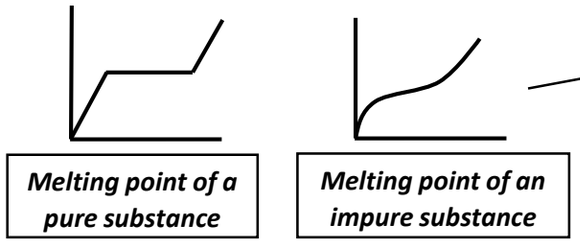
AQA Chemical analysis

Pure substances

Pure substances	***A pure substances is a single element or compound, not mixed with any other substance.***	Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.



Melting point of a pure substance

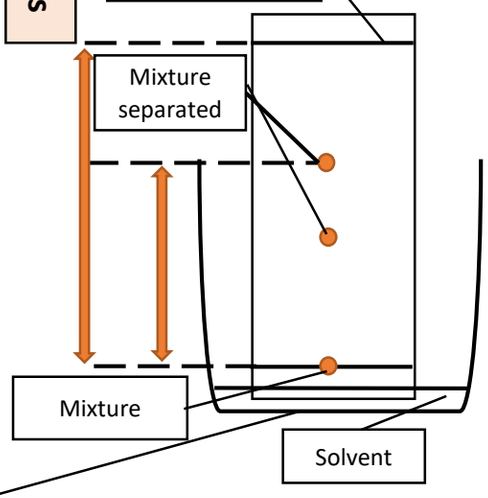
Melting point of an impure substance

Purity, formulations and chromatography

Formulations

Formulation	***A formulation is a mixture that has been designed as a useful product.***
How are formulations made?	***By mixing chemicals that have a particular purpose in careful quantities.***
Examples of formulations.	***Fuels, cleaning agents, paints, medicines and fertilisers.***

Chromatography



Chromatography	***Can be used to separate mixtures and help identify substances.***	Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).
R_f Values	***The ratio of the distance moved by a compound to the distance moved by solvent.***	$R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$
Pure substances	***The compounds in a mixture separate into different spots.***	This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.

Identification of common gases

Gas	Test	Positive result
Hydrogen	***Burning splint***	'Pop' sound.
Oxygen	***Glowing splint***	Re-lights the splint.
Chlorine	***Litmus paper (damp)***	Bleaches the paper white.
Carbon dioxide	***Limewater***	Goes cloudy (as a solid calcium carbonate forms).

Identification of ions (CHEMISTRY ONLY)

Flame tests (chem only)

Element	Colour flames
Lithium	***Crimson***
Sodium	***Yellow***
Potassium	***Lilac***
Calcium	***Orange-red***
Copper	***Green***

Metal hydroxides (chem only)

Sodium hydroxide	***Is added to solutions to identify metal ions.***
White precipitates	***Aluminium, calcium and magnesium ions form this with sodium hydroxide solution.***
Coloured precipitates	***Copper (II) = blue Iron (II) = green Iron (III) = brown***

Carbonates, halides and sulfates (chem only)

Carbonates	***React with dilute acids to form carbon dioxide.***
Halide ions	***When in a solution, they produce precipitates with silver nitrate solution in the presence of nitric acid.***
Sulfate ions	***When in a solutions they produce a white precipitate with barium chloride solutions in the presence of hydrochloric acid.***

Instrumental methods

Instrumental methods	***Methods that rely on machines***	Can be used to identify elements and compounds. These methods are accurate, sensitive and rapid.

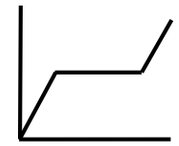
Flame emission spectroscopy

Flame emission spectroscopy	***An instrumental method used to analyse metal ions.***	The sample solution is put into a flame and the light that is given out is put through a spectroscope. The output line spectrum, can be analysed to identify the metal ions in the solution. It can also be used to measure concentrations.

Purity, formulations and chromatography

Pure substances

	A pure substances is a single element or compound, not mixed with any other substance.	Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.



Melting point of a pure substance

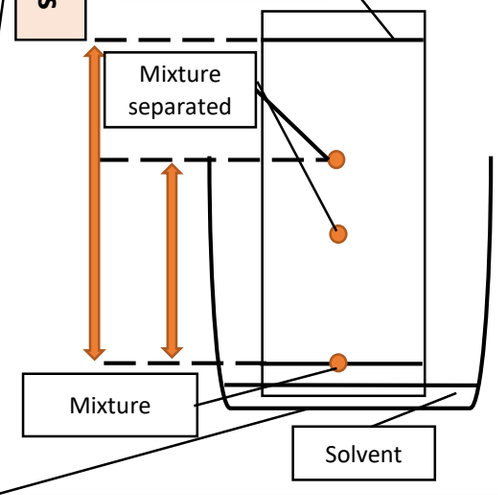
Melting point of an impure substance

Formulations

	A formulation is a mixture that has been designed as a useful product.	
	By mixing chemicals that have a particular purpose in careful quantities.	
	Fuels, cleaning agents, paints, medicines and fertilisers.	

Chromatography

	Can be used to separate mixtures and help identify substances.	Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).
	The ratio of the distance moved by a compound to the distance moved by solvent.	R_f = distance moved by substance / distance moved by solvent
	The compounds in a mixture separate into different spots.	This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.



AQA Chemical analysis

Identification of common gases

Gas	Test	Positive result
	Burning splint	‘Pop’ sound.
	Glowing splint	Re-lights the splint.
	Litmus paper (damp)	Bleaches the paper white.
	Limewater	Goes cloudy (as a solid calcium carbonate forms).

Identification of ions (CHEMISTRY ONLY)

Flame tests (chem only)

Element	Colour flames
	Crimson
	Yellow
	Lilac
	Orange-red
	Green

Metal hydroxides (chem only)

Sodium hydroxide	*Is added to solutions to identify metal ions.*
	Aluminium, calcium and magnesium ions form this with sodium hydroxide solution.
	Copper (II) = blue *Iron (II) = green* *Iron (III) = brown*

Carbonates, halides and sulfates (chemistry only)

	React with dilute acids to form carbon dioxide.
	When in a solution, they produce precipitates with silver nitrate solution in the presence of nitric acid.
	When in a solutions they produce a white precipitate with barium chloride solutions in the presence of hydrochloric acid.

Flame emission spectroscopy

Instrumental methods

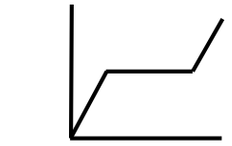
	Methods that rely on machines	Can be used to identify elements and compounds. These methods are accurate, sensitive and rapid.

	An instrumental method used to analyse metal ions.	The sample solution is put into a flame and the light that is given out is put through a spectroscope. The output line spectrum, can be analysed to identify the metal ions in the solution. It can also be used to measure concentrations.

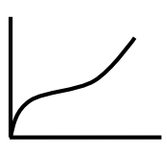
Purity, formulations and chromatography

Pure substances

Pure substances		Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.



Melting point of a pure substance

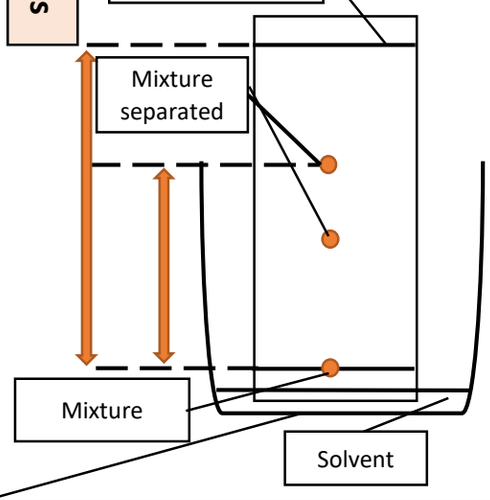


Melting point of an impure substance

Formulations

Formulation	
How are formulations made?	
Examples of formulations.	

Chromatography



Chromatography		Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).
R_f Values		R_f = distance moved by substance / distance moved by solvent
Pure substances		This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.

AQA Chemical analysis

Identification of common gases

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		‘Pop’ sound.
		Re-lights the splint.
		Bleaches the paper white.
		Goes cloudy (as a solid calcium carbonate forms).

Identification of ions (CHEMISTRY ONLY)

Flame tests (chem only)

Element	Colour flames
Lithium	
Sodium	
Potassium	
Calcium	
Copper	

Metal hydroxides (chem only)

Sodium hydroxide	
White precipitates	
Coloured precipitates	

Carbonates, halides and sulfates (chem only)

Carbonates	
Halide ions	
Sulfate ions	

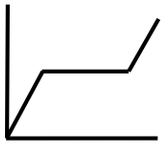
Instrumental methods

Instrumental methods		Can be used to identify elements and compounds. These methods are accurate, sensitive and rapid.

Flame emission spectroscopy

Flame emission spectroscopy		The sample solution is put into a flame and the light that is given out is put through a spectroscope. The output line spectrum, can be analysed to identify the metal ions in the solution. It can also be used to measure concentrations.

Pure substances		



Melting point of a pure substance

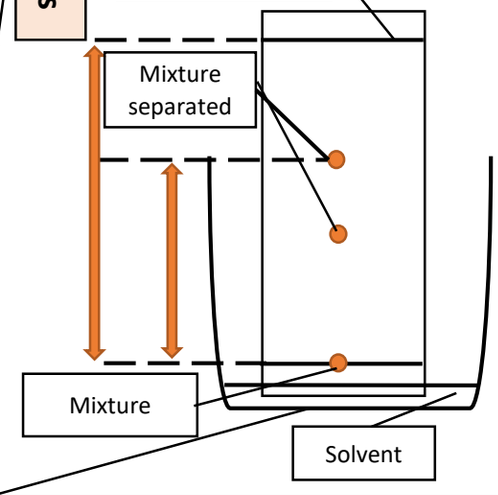
Melting point of an impure substance

Pure substances

Purity, formulations and chromatography

Chromatography

Position solvent reaches



Chromatography		
R_f Values		
Pure substances		

Formulations

Formulation	
How are formulations made?	
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AQA Chemical analysis

Identification of common gases

Gas	Test	Positive result

Identification of ions (CHEMISTRY ONLY)

Element	Colour flames

Flame tests (chem only)

Flame emission spectroscopy

Metal hydroxides (chem only)

Sodium hydroxide	
White precipitates	
Coloured precipitates	

Carbonates, halides and sulfates (chem only)

Carbonates	
Halide ions	
Sulfate ions	

Instrumental methods

Instrumental methods		

Flame emission spectroscopy		