6.1 Planning whole IA2 investigations

Name: _____ Class: _____ Date: _____ **Total: 29 marks**

KEY WORDS ethics • dependent variable • standardised exercise

Objective

Write the 16-mark investigation plan WBI16 closes with: ethics, safety, a nine-mark method with controls and monitoring, recording and analysis, and honest limitations. Original practice for the Unit 6 planning criteria, grounded in the Summer 2025 fitness-programme question.

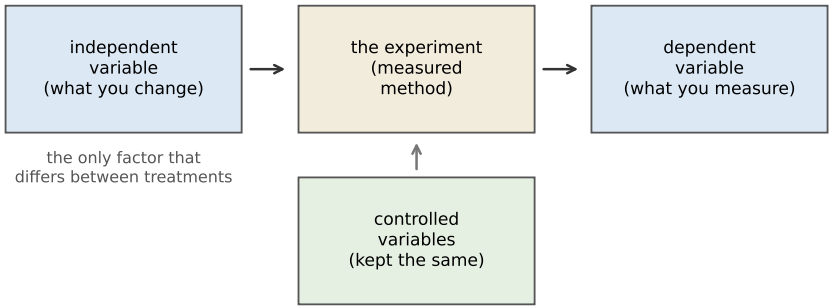
1 Key knowledge and worked examples

■ The plan question pays out in named blocks

Ethics first: informed consent of volunteers; participation is voluntary; organisms (where used) are treated per the specification's ethical-use requirement. **Safety**: the specific risk with its specific control – sterilise or replace the mouthpiece between students (infection); check volunteers can safely exercise.

■ The nine-mark method

Work down a checklist the scheme mirrors: two groups that differ only in the planned programme; the **dependent variable** stated as a measurable time (time for breathing rate and tidal volume to return to resting values); apparatus used correctly and named (spirometer with soda lime, nose clip, practise breaths before recording); resting values measured first; the **same standardised exercise** for every participant; two control variables named (age, sex, BMI, smoking, room temperature…) with the method of control for one; repeats to give means **and** standard deviations.



Beetroot example: alcohol concentration changed, pigment loss measured; temperature, size, volume, time fixed; a water-only treatment is the control.

■ Record, present, analyse

A table of *raw* times with headings and units, means calculated from repeats; a **bar chart** of mean recovery time per group with a **t-test** for the difference – or, with several fitness levels, a scatter/line graph with a **correlation** test. Close with two real limitations: volunteers' diet, stress and prior fitness cannot be fully controlled; apparatus leaks, exhausted soda lime, abnormal breathing through a mouthpiece.

2 Practice

2.1 State the ethical concern and the safety precaution required before a spirometer study on student volunteers. [2]

2.2 A plan measures "recovery rate". Why does the scheme reject "recovery rate" as the dependent variable, and what should be written instead? [2]

2.3 Give two control variables for the fitness investigation and the method of controlling one of them. [3]

2.4 Explain why "exercise, then rest" is not a standardised exercise, and give a standardised alternative. [2]

3 Exam-style questions

3.1 Plan an investigation of the hypothesis: seedlings given a fertiliser treatment grow taller than untreated seedlings. Include groups, the dependent variable with its measuring technique, two controlled variables with methods, safety, and how repeats are used. [7]

3.2 Devise a method to test whether students who have used a fitness programme recover faster after exercise, using a spirometer. Your method must state how variables are controlled and monitored, and how quantitative results are produced. [8]

3.3 For your method in 3.2, describe how results should be recorded, presented and analysed to draw a conclusion, and give two limitations of the method. [5]