

Name: _____

Date: _____

Samples, Experimental, & Observational Studies

One hundred students out of 800 at a school were surveyed. The results are recorded in each problem below. Predict the number of students in the population that would answer similarly.

- 1.) Twenty-five said they attended the fall play.

200 students

- 2.) Seventy-eight said they rode the bus to school.
- $$\frac{78}{100} = \frac{x}{800} \quad \frac{100x}{100} = \frac{62400}{100}$$
- $$x = 624$$

624 students

- 3.) Eighty-two said they had taken an art class as an elective.

656 students

- 4.) Sixty-four said they were members of an extracurricular club.

$$\frac{64}{100} = \frac{x}{800} \quad \frac{100x}{100} = \frac{51200}{100}$$

$$x = 512$$

512 students

- 5.) Sixty-five said they played a sport.

520 students

- 6.) Twenty-three said math is their favorite subject.

$$\frac{23}{100} = \frac{x}{800} \quad \frac{100x}{100} = \frac{18400}{100}$$

$$x = 184$$

184 students

- 7.) **Estimation** In a survey of 100 students, about 32 reported that they lived within walking distance of the school. The school has 893 students. Use mental math to estimate how many students in the school are within walking distance.

Approximately 300 students

Determine whether each situation is an experiment or an observational study.

- 8.) A researcher wants to know whether babies born into homes with older siblings develop speech skills earlier than babies who are born as only children. **Observational Study**
- 9.) A bakery wants to know whether glaze or powdered sugar is a more enticing pastry topping. They make some pastries with each topping, and see which sells better. **Experiment**
- 10.) A car dealer wants to know what color cars seem to sell the best, so she looks over the past year's sales record. **Observational Study**
- 11.) A cell phone manufacturer wants to investigate the user-friendliness of a new design, so the manufacturer gives the new phones to fifty people for a week and then gets their feedback. **Experiment**
- 12.) A filmmaker wants to know the effect of eating fast food on his general health, so he eats fast food every day for four weeks and has doctors monitor his health.

Experiment

In exercises 13-16, the study described in the report is a randomized comparative experiment. Describe the treatment, the treatment group, and the control group.

Answers on last page

- 13.) A pharmaceutical company wants to know about the side effects of a new blood pressure drug. Out of 200 randomly selected volunteers currently on blood pressure medication, it switches the old drug with the new drug for 100 of them, and continues to give the other 100 the old drug. It then monitors the two groups for side effects.
- 14.) A research team wants to know whether a new laundry detergent is effective. The team washes variety of fabrics with a variety of stains in the new detergent, and washes the same pairings of fabrics and stains in just hot water. And compares the results.
- 15.) A food company is testing a new recipe for a dinner entrée. The company invites 100 people to a dinner to test the new recipe. Half the people are served the old recipe, and half are served the new recipe. They find that the people who were served the new recipe ate 15% more.
- 16.) A battery manufacturer develops a new battery that it claims is an improvement on its existing product. A research group compares the battery life for 20 assorted devices on the new battery and the old battery, and finds that the devices run an average of 20% longer on the new battery.

Classify each as self-selected, random, systematic, stratified, convenience, or clustered survey.

- 17.) **Radio** - The host of a radio show wants to know the listeners' favorite bands. He asks listeners to call the radio station and tell him their favorite bands. *Self-selected*
- 18.) **Customer Satisfaction** - The owner of a lawn care company wants to know if his clients are satisfied with the company's service. He decides to ask 15 clients, randomly chosen from a list of his 32 clients, for their opinions of the company's service. *Random*
- 19.) **Business** - The general manager of a fast-food restaurant chain wants to determine the interest in a new food item that he is considering adding to the menu in the next month. He has the local manager at each of the 10 restaurants in the chain survey 20 randomly selected people throughout the day. *stratified*
- 20.) **Television** - The programming director of a local television station decides to conduct a survey to find out if the station's viewers prefer to watch the local news at 5:30 or 6:00. He asks each viewer to call a toll-free number and state his or her preference. *Self-Selected*
- 21.) **Business** - The manager of a credit union wants to know whether its members utilize the online services offered on the credit union's Web site. He randomly selects 20 members registered as local patrons and each at the five branches of the credit union to call and ask whether they use the online services. *stratified*
- 22.) **Local Government** - Town officials are deciding whether to build a public parking lot downtown. The officials decide to ask residents to come to a town hall meeting to participate in a vote on the issue. *self-selected*
- 23.) **Human Resources** - The human resource manager at a business wants to know how satisfied the company's employees are with their jobs. She surveys the 20 people who sit closest to her office. *convenience*
- 24.) **Scientific Research** - The researchers at a hearing research center want to know if the music played during aerobics classes at health clubs is loud enough to cause hearing damage. They randomly choose 10 health clubs from the 150 health clubs in the area and measure the loudness of the music played during the aerobics classes. *Random*
- 25.) **Customer Satisfaction** - The manager of a movie theater wants to know how the movie viewers feel about the new 3D glasses at the theater. She asks every 30th person who exits the theater each Saturday night for a month. *systematic*
- 26.) **Journalism** - A writer for a travel magazine wants to learn tourists' opinions about the night life in a city. She decides to visit a different tourist attraction every day for a week. She will have the magazine's interns, who are traveling with her, interview every tourist they see at each attraction. *cluster*
- 27.) **Student Government** - Your class officers are planning a dance, and they want to know if they should hire a DJ or a live band. They decide to survey every tenth student as he or she leaves at the end of the school day. *systematic*

Treatment

13. switching volunteers to the new drug
14. adding detergent to the wash
15. feeding people new Recipe
16. Running devices on improved battery

Treatment group

- volunteers taking new drug
- clothes washed with detergent
- people served new Recipe
- devices running on new battery

Control group

- volunteers using original drug
- clothes washed in hot water
- people served old Recipe
- devices running on original battery