PREPARING FOR A LEVEL CHEMISTRY PART 4

PRACTICAL CHEMISTRY AND HAZARDS

MOVING FORWARD

WITH EACH OF THESE LESSONS PLEASE FOLLOW THE PRESCRIBED FORMAT.

1. WATCH THE VIDEO LINKED ON THE VLE
2. READ THROUGH THE POWERPOINT
3. HAVE A GO AT ALL THE QUESTIONS

THE TOPICS MAY SEEM BASIC TO YOU BUT THE QUESTIONS SHOULD TEST YOU AT EACH STAGE.

KEY TERMS

Solute – A substance that can dissolve in a solvent. E.g. salt, sugar

Solvent – The substance that a solute dissolves in. E.g. water, alcohol

Solution – Formed when a solute is dissolved in a solvent. E.g. salt water

Soluble – A solute that can dissolve in a solvent. E.g salt (NaCl) is soluble in water

Insoluble – A substance that cannot dissolve in a solvent. E.g. silver chloride cannot dissolve in water

Aqueous – State we use to describe a solution

Mixture – One or more different compounds NOT chemically bonded. E.g. Crude oil

Saturated – A solution that cannot contain more dissolved solute.

PRACTICAL TECHNIQUES

There are a few different practical setups you will have looked at during your GCSE courses and many of them contain key skills you will need for A level chemistry.

Evaporation – Extracting the solute from a solution by removing the solvent. Usually using heat.

Crystallisation – Creating a saturated solution at high temperature and solute forming crystals as it cools

Filtration – Extracting an insoluble oslid from a mixture

Distillation – Extracting a solvent, like water, from a solution

Fractional distillation – Separating a mixture of different liquids

Chromatography – Separating a mixture

SEPARATING TECHNIQUES

All of those listed on the previous slide could be described as separating techniques. A way of taking some form of combination of chemicals and pulling them apart to get the individual chemicals. The technique used will depend strongly on a number of factors.

State of desired compound

State of undesired compounds

Number of chemicals in the mixture / solution

Temperature of the reaction

All of these factors play a role in how you would extract them.

Most techniques revolve around the physical properties of the substances in question and these nearly always come down to the forces between the molecules and how strong the attractions are.

QUANTITATIVE OR QUALITATIVE?

Two key words that come up a lot in practical are these two

Quantitative – Is all about amounts. How much have we got, what concentration how much energy…

Qualitative – Is simply what is it? Can we identify the unknown.

Make sure you are happy with each of these key terms

ANALYTICAL TECHNIQUES

There are a few other techniques that are more analytical. This means that rather then just separating we can analyse / study / work something out from the results and you will do a lot of this during you're a level chemistry course. If you have done triple chemistry you will have come across a couple of these techniques briefly.

Titration – used to calculate concentrations and amounts of substance from different calculations based on the results of the experiment, you will do a lot of these in A level chemistry (Quantitative)

Chromatography – both separates but also allows you to analyse the smaples and you will look at this in more detail during A level chemistry. (Quantitative / Qualitative)

Instrumental analytical techniques – We will introduce lots of these throughout the course. (Quantitative / Qualitative)

Chemical tests – simple tests that involve addition of small amounts to unknowns for identification. (Qualitative)

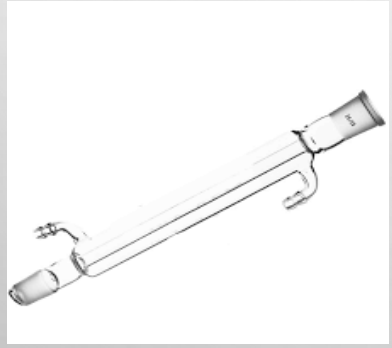
PRACTICAL EQUIPMENT

Some examples of important practical equipment, you may not have seen some of them before.

Conical flask (shaped like a cone)

Burette used to accurately measure amounts of solutions, essential in a titration

Volumetric flask used to make a solution with an accurately known concentration



Condenser essentially two glass tubes one in the middle for reactants and a 'jacket' of cold water around it keeping chemicals from evaporating

Glass pipette used to accurately measure specific, set amounts come in various sizes.

Evaporating basin, used to heat solutions allowing evaporation of slovents.

HAZARD SYMBOLS

Some of these you will come across more than others but you should be abel to recognise them all.

				
General hazard – mild consequences may have once been harmful or irritant. E.g. very dilute acid	Toxic – Particularly harmful if inhaled or ingested. E.g. Chlorine gas	Flammable – Will burn / ignite very easily. E.g. almost any organic chemical	Corrosive – Will dissolve / Degrade substances on contact, including skin. E.g. Strong acids	Oxidsing agent – Will basically help other substances burn / react quicker. Most explosives / gunpowder contains an oxidising agent
				
Health hazard – could be a carcinogen, cause cancer, and we do use some of these in A level chemistry.	Compressed gas – A container that contains compressed gas, dangerous if heated or damaged	Explosive – Will react rapidly releasing a lot of gas and energy	Environmental hazard – Particularly dangerous to sensitive ecosystems. Lots of transition metals and organic compounds are dangerous to the environment so when we sue them we do not put them down the sink we have to collect them in special waste bottles. Used a lot in A level chemistry.	