

Section A: Key Vocabulary

Tier 3 vocabulary	Definition
Relative atomic mass (A_r)	The mean mass of an atom of an element compared to 1/12 the mass of a ^{12}C atom.
Relative formula mass (M_r)	The mean mass of a unit of a substance compared to 1/12 the mass of a ^{12}C atom.
Empirical formula (n)	Formula showing the simplest whole-number ratio of the atoms of each element in a compound.
Pure substance (n)	Consisting of just one type of element or compound.
Filtrate (n)	Liquid that passes through the filter during filtration.
Residue (n)	Insoluble material left in the filter paper during filtration.
Saturated solution (n)	A solution containing the maximum mass of solute possible at a given temperature.
Liebig condenser (n)	Apparatus that can cool and condense a substance.
Fraction (n)	In Chemistry, a substance separated during fractional distillation.
Fractionating column (n)	A piece of apparatus used to improve the separation of solvents during fractional distillation.
Distillate (n)	A liquid product condensed from its vapour during distillation.
Chromatogram (n)	The pattern produced when separating a mixture using chromatography.
Stationary phase (l)	A substance in the solid or liquid state that does not move during chromatography.
Mobile phase (l)	A substance in the liquid or gas state that moves during chromatography.
Tier 2 vocabulary	Definition
Symbol (n)	A shorthand way to represent an element on the periodic table.
Separate (v)	Cause to move or be apart.
Volatile (adj)	(of a substance) easily evaporated at normal temperatures.

Section B: Microscopes**Relative formula mass and Empirical formulae****Calculating relative formula mass (e.g. H_2O) :**

1. Write down A_r values of elements in the compound (this is the larger of the two numbers next to

An elements symbol): $\text{H} = 1.0$, $\text{O} = 16.0$

2. Work out the number of atoms of each element:

$\text{H} = 2$, $\text{O} = 1$

3. Multiply the number of each atom by its A_r value and add these together: $M_r = (2 \times 1.0) + (1 \times 16.0) = \mathbf{18.0}$

Calculating an empirical formula (e.g. Butene, C_4H_8)

1. Find the highest common factor between the numbers in the molecular formula:

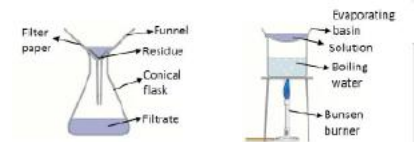
Highest common factor of 4 and 8 is 4.

2. Divide the chemical formula by the highest common factor: $\text{C} = 4/4 = 1$ $\text{H} = 8/4 = 2$

3. Write down the empirical formula:

**Chromatography**

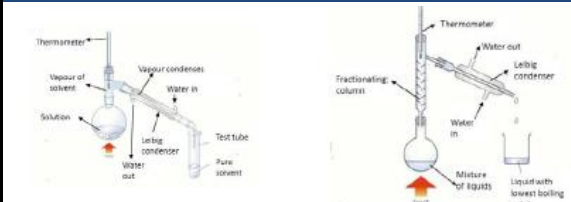
Chromatography	Mobile Phase	Stationary phase
Paper chromatography	Solvent	Paper
Thin layer chromatography (TLC)	Solvent	Thin plate of silica powder on glass.
Gas chromatography	Silica powder packed into a thin tube	Unreactive gas e.g. nitrogen

Section C: Diagrams**Filtration and Crystallisation**

Filtration

Crystallisation

- Filtration separates any insoluble substances from a liquid/solvent.
- Crystallisation separates a solute from a solution.

Simple and Fractional distillation

Simple distillation

Fractional distillation

- Distillation separates substances by boiling point.
- Simple distillation separates a solvent from a solution.

Chromatography

Chromatography separates substances by their solubility.

Chromatography is an analytical technique.

$$R_f \text{ value} = \frac{\text{distance travelled by spot}}{\text{distance travelled by solvent}}$$