

APES has no laboratory exam, but every paper contains data analysis and one design question, and both are marked to a formula: identify the variables, do the arithmetic with units shown, and connect the number to an environmental consequence. 环境科学的实验与数据题按固定要点给分: 变量、带单位的计算、以及数字对应的环境后果。

Designing an investigation

Name the independent variable, the dependent variable and one controlled variable. All three are separately creditable.

Describe the control group as identical except for the independent variable – the phrase “all other conditions kept the same” is worth writing every time.

Say how you would measure the dependent variable, with a unit and a frequency.

State a testable hypothesis in “if ... then ...” form; a prediction with no mechanism does not earn the reasoning point.

Calculations

SHOW THE SET-UP. A correct answer with no working can lose the working marks; an incorrect answer with correct set-up keeps most of them.

Carry units through the calculation and cancel them – dimensional analysis is the standard method and is credited.

Percentage change is $(\text{new} - \text{old}) \div \text{old} \times 100$, and the sign matters; a decrease is negative.

For doubling time use the rule of 70: 70 divided by the percentage growth rate per year.

Half-life problems halve the quantity once per half-life; count the halvings rather than dividing by the total time.

Energy problems: watch the difference between power (kW) and energy (kWh), and convert time to hours before multiplying.

Interpreting data

Describe a trend with direction AND magnitude, quoting the numbers: “rose from 320 to 415 ppm between 1960 and 2020”.

Distinguish correlation from causation. A question asking whether the data PROVE a cause wants you to say they do not, and to name a confounding variable.

Identify the axis units before reading a graph – logarithmic scales and per-capita axes are routinely misread.

When a solution is asked for, give one that is specific and feasible, then state its drawback. Both halves are usually creditable.