

3-28-19

Aim: *SWBAT* understand random samples and make inferences based on the population using random samples.

HW: Pages 4 - 5

Do Now: Packet Page 1

**Aim:** SWBAT determine if a sample is a biased or an unbiased representation of a population and whether or not the results can be used to make further predictions about a population.

**Do Now:** Read the following information and use it to determine if # 1 - 4 are examples of biased or unbiased sampling.

### Unbiased Random Sampling Techniques:

- Use a Pattern: Selecting every 4<sup>th</sup> person who enters the cafeteria.
- Use a Method: Draw names out of a hat, in which everyone has an equal chance of being selected.
- Divide the Population into Groups: Separate data by grade level and randomly select from each group.

### Biased Random Sampling Techniques:

- Allowing people to volunteer to take a survey
- Survey people who are present, but do not represent the entire population
- Choose specific groups of people, such as honor roll students, to represent the entire population

1. You fill a jar with each Felix Festa student's name written on its own slip of paper. You pick 10 slips of paper from the top of the jar to determine the location of the 7<sup>th</sup> grade field trip.

Unfair  
Biased OR Fair  
Unbiased

2. You asked every eighth student entering the school which of four subjects was his or her favorite.

Biased OR Unbiased

3. You asked only 8<sup>th</sup> grade students their view of the "Backpack Policy" and use their answers to determine what is best for all the students in our middle school.

Biased OR Unbiased

4. You ask every 10<sup>th</sup> student on the alphabetized school roster what their favorite genre of music is and use the results to determine the songs played in the morning.

Biased OR Unbiased

**Statistics** is the study of how to collect, organize, analyze, and interpret numerical information from data. Not all data is good data, so it is important that data is collected carefully and in an unbiased manner.

**Population** - the whole set from which a sample of data is selected.

**Random Sample** - A representative part of a larger whole or population in which every object or event has to have an equal chance of being selected.

Use evidence, from the described sampling technique, to answer each question.

5. Carla has a list of all 720 students in her middle school. She writes the names of each student on a slip of paper and puts each slip in the box. Then, she swirls the papers before she pulls a name. She repeats it 30 times to decide who she will survey about the upcoming school election.

A. How many students are in Carla's sample? 30

B. How many students are in the population? 720

- C. Carla asks her friend for some advice about her sampling technique. One friend suggests that she survey only 8<sup>th</sup> grade students because they are the oldest and probably know more about the election than younger students. Do you think this suggestion creates a random sample? (Yes or No) Explain.

No because 8<sup>th</sup> grade students are a specific group.

- D. Another friend suggests that she makes the sample larger and surveys 100 students. Which sample size is more likely to represent the population? Explain.

The 100 student sample is more representative because it will provide more opinions.

- E. Using Carla's original sampling technique, 16 of the 30 people surveyed said they would vote for Ben. Use Carla's results to predict how many of the 720 students will vote for Ben.

$$\frac{16}{30} = \frac{x}{720}$$

$$\frac{30x}{30} = \frac{11520}{30}$$

$$x = 384$$

**HOMEWORK**

1. The School board wants to study computer literacy among teachers. Which would represent a **random** sample of teachers?
  - a. All high school math teachers
  - b. Teachers from the middle school whose name begins with N
  - c. All male teachers
  - d. Every eighth teacher on an alphabetical list

2. An on-line bookseller randomly chooses 200 book buyers from its database and then surveys those book buyers to find out if they were satisfied with the time it took to deliver their orders. Explain if the bookseller's survey is biased or not.

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3. Milena surveys 80 high school students, who are leaving a jazz concert, to determine the favorite type of music among high school students. Explain whether or not Milena's survey is biased.

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4. Max wants to find out the exercise habits of local children. He plans to survey every third child he sees coming out of a sporting goods store. Max says his sample is not biased. Do you agree or disagree? Explain.

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5. A high school has 1800 students. A random sample of 80 shows that 24 kids have cell phones. Predict the number of students in the entire high school who have cell phones using a proportion.

6. In a random sample, 3 of 400 computer chips are found to be defective. Based on the sample, about how many chips out of 100,000 would you expect to be defective?
- a. 750
  - b. 3000
  - c. 4000
  - d. Cannot be Determined
7. A mint produces 150,000 souvenir coins each year. In a random sample of 400 coins, 3 have a misprint. Predict the number of coins that will have misprints in a year.
8. Zach chooses a random sample of 50 out of 400 students. He finds that 7 of them have traveled to a foreign country. Zach claims that over 50 out of all 400 students have traveled to a foreign country. Do you agree or disagree? Explain your answer on the lines below.

Circle one: agree      disagree

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