# Samples and Surveys

## Vocabulary

### Review

**1.** Circle the statements that describe the *population* of students in your class.

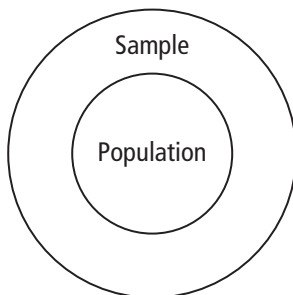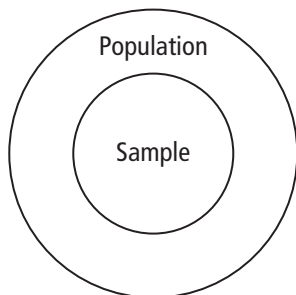| | | |
|---|---|---|
| more than 25 students | less than 25 students | more boys than girls |
| fewer boys than girls | ages range from 14 to 16 | no students with red hair |

**When you conduct a survey, the entire group that you want information about is called the *population*. When a *population* is too large to survey, you may survey a part of it to find characteristics of the whole. The part that is surveyed is called a *sample*.**

**2.** Cross out the model below that does NOT show the correct relationship between a *sample* and its *population*.

Population

Sample

Sample

Population

### Vocabulary Builder

**bias** (noun) **BY us**

**Definition:** A **bias** is a preference or an inclination that inhibits fair judgment.

**Math Usage:** A survey question can have **bias** if it makes assumptions that may or may not be true. A sample of people can be **biased** if the sample does not accurately represent the population.

### Use Your Vocabulary

**3.** Circle the words that have a similar meaning to *bias*.

| | | | |
|---|---|---|---|
| impartial | influence | unfair | not representative |
| favoring | equal | favoritism | balanced |

**Quantitative** data measure quantities and can be described numerically, such as test scores and ages. Quantitative data also have units. **Qualitative** data name qualities and can be words or numbers, such as hair color or ZIP codes.

**Problem 1** Classifying Data

**Got It?** Is each data set *qualitative* or *quantitative*? Explain.

costs of CDs                    eye colors

**4.** Complete each sentence with the words *qualitative* or *quantitative*.

Data that are words or numbers that do not have a value are _?_ data.

Data that can be described using numbers that have value are _?_ data.

**5.** Underline the correct word to complete each sentence.

The costs of CDs are data that can / cannot be described numerically.

So, data about the costs of CDs is qualitative / quantitative .

A person's eye color can be described using measurements / categories .

So, eye color is qualitative / quantitative.

A set of data that uses only one variable is **univariate.** A set of data that uses two variables is **bivariate.**

**Problem 2** Identifying Types of Data

**Got It?** Is a data set that gives the heights and weights of mammals *univariate* or *bivariate*? Explain.

**6.** Underline the correct words to complete the sentence.

You need one / two variable(s) to represent heights and weights,

so the data set is univariate / bivariate .

The table below shows three methods for choosing a sample to survey from a population.

| Name | Sampling Method | Example |
|---|---|---|
| Random | Survey a population at random. | Survey people whose names are drawn out of a hat. |
| Systematic | Select a number *n* at random. Then survey every *n*th person. | Select the number 5 at random. Survey every fifth person. |
| Stratified | Separate a population into smaller groups, each with a certain characteristic. Then survey at random within each group. | Separate a high school into four groups by grade level. Survey a random sample of students from each grade. |

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## Problem 3  Choosing a Sample

**Got It?** You want to find out how many DVDs students at your school rent in a month. You interview all students leaving a school assembly who are wearing the school colors. Will this plan give a good sample? Explain.

7. Complete each sentence with the appropriate word from the list.

   appropriately          goals          population

   A sample is a portion of the __?__ surveyed to determine characteristics of the whole.

   _____

   A good sample is one that __?__ represents the population.

   _____

   If a sample is not good, the survey will not meet its __?__.

   _____

8. Circle the population you are trying to collect information about.

   teenagers in your town          students in your school          staff at your school

9. Will the plan give a good sample? Explain.

   _____

   _____

   _____

   _____

## Problem 4  Determining Bias in a Survey Question

**Got It?** **Reasoning** A reporter wants to find out what kinds of movies are most popular with local residents. He asks the biased question, "Do you prefer exciting action movies or boring documentaries?" What unbiased question could the reporter ask instead?

10. Circle the words of the reporter's question that make the question biased.

    Do you prefer exciting action movies or boring documentaries?

11. Underline the correct words to complete the sentence.

    The words circled in Exercise 10 make certain types of movies

    seem more appealing / the same.

12. Cross out the biased questions.

    | Do you prefer exciting action movies or documentaries? | Do you prefer action movies or boring documentaries? | Do you prefer action movies or documentaries? |

**Problem 5** **Determining Bias in a Sample**

**Got It?** You want to know how many of your classmates have cell phones. To determine this, you send every classmate an e-mail asking, "Do you own a cell phone?" How might this method of gathering data affect the results of your survey?

**13.** Suppose the samples described in Column A were surveyed. Draw a line from each sample in Column A to the reason the sample may be biased in Column B.

| Column A | Column B |
|---|---|
| people using pay phones | These people may be more likely to own a cell phone since that may be their method of communication. |
| people who do not have a land line phone at home | These people may be more likely to not own a cell phone because they are using a type of phone that is less convenient. |
| people at a cell phone store | These people may be more likely to own a cell phone since they are in the store to purchase or replace a phone. |

**14.** Look back at the original method of gathering data. How might this method affect the results of the survey?

_____

**Lesson Check** • **Do you UNDERSTAND?**

**Writing** Explain why "Do you prefer *delicious* fruit or *plain* vegetables for a snack food?" is a biased survey question.

**15.** Circle one word to make a true statement.

A bias makes one category seem equally / more appealing than another.

**16.** Underline the words in the sentence that make the survey question biased.

**17.** Why is the survey question biased?

_____

_____

**Math Success**

**Check off the vocabulary words that you understand.**

☐ quantitative   ☐ qualitative   ☐ univariate   ☐ bivariate

☐ population   ☐ sample   ☐ bias

**Rate how well you can *classify data and determine bias*.**

| Need to review | 0 2 4 6 8 10 → | Now I get it! |
|---|---|---|

**Lesson 12-5**