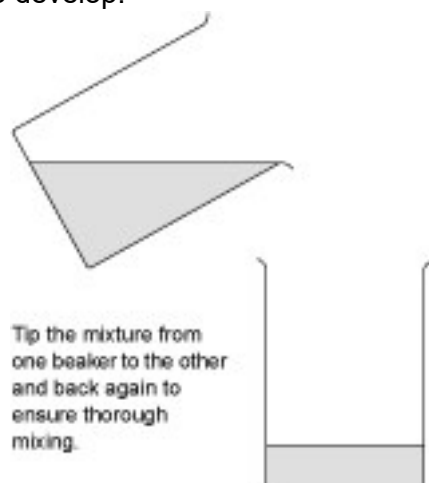


The effect of concentration and temperature on reaction rate – student sheet

Introduction

In this experiment, two colourless solutions are mixed to make a solution which becomes dark blue. Changing the concentration or temperature of the solutions changes the time required for the blue colour to develop.



Equipment

Apparatus

- Eye protection
- Beakers, 250 cm³, x2
- Water bath (or some means of warming solution A)

Chemicals

- Solution A – 4.3 g of KIO₃ per dm³
- Solution B – starch solution

Health, safety and technical notes

- Read our standard health and safety guidance here <https://rsc.li/3HwQTTK>
- Always wear eye protection.
- Both solutions are of low hazard.

Procedure

1. Place 50 cm³ of solution A in a 250 cm³ beaker.
2. Place the same volume of solution B in a second beaker.
3. Mix the two solutions by pouring from one beaker into the other several times.
4. Note the time required for a reaction to occur (formation of blue colour).
5. Repeat, but use solution A that has been diluted to one half the concentration. Note the time for the reaction to occur.
6. Repeat using solution A warmed to 35 °C. Note the time for a reaction to occur.

Questions

1. There are more molecules of reactant in the solution, therefore more chance of reacting.
2. Increasing the temperature has two effects. Since the particles are moving faster, they will travel a greater distance in a given time and so will be involved in more

collisions. In addition, because the particles are moving faster, a larger proportion of the collisions will exceed the activation energy, the energy needed to react. The rate of the reaction therefore increases.

3. Depending on the results of the experiment, increase/decrease concentration to a specific amount AND/OR increase/decrease the temperature by a specific amount.