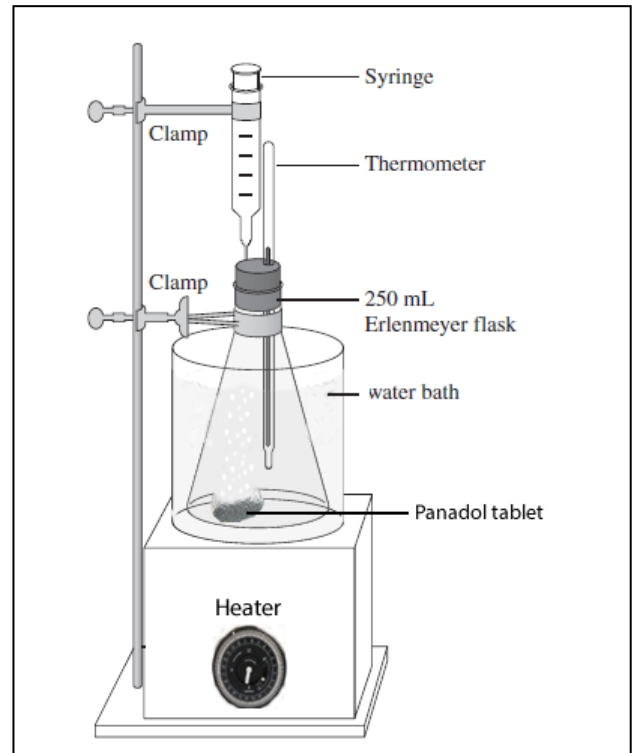


Friday worksheet 3 – Experimental technique

1) A student investigated the impact temperature has on the rate of a reaction. The student used the setup shown on the right. A Panadol tablet was placed in a flask with a certain amount of water and the volume of gas released captured in a syringe and its volume measured over time. The temperature of the water inside the flask was controlled using a heater with a temperature dial and verified by a thermometer placed in the water bath.



(a) Outline:

- the dependent and independent variables
- all the controlled variables in this investigation.

(b) Identify two possible random errors in this investigation.

(c) Identify a potential systematic error and explain how it may be reduced in this investigation.

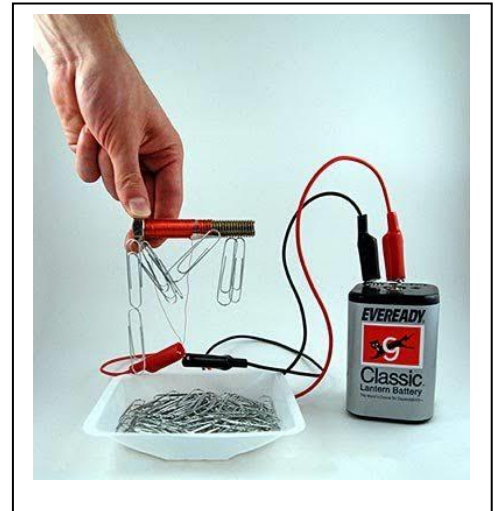
2) A student wanted to see if the magnetic force of an electromagnet is directly related to the number of coils of wire around a central iron bolt. Similar bolts and identical wire were



used to construct 7 electromagnets, 4 of which are shown on the right.

Each electromagnet was tested to see how many paper clips it could pick up using a 6V battery. The exact same 6V battery was used throughout the investigation. The table below has the data.

Loops of wire	Paper clips picked up
50	12
100	25
150	38
200	51
250	64
300	30
350	12



- Formulate a testable hypothesis for this investigation
- Graph the results on a set of axis using the graph paper provided on the right.
- Is the hypothesis supported? Explain
- Are the data points at 300 and 350 coils outliers? How can you substantiate that they are or are not outliers?
- Are the results obtained valid and reliable?
- Are the results accurate? If yes, explain why? If not explain why not and suggest what can be done to improve the accuracy?
- Write a procedure as a set of logical and sequential steps indicating the equipment that will be used and how each variable will be either measured, changed or controlled.

