

Planning

Aim

Theory

P₁rocedure

- **p**ilot experiment
- **a**nnotated diagram
- **n**umbered steps
 - **d**ependent variables
 - **i**ndependent variables
 - **C**ontrol conditions
 - **e**quilibrium time
- **C**ontrol
- **r**eplicates and repeats

Data recording and processing

Risks

P₂recautions

Aim

- To investigate how (independent variable) affects (dependent variable)

Theory

- Main theory linking independent variable to dependent variable
- How measurable variable is an indication of dependent variable
- **Predicted trend + Why
- **Dependent variable
- **Independent variable + Range of values used

Procedure

- Pilot Experiment
 - **Conduct a pilot experiment to determine the suitability of apparatus, suitability of range of independent variable (state), optimum conditions and amount of materials (state) used

- Annotated Diagram (only if required in question/lengthy description can be explained using diagram)
- Numbered Steps
 - Dependent variable
 - Measured variable + how it is measured
 - Calculations to get dependent variable from measured variable
 - Independent variable
 - How they are varied
 - e.g. Dilution table for concentrations
 - **Constant conditions
 - Give 2
 - **What + How** they are controlled
 - Why they need to be controlled
 - Give an exact value
 - **Equilibration time
 - Allow 1min of equilibration time for ____ to reach ____
- Control
 - **[What + How] Keeping all other variables constant, set up a control experiment repeating steps 1-X using ____ instead of ____.
 - **[Why] This is to show that any changes in ____ is due to ____ and not other factors in the set up.
- Replicates and Repeats
 - **[Replicates] Conduct 3 replicates for each (independent variable) to check that there are no anomalous results + How to conduct replicates
 - Within the same experiment
 - **[Repeats] Repeat the entire experiment twice to ensure reproducibility
 - Use new samples

Data Recording and Processing

- Draw table with headings + units
 - 3 replicates + average
 - Processed data
- Draw graph with labelled axes + units
 - Show expected trend

Risks and Precautions (1M only)

- What + Why
- Examples
 - Wear gloves and goggles when handling chemicals as they are caustic/corrosive to protect hands and eyes
 - Wear mittens when handling hot objects to prevent scalding
 - Use Perspex shield to prevent exposure to radiation from radioactive isotopes
 - When using scalpel, cut objects away from the hand to avoid getting cut

