Chemistry Transition Work June 2020

For each subject you will receive a detailed introduction to allow full transition into the college and your new learning. Please complete the weekly tasks outlined below and attend the meet sessions with the teachers for further guidance and information. Please keep all work created in a folder to present to me in the first lesson in September.		
Chemistry A Level	**Google Classroom Code:**	**Google Meet code:**
OCR A level Chem A	xmmq7vo	chemistrytransition
Weekly Tasks	**Topic**	**Resources**
W/C 1.6.20	Chemistry topic 1 – Electronic structure, how electrons are arranged around the nucleus	A periodic table can give you the proton / atomic number of an element, this also tells you how many electrons are in the atom. You will have used the rule of electrons shell filling, where: The first shell holds up to 2 electrons, the second up to 8 and the third up to 8. The 'shells' can be broken down into 'orbitals', which are given letters: 's' orbitals, 'p' orbitals and 'd' orbitals You can read about orbitals here: http://bit.ly/pixlchem1 http://www.chemguide.co.uk/atoms/properties/atomorbs.html#top Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Now that you are familiar with s, p and d orbitals try these problems, write your answer in the format: 1s2 , 2s2 , 2p6 etc. Q1.1 Write out the electron configuration of: a) Ca b) Al c) S d) Cl e) Ar f) Fe g) V h) Ni i) Cu j) Zn k) As Q1.2 Extension question, can you write out the electron arrangement of the following ions: a) K+ b) O2- c) Zn2+ d) V5+ e) Co2+
W/C 8.6.20	Chemistry topic 2 – Isotopes and mass	You will remember that an isotopes are elements that have differing numbers of neutrons. Hydrogen has 3 isotopes; $H1\ 1$ $H1\ 2$ $H1\ 3$ Isotopes occur naturally, so in a sample of an element you will have a mixture of these isotopes. We can accurately measure the amount of an isotope using a mass spectrometer. You will need to understand what a mass spectrometer is and how it works at A level. You can read about a mass spectrometer here: http://bit.ly/pixlchem3 http://www.kore.co.uk/tutorial.htm http://bit.ly/pixlchem4 http://filestore.aqa.org.uk/resources/chemistry/AQA-7404- 7405-TN-MASS-SPECTROMETRY.PDF A mass spectrum for the element chlorine will give a spectrum like this: 75% of the sample consist of chlorine-35, and 25% of the sample is chlorine-37. Given a sample of naturally occurring chlorine ¾ of it will be Cl-35 and ¼ of it is Cl-37. We can calculate what the mean mass of the sample will be: Mean mass = 75 x 35 + 25 x 37 = 35.5 100 100 If you look at a periodic table this is why chlorine has an atomic mass of 35.5. http://www.avogadro.co.uk/definitions/ar.htm

		An A level periodic table has the masses of elements recorded much more accurately than at GCSE. Most elements have isotopes and these have been recorded using mass spectrometers. Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Q2.1 What must happen to the atoms before they are accelerated in the mass spectrometer? Q2.2 Explain why the different isotopes travel at different speeds in a mass spectrometer. Q2.3 Use the percentages of each isotope to calculate the accurate atomic mass of the following elements. a) Antimony has 2 isotopes: Sb-121 57.25% and Sb-123 42.75% b) Gallium has 2 isotopes: Ga-69 60.2% and Ga-71 39.8% c) Silver has 2 isotopes: Ag-107 51.35% and Ag-109 48.65% d) Thallium has 2 isotopes: Tl-203 29.5% and Tl-205 70.5% e) Strontium has 4 isotopes: Sr-84 0.56%, Sr-86 9.86%, Sr-87 7.02% and Sr-88 82.56%
W/C 15.6.20	Chemistry topic 3 – Chemical equations	Balancing chemical equations is the stepping stone to using equations to calculate masses in chemistry. There are loads of websites that give ways of balancing equations and lots of exercises in balancing. Some of the equations to balance may involve strange chemical, don't worry about that, the key idea is to get balancing right. http://bit.ly/pixlchem7 http://www.chemteam.info/Equations/Balance-Equation.html This website has a download; it is safe to do so: http://bit.ly/pixlchem8 https://phet.colorado.edu/en/simulation/balancing-chemical-equations Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Q3.1 Balance the following equation a. H2 + 02 → H20 b. S8+ 02 → S03 c. HgO → Hg+ 02 d. Zn+ HCl → ZnCl2+ H2 e. Na+ H20 → NaOH + H2 f. C10H16+ Cl2 → C + HCl g. Fe+ 02→ Fe203 h. C6H1206+ 02 → C02+ H20 i. Fe203 + H2 → Fe + H20 j. Al + FeO → Al2O3 + Fe
W/C 22.6.20	Chemistry topic 4 – 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-trbptds_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 x 1023!!!!), 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 Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Q4.1 Answer the following questions on moles. a) How many moles of phosphorus pentoxide (P4O10) are in 85.2g? b) How many moles of potassium in 73.56g of potassium chlorate (V) (KClO3)? c) How many moles of water are in 249.6g of hydrated copper sulfate(VI) (CuSO4.5H2O)? For this one, you need to be aware the dot followed by 5H2O 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 (SnSO4)? e) If I have 2.4g of magnesium, how many g of oxygen(O2) will I need to react completely with the magnesium? 2Mg +O2 → MgO
W/C 29.6.20	Chemistry topic 5 – Solutions and concentrations	In chemistry a lot of the reactions we carry out involve mixing solutions rather than solids, gases or liquids. You will have used bottles of acids in science that have labels saying 'Hydrochloric acid 1M', this is a solution of hydrochloric acid where 1 mole of HCl, hydrogen chloride (a gas) has been dissolved in 1dm3 of water. The dm3 is a cubic decimetre, it is actually 1 litre, but from this point on as an A level chemist you will use the dm3 as your volume measurement. http://bit.ly/pixlchem10 http://www.docbrown.info/page04/4_73calcs11msc.htm Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Q5.1 a) What is the concentration (in mol dm-3) of 9.53g of magnesium chloride (MgCl2) dissolved in 100cm3 of water? b) What is the concentration (in mol dm-3) of 13.248g of lead nitrate (Pb(NO3)2) dissolved in 2dm3 of water? c) If I add 100cm3 of 1.00 mol dm3 HCl to 1.9dm3 of water, what is the molarity of the new solution?

		d) What mass of silver is present in 100cm3 of 1moldm-3 silver nitrate (AgNO3)? e) The Dead Sea, between Jordan and Israel, contains 0.0526 moldm-3 of Bromide ions (Br -), what mass of bromine is in 1dm3 of Dead Sea water?
W/C 6.7.20	Chemistry topic 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://bit.ly/pixlchem13 http://www.chemguide.co.uk/orgpropsmenu.html#top And how to name organic compounds here: http://bit.ly/pixlchem14 http://www.chemguide.co.uk/basicorg/conventions/names.html#top Task 1: Write a 50 Word summary on this topic from the secondary resources provided and other resources you may have used to aid your understanding. Task 2: Q6.1 Alcohols How could you make ethanol from ethene? How does ethanol react with sodium, in what ways is this a) similar to the reaction with water b) different to the reaction with water? Q6.2 Aldehydes and ketones Draw the structures of a) propanal b) propanone How are these two functional groups different?
Fortnightly Meet: Date & Time	**Teacher delivering**	**Resources**
Mon 1st June 2020 2:30pm	Mrs R Histead	Introduction into oxidation numbers
Thursday 18th June 20 10:10am	Miss C Micallef	Introduction into Nomenclature
Monday 29th June 20 10am	Miss H Swinson	Intro in moles
General resources and suggested reading: Specification Link: https://www.ocr.org.uk/Images/171720-specification-accredited-a-level-gce-chemistry-a-h432.pdf Preferred websites: http://www.chemguide.co.uk/ https://www.physicsandmathstutor.com/chemistry-revision/a-level-aqa/ https://www.rsc.org/		

Possible additional interest reading:
https://www.studocu.com/en-gb/document/university-of-hertfordshire/chemistry/summaries/chemistry-fact-sheet-nomenclature/1193179/view
http://bit.ly/pixlchem5
http://www.chemguide.co.uk/atoms/bonding/covalent.html#top
http://bit.ly/pixlchem6
http://www.chemguide.co.uk/atoms/bonding/shapes.html#top