A Level Chemistry at Plymouth High School

Yr11 into Yr12 summer transition task:

We study the OCR A specification which is split into the following modules:

Year 1 (AS)		Year 2 (A2)	
Module 1	Practical skills in chemistry		
Module 2	Foundations in chemistry	**Module 5**	Physical chemistry and transition elements
Module 3	The periodic table and energy	**Module 6**	Organic chemistry and analysis
Module 4	Core organic chemistry		
Practical Assessments (PAGs) (not graded but pass/fail)			

You will have two chemistry teachers who teach you different modules. One teacher will teach Modules 3 and 5, and the other will teach Modules 4 and 6. Modules 1 and 2 will be shared across both teachers. The PAGs are carried out throughout the two-year course in line with the specification.

Your preparation for A-level consists of three tasks. This work should be completed before you start Y12 and the final sheet filled in and handed into your Chemistry teacher in your first lesson with them. You do not need to show evidence of your summer work as your first assessment will show this.

Task one:

As part of the A level course you will be expected to complete and pass regular assessments throughout the two-year course. These will be at the end of modules at regular intervals. The first of these assessments will be taking place within the first two/ three weeks and will take the form of A Level questions based on GCSE content. You could be examined on any of the following topics and should revise them over the summer holidays:

Atomic structure	□
Ions	□
Equations	□
Percentage yield	□
Isotopes,	□
Atom economy	□
Bonding	□
Concentrations	□
Moles	□

The specification points for these topics are found in Appendix 1 of this document. If you do not pass this assessment then you will be given 72 hours (over the weekend) to revise for a resit. Make sure you are prepared for this re-test, as failure to pass will mean having a conversation about whether continuing with Chemistry is the right choice for you...

Task 2:

You will be expected to be independent and active learners in order to progress and achieve in the two-year course. In order to practice these skills, you may well be asked to read ahead or research a topic before learning about it in lessons (this is called flipped learning). The first topic for you to research and read up about is set out below. You can use the internet or any of the other suggested resources on the reading list (page 3). This content could well be in the first chemistry progress test;

Energy levels, shells, sub-shells, atomic orbitals, electron configuration

You need to know:

- The number of electrons that can fill the first four shells
- What atomic orbitals are, including:
    - as a region around the nucleus that can hold up to two electrons, with opposite spins
    - the shapes of s- and p-orbitals
    - the number of orbitals making up s-, p- and d-sub-shells, and the number of electrons that can fill s-, p- and d-sub-shells
- How orbitals fill up
- How to deduce the electron configurations of:
    - atoms, given the atomic number, up to atomic number 36
    - ions, given the atomic number and ionic charge, up to atomic number 36.

Task 3:

As with GCSE Chemistry, a good proportion of the specification has a strong mathematical emphasis. Learn about and memorise the following unit conversions in preparation for Y12 Chemistry:

$cm^3 \rightarrow dm^3$	
$dm^3 \rightarrow m^3$	
atm → kPa	
kPa → Pa	
°C → K	
J → kJ	

A-level Chemistry Reading list

Websites

chemguide.com http://www.docbrown.info/page14/page14.htm http://www.rsc.org/Education/SchoolStudents/index.asp http://www.creative-chemistry.org.uk/alevel/ http://a-levelchemistry.co.uk/ http://www.s-cool.co.uk/a-level/chemistry http://www.physicsandmathstutor.com/chemistry-revision/a-level-ocr-a/ www.ocr.org.uk – For past papers. Both the current (from 2015) and legacy Chemistry A papers. (Modules 1,2,3 = F321, Modules 1,2,4 = F322, Modules 1,2,6 = F324, Modules 1,2,5 = F325)

Books

Textbooks - all specs
Revision guides - all specs
Calculations in AS / A Level Chemistry 2000 by Jim Clark (Author) ISBN-10: 0582411270 ISBN-13: 978-0582411272
Why chemical reactions happen (Wothers, Keeler, OUP) ISBN-10: 0199249733 ISBN-13: 978-0199249732
What is Chemistry? 2013 by Peter Atkins (Author) ISBN-10: 0199683980 ISBN-13: 978-0199683987

Magazines

New Scientist FOCUS Chemistry today National Geographic

YouTube

There are many relevant videos in YouTube, there are new channels be created every day. Watch any but be aware of American terminology as it can sometimes differ!

- MaChemGuy is recommended. He has many videos separated out into topics.
- Shaun from freesciencelessons has also branched out into A-level Chemistry for some topics. Check his A-level chemistry playlists out here:
  - https://www.youtube.com/playlist?list=PL9IouNCPbCxVVg87vikoY8LtC39e-2_7H
  - https://www.youtube.com/watch?v=6KqEIfUJoMs&list=PL9IouNCPbCxVSEsBCJhQMibVvKB6jD89Z
  - https://www.youtube.com/playlist?list=PL9IouNCPbCxXqcP3rJvu4_IqOf1Z_fWDJ

Apps

- Khan Academy: Chemistry 1 - freeXimarc Studios Inc Khan Academy: Chemistry 2 - freeXimarc Studios Inc Chem Pro: chemistry tutor.
- Quizlet
- Kahoot
- Follow us on Twitter @PHSGChemistry for help too

A-level Chemistry transition form

Please fill in this form and hand into your chemistry teacher in your first lesson.

Name:	**Secondary School:**	**Exam board studied for GCSE Chemistry:**
GCSE grades achieved		
Chemistry:	Maths:	English :

What chemistry topics did you enjoy the most at GCSE?		
What topics did you enjoy the least at GCSE?		
Review of Summer holiday tasks		
TASK ONE	With what revision topics did you feel the most comfortable?	
	Which topics were difficult to revise?	
TASK TWO	What went well with this task?	
	What was difficult about this task?	
TASK THREE	In what context may you need to use the m^3 conversion?	
	Why do you think we use Kelvin for temperature in chemistry?	
What career are you interested in pursuing?		
Things you are most looking forward to learning in the next two years of A-level Chemistry.		
Is there anything that worries you or any questions about A-level chemistry?		

Appendix 1:

Link to full OCRA A-level specification is here: https://www.ocr.org.uk/Images/171720-specification-accredited-a-level-gce-chemistry-a-h432.pdf

Specification points for the first progress test:

Atomic structure	☺
• atomic structure in terms of the numbers of protons, neutrons and electrons for atoms and ions, given the atomic number, mass number and any ionic charge • Different models for atomic structure can be used to explain different phenomena, e.g. the Bohr model explains periodic properties. • The changing accepted models of atomic structure over time. The use of evidence to accept or reject particular models.	
Equations	
• the writing of formulae of ionic compounds from ionic charges, including: o prediction of ionic charge from the position of an element in the periodic table o recall of recall of the names and formulae for the following ions: NO3–, CO32–, SO42–, OH–, NH4+, Zn2+ and Ag+ (Note that 'nitrate' and 'sulfate' should be assumed to be NO_3^- and SO_4^{2-}. Charges on ions other than in (i) and (ii) will be provided.) • construction of balanced chemical equations (including ionic equations), including state symbols, for reactions studied and for unfamiliar reactions given appropriate information	
Percentage yield and Atom economy	
• calculations to determine: o the percentage yield of a reaction or related quantities o the atom economy of a reaction. • the benefits for sustainability of developing chemical processes with a high atom economy • Use of processes with high atom economy in chemical industry and other areas.	
Isotopes,	
• isotopes as atoms of the same element with different numbers of neutrons and different masses	
Bonding	
Ionic bonding: • ionic bonding as electrostatic attraction between positive and negative ions, and the construction of 'dot-and-cross' diagrams • explanation of the solid structures of giant ionic lattices, resulting from oppositely charged ions strongly attracted in all directions e.g. NaC*l* • explanation of the effect of structure and bonding on the physical properties of ionic compounds, including melting and boiling points, solubility and electrical conductivity in solid, liquid and aqueous states • Use of ideas about ionic bonding to explain macroscopic properties. Covalent bonding: • covalent bond as the strong electrostatic attraction between a shared pair of electrons and the nuclei of the bonded atoms • construction of 'dot-and-cross' diagrams of molecules and ions to describe: o single covalent bonding o multiple covalent bonding o dative covalent (coordinate) bonding. • 'Dot-and-cross' diagrams of up to six electron pairs (including lone pairs) surrounding a central atom.	

•	
Moles and concentrations	

• Explanation and use of the terms:
• *amount of substance*
• *mole* (symbol 'mol'), as the unit for amount of substance.
• the *Avogadro constant,* N_A (the number of particles per mole, 6.02×10^{23} mol^{-1})
• *molar mass* (mass per mole, units g mol^{-1})
• *molar gas volume* (gas volume per mole, units dm^3 mol^{-1}).
• calculations, using amount of substance in mol, involving:
  ○ mass
  ○ gas volume
• solution volume and concentration.
• Learners will be expected to express concentration in mol dm^{-3} and g dm^{-3} .	