Unit 4: Probability & Statistics

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

The purpose of this unit is to expand on previous knowledge of simple probability to experimental probability, compound events, and comparing different populations. With a greater understanding of probability students will be able to better evaluate statistical data in the real-world.

ESSENTIAL QUESTIONS

- How can we use the total number of outcomes and the amount of favorable outcomes to calculate the probability or likelihood of the event occurring?

- How can we calculate and use relative frequencies and experimental probability to make predictions of events?

- What methods can use to find the total number of outcomes of compound events?

- What strategies can we use to determine whether sample data is a true and unbiased representation of a population?

- How can we use box-and-whisker plots, dot diagrams, stem and leaf plots, and other measures of central tendency to compare multiple populations?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)

MA.7.SP	Statistics and Probability
MA.7.SP.A	Use random sampling to draw inferences about a population.
MA.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.
MA.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.
MA.7.SP.B	Draw informal comparative inferences about two populations.
MA.7.SP.B.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
MA.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.
MA.7.SP.C	Investigate chance processes and develop, use, and evaluate probability models.
MA.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.
MA.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.
MA.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.
MA.7.SP.C.7a	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
MA.7.SP.C.7b	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
MA.7.SP.C.8	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
MA.7.SP.C.8a	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.
MA.7.SP.C.8b	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.
MA.7.SP.C.8c	Design and use a simulation to generate frequencies for compound events.

New Jersey (NJSLS) - K-12 - Math Practice Standards (2020)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

TECH.9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.
TECH.9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
TECH.9.4.8.TL.5	Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.
TECH.9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.
TECH.9.4.8.IML.2	Identify specific examples of distortion, exaggeration, or misrepresentation of information.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.

PRE-ASSESSMENTS

None given for this unit.

INSTRUCTIONAL PLAN

MODULE 1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about probability so that we can determine the likelihood of events taking place.
Student Learning Strategies	-Peardeck Lesson on Introduction to Probability. -IXL Lessons EE.1 through EE.3
Success Criteria	I can find the probability of a simple event. I can describe the probability of a generalized ev as being impossible, unlikely, very likely, or certa
Formative Assessment (drives instructional	-Peardeck lesson interaction & feedback.

decisions)	-Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

[Introduction to Probability](#)

MODULE 2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to find experimental probability so that we can make predictions about the likelihood of an event taking place after conducting experiments.
Student Learning Strategies	-Probability experiments with Dice. -IXL Lessons EE.4 through EE.7
Success Criteria	I can find the probability of certain outcomes after conducting an experiment and collecting data results. I can use experimental probability to make a prediction about the likelihood of future outcomes.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks. Probability experiments.
Suggested Modifications	Students can work in groups. Students can choose the types of experiments to perform.

MODULE 3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about the fundamental counting principle and tree diagrams so that we can determine the number of possible outcomes of compound events.
Student Learning Strategies	-Peardeck Lesson on Compound Events. -IXL Lessons EE.8 and EE.9
Success Criteria	I can construct a tree diagram to model the outcomes of a compound event. I can apply the fundamental counting principle to determine the number of outcomes of compound events.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 4

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to find the probability of compound events so that we can determine the likelihood of a series of events occurring and to make predictions about future events.
Student Learning Strategies	-Peardeck Lesson on Compound Probability. -IXL Lesson EE.10
Success Criteria	I can find the probability of a compound event. I can verify the probability of a compound event by constructing a tree diagram.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.

Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 5

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to find the probability of dependent and independent events so that we determine the likelihood of events taking place that may or may not be affected by previous outcomes.
Student Learning Strategies	-Peardeck Lesson on Dependent & Independent Events. -IXL Lessons EE.12 through EE.14
Success Criteria	I can explain the difference between dependent and independent events. I can find the probability of compound events that may be dependent or independent of each other.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 6

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about sampling methods of populations so that we can distinguish between biased and unbiased samples and to make inferences about populations.
Student Learning Strategies	-Peardeck Lesson on Samples & Populations. -IXL Lessons DD.8 and DD.9

Success Criteria	I can explain the difference between biased and unbiased samples. I can make inferences about a population where an unbiased sample is representative of that population
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 7

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about measures of central tendency and spread so that we can make comparisons between two sets of population samples.
Student Learning Strategies	-Peardeck Lesson on Central Tendency & Spread. -IXL Lessons DD.1 through DD.7
Success Criteria	I can find mean, median, mode, and range for a data set. I can find the interquartile range and construct a box and whisker plot for a data set. I can make comparisons between two data sets using box and whisker plots.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

REFLECTIONS

This unit was only briefly touched on due to limitations of time this year.

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.RI.7.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.7.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.7.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.