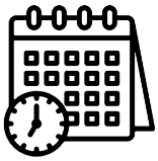
St. Anne's Sixth Form

Get Ahead Tasks

Chemistry A Level

What does a successful A-level Chemistry student look like?

After every lesson	After each chapter	Throughout
REVIEW YOUR NOTES Are they complete? Do you need to re-draw or write anything so that it will make sense in 6 months' time? Do not waste time making notes pretty! Check against the specification. 	**KEEP ON TOP OF REVISION** Create a concise flash card of definitions or processes you need to know by rote (use mark-scheme language). Use them! Test yourself each evening. 	**JOIN IN** Get involved in your chemistry lesson. Don't just sit there passively. The more you contribute, the more you build confidence and understanding 
CHECK YOUR UNDERSTANDING Decide what you don't yet "know" and what you don't yet "understand". Cover up definitions and processes and see what you can say out-loud. Ask your teacher next lesson if there's something you don't understand. 	**TEST YOURSELF** You need to identify what you can still recall and what you can't recall anymore. Use "look, cover, write, check" for definitions and processes (use in conjunction with the A level Spec).	**READ** BBC News (Science / Health section) Books (look in the Beyond The Syllabus document in the transition information you were given for some examples) Keep a list in your phone or make notes of books you've read in an "extra reading" journal. This will be beneficial for your A2 essay and University applications.

READ THE TEXTBOOK Read your textbook and revision guide. Are there any other facts, diagrams, examples, analogies etc that you need to add into your notes? 	**PAST PAPER QUESTIONS** Check all of your answers strictly against the mark-scheme. Learn the mark-scheme language. It's worth also looking at examiners reports at times too, they offer deeper understanding into why you've got the marks you have for a particular Q.	**EVALUATE** Every time you see a science-based headline, read the article and try to evaluate the evidence. Think sample size and make-up, stats tests, etc. think like a scientist, question everything!
COMPLETE ASSIGNED HOMEWORK/EXAM QS Attempt exam questions without your notes. Switch colour and fill in gaps using your notes. As soon as work comes back marked, read the feedback add corrections using the mark-scheme and additional notes	**SENECA** Lots of people find Seneca useful for study and revision. Your teacher will assign the relevant courses to you. SENECA	**YOUTUBE** YouTube is great for taking your A Level knowledge to a higher level. Keep a record of things you've watched. 
POST-IT REMINDERS Use post-its to remind yourself which parts of your homework you needed to use your notes for or concepts you don't understand yet, and questions you need to ask.	**TIMING** For smaller tests, you should be studying throughout so final 'revision' can be done in the week before your test. For larger exams you will need to start a few months ahead of the date 	**REVISE REGULARLY** Schedule time to review older chapters regularly. Use your revision timetable you made to build in revision time for all your subjects.
ASK QUESTIONS Email your teacher to arrange a time to talk-through a concept you don't understand or ask in the next lesson. 		**NO DISTRACTIONS!** When you do sit down to work, make sure you leave your phone in another room (or turn off app notifications). Focus on what you're doing. 

Research task:

Robert Boyle, John Dalton, Henri Becquerel and Earnest Rutherford all investigated the structure of the atom. Each scientist took our understanding forward. Starting with Robert Boyle, research the theory each of these men put forward which finally lead to our modern understanding of the fundamental particles we know about today. Only a sentence or two is required for each scientist.

Practicing skills:

Writing equations is a large part of A level chemistry, can you write balanced symbol equations for the following?

(10 marks)

1. The reaction between silicon and nitrogen to form silicon nitride Si_3N_4.

.....

2. The neutralisation of sulfuric acid with sodium hydroxide.

.....

3. The preparation of boron trichloride from its elements.

.....

4. The reaction of nitrogen and oxygen to form nitrogen monoxide.

.....

5. The combustion of ethanol (C_2H_5OH) to form carbon dioxide and water only.

.....

6. The formation of silicon tetrachloride ($SiCl_4$) from SiO_2 using chlorine gas and carbon.

.....

7. The extraction of iron from iron(III) oxide (Fe_2O_3) using carbon monoxide.

.....

8. The complete combustion of methane.

.....

9. The formation of one molecule of ClF_3 from chlorine and fluorine molecules.

.....

10. The reaction of nitrogen dioxide with water and oxygen to form nitric acid.

.....

Some fundamental skill which are needed through

Balance the equations below.

1. …..C + …..O_2 ⟶ …..CO
2. …..Ba + …..H_2O ⟶ …..$Ba(OH)_2$ + …..H_2
3. …..C_2H_6 + …..O_2 ⟶ …..CO_2 + …..H_2O
4. …..HCl + …..$Mg(OH)_2$ ⟶ …..$MgCl_2$ + H_2O
5. …..N_2 + …..O_2 ⟶ …..NO
6. …..Fe_2O_3 + …..C ⟶ …..Fe + …..CO_2
7. …..CH_3CH_2OH + …..[O] ⟶ …..CH_3COOH + …..H_2O
8. …..HNO_3 + …..CuO ⟶ …..$Cu(NO_3)_2$ + H_2O
9. …..Al^{3+} + …..e^- ⟶ …..Al
10. …..$[Fe(H_2O)_6]^{3+}$ + …..CO_3^{2-} ⟶ …..$Fe(OH)_3(H_2O)_3$ + …..CO_2 + …..H_2O

Rearranging equations

1. The amount of substance in moles (n) in a solution can be calculated when the concentration given in mol/dm^3 (c) and volume (v) in cm^3 are known by using the equation:

$$n = \frac{cv}{1000}$$

a. Rearrange this equation making c the subject of the equation. (1 mark)

b. Rearrange this equation making v the subject of the equation. (1 mark)

2. The density of a substance can be calculated from its mass (m) and volume (v) using the equation:

$$d = \frac{m}{v}$$

a. Rearrange this equation so that the mass of a substance can be calculated given its density and volume.

(1 mark)

Chemists most commonly work with masses expressed in grams and volumes in cm^3. However, the SI unit for density is kg/m^3.

b. Write an expression for the calculation of density in the SI unit of kg/m^3 when the mass (m) of the substance is given in g and the volume (v) of the substance is given in cm^3.

(2 marks)

3. The de Broglie relationship relates the wavelength of a moving particle (λ) with its momentum (p) through Planck's constant (h):

$$\lambda = \frac{h}{p}$$

a. Rearrange this equation to make momentum (p) the subject of the formula.

(1 mark)

Momentum can be calculated from mass and velocity using the following equation.

$$p = mv$$

b. Using this equation and the de Broglie relationship, deduce the equation for the velocity of the particle.

(2 marks)

4. The kinetic energy (KE) of a particle in a time of flight mass spectrometer can be calculated using the following equation.

$$KE = \frac{1}{2}mv^2$$

Rearrange this equation to make v the subject of the equation.

(2 marks)