

Titration method

In a titration you follow a sequence of steps to get a valid and accurate result. Over time, scientists have refined the steps and developed a **standard procedure**. Every time we do a titration, we follow that standard procedure.

Fill the apparatus

First, fill the **volumetric pipette**.

- Use a pipette filler to fill the pipette with the second solution beyond the fill line. Your teacher will show you how to use the pipette fillers at your school/college.
- Break the seal with the filler and put your thumb over the end of the pipette.
- Let the solution out of the end of the pipette using small thumb movements until the meniscus rests on the fill line.
- When the meniscus rests on the fill line, let out the 25 cm³ portion of solution into the conical flask you will do the titration in. Never force the solution out of the end of the pipette, there should always be a drop of solution left.

Next, fill the **burette**.

- Carefully clamp the burette to a clamp stand and make sure you close the burette tap.
- Then fill the burette with the first solution using a **funnel**.
- Fill to above the 0.00 cm³ line then open the tap and let some solution through. This is to fill the **air gap** between the tap and the tip of the burette.
- Remove the funnel before you start the titration.

Did you know ...?

Until the 1970s, scientists didn't use pipette fillers. They used to suck up the solution into the pipette with their mouths! They did this in chemical laboratories and in biological sciences with blood and other fluids. Scientists eventually stopped this practice because it was incredibly dangerous.

Determine an end point

When you have filled the burette and pipette, carry out the titration.

- Place the **conical flask** below the burette, on top of a **white tile** which will help you visualise the **end point**.

- Before you do any titration, make sure you add an **indicator** to the solution in the conical flask.
- First, do a **rough titration**, followed by as many **accurate titrations** as you need to get **concordant results** (results within 0.10 cm³ of each other).

For a **rough titration**:

- Note the start point on the burette (it might not be 0.00 cm³) in a results table.
- Open the burette tap and let down solution B into the conical flask while you swirl the flask.
- Close the tap when you see a colour change.
- Record the volume on the burette in a table.

For an **accurate titration**:

- Note the start point on the burette in a table.
- Add in solution from the burette slowly (drops of around 1 cm³) by opening and closing the tap while you swirl the conical flask with your other hand.
- When the reading on the burette gets within 5 cm³ of the end point from the rough titration, add smaller portions of solution until eventually you are adding the solution in the burette dropwise.
- Squirt **distilled water** down the sides of the conical flask to make sure that any splashes of solution on the sides react.
- You will see the colour change occur over the addition of a single drop of solution B.
- Record the reading on the burette in a table.

Volume	Rough	Run 1	Run 2
Start (cm ³)			
End (cm ³)			
Titre (cm ³)			