IGCSE Physics

Lab Report Guide · 实验报告指南

The practical paper gives you the method and asks you to take readings, put them in a table, plot them, and comment. Almost every lost mark is a missing unit, a badly chosen scale, or an improvement that is too vague to carry out. 失分几乎都来自单位遗漏、坐标刻度不当或改进建议过于笼统。

Taking the readings

Read the instrument correctly – Look straight at the scale, not from an angle, so the reading is not distorted. For a liquid, read the bottom of the curved surface at eye level.

Use the whole range – Spread your readings across the range you are allowed. Five readings bunched together show much less than five spread out.

Repeat and average – Take each reading at least twice and write both down, then the mean. If two readings differ a lot, take a third.

Time short events properly – For a pendulum or any repeating motion, time ten swings and divide by ten. Timing one swing gives a value smaller than your own reaction time can measure.

The results table

Headings – Quantity and unit at the top of each column, written as length/cm or time/s. The unit never goes beside each number.

Decimal places – Every number in a column has the same number of decimal places, decided by the instrument. A ruler marked in millimetres gives 12.4 cm, so write 9.0 cm, not 9 cm.

Calculated columns – If the question asks for a value such as $1/d$ or T^2, give it its own column with its own heading and unit.

The graph

Choose the scale first – The plotted points should fill more than half the grid both ways. Use scales of 1, 2 or 5 units per square – never 3, which makes every point hard to plot.

Label the axes – Quantity and unit on both axes, with the thing you changed on the horizontal axis.

Plot and draw – Small neat crosses, then one straight line with a ruler or one smooth curve, with about as many points above the line as below. Do not join the dots one by one.

Find the gradient – Draw a large triangle on the line, use points that are easy to read, and show the division. Give the gradient a unit, worked out from the two axis units.

Conclusions and comments

Describe the pattern with numbers – "As the current doubled from 0.2 A to 0.4 A, the voltage also doubled from 1.0 V to 2.0 V, so they are proportional."

Say whether it agrees – If the question suggests a relationship, say whether your graph supports it and give the evidence: a straight line through the origin means directly proportional.

Comment on the anomaly – Circle any point far from the line and give one reason it could be wrong.

Problems and improvements

Name the difficulty exactly – "It was hard to see exactly when the ball passed the mark" is a real difficulty. "Human error" is not and scores nothing.

Give a matching fix – For that difficulty: "put a marker at eye level next to the mark", or "use light gates instead of a stopwatch".

Safety when asked – Name the hazard and the precaution together: hot water can scald, so use tongs; a heavy mass can fall, so put a sand tray beneath it.

The write-up in order

What was changed, what was measured, and what was kept the same.

A table with headings, units, repeats and means.

A graph with sensible scales, labelled axes and one line of best fit.

The gradient, with working shown on the graph and a unit on the answer.

A conclusion using numbers, then two difficulties with two matching improvements.