Math 3 **9.6 Sampling** Unit 9

*SWBAT identify and apply methods of data collection for the purpose of statistical analysis.*

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| For an event to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, there is no predetermined pattern or bias toward any particular outcome. |

**Example 1:** A class of 25 students wants to choose 3 students at random to bring food for a class party. Any set of 3 students would have an equal chance of being chosen. Which of the following strategies will result in a fair decision? Are these scenarios random? If not, explain.

1. The students line up alphabetically, and each one in succession flips a fair coin. The first three students to flip heads bring the food.
2. Each student draws a card from a well-shuffled deck of 52 cards. The teacher shuffles a second deck of cards, spreads them out, and draws cards one by one until he matches the cards of the three students.

**Example 2:** A random number table contains randomly-generated digits from 0 to 9. You can use these numbers to model randomness for sampling purposes.



A coach wants to select 3 of her 15 basketball players at random to lead warm-ups before practice each week. The coach assigns each player a number 01 to 15. How can the coach use the random number table to fairly choose the three players?

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| **Simulations and Probability Models**You can use a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to assign probabilities to outcomes of a chance process.**Example 3:** Suppose that you are playing a board game for which you must roll a 6 on a number cube before you are able to move your game piece from start. Describe a simulation you can use to predict the number of times you would expect to have to roll the number cube before you can move from start. |

Sampling Methods

Convenience Sample: Select any members of the population who are conveniently and readily available

Voluntary Response Sample: Select only members of the population who volunteer for the sample

Systematic Sample: Order the population and then select from it at regular intervals

Random Sample: All members of the population are equally likely to be chosen

Types of Studies

Observational: Members are observed or measured in such a way that they are not affected by the study.

Controlled Experiment: The sample is divided into two groups.

* A “treatment” is imposed on one group, but not on the control group.
* The effect of the “treatment” on the treatment is then compared to the control group.

Survey: Every member of the sample set is asked a set of questions

**Bias:** systematic error introduced by the sampling method.

**EX:** Only surveying a certain age group or excluding certain people with specific opinions

**Example 4:** What type of sampling method is used in each scenario? Is there any bias in each sample?

1. A service surveys every 25th listing in a local directory.
2. A reporter interviews people on the street in a large city.
3. A radio station allows people to call in to give their answers to a survey.

**Survey Questions**

*To create unbiased survey questions, avoid:*

* Combining two or more issues, using double negatives, overlapping answer choices, words that cause strong reaction, leading the subject to an answer.

**Example 5:** Are the following questions bias? If they are, explain why.

1. Do you think that the food and beverages being served in the cafeteria taste good?
2. Don’t you agree that school days should be shorter?
3. Do you prefer watching exciting movies or reading dull books?