CIE Physics IGCSE

General practical skills

Planning experiments and improving technique

Key Terms

Independent variable (IV): the thing you are going to **change**
Dependent variable (DV): the thing you are going to **measure** (it is dependent on the independent variable)
Control variables: the things you are going to **keep the same** (so that the results are as reliable as possible.)

Planning the Experiment

When planning an investigation, the first step is to **identify your variables**: What are you going to change? What are you going to measure? What is going to stay the same?
The **control variables** in an experiment are incredibly important in ensuring the test is **fair**.

Before starting the experiment you must also **evaluate the dangers** in a **risk assessment** (detailed in a previous section) to ensure that it is safe to continue.

Conducting the Experiment

During the experiment, make sure all control variables are kept constant, and take care to follow the precautions set out in your risk assessment.

In order to make the results as reliable as possible, you should **repeat the experiment a few times** so that you have more data to work with. This will allow you to easily identify any anomalous results (and remove them from the data set so they do not affect any further calculations), and determine the mean for each set of readings. Repeating the experiment will also give an idea of how reliable your results are: if repeat readings are all very different, it is likely they are unreliable. You should also use the best equipment available – instruments with the **highest resolution** – to **maximise precision**.

Reflecting on how well your plan worked

Did you choose the right range of values for your IV? Was your DV affected by your IV in the way you expected? Was your measuring equipment sensitive enough to detect the change? Were there any confounding variables that you were unaware of, or unable to control for? Did you choose the right apparatus for your needs?

Suggesting improvements

Here are some common issues that can affect the results of experiments;

- Small **sample size**
- Experiment was **not repeated**
- Equipment **not precise**
- Certain variables were **not controlled**