Domain: **Statistics and Probability (SP)**

Cluster: Use random sampling to draw inferences about a population.

Standard: **7.SP.1.** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

Standards for Mathematical Practice (MP):

MP.3. Construct viable arguments and critique the reasoning of others.
MP.6. Attend to precision.

Connections:

This cluster is connected to the Grade 7 Critical Area of Focus #4, **Drawing inferences about populations based on samples**. Initial understanding of statistics, specifically variability and the measures of center and spread begins in Grade 6.

Instructional Strategies

In Grade 6, students used measures of center and variability to describe data. Students continue to use this knowledge in Grade 7 as they use random samples to make predictions about an entire population and judge the possible discrepancies of the predictions. Providing opportunities for students to use real-life situations from science and social studies shows the purpose for using random sampling to make inferences about a population.

Make available to students the tools needed to develop the skills and understandings required to produce a representative sample of the general population. One key element of a representative sample is understanding that a random sampling guarantees that each element of the population has an equal opportunity to be selected in the sample. Have students compare the random sample to population, asking questions like "Are all the elements of the entire population represented in the sample?" and "Are the elements represented proportionally?" Students can then continue the process of analysis by determining the measures of center and variability to make inferences about the general population based on the analysis.

Provide students with random samples from a population, including the statistical measures. Ask students guiding questions to help them make inferences from the sample.

Explanations and Examples:

7.SP.1 Students recognize that it is difficult to gather statistics on an entire population. Instead a random sample can be representative of the total population and will generate valid results. Students use this information to draw inferences from data. A random sample must be used in conjunction with the population to get accuracy. For example, a random sample of elementary students cannot be used to give a survey about the prom.

Example:

- The school food service wants to increase the number of students who eat hot lunch in the cafeteria. The student council has been asked to conduct a survey of the student body to determine the students' preferences for hot lunch. They have determined two ways to do the survey. The two methods are listed below. Identify the type of sampling used in each survey option. Which survey option should the student council use and why?

  1. Write all of the students' names on cards and pull them out in a draw to determine who will complete the survey.
  2. Survey the first 20 students that enter the lunch room.

Common Misconceptions:

Students may believe:
One random sample is not representative of the entire population. Many samples must be taken in order to make an inference that is valid. By comparing the results of one random sample with the results of multiple random samples, students can correct this misconception.