

## Edexcel Chemistry GCSE

CP 2: Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of dilute hydrochloric acid

Notes



## Investigating pH (neutralisation)

### Aim

Investigate the change in pH on adding powdered calcium hydroxide or calcium oxide to a fixed volume of dilute hydrochloric acid.

### Equipment list

- 25 cm<sup>3</sup> measuring cylinder or volumetric pipette and pipette filler
- Beaker
- Glass rod
- Universal indicator or pH probe
- Spatula

### Chemicals required

- Hydrochloric acid
- Powdered calcium hydroxide or calcium oxide

### Method

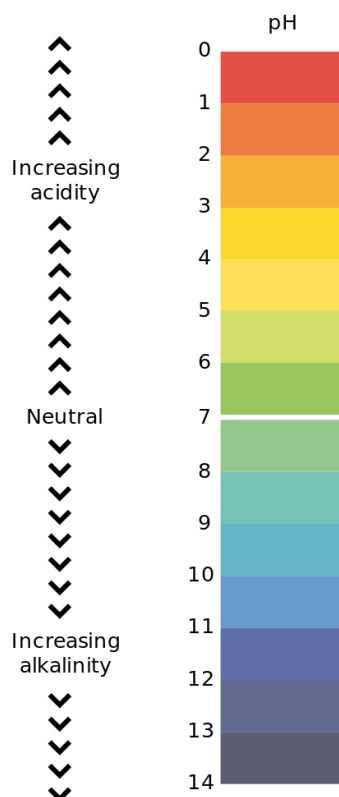
1. Using the measuring cylinder or volumetric pipette, add 25 cm<sup>3</sup> of dilute hydrochloric acid to a beaker.
2. Add a few drops of universal indicator. Compare the initial colour of the solution to a pH colour chart and record the pH. Alternatively, a pH probe can be used.
3. Add calcium hydroxide or calcium oxide (one level spatula at a time) to the beaker, stirring and recording the pH between additions.
4. Stop adding calcium hydroxide/calcium oxide when the pH remains constant.

### Key points

- The equations for the reactions, depending on which base is used, are:  
 $\text{CaO} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O}$   
 $\text{Ca(OH)}_2 + 2\text{HCl} \rightarrow \text{CaCl}_2 + 2\text{H}_2\text{O}$
- A volumetric pipette offers greater accuracy than a measuring cylinder when measuring the volume of hydrochloric acid.
- Stirring the solution before taking a pH reading ensures the reaction is complete and that the pH is consistent throughout the mixture.
- Using a pH probe instead of universal indicator offers greater accuracy.



## Diagram



[Hans Kirkendoll](#) [CC0 1.0](#)

### Safety Precautions

- Safety glasses must be worn.
- Hydrochloric acid is corrosive in high concentrations. Wash hands immediately after any contact with the skin.
- Calcium hydroxide may cause skin and eye irritation so wear gloves and safety goggles. Wash hands immediately after any contact with the skin.
- Clear up any spillages or broken glassware immediately.

### Analysis of results

The starting pH and final pH can be recorded to investigate the effect of adding calcium hydroxide/calcium oxide to hydrochloric acid.

