NEATH PORT TALBOT COLLEGE
COLEG CASTELL NEDD PORT TALBOT

School of Maths & Science
Science Practical

To find out how changing chemical concentrations affect the rate of reaction

---

◆ **Aim**

At the end of the experiment you should be able to see how a change in concentration will affect the rate of the reaction.

◆ **Introduction**

Dilute hydrochloric acid (colourless) reacts with sodium thiosulfate solution (colourless) to give a precipitate of sulfur (yellow).

The time for a reaction to take place can easily be measured by looking through the reaction mixture at a pencil cross until it can no longer be seen.
(The sulfur precipitate makes the mixture cloudy).

If the concentration of sodium thiosulfate is changed each time, the effect of concentration may be compared.

◆ **Safety**

Control Measures
- The wearing of **safety glasses** and a **laboratory coat** at all times will be sufficient to take account of most hazards and significant risks.
- Keep stoppers on bottles as much as possible.
- All waste is to be placed in the labelled container immediately after use.
- You are reminded of the need for good laboratory practice in order to maintain a safe working environment.

Hazards

Irritant	Hydrochloric acid
Harmful / Irritant	Sodium thiosulfate solution
Toxic	Sulfur dioxide gas

◆ Procedure

1. Measure 50 cm^3 of the sodium thiosulfate solution into a conical flask.

2. Put a pencil cross on a piece of white paper and stand the flask on it.

3. Measure 5 cm^3 of hydrochloric acid. Pour this into the flask. Swirl it to mix. Start timing.

4. Look down through the mixture at the cross. Time how long it takes to "disappear". At the end of the experiment, pour contents down the sinks in the fume cupboard.

5. Repeat the experiment using different volumes of solution given below. Thoroughly clean all your apparatus between experiments.

N.B. always add the acid last and swirl the flask to mix.

Volume of Sodium Thiosulfate solution / cm^3	Volume of Water / cm^3
50	0
40	10
30	20
25	25
20	30
15	35
10	40

Results

Volume of sodium thiosulfate / cm^3	Time / secs	$\dfrac{1}{Time}$ / S^{-1}
50		
40		
30		
25		
20		
15		
10		

Treatment of Results

1. Draw a graph of volume against time.

2. As rate α $\dfrac{1}{Time}$, draw a graph of rate against volume.

Questions

As the volume of sodium thiosulfate ≡ Initial concentration of the sodium thiosulfate.

1. What shape is the graph of initial concentration against time?

2. What shape is the graph of initial concentration against rate?

3. What do you conclude from the shape of the graph of initial concentration against rate?