TUXFORD

Chemistry Department

Welcome to Chemistry

We hope you enjoy your time with us today and can see that even though Chemistry is challenging, it is extremely rewarding. We hope that in this course you will gain a high level of knowledge and understanding of Chemistry enabling you to attain not only the highest grades, but also a real appreciation of Chemistry in the wider context of the outside world.

Expectations

The time allocation for this course is five lessons a week. In order to be successful you are expected to do at least the same number of hours in terms of private study.

Your progress will be assessed regularly and the first test will be within the first 3 weeks of the course. Your progress will be continually assessed in terms of homeworks, tests and presentations. Take every assessment seriously-we do!

Within the constraints of the time allocated, practical work will form a valuable aspect of this course and students will develop their skills with a view to maximising their marks on the practical questions/paper. All students must complete the core practicals to achieve practical endorsement. You are expected to know your work from GCSE well; we will not have time to go over this material.

Recommended Text Books/revision guides
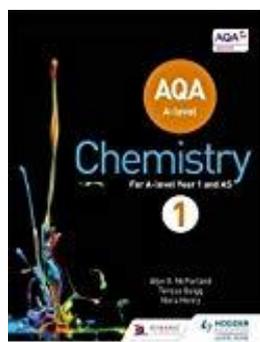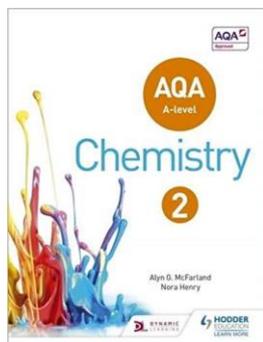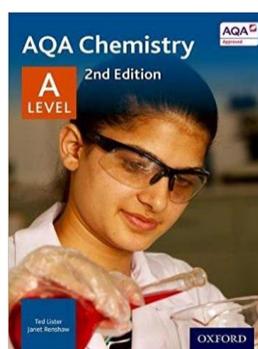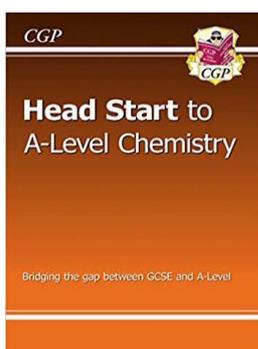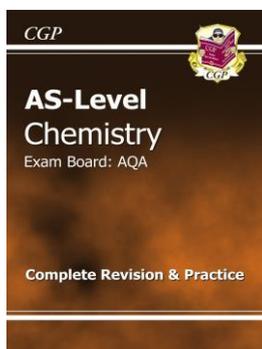
Bridging Work

Using online resources/revision guides solve the following problems. In addition to this you must be able to fully understand all parts of the GCSE syllabus, especially:

Essential reading 20 Pre-U points

Basic Atomic Structure

http://www.chemguide.co.uk/atoms/properties/   gcse.html#top

Basic Kinetic theory:

http://www.chemguide.co.uk/physical/kt/basic.html#top

Basic chemical energetics:

http://www.chemguide.co.uk/physical/energetics/basic.html#top

Chemical calculations:

http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa/chemcalc/

Chemical synthesis:

http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr/chemical_synthesis/

http://thereaction.net/

http://pubs.rsc.org/en/Journals?key=Title&value=Current

Optional

 60 Pre-U points

Visit the Royal Society of Chemistry http://www.rsc.org/ have a look at the student pages and register with Chem Net

Watch

40 Pre-U points

http://topdocumentaryfilms.com/chemistry-almost-everything/

60 Pre-U points
Task 1 - Fundamental Particles

Atoms are the basic building blocks of matter. It is not the smallest of particles, and within Chemistry, we are interested in electrons, protons and neutrons.
Using a periodic table, draw the *electronic configuration*, as well as identifying *how many sub-atomic particles* there are for the following atoms and its corresponding ions:

Hydrogen	Nitrogen	Calcium
Number of: e-: p: n:	Number of: e-: p: n:	Number of: e-: p: n:
Hydrogen ion, H+	**Nitrogen ion**	**Calcium ion**
Number of: e-: p: n:	Number of: e-: p: n:	Number of: e-: p: n:

Task 2 Dot cross diagrams

You would have covered ionic and covalent bonding in your GCSE. Using your knowledge, draw the dot cross diagrams for the following compounds, showing only outer electrons. You will need to decide what type of bonding is within the atoms of these compounds before you start.

Oxygen gas	**Sodium chloride**
Magnesium oxide	**Water**
Carbon dioxide	**Calcium chloride**
Ethane	**Nitrogen gas**

Task 3 - Rearranging Formulae

When solving chemistry problems you will often be required to rearrange an equation to solve for an unknown. You would have seen this in Physics when trying to solve speed.
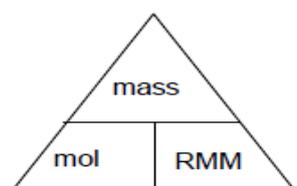Speed (m/s) = distance (m) / time (s)
We can write this to show distance and time as follows:
Distance (m) = speed (m/s) x time (s) Time (s) = distance (m) / speed (m/s)
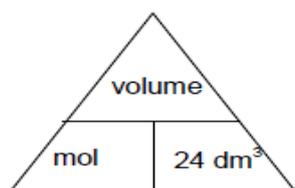

Rearrange the following:

a)

mass =

mol =

RMM =

b)

Volume =

mol =

c)

$$n = c \, v$$

c =

v =

The units of n is mol and the unit for v is dm^3. Write down the units for c.

d)   There are $1000 cm^3$ in $1 dm^3$. Convert the following:

1.	250 cm^3 is	dm^3	4.	0.8 dm^3 is	cm^3
2.	30 cm^3 is	dm^3	5.	10 dm^3 is	cm^3
3.	500 cm^3 is	dm^3	6.	0.0065 dm^3 is	cm^3

60 Pre-U points

TASK 4 Chemical Calculations Extra Challenge

1. A chemist reacted 0.243g of magnesium with chlorine to produce magnesium chloride.

$$Mg \ (s) + Cl_2 \ (g) \longrightarrow MgCl_2 \ (s)$$

Calculate the amount, in mol, of magnesium that reacts.

Calculate the amount, in mol, of magnesium chloride that was made.

Calculate the amount, in grams, of magnesium chloride made. Give your answer three decimal places.

2. A student heated 2.50 g of calcium carbonate, which decomposed as shown in the equation.

$$CaCO_3 \ (s) \longrightarrow CaO \ (s) \ + \ CO_2 \ (g)$$

Calculate the amount, in mol, of calcium carbonate that decomposes.

Calculate the amount, in mol, of carbon dioxide that was made.

Calculate the amount, in dm^3, of carbon dioxide that was made.

3. A student 4.00 g of calcium carbonate with 50cm^3 of hydrochloric acid. Calcium chloride, water and carbon dioxide were produced in the reaction.

Write a balanced equation for this reaction.

Calculate the amount, in mol, of calcium carbonate that reacted.

Calculate the amount, in mol, of hydrochloric acid that reacted.

Calculate the concentration of hydrochloric acid used.