

KS3 – Collecting Data

Section A – Sampling

Q1 (4 marks)

Answer these questions about populations and samples.

- a) What is meant by the population in a statistical investigation?

- b) What is meant by a sample?

- c) Give one reason why a researcher might use a sample instead of asking the whole population.

- d) A school wants to investigate the travel habits of all 900 students. What is the population?

Q2 (4 marks)

For each investigation, state whether the group described is the population or a sample.

- a) Every Year 8 student in a school is asked about homework.

- b) 40 students are chosen from a school of 1,200 students.

- c) Every customer who visited a small café on Monday is asked to rate the service that day.

- d) 100 households are selected from all households in a town.

Q3 (4 marks)

Decide whether each sampling method is likely to be representative. Explain your answer briefly.

- a) To find students' favourite school subject, a teacher asks only students in the maths club.

- b) To find opinions across a school, students are randomly selected from every year group.

- c) To find what people in a town think about a new sports centre, a researcher asks only people leaving the current sports centre.

- d) To estimate students' journey times, a school chooses students from different year groups and different parts of the local area.

Q4 (3 marks)

Answer these questions about sample size.

- a) Two random samples contain 10 people and 100 people. Which would usually give the more reliable estimate of the population?

- b) Explain why asking only 3 students may give an unreliable picture of a whole school's opinion.

- c) Does a larger sample automatically remove all bias? Explain briefly.

Q5 (4 marks)

Suggest a sensible way to choose a sample in each situation.

- a) A school wants the opinions of students from Years 7, 8 and 9.

- b) A supermarket wants feedback from customers who shop on different days of the week.

- c) A town council wants opinions from people living in different neighbourhoods.

- d) A sports club wants feedback from both junior and adult members.

Challenge

Q6 (4 marks)

A secondary school has 300 students in Year 7, 280 in Year 8, 260 in Year 9, 240 in Year 10 and 220 in Year 11. A student wants a sample of 50 students.

Explain why choosing 10 students randomly from each year group is a reasonable sampling method.

Section B – Questionnaires

Q7 (4 marks)

Answer these questions about questionnaires.

- a) What is a closed question?

- b) What is an open question?

- c) Give one advantage of using closed questions.

- d) Give one advantage of using open questions.

Q8 (4 marks)

For each question, state whether it is open or closed.

- a) "How many hours of homework did you do yesterday?" with boxes: 0–1, 2–3, 4–5, more than 5.

- b) "What could the school do to improve lunchtime?"

- c) "Do you use the school library?" with answers Yes or No.

- d) "Why did you choose your favourite subject?"

Q9 (4 marks)

Each questionnaire question has a problem. State the problem.

a) "How much do you exercise? 0–2 hours, 2–4 hours, 4–6 hours."

b) "How many books do you read each month? 0, 1–2, 3–4."

c) "Do you agree that our excellent school lunches should stay the same?"

d) "How old are you?" with response options 11–12, 13–14, 15–16, when some respondents are 17.

Q10 (4 marks)

Rewrite each question or set of response options to make it suitable.

a) "Do you play football or basketball?" Answer: Yes / No.

b) "How many hours do you spend online? 0–2, 2–4, 4–6, 6+."

c) "Don't you think the school day is too long?"

d) A survey asks "How do you travel to school?" but only gives Bus and Car as choices.

Write one suitable questionnaire question for each investigation. Include response options where appropriate.

- a) Finding how students usually travel to school.

- b) Finding how many hours students spend reading each week.

- c) Finding students' opinions of a new after-school club.

- d) Finding one improvement students would make to the school library.

Challenge

Q12 (4 marks)

A student wants to investigate how much sleep Year 9 students get on a school night.

Write one suitable closed questionnaire question with non-overlapping response categories.

Section C – Bias

Q13 (4 marks)

State whether each question is biased. If it is biased, explain why.

a) "How would you rate the school canteen: poor, satisfactory, good or excellent?"

b) "Don't you agree that homework helps students learn better?"

c) "How many times did you use the library last week?"

d) "How much do you enjoy our fantastic new sports facilities?"

Q14 (4 marks)

Explain why each sample may be biased.

a) A school asks only members of the football team whether it should spend more money on football equipment.

b) A cinema asks people at a midnight horror-film screening what type of film the town prefers.

c) A council asks only car drivers whether more cycle lanes should be built.

d) A school surveys only Year 11 students about changes that would affect all year groups.

Q15 (4 marks)

Suggest one improvement to reduce the bias in each investigation.

a) A café asks only customers who visit between 8 am and 9 am about its full-day menu.

b) A school asks only top-set maths students whether maths homework is useful.

c) A leisure centre asks only swimmers which new activity it should introduce.

d) A survey about public transport is carried out only at a railway station.

Q16 (4 marks)

For each investigation, identify whether the main problem is the question, the sample, or both.

a) A teacher asks only the school chess club: "Do you agree that our brilliant chess club deserves more funding?"

b) A random sample of students is asked: "How many days did you use the school library last week?"

c) Students leaving a school concert are asked: "Should the school hold more music events?"

d) A random sample of residents is asked: "Don't you agree that the ugly old park should be replaced?"

Challenge

Q17 (4 marks)

A school wants to find out whether students want a longer lunch break. One student plans to stand outside the canteen and ask 20 friends:

"Wouldn't a longer lunch break make school much better?"

Identify two sources of bias and suggest an improvement for each.

Total: ____ / 67

Percentage: ____%