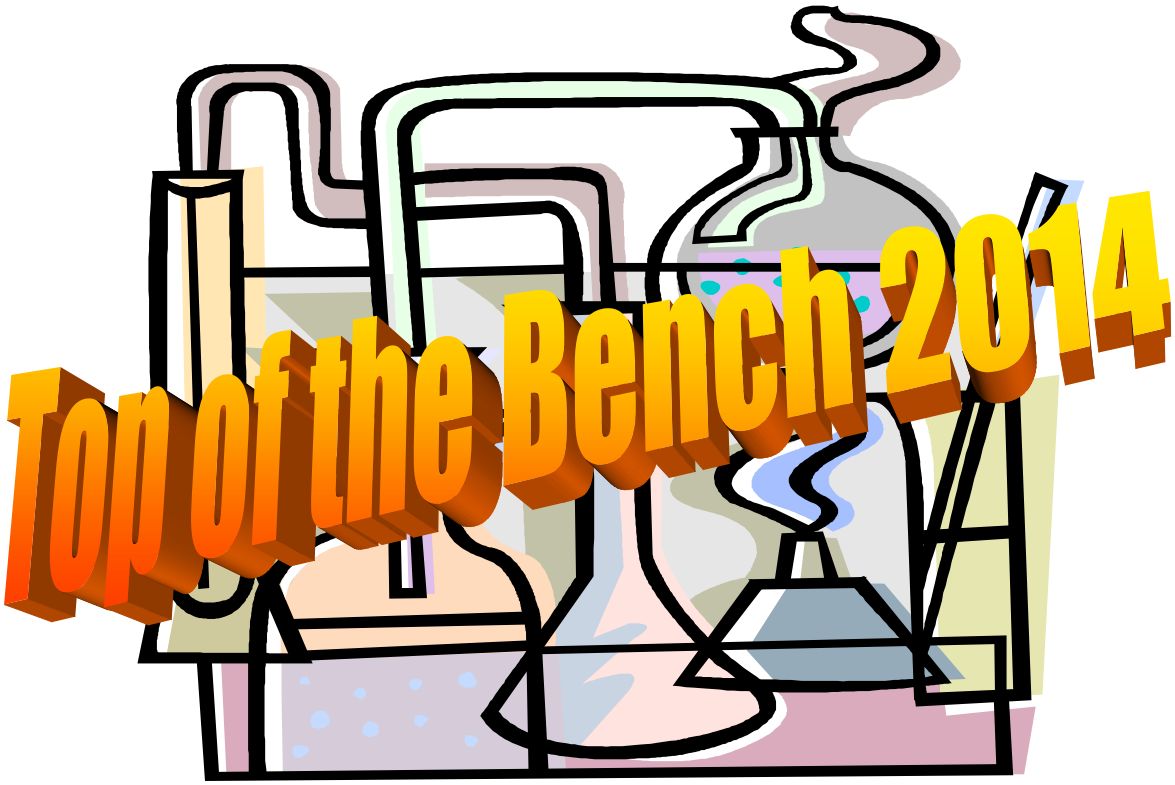
**Mid Scotland Section**

**School Name:**

# Laboratory Report



## For the S3/S4 Pair

# Effect of temperature on reaction rate.

**What to do**

(a) Put 10ml of sodium thiosulphate solution and 40 ml of water into a conical flask. Measure 5ml of dilute hydrochloric in a syringe. Warm the thiosulphate solution in the flask on a hotplate, if necessary, to bring it to the required temperature. The object is to repeat the experiment at least 5 times with temperatures in the range 20 - 65°C.

Put the conical flask over a piece of paper with a cross on it. Add the acid and immediately start the clock. Swirl the flask to mix the solutions and place it back on the piece of paper with a cross on it. Take the initial temperature of the mixture.

Look down at the cross from above. When the cross disappears, stop the clock and note the time taken. Record the final temperature of the mixture in the flask.

Take the average of the two temperature readings as the temperature of the reaction

As soon as possible pour the solution down the sink in the fume cupboard and wash it away.

For each set of results, calculate the value of 1/time. This value can be taken as a measure of the rate of reaction for this experiment.

(b) Make a table of your results and then plot a graph of 1/time against the average temperature.

***Write the name of your school on the top of your graph paper.***

(c) From your graph, determine the value for the rate of this reaction at 10°C and write your answer clearly on the graph paper.

(d) What temperature rise causes this rate to become double?

Name of School: _____

# Effect of temerature on reaction rate.

**What to record:**

Consider the experimental method and write in the box below what steps you will take to maximise consistency and minimise errors.

Hint: Think about ways of minimising the risk of contamination, eliminating changes in other variables and maximising precision in experimental measurement.

(b)Make a table of your results in the box below, or on the back of this page.

(d) What temperature rise causes the rate to double?_____

## For the S2/S3 Pair

# Effect of concentration on reaction rate.

**What to do**

(a) Put 50ml of sodium thiosulphate solution from the bottle marked "Unknown Concentration" into a conical flask.

Measure 5ml of dilute hydrochloric in a graduated syringe. Add the acid to the flask and immediately start the stopwatch. Swirl the flask to mix the solutions and place it on the piece of paper marked with a cross.

Look down at the cross from above. When the cross disappears, stop the stopwatch and note the time. You may repeat this to check for accuracy. Record the time, t, in seconds in the "What to record" section.

Calculate the value of 1/time (this value can be taken as a measure of the rate of reaction). Record this value as you will need to use it later to find the unknown concentration.

As soon as possible, pour the reaction mixture down the sink in the fume cupboard and wash it away.

(b) Put 50ml of sodium thiosulphate solution ($50gdm^{-3}$) into a conical flask and repeat the experiment as in part (a). Record the time taken, the value of 1/time taken and initial concentration of the sodium thiosulphate in your results table.

Repeat the experiment at least four more times using different concentrations of sodium thiosulphate solution. Use 10ml, 20ml, 30ml and 40ml of thiosulphate solution made up each time to 50ml by adding water. Calculate the initial concentration of sodium thiosulphate solution and the value of 1/time for each experiment and record them in your table.

**(c)**Plot a graph of 1/time taken on the vertical (y) axis and concentration on the horizontal (x) axis.

***Please write the name of your school at the top of your graph paper.***

(d) From your graph determine the concentration of the sodium thiosulphate solution used in part (a)

Name of School: _____

# Effect of concentration on reaction rate.

**What to record:**

Consider the experimental method and write in the box below what steps you will take to maximise consistency and minimise errors.

Hint: Think about ways of minimising the risk of contamination, eliminating changes in other variables and maximising precision in experimental measurement.

(a)Time(s) taken for cross to disappear_____

Value of 1/time taken_____(You will need to use this in part (d))

(b)Make a table of your results on the reverse of this page.

(c) Graph – Remember to write the name of your school on your graph.

(d) From your graph determine the concentration of sodium thiosulphate used in part (a).

Concentration_____