

3.2 Introduction to Planning a Study

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS experiment 实验 • observational study 观察性研究 • population 总体
• sample 样本 • treatment 处理

Objective

Build the skills to answer exam questions on **planning a study**.

You must be able to:

- distinguish an **observational study** 观察性研究 from an **experiment** 实验
- identify the **population** 总体 and the **sample** 样本
- explain why only a well-designed experiment can show **cause and effect** 因果

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Observational study vs experiment

- **Observational study** — observe and record **without imposing** any treatment.
- **Experiment** — deliberately **impose treatments** and compare the responses.

■ Population and sample

The **population** is the whole group of interest; the **sample** is the part actually studied.

■ Cause and effect

Only a **well-designed experiment** (with randomly assigned treatments) can establish a **cause-and-effect** relationship.

2 Practice

2.1 State the difference between an observational study and an experiment. [2]

2.2 State the difference between a population and a sample. [2]

2.3 State which type of study can establish cause and effect. [1]

3 Exam-style questions

3.1 Only a well-designed _____ can show cause and effect. [1]

- **A** observational study
- **B** experiment
- **C** survey
- **D** census

3.2 The group actually studied is the [1]

- **A** population
- **B** sample
- **C** treatment
- **D** response

3.3 Researchers give one group a new drug and another a placebo, then compare the results.

(a) Name this type of study. [1]

(b) Name the whole group of interest. [1]

(c) State whether a cause-and-effect conclusion is possible. [1]

Solutions

- 2.1** an observational study only observes; an experiment imposes treatments.
- 2.2** the population is the whole group of interest; the sample is the part actually studied.
- 2.3** a well-designed experiment.
- 3.1 B.**
- 3.2 B.**
- 3.3** (a) an experiment. (b) the population. (c) yes (with random assignment).