Activity AC6.6 Rate of reaction – concentration

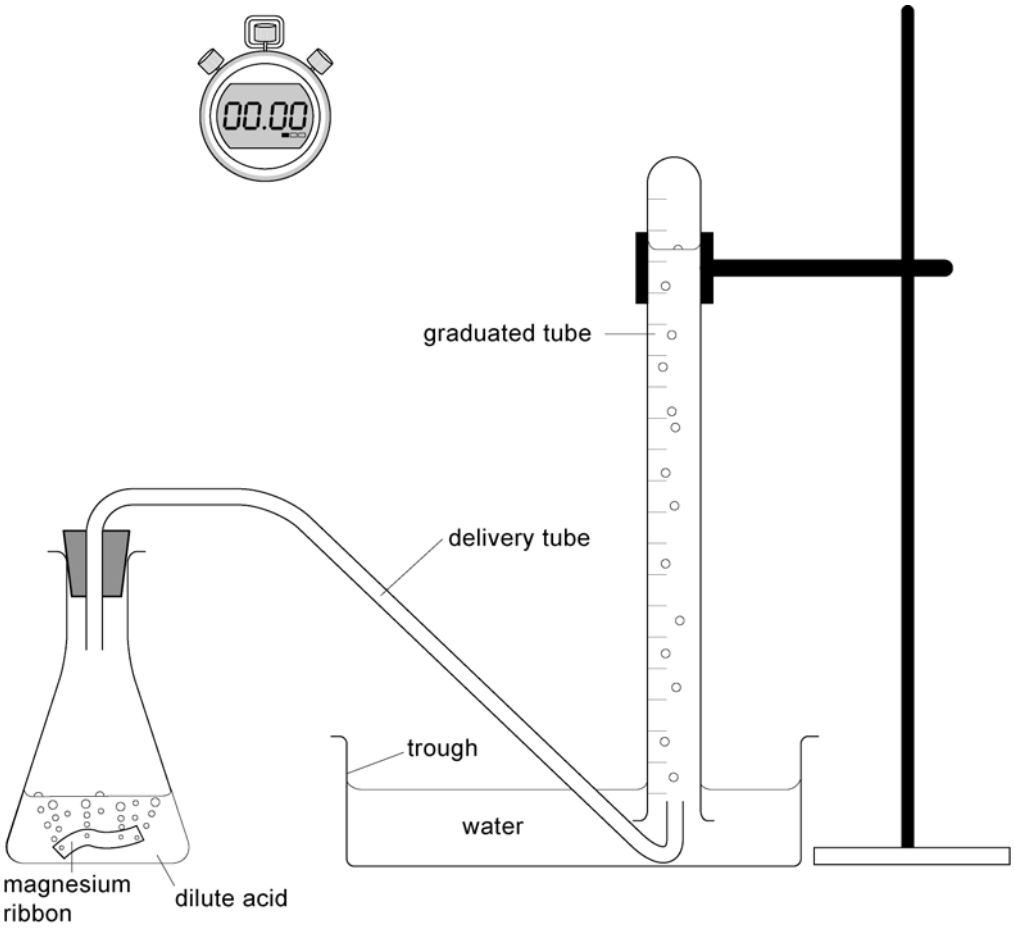
You are going to investigate how the concentration of hydrochloric acid affects its rate of reaction with the metal magnesium.

YOU MUST WEAR EYE PROTECTION

HARMFUL
dilute hydrochloric acid

HIGHLY FLAMMABLE
magnesium ribbon

To do



1. Clean a length of magnesium ribbon. Cut off a 30 mm strip.
2. Pour 50 cm^3 dilute hydrochloric acid into a 100 cm^3 flask. Fit a delivery tube and arrange to collect the gas produced in a graduated tube over water.
3. Add the strip of magnesium to the flask, putting the bung back into the flask as quickly as you can. Start timing.
4. Repeat steps **1–3** but this time use 25 cm^3 dilute hydrochloric mixed with 25 cm^3 water in step **2**.

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To record

5 Record your results in a table like this.

Time/minutes	0	1	2	3	4	5	6	7	8
More concentrated acid – volume (cm^3)									
Less concentrated acid – volume (cm^3)									

6 Draw a graph of your results, putting time on the horizontal axis and volume of hydrogen on the vertical axis. Plot both sets of results on the same axes. Join each set of points with a smooth curve.

7 Label your graphs to show when the rate of reaction was fastest and when it was very slow.

To answer

8 Write the word and symbol equations for the reactions of magnesium with acid.

9 What is there to see that shows that the reaction has stopped?

10 Which chemical was in excess in these experiments: the magnesium or the acid?

11 Why does the reaction of magnesium and acid slow down and stop?

12 The concentration of the more concentrated acid was 74 g/litre. What was the concentration of the diluted acid?

13 How did repeating the experiment with diluted acid affect:

a the final volume of hydrogen produced

b the rate of reaction at the start?

14 Why does diluting the acid have the effects noted in your answers?