

11.1 Note Guide

T11-1: I can... identify types of data collections and improve flaws in the design.

Populations:

Census:

Sample:

Parameter:

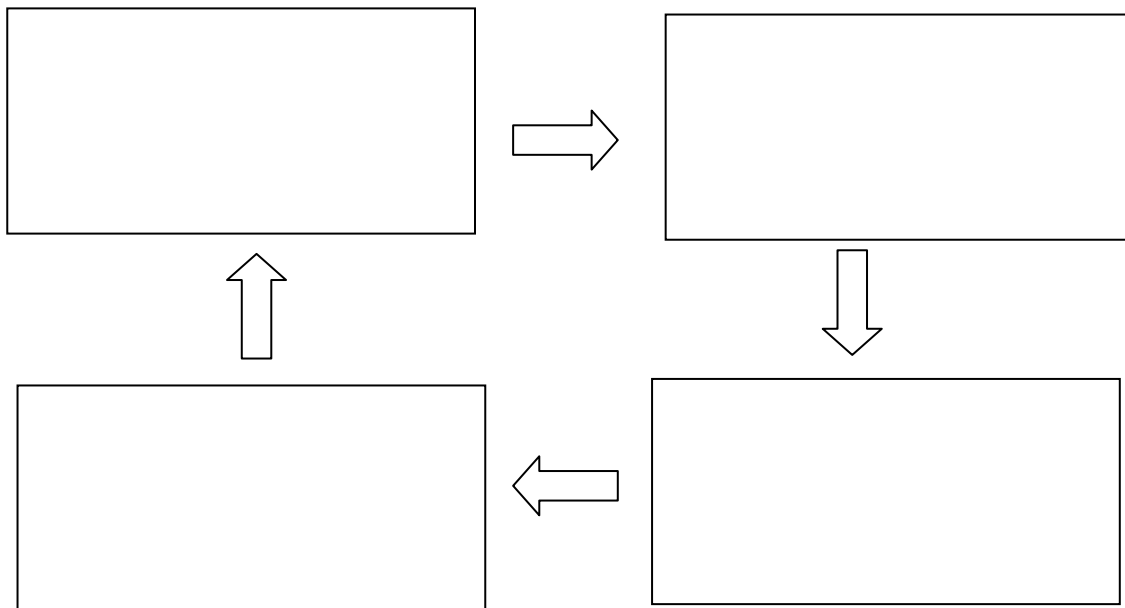
Example: NHS average age

Statistic:

Example: average age of Green School

Statistics are often used to estimate unknown population parameters.

Steps in a typical statistical study:



To draw accurate conclusions, it is important to select an unbiased sample.

Bias:

Example: Only asking a sample of NHS freshmen where they eat lunch during the school day and inferring the result to the population of NHS.

Who is left out? Why is this biased?

Example: Only asking a sample of NHS girls how much money they spend on clothes and inferring the result to the population on NHS.

Who is left out? Why is this biased?

To reduce the possibility of selecting a biased sample, a random sample can be taken.

Random sample:

How do we select in this way?

Drawing-Draw a name from a hat

Technology-Random number generator

Study Types

Definition	Example
<u>survey</u> : data are collected by members of a population regarding their characteristics, behaviors, or opinions	To determine whether the student body likes the new cafeteria menu, the student council asks a random sample of students for their opinion.
<u>experiment</u> : sample is divided into 2 groups: ~Experimental group undergoes a change ~Control group does not undergo a change The effect on the experimental group is then compared to the control group.	A restaurant is considering creating meals with chicken instead of beef. They randomly give half of a group of participants meals with chicken and the other half meals with beef. Then they ask how the participants like the meal.
<u>observational study</u> : members of a sample are measured or observed without being affected by the study	Researchers at an electronics company observe a group of teenagers using different laptops and note their reactions.

Determine whether each situation describes a survey, an experiment, or an observational study. Then identify the sample and suggest a population from which it may have been selected.

Example: A record label wants to test three designs for an album cover. They randomly select 50 teenagers from local high schools to view the covers while they watch and record their reactions.

Solution:

Example: The city council wants to start a recycling program. They send out a questionnaire to 200 random citizens asking what items they would recycle.

Solution:

Classify each method as a survey, an experiment, or observational study, and explain which would be most reliable.

Method A	Method B	Method C
Choose 50 people who have at least one serving of soy a day and 50 who don't, and check their cholesterol levels.	Randomly choose 100 people. Ask how many servings of soy they have a week, and ask if their cholesterol levels are high.	Randomly choose 50 people to eat at least one serving of soy a day, and 50 people not to, and monitor their cholesterol levels.

Determine whether each situation calls for a survey, an experiment, or an observational study. Explain your reasoning.

Example: A pharmaceutical company wants to test whether a new medicine is effective.

Solution:

Example: A news organization wants to randomly call citizens to gauge opinions on a presidential election.

Solution:

The questions chosen for a survey or procedures used in an experiment can also introduce bias and thus affect the results of the study.

Avoid survey questions that:

- ~are confusing or wordy
- ~encourage a certain response
- ~cause a strong reaction
- ~address more than one issue

Determine whether each survey question is biased or unbiased.

Example: Don't you agree that the cafeteria should serve healthier food?

Identify any flaws in the design of the experiment and describe how they could be corrected.

Experiment: An electronics company wants to test whether using a new graphing calculator increases students' test scores. A random sample is taken. Calculus students in the experimental group are given the new calculator to use and Algebra 2 students in the control group are asked to use their own calculator.

Summary:

Try to select people randomly to avoid bias.

Try to avoid questions that lead to bias.

Try to design experiments to avoid bias.

Basically, AVOID BIAS!!!

CREATE YOUR OWN SURVEY!!

WATCH OUT FOR BIAS...

You and a partner will create a survey question to ask a random set of advisories across NHS.

You will need to

- determine the parameter and the sample.
- show what the survey told you.
- show the statistical work to back it up.
- state three different ways the survey could have been bias.