

Biology – P6 Notes

It is important to investigate **change** because the starting variable could be different.

An experiment could be carried out for longer because there is a **greater change** in the variable so it is easier to compare/more apparent/more accurate to measure.

From a group, objects to be tested are selected at random to avoid **bias**.

A result is anomalous because it is a lot **different** than the other results.

Purpose of control: Comparison

To enforce anaerobic respiration/to stop oxygen from coming in contact with solution, a layer of oil is used

Sources of error:

1. **The same type of plant/fruit may not be used**; use same species
2. **Water loss from tubes was not accounted for**; cover the tubes
3. Reuse of syringe; **(causes contamination)** use a new syringe each time
4. **A subjective/non-quantifiable variable was measured**; measure a more quantifiable variable for accurate results
5. **No repeats**; repeat the experiment 3 times and consider mean results
6. **Mass/volume/size/shape of pieces is not the same**
7. **Uneven crushing**; use a mortar and a pestle
8. **All measurements not taken at the same time**; carry out each experiment separately
9. **Volume of each drop could vary**; measure volume used instead of number of drops
10. **Temperature of water may change**; maintain water temperature using a thermostatically controlled water bath
11. **Heat may be lost through gaps in lid/cork**; make sure lid perfectly fits container
12. When a variable (eg potato) is cut into smaller pieces, the **smaller pieces are not measured into equal sizes**
13. **Number of bubbles counted**; measure volume of gas as the volume of each bubble may vary

Precautions:

1. Take readings with eye perpendicular to scale (avoid parallax)
2. Take readings from the bottom of the meniscus
3. Leave all test tubes in a water bath to equilibrate
4. Stir a solution to distribute all the components evenly
5. While taking readings from a measuring cylinder, place it on a flat surface
6. Wear a lab coat
7. Stand while performing experiment
8. Don't expose an alcohol/reagent to a flame directly; heat it using a water bath
9. Use burette/pipette instead of measuring cylinder
10. In photosynthesis experiment, use a heat shield (beaker of water) placed between the plant and the lamp to prevent the temperature from changing due to the changing light intensity
11. Heat using water bath (often used in Benedict's test for reducing sugars)
12. While using a knife use a solid surface to cut on, cut away from fingers

Hazards:

1. Cutting with knife may injure hand; cut on a surface and away from hand/use gloves
2. H_2O_2 is corrosive; use gloves and goggles while handling it
3. While exhaling through a tube into e.g. lime water, there is a risk of lime water being swallowed

While drawing diagrams:

1. Draw smooth lines
2. Make the diagram larger than the original
3. Draw all details required
4. Use lines and not arrows to label

To make a result more reliable/accurate:

1. Repeat and take mean (to eliminate anomalies)
2. Use a greater range of values of the independent variable
3. Maintain same temp (any controlled variable that has not already been mentioned in the experiment)
4. Use smaller intervals between variables (especially while plotting graphs)