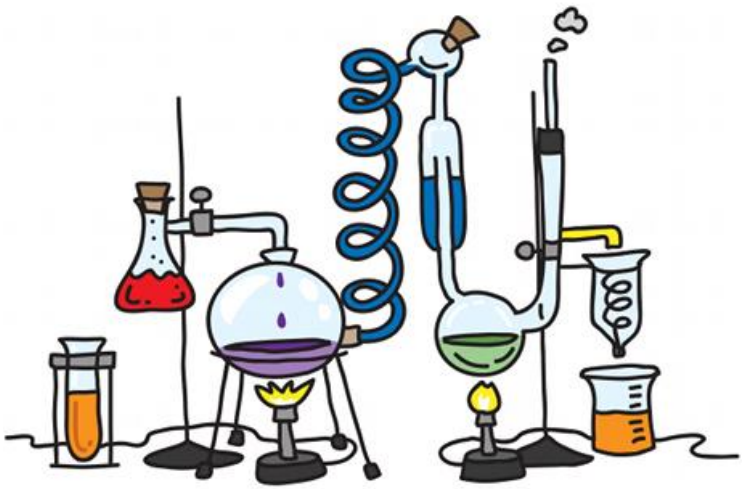




Induction Day
24th June 2019

Do register

Please make sure that you have written your school email address on the register so that we can easily contact you.

CHEMISTRY

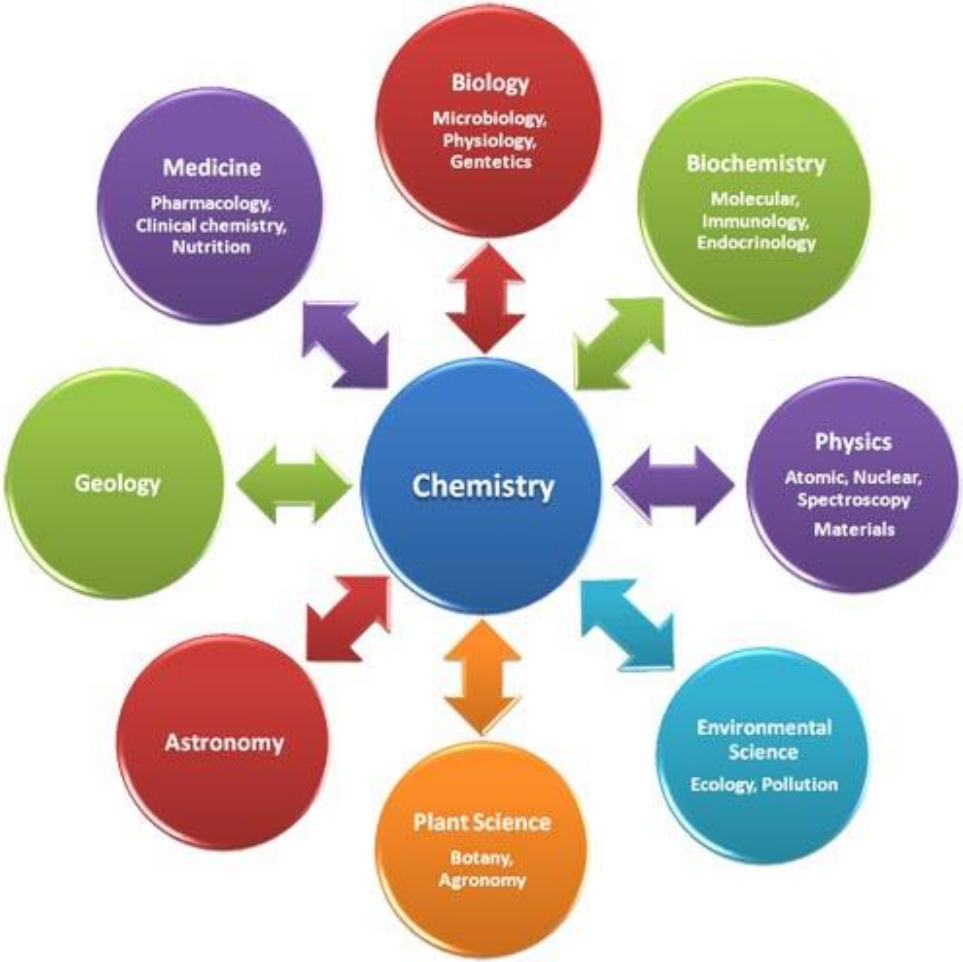
SUITABILITY

- APS 5.2
- Grade 6 in GCSE Sciences. If more than one Science at least two must be at a grade 6 (one must be Chemistry).
- Grade 6 in GCSE Maths (discussion with department if a grade 5 is achieved)
- Pass the entry exam.

REALITY

- **A LEVEL CHEMISTRY IS TOUGH. Every year we have students who find the transition difficult/impossible. In recent years students failed year 12 because of failing year 12 Chemistry. They then have to start year 12 again with new option choices.**

- **What ever the topic, activity, or task you are set you will have to give your FULL commitment**



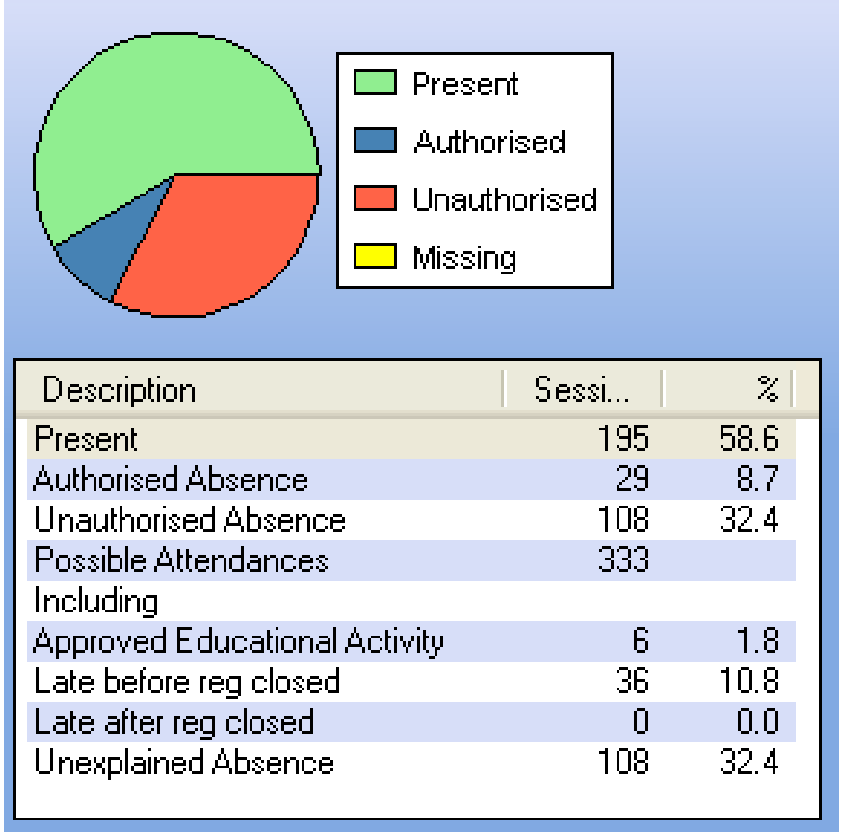
However, if you decide to choose CHEMISTRY and succeed, it will open doors for you.

-GATEWAY SUBJECT.

(Don't forget to use the new 'Informed choices' tools to work out what you need for certain courses..)

(https://www.informedchoices.ac.uk/degrees)

EXPECTATIONS- ATTENDANCE



Description	Sessi...	%
Present	195	58.6
Authorised Absence	29	8.7
Unauthorised Absence	108	32.4
Possible Attendances	333	
Including		
Approved Educational Activity	6	1.8
Late before reg closed	36	10.8
Late after reg closed	0	0.0
Unexplained Absence	108	32.4

SIMPLE RULE

- **If you do not attend all of your lessons you will fail.**
- **If your attendance drops below 80% you will also probably fail!!!**
- **If you are ill you must catch up.**

EXPECTATIONS- DEADLINES

IT IS NOT ACCEPTABLE TO MISS A DEADLINE

It benefits no one to be forever chasing bits of paper.
Expect one chance, and that's it.

EXPECTATIONS- RECORD KEEPING

- You will need to keep your study notes and work in a folder in an organised manner.

- Every month or so you will be expected to hand the folder in for marking and evaluation.

- The monitoring of this will be increased next year, be prepared!

EXPECTATIONS- RECORD KEEPING

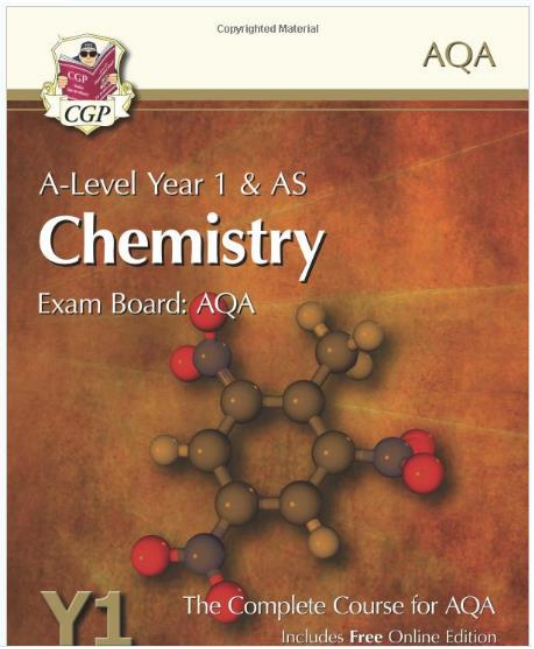
- You will also need to buy a hardback lab log to write your experiments in.

- You have to complete and write up a minimum of 12 experiments over the two years.

- If your lab book is assessed as up to standard you will also be accredited with the experimental award on your final certificate.

EXPECTATIONS- TEXTBOOKS

We strongly advise you to purchase the recommended book(s).



https://www.amazon.co.uk/New--Level-Chemistry-AQA-Student/dp/1782943218/ref=sr_1_3?s=books&ie=UTF8&qid=1467284369&sr=1-3&keywords=aqa+chemistry+as+year+1

EXPECTATIONS- SAFETY EXPECTATIONS

HAIR TO BE TIED BACK.

BANNED.
Shorts, tops that do not cover shoulders, and open toed shoes…Mr Hardy has a thing against crow toes!

EXAMS

- You are the 5th cohort doing the new course.
- The results of the year 12 exam will not count towards your A level grade, but you will need to pass it!
- You will sit three papers on the whole two years of the course in year 13 to give you your grade.
- Paper three will be your practical assessment and will ask you questions on the practicals recorded in your lab records books.
- There are various assessment points (AP) throughout the course, based on the topics recently studied. It is expected that you will revise for these and the data will be collected and shared. Less than 40% on any of these assessments is considered "of concern". This data is used to inform us for predicts, but also used as evidence of progress.

AQA
Realising potential

Your best friend ☺

AS AND A-LEVEL CHEMISTRY

AS (7404)
A-level (7405)

Specifications
For teaching from September 2015 onwards
For AS exams in May/June 2016 onwards
For A-level exams in May/June 2017 onwards

Version 1.1 December 2015

CONTENT

3.1 Physical chemistry page 11

3.1.1 Atomic structure page 11

3.1.2 Amount of substance page 13

3.1.3 Bonding page 16

3.1.4 Energetics page 19

3.1.5 Kinetics page 20

3.1.6 Chemical equilibria, Le Chatelier's principle and K_c page 22

3.1.7 Oxidation, reduction and redox equations page 24

3.1.8 Thermodynamics (A-level only) page 25

3.1.9 Rate equations (A-level only) page 27

3.1.10 Equilibrium constant K_p for homogeneous systems (A-level only) page 29

3.1.11 Electrode potentials and electrochemical cells (A-level only) page 30

3.1.12 Acids and bases (A-level only) page 32

3.2 Inorganic chemistry page 34

3.2.1 Periodicity page 34

3.2.2 Group 2, the alkaline earth metals page 35

3.2.3 Group 7(17), the halogens page 36

3.2.4 Properties of Period 3 elements and their oxides (A-level only) page 38

3.2.5 Transition metals (A-level only) page 39

3.2.6 Reactions of ions in aqueous solution (A-level only) page 44

3.3 Organic chemistry page 45

3.3.1 Introduction to organic chemistry page 45

3.3.2 Alkanes page 47

3.3.3 Halogenoalkanes page 48

3.3.4 Alkenes page 49

3.3.5 Alcohols page 51

3.3.6 Organic analysis page 53

3.3.7 Optical isomerism (A-level only) page 54

3.3.8 Aldehydes and ketones (A-level only) page 55

3.3.9 Carboxylic acids and derivatives (A-level only) page 56

3.3.10 Aromatic chemistry (A-level only) page 57

3.3.11 Amines (A-level only) page 58

3.3.12 Polymers (A-level only) page 59

3.3.13 Amino acids, proteins and DNA (A-level only) page 60

3.3.14 Organic synthesis (A-level only) page 63

3.3.15 Nuclear magnetic resonance spectroscopy (A-level only) page 64

3.3.16 Chromatography (A-level only) page 65

HOW THE CONTENT IS EXAMINED

2.2 AS

Assessments

Paper 1	+	Paper 2
What's assessed • Relevant Physical chemistry topics (sections 3.1.1 to 3.1.4, 3.1.6 and 3.1.7) • Inorganic chemistry (Section 3.2.1 to 3.2.3) • Relevant practical skills		**What's assessed** • Relevant Physical chemistry topics (sections 3.1.2 to 3.1.6) • Organic chemistry (Section 3.3.1 to 3.3.6) • Relevant practical skills
How it's assessed • written exam: 1 hour 30 minutes • 80 marks • 50% of the AS		**How it's assessed** • written exam: 1 hour 30 minutes • 80 marks • 50% of the AS
Questions 65 marks of short and long answer questions 15 marks of multiple choice questions		**Questions** 65 marks of short and long answer questions 15 marks of multiple choice questions

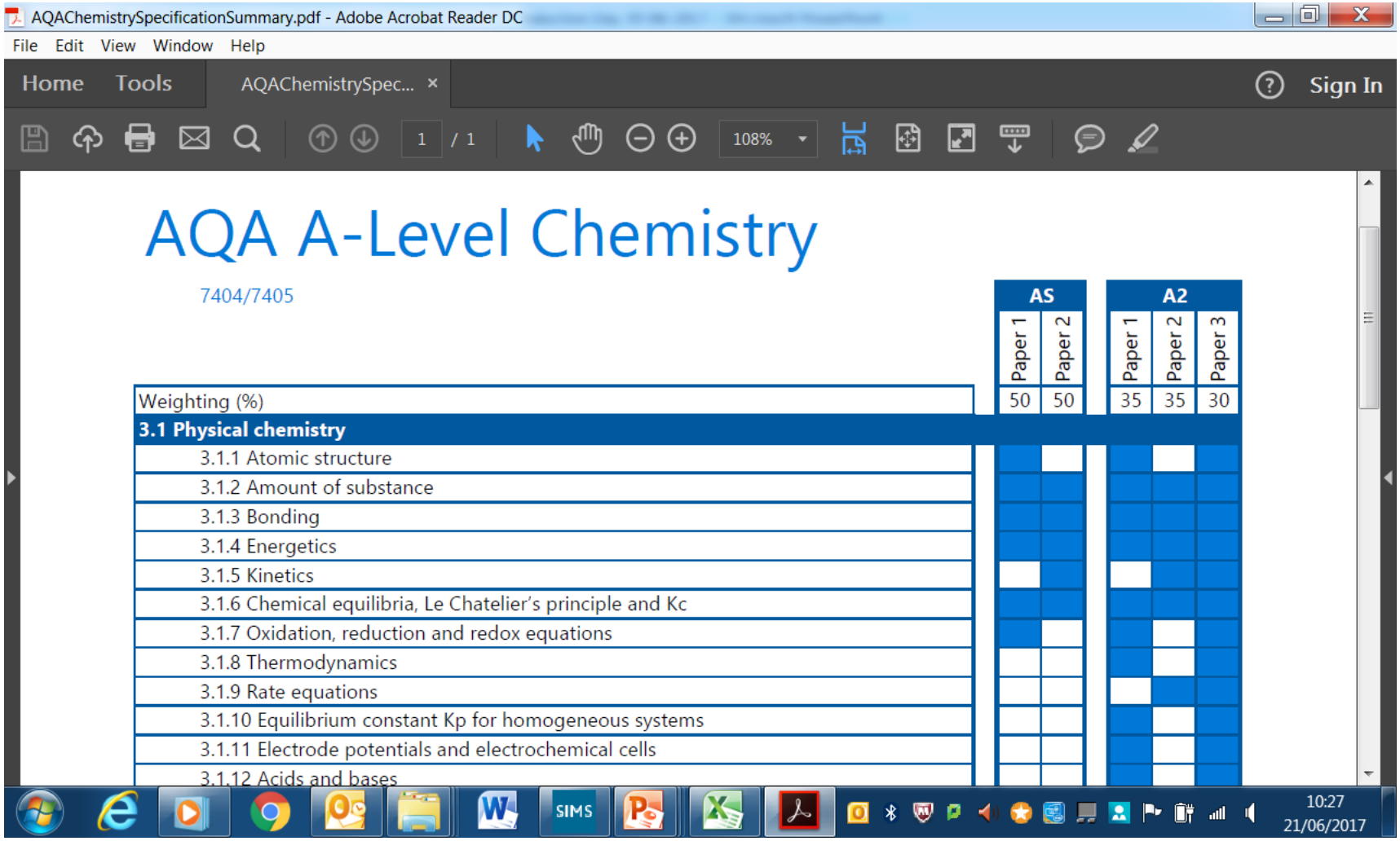
HOW THE CONTENT IS EXAMINED

2.3 A-level

Assessments

Paper 1	Paper 2	Paper 3
What's assessed • Relevant Physical chemistry topics (sections 3.1.1 to 3.1.4, 3.1.6 to 3.1.8 and 3.1.10 to 3.1.12) • Inorganic chemistry (Section 3.2) • Relevant practical skills	**What's assessed** • Relevant Physical chemistry topics (sections 3.1.2 to 3.1.6 and 3.1.9) • Organic chemistry (Section 3.3) • Relevant practical skills	**What's assessed** • Any content • Any practical skills
How it's assessed • written exam: 2 hours • 105 marks • 35% of A-level	**How it's assessed** • written exam: 2 hours • 105 marks • 35% of A-level	**How it's assessed** • written exam: 2 hours • 90 marks • 30% of A-level
Questions 105 marks of short and long answer questions	**Questions** 105 marks of short and long answer questions	**Questions** 40 marks of questions on practical techniques and data analysis 20 marks of questions testing across the specification 30 marks of multiple choice questions

HAND-OUT – next year



AQA A-Level Chemistry

7404/7405

	AS		A2		
	Paper 1	Paper 2	Paper 1	Paper 2	Paper 3
Weighting (%)	50	50	35	35	30
3.1 Physical chemistry					
3.1.1 Atomic structure	■		■		■
3.1.2 Amount of substance	■	■	■	■	■
3.1.3 Bonding	■	■	■	■	■
3.1.4 Energetics	■	■	■	■	■
3.1.5 Kinetics		■		■	■
3.1.6 Chemical equilibria, Le Chatelier's principle and Kc	■	■	■	■	■
3.1.7 Oxidation, reduction and redox equations	■		■		■
3.1.8 Thermodynamics			■		■
3.1.9 Rate equations				■	■
3.1.10 Equilibrium constant Kp for homogeneous systems			■		■
3.1.11 Electrode potentials and electrochemical cells			■		■
3.1.12 Acids and bases			■		■

Chemistry induction test

First lesson in September. We have not finalised the test but we would expect you to know the following as a minimum:

- 4.1 Atomic Structure and the periodic table:
  - subatomic particles, electronic structure, noble gases, halogens, alkali metals
- 4.2 Bonding, structure and the properties of matter :
  - bonding x3, properties of small molecules/alloys/ionic/covalent compounds
- 4.3 Quantitative chemistry:
  - balancing equations, Mr, moles, amount of substances in equations, limiting reactions
- 4.4 Chemical changes:
  - reactivity series, metal extraction, salts, electrolysis, metal+acid rxns,
- 4.5 Energy changes:
  - exothermic and endothermic reactions, reaction profiles
- 4.6 The rate and extent of chemical change:
  - calculating rate, factors, reversibility/equilibrium
- 4.7 Organic chemistry :
  - crude oil, hydrocarbons , alkanes, fractional distillation, cracking
- 4.8 Chemical analysis:
  - chromatography, gas tests,
- 4.9 Chemistry of the atmosphere:
  - atmosphere composition, atmosphere evolution, climate change, pollutants
- 4.10 Using resources:
  - sustainable development, potable water, waste water treatment

Prep sessions:
‘Head Start to A-Level Chemistry’- GCP
‘Essential Maths Skills for A-Level Chemistry’- GCP

Recommended textbooks:
‘A-Level Year 1 & AS Chemistry’, Exam Board AQA- CGP
‘A-Level Year 2 Chemistry’, Exam Board AQA- CGP

Students can use the following link to access the (new) specification, required practical handbook and past papers.
http://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405

List of good A-Level Chemistry websites: (with the caveat that I cannot check every web page that appears on these websites)

http://www.chemguide.co.uk
http://www.s-cool.co.uk/a-level/chemistry
http://www.a-levelchemistry.co.uk
http://www.physicsandmathstutor.com/chemistry-revision/a-level-aqa/
http://www.rsc.org/learn-chemistry/wiki/A-Level_Chemistry_Revision
http://www.docbrown.info/page13/page13.htm

Best of luck for your exam results and enjoy your summer.

TODAY

You are going to need to demonstrate your lab skills to separate water from ink…

- Wear goggles at all times
- Demonstrate safe and controlled use of the Bunsen burner.

Revision for induction, incl. quantitative chemistry HT

GCSE Chemistry

PAPER 1

- 4.1 Atomic Structure and the periodic table
- 4.2 Bonding, structure and the properties of matter
- 4.3 Quantitative chemistry
- 4.4 Chemical changes
- 4.5 Energy changes

PAPER 2

- 4.6 The rate and extent of chemical change
- 4.7 Organic chemistry
- 4.8 Chemical analysis
- 4.9 Chemistry of the atmosphere
- 4.10 Using resources

LESSON	LINK TO SPECIFICATION
Conservation of mass, balanced chemical equations & Mr	4.3.1.1 Conservation of mass and balanced chemical equations
	4.3.1.2 Relative formula mass
Mass changes when gases are in reactions & chemical measurements	4.3.1.3 Mass changes when a reactant or product is a gas
	4.3.1.4 Chemical measurements
Moles (HT ONLY)	4.3.2.1 Moles (HT ONLY)
Amounts of substances in equations (HT ONLY)	4.3.2.2 Amounts of substances in equations (HT ONLY)
Using moles to balance equations (HT ONLY)	4.3.2.3 Using moles to balance equations (HT ONLY)
Limiting reactions (HT ONLY) & Concentration of solutions	4.3.2.4 Limiting reactions (HT ONLY)
	4.3.2.5 Concentration of solutions

HAND-OUT- double sided

CHEMICAL CALCULATIONS

Balance the equations below:

1) ___ N_2 + ___ H_2 → ___ NH_3

2) ___ $KClO_3$ → ___ KCl + ___ O_2

3) ___ NaCl + ___ F_2 → ___ NaF + ___ Cl_2

4) ___ H_2 + ___ O_2 → ___ H_2O

Work out the Mr for the following compounds:

1. CaO 2. CO_2 3. NH_3 4. $MgCl_2$ 5. Fe_2O_3 6. $Ca(OH)_2$ 7. $Al(NO_3)_3$

No. of moles = Mass / M_r

H_2SO_4	98	The mass of 0.5moles
$Zn(CN)_2$	117	The number of moles in 11.7g
Al_2O_3	102	The number of moles in 122.4g
$CaCl_2$	111	The mass of 0.4moles
NH_4NO_3	80	The mass of 0.75moles

Use the following masses of reactants and products to write balanced symbol equations.

1) 4.40 g of propane (C_3H_8) reacts with 16.0 g of oxygen to produce 13.2 g of carbon dioxide and 7.20 g of water.

2) 79.2 g of $C_{14}H_{30}$ is cracked to produce 40.0 g of C_7H_{16}, 17.6 g of C_3H_8 and 22.4 g of C_2H_4.

3) 21.30 g of chlorine reacts with 24.00 g of sodium hydroxide to produce 29.25 g of sodium chloride. There are two possible chemical reactions that can happen:

$Cl_2 + 2NaOH \rightarrow NaClO + NaCl + H_2O$ and

$3Cl_2 + 6NaOH \rightarrow NaClO_3 + 5NaCl + 3H_2O$

Which is the correct reaction?

$4Li + O_2 \rightarrow 2Li_2O$ How much Li_2O can be made from 30g of Li? (3)

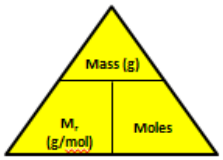
$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ How much CO_2 can be made from 6g of C_2H_6? (3)

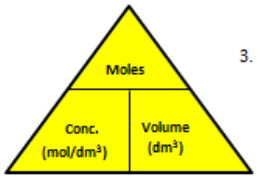
$CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$ How much $CaCO_3$ is needed to make 18g of $Ca(NO_3)_2$? (3)

Problem #1: For the combustion of sucrose:
$C_{12}H_{22}O_{11} + 12O_2 \rightarrow 12CO_2 + 11H_2O$
there are 10.0 g of sucrose and 10.0 g of oxygen reacting. Which is the limiting reagent?

Problem #2: Calculate the number of NaBr formula units formed when 50 NBr_3 molecules and 57 NaOH formula units react?
$2NBr_3 + 3NaOH \rightarrow N_2 + 3NaBr + 3HOBr$

Problem #3: Aluminum reacts with chlorine gas to form aluminum chloride via the following reaction: $2Al + 3Cl_2 \rightarrow 2AlCl_3$
How many grams of aluminum chloride could be produced from 34.0 g of aluminum and 39.0 g of chlorine gas?





1. What would be the concentration of...?
   a) 73 g of HCl in 1 dm^3
   b) 159.5 g of $CuSO_4$ in 0.5 dm^3
   c) 42.5 g of $NaNO_3$ in 0.5 dm^3
   d) 5.6 g of KOH in 100 cm^3
2. How much water would you need to add to...?
   a) 2 moles to get a concentration of 1 mol/dm^3
   b) 0.5 moles to get a concentration of 0.5 mol/dm^3
   c) 0.75 moles to get a concentration of 2 mol/dm^3
   d) 0.1 moles to get a concentration of 1 mol/dm^3
3. How much water would you need to add to...?
   a) 20 g of NaOH to get a concentration of 1 mol/dm^3
   b) 14.9 g of KCl to get a concentration of 0.5 mol/dm^3
   c) 15.95 g $CuSO_4$ to get a concentration of 2 mol/dm^3
   d) 4.25g $NaNO_3$ to get a concentration of 1 mol/dm^3

CHEMICAL CALCULATIONS

Balance the equations below:

1) ____ N_2 + ____ H_2 → ____ NH_3

2) ____ $KClO_3$ → ____ KCl + ____ O_2

3) ____ NaCl + ____ F_2 → ____ NaF + ____ Cl_2

4) ____ H_2 + ____ O_2 → ____ H_2O

Work out the Mr for the following compounds:

1. CaO 2. CO_2 3. NH_3 4. $MgCl_2$
5. Fe_2O_3 6. $Ca(OH)_2$ 7. $Al(NO_3)_3$

No. of moles = $\frac{\text{Mass}}{M_r}$

H_2SO_4	98	The mass of 0.5moles
$Zn(CN)_2$	117	The number of moles in 11.7g
Al_2O_3	102	The number of moles in 122.4g
$CaCl_2$	111	The mass of 0.4moles
NH_4NO_3	80	The mass of 0.75moles

Use the following masses of reactants and products to write balanced symbol equations.

1) 4.40 g of propane (C_3H_8) reacts with 16.0 g of oxygen to produce 13.2 g of carbon dioxide and 7.20 g of water.

2) 79.2 g of $C_{14}H_{30}$ is cracked to produce 40.0 g of C_7H_{16}, 16.8 g of C_3H_6 and 22.4 g of C_2H_4.

3) 21.30 g of chlorine reacts with 24.00 g of sodium hydroxide to produce 29.25 g of sodium chloride. There are two possible chemical reactions that can happen:

$Cl_2 + 2NaOH \rightarrow NaClO + NaCl + H_2O$ and

$3Cl_2 + 6NaOH \rightarrow NaClO_3 + 5NaCl + 3H_2O$

Which is the correct reaction?

- Balancing equations
- Mr
- Moles
- Reacting masses
- Using moles to balance equations

$4Li + O_2 \rightarrow 2Li_2O$ How much Li_2O can be made from 30g of Li? (3)

$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$ How much CO_2 can be made from 6g of C_2H_6? (3)

$CaCO_3 + 2HNO_3 \rightarrow Ca(NO_3)_2 + CO_2 + H_2O$ How much $CaCO_3$ is needed to make 18g of $Ca(NO_3)_2$? (3)

PTO

Problem #1: For the combustion of sucrose:

$C_{12}H_{22}O_{11} + 12O_2 \rightarrow 12CO_2 + 11H_2O$

there are 10.0 g of sucrose and 10.0 g of oxygen reacting. Which is the limiting reagent?

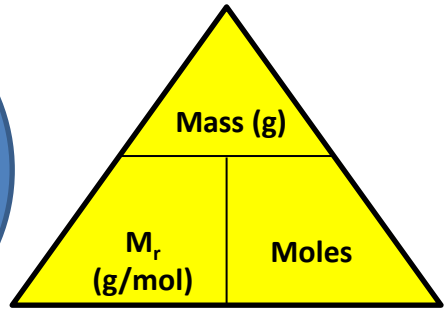
Problem #2: Calculate the number of NaBr formula units formed when 50 NBr_3 molecules and 57 NaOH formula units react?

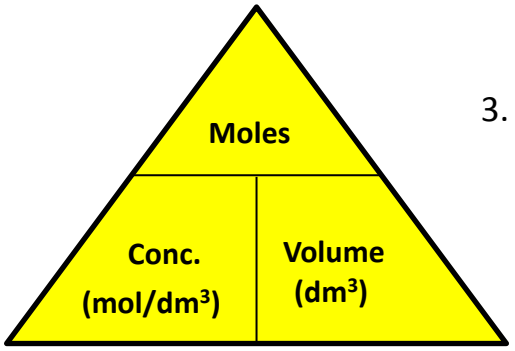
$2NBr_3 + 3NaOH \rightarrow N_2 + 3NaBr + 3HOBr$

Problem #3: Aluminum reacts with chlorine gas to form aluminum chloride via the following reaction: $2Al + 3Cl_2 \rightarrow 2AlCl_3$

How many grams of aluminum chloride could be produced from 34.0 g of aluminum and 39.0 g of chlorine gas?

- Limiting reactions & Concentration of solutions





1. What would be the concentration of...?
   a) 73 g of HCl in 1 dm^3
   b) 159.5 g of $CuSO_4$ in 0.5 dm^3
   c) 42.5 g of $NaNO_3$ in 0.5 dm^3
   d) 5.6 g of KOH in 100 cm^3
2. How much water would you need to add to...?
   a) 2 moles to get a concentration of 1 mol/dm^3
   b) 0.5 moles to get a concentration of 0.5 mol/dm^3
   c) 0.75 moles to get a concentration of 2 mol/dm^3
   d) 0.1 moles to get a concentration of 1 mol/dm^3
3. How much water would you need to add to...?
   a) 20 g of NaOH to get a concentration of 1 mol/dm^3
   b) 14.9 g of KCl to get a concentration of 0.5 mol/dm^3
   c) 15.95 g $CuSO_4$ to get a concentration of 2 mol/dm^3
   d) 4.25g $NaNO_3$ to get a concentration of 1 mol/dm^3

PTO