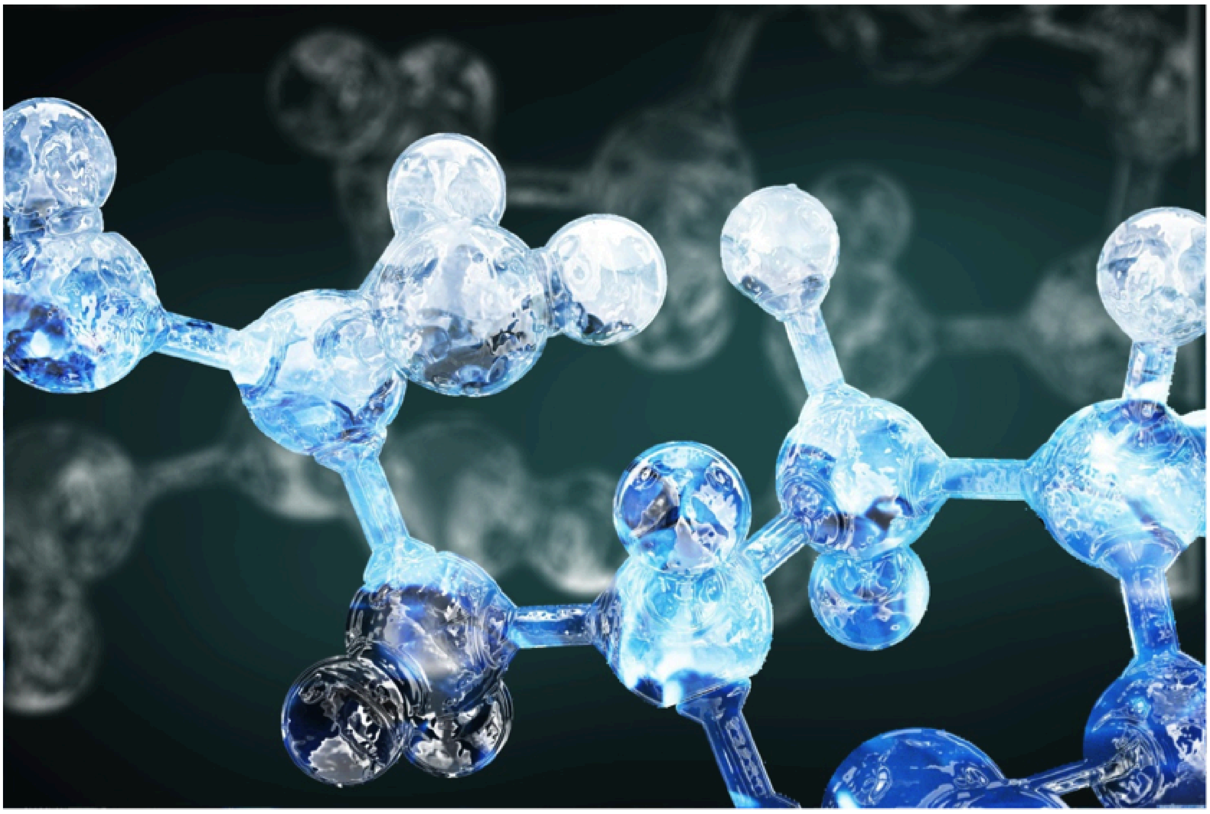
Chemistry transition work

HEAD OF CHEMISTRY | Mr C Watts



INTRODUCTION

Welcome to the Chemistry department at Ashlawn School; we look forward to you joining us in September.

KS5 Chemistry follows the **OCR A** two year Linear A level course. During Year 12 and Year 13 you will study six modules which will enhance your practical skills and application of knowledge. In addition to the modules, you will complete a practical endorsement of the course which is pass or fail.

This course is divided into six modules, each containing different key concepts of Chemistry.

Module 1 – Development of practical skills in Chemistry

- Practical skills assessed in a written examination
- Practical skills assessed in the practical endorsement

Module 2 – Foundations in Chemistry

- Atoms, compounds, molecules and equations
- Amount of substance
- Acid–base and redox reactions
- Electrons, bonding and structure

Module 3 – Periodic table and energy

- The periodic table and periodicity
- Group 2 and the halogens
- Qualitative analysis
- Enthalpy changes
- Reaction rates and equilibrium (qualitative)

Module 4 – Core organic chemistry

- Basic concepts
- Hydrocarbons
- Alcohols and haloalkanes
- Organic synthesis
- Analytical techniques (IR and MS)

Module 5 – Physical chemistry and transition elements

- Reaction rates and equilibrium (quantitative)
- pH and buffers
- Enthalpy, entropy and free energy
- Redox and electrode potentials
- Transition elements

Module 6 – Organic chemistry and analysis

- Aromatic compounds
- Carbonyl compounds
- Carboxylic acids and esters
- Nitrogen compounds
- Polymers
- Organic synthesis
- Chromatography and spectroscopy (NMR)

By completing an A level in any of the sciences this demonstrates to future universities and/or employers that you can work in a logical and methodical manner. Choosing A level Chemistry can open doors into careers such as medicine, forensic science, research, law, veterinary medicine, and many more!

The Chemistry team

Mr C watts

Mrs K Horwood

P Stokle

Mr A attwell

Course information

As a student in Chemistry you will have 10 lessons of Chemistry per fortnight. These lessons will be split 50/50 between 2 teachers. You will receive homework from both these teachers as this can have a very positive influence on your final grade and we expect that it is completed. In addition, we expect that you complete **at least 5 hours per week** of independent study to aid your learning.

You can expect to also receive support from us; at different points throughout the academic year the Chemistry department will run the following:

a) After school revision
b) Google web page just for A level chemistry. This has further reading, revision notes, PowerPoints, useful websites, past exam papers and more.
c) Student friendly curriculum map so you can track your learning throughout the specification.
d) Intervention with key students who are finding the course challenging.
e) Subject mentoring.

Below is the outline for your exams

Paper	**Marks**	**Duration**	**Weighting**
Paper 1 – modules 2,3,5 Paper 2 – modules 2,4,6	Section A: 15 – Multiple choice. Section B: 85 – structured and extended questions.	2 h 15 mins	37% each
Paper 3 – modules 2-6	70 marks – structured and extended questions.	1h 30 mins	26%
PAG	Pass or Fail – students will complete a minimum of 12 PAG activities.	0	Reported separately to the exam board

What is a PAG?

A PAG is the practical endorsement part of the specification and the aims of the module are to train you in practical skills that you can use at University/industry.

These skills will be assessed during your practical lessons and in the final 3 examinations.

USEFUL INFORMATION

Revision, we all dread having to revise for exams but it does have such a huge impact on your grades. The Chemistry team have put together their idea of a perfect revision strategy.

1) Start your revision early; the earlier you start the easier it is.
2) Use the Ashlawn google site as it has lots of resources.
3) Functional notes. It's great that all of your notes are on pretty light blue paper and in your best hand writing; the problem is that they took you 6 hours to do. Limit yourself when writing notes and make sure they contain the information that you really need.
4) Use your revision guide; that's what you bought it for.
5) Take short breaks; tired people do not revise effectively.
6) Learn when the best time of day for you to revise is. Miss Starkey works best in the afternoon whereas Miss Patel works best during the morning.
7) Snacks! Yes grab some snacks and get revising.
8) Start with the hardest material first. This way as the pressure starts to build towards the exam you have already completed the hardest part.
9) Use a proper work space/desk.
10) Do not procrastinate. Put the X-box and Pinterest away; you can go on these during your short but frequent breaks.
11) PRACTICE EXAM PAPERS – until you have completed them all you haven't done enough.
12) Create a realistic exam timetable; many are available as free downloads from the internet.
13) Create your own pop quizzes and tests; the most important thing is to write down the information.
14) Watch video/animations about difficult topics.
15) Lastly, you have at least 2 Chemistry teachers and access to many more. Use us. Anytime you are stuck, regardless if it's September or the day before your exam, speak to your teacher. We can help.

USEFUL WEBSITES

Below is a list of useful websites to help you in your studies.

1. **Chemguide** http://www.chemguide.co.uk/
2. **Ashlawn Chemistry page** https://sites.google.com/ashlawn.org.uk/ks5chemistry/home
3. **Doc Brown's Chemistry Clinic** http://www.docbrown.info/page13/page13.htm
4. **Dr Rod Beavon's Chemistry pages** http://rod.beavon.org.uk/chemistry_contents.htm
5. **Physics and Maths Tutor** http://rod.beavon.org.uk/chemistry_contents.html

6. **Get Revising** https://getrevising.co.uk/resources/level/a_ib/subjects/chemistry
7. **Chemrevise** https://chemrevise.org/ocr-revision-guides/
8. **Knockhardy notes and powerpoints**http://www.knockhardy.org.uk/sci.htm
9. **BBC Bitesize** http://www.bbc.co.uk/bitesize/higher/chemistry/
10. **Exam tutor APP** http://www.examstutor.com/resources/apprevision/chemistry_app.php
11. **MaChemGuy (PAG's)** https://www.youtube.com/user/MaChemGuy

STARTING THE COURSE

The gap between GCSE and A level can be challenging for students; you will be provided with two pieces of summer work to help 'bridge the gap'. It is essential that you complete this summer work as it will also contribute towards your practical assessment tasks.

Resources

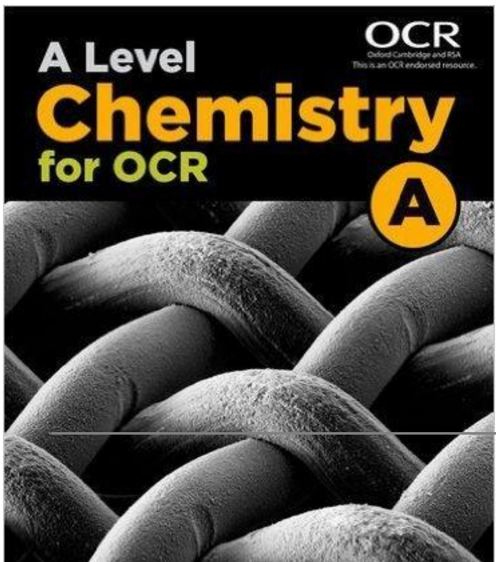
It is an expectation that students supply their own stationary within lessons. Students should ensure that the following resources are available for every lesson.

- Notebook or lined paper
- Writing pens
- Pencils and rubber
- Ruler
- Calculator
- Electronic device (chromebook or laptop NOT mobile phone)
- Folder

Textbook

Please note that students will **not** be provided with a class textbook. Teachers will provide slides and past paper questions for lessons on Google classroom; in addition to extra revision material and homework's.

In addition to these resources students may wish to purchase a textbook to support their independent learning.



The textbook recommend for the course is:
Oxford University Press, A Level Chemistry A for OCR: Student book

ISBN: 978-0198351979

This book will cover your studies in Year 12 and Year 13 Chemistry and will provide exam practice too.

A separate letter will be provided with a list of additional recommended literature to support your studies. This letter will be distributed in **September** when you commence the course**.**

SUMMER HOMEWORK

1. Research and presentation task

Choose to research **one** of the titles below and prepare a scientific presentation on your chosen area of research.

a) The history of the structure of the atom.

b) The history of the arrangement of the periodic table.

c) Analytical techniques: Paper chromatography, Gas chromatography, Mass spectrometry and Infrared spectroscopy.

You should display your work neatly and include as much relevant **scientific detail** as possible. You **cannot** use PowerPoint or any other electronic presentation method. Remember that this homework will be used for your practical assessment.

Time taken to complete task: no more than 2-3 hours

Deadline: Your first lesson back

Presentation length: 5 minutes

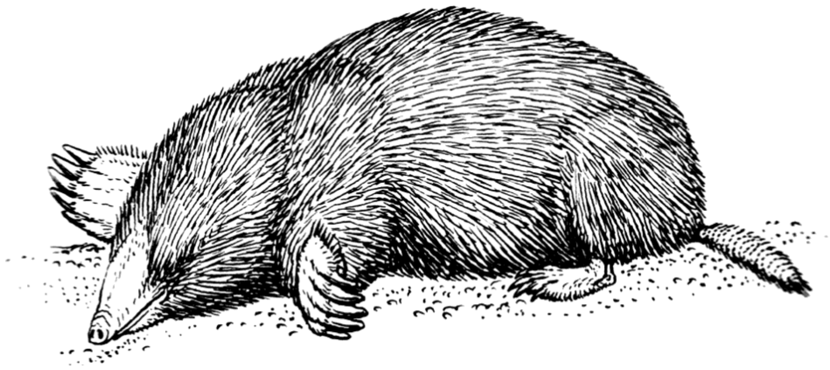
2. Transition pack

Complete the transition pack material; if you are struggling to answer the questions you mind find it useful to use the websites listed earlier on in the course booklet.

TRANSITION PACK

MEASURING AMOUNT OF SUBSTANCE

MASS **VOLUME** **MOLAR MASS**
AVOGADRO



CONCENTRATION **ATOM** **ION** **MOLECULE**

MEASUREMENTS IN CHEMISTRY

Mass

Convert the following into grams:

a. 0.25 kg
b. 15 kg
c. 100 tonnes
d. 2 tonnes

Volume

Convert the following into dm^3:

a. 100 cm^3
b. 25 cm^3
c. 50 m^3
d. 50000 cm^3

Tip – always use standard form for very large and very small numbers!

What is a mole?

Atoms and molecules are very small – far too small to count individually!

It is important to know how much of something we have, but we count particles in MOLES because you get simpler numbers

$$1 \text{ mole} = 6.02 \times 10^{23} \text{ particles}$$

(6.02 10^{23} is known as Avogadro's number)

a. If you have 2.5×10^{21} atoms of magnesium, how many moles do you have?

b. If you have 0.25 moles of carbon dioxide, how many molecules do you have?

How can you work out how many moles you have?

a. From a measurement of **MASS**:

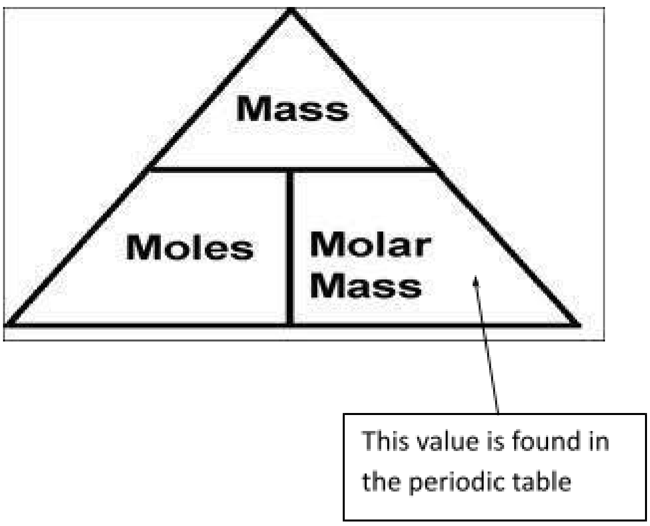
You can find the number of moles of a substance if you are given its **mass** and you know its **molar mass**:

number of moles = mass/molar mass

n = m/M

Mass MUST be measured in grams!

Molar mass has units of $gmol^{-1}$



To calculate the **molar mass** of CO_2 add together the masses of each element e.g.

Oxygen = mass of 16 g mol

Carbon = mass of 12 g mol

16	x	2	= 32
12	x	1	= 12
			44

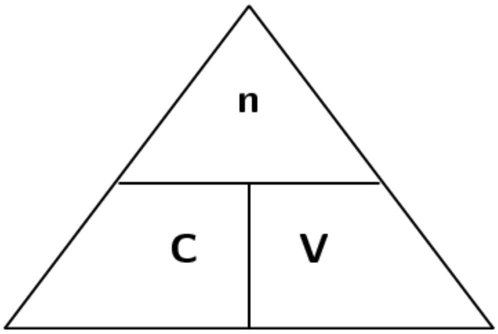
1. Calculate the number of moles present in:	2. Calculate the mass of:	3. Calculate the molar mass of the following substances:
a) 2.3 g of Na	a) 0.05 moles of Cl_2	a) 0.015 moles, 0.42 g
b) 2.5 g of O_2	b) 0.125 moles of KBr	b) 0.0125 moles, 0.50 g
c) 240 kg of CO_2	c) 0.075 moles of $Ca(OH)_2$	c) 0.55 moles, 88 g
d) 12.5 g of $Al(OH)_3$	d) 250 moles of Fe_2O_3	d) 2.25 moles, 63 g
e) 5.2 g of PbO_2	e) 0.02 moles of $Al_2(SO_4)_3$	e) 0.00125 moles, 0.312 g

b. From a measurement of AQUEOUS VOLUME:

You can find the number of moles of a substance dissolved in water (aqueous) if you are given the **volume** of solution and you know its **molar concentration**:

number of moles = aqueous volume x molar concentration

n = V x C



Aqueous volume MUST be measured in dm^3!

concentration has units of $moldm^{-3}$

If you know the molar mass of the substance, you can convert the molar concentration into a mass concentration:

Molar concentration ($moldm^{-3}$) x m_r = mass concentration (gdm^{-3})

1. Calculate the number of moles of substance present in each of the following solutions:	2. Calculate the molar concentration and the mass concentration of the following solutions:	3. Calculate the molar concentration and the mass concentration of the following solutions:
a) 25 cm^3 of 0.1 $moldm^{-3}$ HCl	a) 0.05 moles of HCl in 20 cm^3	a) 35 g of NaCl in 100 cm^3
b) 40 cm^3 of 0.2 $moldm^{-3}$ HNO_3	b) 0.01 moles of NaOH in 25 cm^3	b) 20 g of $CuSO_4$ in 200 cm^3
c) 10 cm^3 of 1.5 $moldm^{-3}$ NaCl	c) 0.002 moles of H_2SO_4 in 16.5 cm^3	c) 5 g of HCl in 50 cm^3
d) 5 cm^3 of 0.5 $moldm^{-3}$ $AgNO_3$	d) 0.02 moles of $CuSO_4$ in 200 cm^3	d) 8 g of NaOH in 250 cm^3
e) 50 cm^3 of 0.1 $moldm^{-3}$ H_2SO_4	e) 0.1 moles of NH_3 in 50 cm^3	e) 2.5 g of NH_3 in 50 cm^3

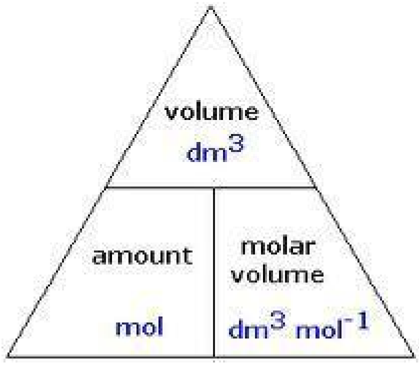
c. From a measurement of GASEOUS VOLUME:

You can find the number of moles of a gas if you are given the **volume** of the gas:

number of moles = volume / 24

n = V / 24

24 dm^3 is the volume occupied by 1 mole of any gas at room temperature and pressure



Volume MUST be measured in dm^3!

1. Calculate the number of moles present in:	2. Calculate the volume of gas occupied by:	3. Calculate the mass of the following gas samples:
a) 48 dm^3 of O_2	a) 0.05 moles of Cl_2	a) 48 dm^3 of O_2
b) 1.2 dm^3 of CO_2	b) 0.25 moles of CO_2	b) 1.2 dm^3 of CO_2
c) 200 cm^3 of N_2	c) 28 g of N_2	c) 200 cm^3 of N_2
d) 100 dm^3 of Cl_2	d) 3.2 g of O_2	d) 100 dm^3 of Cl_2
e) 60 cm^3 of NO_2	e) 20 g of NO_2	e) 60 cm^3 of NO_2