

HOW TO DESIGN AN EXPERIMENT (CRITERION B)

STEP 1: CHOOSE YOUR TEST

Before you can design an experiment, you need to identify what you want to test (what question you want to answer)

STEP 2: IDENTIFY YOUR VARIABLES

This section is all about identifying the variables you'll be working with in your experiment. It should include:

- Independent: What factor you're changing/altering in each trial (*and how it will be altered*)
- Dependent: What you think will be affected (*and how you're going to measure it*)
- Controlled: What things will stay the same in each trial to ensure they don't affect the results

STEP 3: WRITE YOUR HYPOTHESIS

This section is all about making a prediction about what will happen to the dependent variable as you change the independent variable. A hypothesis includes:

- An "If _____ then _____ because _____" format

○ "if the _____ (*independent variable*) is _____ (*how it will be changed*), then the _____ (*dependent variable*) will _____ (*how it will be affected*), because _____ (*scientific reasoning*)

Example: *If the temperature of the oil is increased, then the flow rate of the oil will get faster, because as heat energy is added to the oil the particles move faster and spread apart so they can flow more easily*

STEP 4: DESIGN YOUR METHOD

This section is all about making a set of instructions that tells others how to repeat your experiment exactly. It should include:

- Numbered List of Steps: logically and concisely describe how to complete your exact experiment.
- Quantities and Amounts (*e.x. add 20mL of water into the 250mL beaker*)
- Instructions for when/where to make/record observations.
- Clearly labeled diagram(s) or image(s) of any equipment set-up you will use.
- Safety Precautions: Any important safety information/warnings.

STEP 5: LIST THE MATERIALS YOU'LL NEED

This section is all about describing the equipment and substances you need in order to complete the experiment. It should include:

- A point form list of all equipment and/or substances required to complete the experiment
- Sizes & quantities (*e.x. 2 x 10mL graduated cylinders*)

STEP 6: CREATE A DATA TABLE

This section is all about making a space to record your results when you're actually doing the experiment. It should include:

- A title that is descriptive & underlined
- Column and row headings with units (if applicable)

STEP 7: SUMMARIZE YOUR PROBLEM/QUESTION

This section is usually the last thing we write in an experimental design. The problem/question is all about introducing your experiment to the reader and giving them information they would need to fully understand the science behind your lab.

- Background information/scientific concepts/research that will help the reader understand your experiment
- What question you'll answer by doing your experiment
- A bibliography table to cite any research sources