



|                      | Physical Chemistry   | Organic Chemistry                       | Inorganic Chemistry  |
|----------------------|---|---|---|
| <b>Y12 Topics</b>    | Atomic Structure<br>Amount of Substance<br>Bonding<br>Energetics<br>Kinetics<br>Chemical Equilibrium<br>Le Chatelier's Principle  | Introduction to Organic Chemistry<br>Alkanes<br>Haloalkanes<br>Alkenes<br>Alcohols<br>Organic Analysis                    | Periodicity<br>Group 2 The Alkaline Earth Metals<br>Group 7 The Halogens                                |
| <b>Links to GCSE</b> | Atoms<br>Periodic Table<br>Chemical Reactions<br>Bonding<br>Physical and Chemical Properties<br>Reversible Reactions<br>Reacting Masses and Calculations<br>Rates of Reaction | Crude Oil and Fuels<br>Hydrocarbons<br>Alkanes<br>Alkenes<br>Saturated and Unsaturated<br>Catalytic converters<br>Ethanol | Limestone<br>Building Materials<br>Metals<br>Alloys<br>Extracting Metals<br>The Atmosphere              |

|                   | Physical Chemistry         | Organic Chemistry   | Inorganic Chemistry        |
|-------------------|---|---|---|
| <b>Y13 topics</b> | Thermodynamics<br>Rate Equations<br>The Equilibrium Constant<br>Electrode Potentials<br>Electrochemical cells | Optical Isomerism<br>Aldehydes and Ketones,<br>Carboxylic Acids<br>Aromatic Chemistry<br>Polymers<br>Amines, amino acids, proteins and DNA,<br>Organic Synthesis,<br>NMR Spectroscopy<br>Chromatography | Properties of Period 3 elements and their oxides,<br>Transition Metals<br>Reactions of ions in aqueous solution |

|                          |  |   |  |
|--------------------------|--|---|--|
| <b>Links to<br/>GCSE</b> | Electrolysis<br>Batteries<br>Cells<br>Rates of reaction<br>Exothermic and Endothermic<br>Energy transfer | Polymers<br>Emulsions<br>Vegetable Oils<br>Soap<br>Polymers<br>Amino Acids<br>DNA<br>Nanoscience<br>Medicines | Water<br>Acids Bases and Salts<br>Catalysts<br>Chemical Analysis<br>Chemical Tests |
|                          |  |   |  |

### What can I use to help me prepare for A-level?

- GCSE revision guides - use to ensure you have the foundation knowledge needed.
- CGP 'Head Start to Chemistry' book – perfect for bridging the gap between GCSE and A-level knowledge. Can be bought online for approximately £5.
- AQA website <http://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405> – if you want to find out more about what you'll be studying and how you will be assessed.

### Useful Websites

Though not an exhaustive list, these are some of the websites which you might find useful.

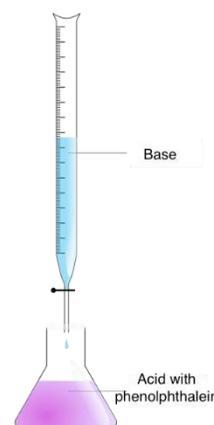
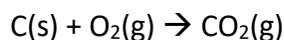
- <http://www.s-cool.co.uk/a-level/chemistry> - Revision website.
- <http://www.chemguide.co.uk/> - Online Chemistry encyclopaedia.
- <http://www.knockhardy.org.uk/sci.htm> - Chemistry teaching website.
- <http://www.creative-chemistry.org.uk/alevel/> - Chemistry notes and worksheets website.
- <http://www.revisionworld.com/a2-level-level-revision/chemistry-level-revision> - Revision website.

### Independent Study Task

Titration is a regular experiment in Chemistry. One of the main tasks of Chemists is to use data they have collected from experiments such as titrations, or that they have been provided, to perform calculations. We have provided some questions focusing on calculations involving moles and masses.

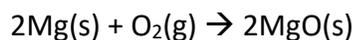
These questions are the similar to those you will have encountered during GCSE, if you need extra guidance refer to your GCSE revision guide or one of the website above. You will need a periodic table.

**1** Carbon reacts with oxygen to form the compound carbon dioxide.



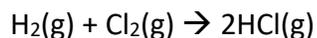
If 0.60 g of carbon is burnt in excess oxygen calculate the mass of carbon dioxide produced.

**2** Magnesium reacts with oxygen to magnesium oxide.



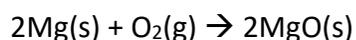
If 0.80 g of magnesium is burnt in excess oxygen calculate the mass of magnesium oxide produced.

**3** Hydrogen reacts with chlorine to form hydrogen chloride.



What mass of hydrogen chloride is produced when 0.40 g of hydrogen is reacted with 5.00 g chlorine?

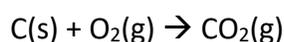
**4** Magnesium reacts with oxygen to form magnesium oxide.



Calculate the volume of oxygen that would be required to react with 1.20 g of magnesium.

(1 mole of a gas has a volume of 24 dm<sup>3</sup> under the conditions in this experiment) **5**

Carbon reacts with oxygen to form the compound carbon dioxide.



Calculate the volume of carbon dioxide gas produced when 1.0 g of carbon is burnt in excess oxygen.

(1 mole of a gas has a volume of 24 dm<sup>3</sup> under the conditions in this experiment)

**6** When calcium carbonate is heated strongly it forms calcium oxide and carbon dioxide.

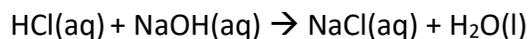


Calculate the volume of carbon dioxide gas that would be produced when 10.0 g of calcium carbonate reacts in this way.

(1 mole of a gas has a volume of 24 dm<sup>3</sup> under the conditions in this experiment)

Extension:

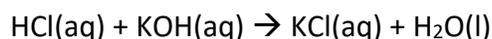
**1** Hydrochloric acid reacts with sodium hydroxide to form sodium chloride and water.



On titration a 25 cm<sup>3</sup> sample of the hydrochloric acid was completely neutralized by 15.0 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> sodium hydroxide solution.

Calculate the concentration of the hydrochloric acid.

**2** Hydrochloric acid reacts with potassium hydroxide to form potassium chloride and water.



On titration a 25 cm<sup>3</sup> sample of the hydrochloric acid was completely neutralized by 20.0 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> potassium hydroxide solution.

Calculate the concentration of the hydrochloric acid.

**3** A chloride of phosphorus contains 22.5% by mass phosphorus.

(a) Calculate the empirical formula of this chloride.

(b) The molecular mass of this chloride is 137.5. What is its molecular formula?

**4** A hydrocarbon contains 85.7% by mass carbon and 14.3% hydrogen.

(a) Calculate the empirical formula of this hydrocarbon.

(b) The molecular mass of this hydrocarbon is 28. What is its molecular formula?

***The answers to these questions should be handed in during your first Chemistry lesson.***