Name _____

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Focus on

• Surveys and Samples

- This investigation will show the various types of surveys and samples.
- A **survey** is a way of collecting data about a population.
- A survey can be a **closed-option survey,** which offers a limited number of choices. Or it can be an **open-optioned survey,** in which there is no limit of choices.
- **Statistics** is the science of gathering and organizing **data** or information so that we can draw conclusions from the data.
- Data can be organized and displayed with a table or chart.

Example

Brian asked his classmates how many hours per day they spend doing outdoor activities.

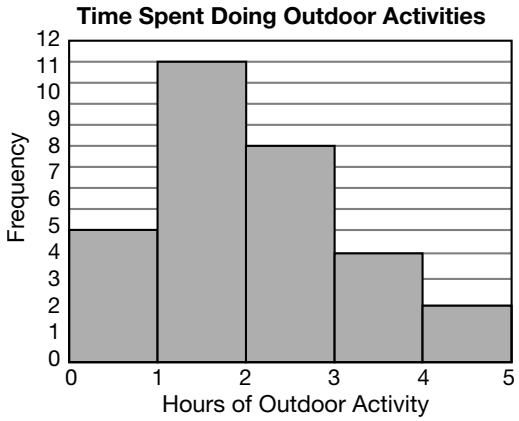
He tallied their different responses and displayed the counts with a **frequency table.** A frequency table shows the number of times a value occurs in the data.

Time Spend Doing Outdoor Activities

Number of Hours per Day	Tally	Frequency
0–59 min	𝍸	5
1 hour–1 hour, 59 min	𝍸 𝍸 |	11
2 hour–2 hour, 59 min	𝍸 |||	8
3 hour–3 hour, 59 min	||||	4
4 hour–4 hour, 59 min	||	2

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Brian made a histogram to show the results.
A **histogram** is a special type of bar graph that displays the information into equal-sized intervals.



This histogram is separated into five **bins,** or ranges of numbers (0–59 minutes, 1 hr–1hr 59 minutes, etc). The height of the bars shows the number of people who responded, with the time ranges listed at the bottom of the bar.

- When collecting data, note that the group of people we ask and the way we ask the questions can affect the data.

  Brian did not consider that the data can change based on who and how he asked the questions. From his data he concluded that most people his age spend 1–3 hours doing outdoor activities each day.

  1. Suppose Brian surveyed his classmates in the fall. How would the results be different if he asked them how much time they spent doing outdoor activities in the winter?

  They may have said they spend _____ time outdoors,

  since people spend _____ time outdoors in

  the w_____.

  2 How could the results be different if Brian conducted the survey in a different city? Would his conclusion be valid?

  Brian's claim m_____ n_____ be valid.

  W_____, number of parks, o_____

  a_____ options, and lifestyle may be different in another city.

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3. Write a precise statement that is a valid conclusion of Brian's survey**.**

The majority of Brian's classmates reported spending

_____ h_____ of outdoor activity each day.

- Brian's data do not represent the entire population. They only represent his class.
- A **sample** is a selection of people from the entire population. By surveying a sample Brian can get a better representation of data for the entire state. For example, a few hundred students from across the state can be surveyed.

4. State if a sample would be helpful to use for problems **a–c.** Explain.

a. Where will your family go on your next vacation?

_____. All f_____ members can be asked.

b. Should your community use local taxes to plant trees or build a community playground?

b. _____. You can sample people from

d_____ areas

b. of the c_____.

c. When will your class participate in the community park cleanup?

c. _____. You can ask all s_____ in the

c_____ to vote.

- There are several ways of collecting samples from a population.

Convenience Sampling: Choose participants who are easy to contact.

Random Sampling: Select participants randomly from an entire population. This system is most likely to produce a sample that is most representative of the population.

Systematic Sampling: Follow a rule or system to select participants.

Volunteer Sampling: Get volunteers to participate.

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5. A grocer wants to survey his customers to find out their opinions on the new bakery in the store.

He considers the following options.

Identify each of the sampling methods.

a. He surveys each person who places an order at the bakery.

_____

b. He places survey forms at the check-out line for customers to fill out if they wish. _____

c. When a person arrives at the check-out counter, the cashier rolls a number cube. If a "one" comes up, the cashier will survey the customer.

_____

Which sample is most likely to produce a sample that is representative of the population?

R_____ sampling produces the most representative sample.

6. Results of the district-wide vote shows that 75% of voters were in favor of the school bond measure, and 25% voted against it.

These are the results of the different samples that were taken before voting.

a. The local news station asked voters to call in their opinions, and 200 out of the 250 callers were in support of the measure.

b. A door-to-door poll found 30 out of 50 people favored the measure.

c. An online computer poll's results showed 730 out of 1000.

Which sample had results that were closest to the district-wide voting results?

_____.

Why do you think this sample had results that were closer to the results of the population than the others?

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The call-in vote showed _____ in favor,

the door-to-door poll showed _____ in favor, and

the online poll showed _____ in favor. Since the

_____ was closest to the actual vote of 75%,

its results were closest to the district-wide vote. A possible

explanation is that this result was close because it had the

l_____ sample.

- When a sample is **biased** it is not representative of the population, so the results may be different from the actual opinions of the population at large.
- **Sampling errors** may result from a biased sample.

7. A city is considering using public funds to provide free wireless internet access throughout the city.

To measure the public's opinion, an online poll was conducted asking: Should the city provide free wireless Internet access throughout the city? The results are shown in the table below.

Yes	82%
No	13%
Not Sure	5%

Do these data represent sampling errors? Explain why the sample might be biased.

The data _____ represent sampling errors.

A sample selected from Internet users _____ be biased,

since the question is about providing Internet access.

The results show great support for the idea, but others in the city

may feel d_____ about the issue.

8. Cindy polled her classmates on their vacation preferences.

She asked, "Would you rather vacation in the beautiful mountains, the hot desert, or at the mosquito-infested lake?"

The results of her survey are displayed in the frequency table below.

Location	Tally	Frequency
Mountains	𝍸 𝍸 ||||	14
Desert	𝍸	5
Lake	|	1

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Why might the way the question was asked influence the results?

Cindy used words like _____ and _____, that would influence a person's opinion on the location. The data showed a strong preference for the _____, which she favorably described.

9. Carlos conducted a survey on the price people would be willing to pay for a new product.

He displayed the data with a histogram as shown below.

$3	$5	$6	$2	$5
$7	$4	$5	$6	$5



Carlos concluded, "Most of the people surveyed would pay in the $5-to-$10 range for this product."

a. Complete the frequency table below.

Then display the data with a histogram using the data ranges from the frequency table.

Price	Tally	Frequency
$0–$1.99		
$2–$3.99		
$4–$5.99		
$6–$7.99		
$8–$9.99		



b. Explain why the way Carlos displayed his results may have affected his conclusion.

Carlos drew a histogram that covered a g_____ range of numbers than his data, and he used w_____ bars.

The histogram is misleading because it appears that most responses named an amount from _____ to _____.

The f_____ t_____, however, shows that this is n_____ true.

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