

Exercise walk-through

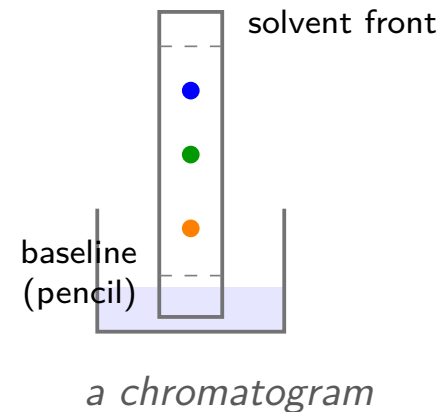
12.1

Experimental design

IGCSE Chemistry

What we will cover

- 1 Apparatus & key words
- 2 Titration
- 3 Chromatography
- 4 Separation & purification
- 5 Tests for ions
- 6 Tests for gases & flames



The apparatus, and the words that go with it

Measuring

Volume: a measuring cylinder, pipette or burette. Time: a **stop-watch**. Temperature: a **thermometer**. Mass: a balance.

Simple distillation

Simple distillation separates a solvent – the liquid – from a solution; fractional distillation separates two liquids.

Saturated solution

A **saturated solution** holds the most solute that will dissolve at that temperature.

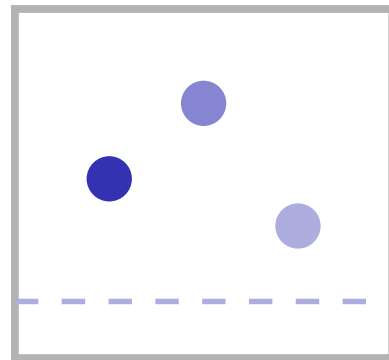
Purity

Check purity with the **melting point** and boiling point: a pure substance melts and boils at sharp fixed temperatures, and impurities lower the melting point and raise the boiling point.

“Pure” in chemistry means one substance – not the everyday sense of clean or natural.

Check yourself

- 1 What is the end-point of a titration?
- 2 How many spots does a pure substance give?
- 3 What reagent tests for a chloride ion?
- 4 What flame colour does sodium give?



Answers 1. where the indicator just changes colour 2. one 3. silver nitrate (after nitric acid) 4. yellow

Exercises 2.1·2.2

2.1 Name the apparatus used to measure an accurate volume of a solution. [1]

2.2 Define a saturated solution. [1]

Exercises 2.1·2.2

2.1 Name the apparatus used to measure an accurate volume of a solution. [1]

2.1

- an accurate volume of solution: a **burette** or a **(volumetric) pipette**
-

2.2 Define a saturated solution. [1]

2.2

- a **saturated** solution holds the **maximum amount of solute** that will dissolve at that temperature

Exercise 3.1

3.1 Which apparatus measures the volume of a gas produced?

[1]

☐

A thermometer

B balance

C gas syringe

D stop-watch

Exercise 3.1

3.1 Which apparatus measures the volume of a gas produced?

[1]

☐

A thermometer

B balance

C gas syringe

D stop-watch

3.1 C

- a **gas syringe** measures the volume of gas produced
- A is temperature; B is mass; D is time

Exercise 3.2 (a)

3.2 A student needs to measure exactly 25.0 cm^3 of acid and the temperature of a reaction.

(a) Name the apparatus for each.

[2]

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3.2 A student needs to measure exactly 25.0 cm^3 of acid and the temperature of a reaction.

(a) Name the apparatus for each. [2]

(a)

- 25.0 cm^3 of acid: a **pipette** (or burette)
- temperature: a **thermometer**

Exercise 3.2 (b)

3.2 A student needs to measure exactly 25.0 cm^3 of acid and the temperature of a reaction.

(b) State the difference between a residue and a filtrate. [2]

Exercise 3.2 (b)

3.2 A student needs to measure exactly 25.0 cm^3 of acid and the temperature of a reaction.

(b) State the difference between a residue and a filtrate. [2]

(b)

- **residue:** the solid left on the filter
- **filtrate:** the liquid that passes through