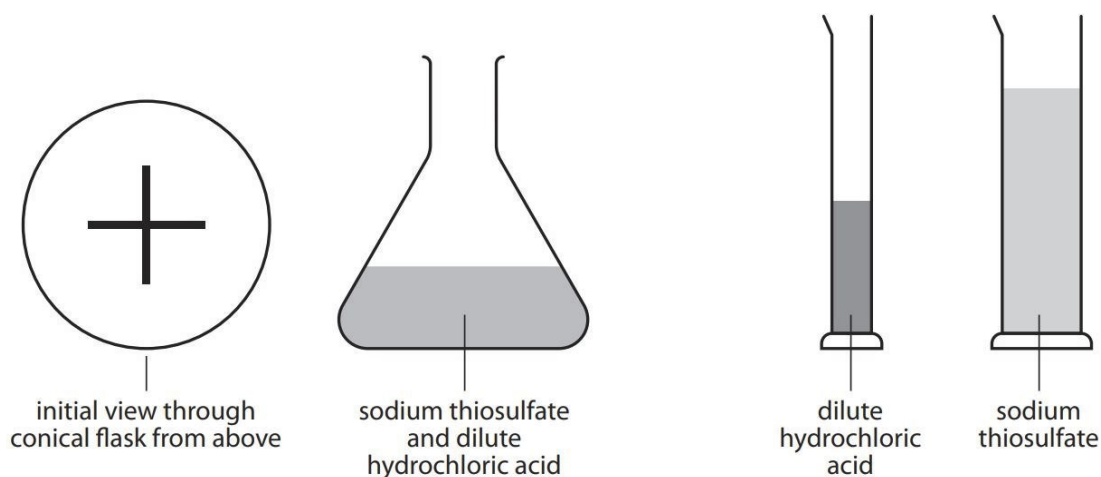


The effect of concentration on reaction rate - student sheet

Introduction

In this experiment, the effect of the concentration of sodium thiosulfate on the rate of reaction is investigated.



Equipment

Apparatus

- Eye protection
- Conical flask, 250 cm³
- Measuring cylinder, 100 cm³

Chemicals

- Sodium thiosulfate solution 50 g dm⁻³
- Hydrochloric acid 2 mol dm⁻³

Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3GkcuhG>
- Always wear eye protection.
- Sodium thiosulfate solution 50 g dm⁻³ is low hazard (see CLEAPPS Hazcard [HC095a](#)).
- Dilute hydrochloric acid is low hazard at the concentration used (see CLEAPSS Hazcard [HC057a](#)).

Procedure

1. Put 50 cm³ of sodium thiosulfate solution in a flask.
2. Measure 5 cm³ of dilute hydrochloric acid in a small measuring cylinder.
3. Add the acid to the flask and immediately start the clock. Swirl the flask to mix the solutions and place it on a piece of paper marked with a cross.
4. Look down at the cross from above. When the cross disappears, stop the clock and note the time. Record this in the table provided.
5. Repeat this using different concentrations of sodium thiosulfate solution. Make up 50 cm³ of each solution. Mix different volumes of the sodium thiosulfate solution with water as shown in the table.

6. As soon as possible, pour the solution down the sink (in the fume cupboard if possible) and wash away.

Questions

1. Calculate the concentration of sodium thiosulfate in the flask at the start of each experiment. Record the results in the table provided.
2. For each set of results, calculate the value of $1/\text{time}$. (This value can be taken as a measure of the rate of reaction).
3. Plot a graph of $1/\text{time}$ taken on the vertical (y) axis and concentration on the horizontal (x) axis.

Volume of sodium thiosulfate solution/cm ³	Volume of water/cm ³	Time taken for cross to disappear /s	Original concentration of sodium thiosulfate solution/g dm ⁻³	$1/\text{time taken /s}^{-1}$
50	0	50		
40	10			
30	20			
20	30			
10	40			