# Unit 5
# Statistics and Probability

## Grade 7 Math

## Unit Description:

Students will explore random samples and make statistical inferences. To compare data, students will use mean, mean absolute deviation, measures of center and variability. Additionally, students will explore experimental probability.

### Standards for Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.
MP.2 Reason abstractly and quantitatively.
MP.3 Construct viable arguments and critique the reasoning of others.
MP.4 Model with mathematics.
MP.5 Use appropriate tools strategically.
MP.6 Attend to precision.
MP.7 Look for and make use of structure.
MP.8 Look for and express regularity in repeated reasoning.

### Louisiana Student Standards for Mathematics (LSSM)

| SP: Statistics and Probability | |
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| **A. Use random sampling to draw inferences about a population.** | |
| 7.SP.A.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 (statistical population: a set of people, things, observations, or concepts that share a property or set of properties). |
| 7.SP.A.2 | Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be. |

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| **B. Draw informal comparative inferences about two populations** | |
| 7.SP.B.3 | Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities using quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. |
| 7.SP.B.4 | Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. |
| **C. Investigate chance processes and develop, use, and evaluate probability models.** | |
| 7.SP.C.5 | Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. |
| 7.SP.C.6 | Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times. |
| 7.SP.C.7 | Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.<br>**a.** Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.<br>**b.** Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? |

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| 7.SP.C.8 | Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (Include: fundamental counting principle, combinations, and permutations to find possible outcomes)<br>**a.** Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.<br>**b.** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.<br>**c.** Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood? |

## Enduring Understandings:

*The way that data is collected, organized and displayed influences interpretation.
*Measures of center and measures of variability can be compared and used to make inferences for two populations.
*The probability of a chance event is a rational number between 0 and 1.
*The probability of a compound event can sometimes be found using organized lists, tables, tree diagrams, and simulations.
*The probability of a compound event is similar to the probability of a simple event in that both are ratios comparing the number of favorable outcomes within a sample space to the entire sample space.

## Essential Questions:

*How can you predict the outcome of future events?
*Why is data collected and analyzed?
*How do you know which type of graph to use when displaying data?
*How do people use data to influence others?
*How can predictions be made based on data?
*How can the probability of an event be determined?
*What is the reliability of the determination of the probability of an event?