Trimester:	Unit Title:	Recommended Instructional Days:
3	**Probability**	**12 - 16 days**
Domains: Statistics and Probability		

Strand:

☐ **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 ½ 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.
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.*

☐ **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.
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?*

☐ **7.SP.C.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
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.

7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
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.

7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
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?*

Key:

Major Cluster **Supporting Cluster** **Additional Cluster** **Climate Change Opportunity**

Progress Indicators: ◊ Tests ◊ Homework / Classwork ◊ Projects ◊ Formative Assessments ◊ Summative Assessments

Mathematical Practices:

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

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Questions:
Lesson 1: How can you describe the likelihood of an event? When would an event have a 0 chance of occurring?
Lesson 2: How do theoretical and experimental probability differ? When might they be the same? How can experimental and theoretical probabilities be used to make predictions or draw conclusions?
Lesson 3: How can all the possible outcomes, or sample space, of a compound event be represented?
Lesson 4: How can you use technology simulations to estimate probabilities?

Essential Understandings:
Probability quantifies the likelihood that something will happen and enables us to make predictions and informed decisions.
A ratio of the event occurring to the total number of events describes the probability.
Experimental results tend to approach theoretical probabilities after a large number of trials.
The outcomes of an event can be determined by using the addition and/or multiplication counting principles.
The number of outcomes can be determined using counting trees, organized lists, and multiplication.

Vocabulary:
- experiment
- outcomes
- event
- favorable outcomes
- probability
- relative frequency
- experimental probability
- theoretical probability
- sample space
- Fundamental Counting Principle
- compound event
- simulation

**Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts. When students encounter a new definition, encourage them to write in their Big Ideas Student Journals. They will revisit these definitions during the Chapter Review.*

Suggested Activity Descriptions:
- Chapter Exploration problems on TB page 282.
- Exploration Activities at the beginning of each section.
- Using a bag of Jolly Ranchers, place 10 like colored pieces in various boxes/bags. Tell students that there are 10 in each bag. Then, ask students to come to the front and select from a bag and take note of the color. The goal is for students to begin to notice a pattern and to be able to connect the "likeliness" of selecting various colors to the Jolly Ranchers in the bag. Then, ask students to predict what they think is in the bag. Discuss their predictions as a class.
- Simulate situations using coins, number cubes, colored tiles, etc.
- Have students brainstorm several real-world examples of situations where probability is important.
- Have students survey the class to find the month of each person's birthday. Have them record the data in a line plot and find the experimental probability of a birthday occurring in specific months.

- Supply students with index cards and have them write one of the letters of their name on each card. Have them find the theoretical probabilities of events such as picking a vowel at random and picking an "m" and then picking a vowel. Next, have students find the experimental probabilities and compare the results.
- Have students roll a die or spin spinners to test the Law of Large Numbers.
- Bring in four t-shirts, three pairs of shorts, and a pair of socks. Use the clothing to model the various options and sketch the sample space.
- Anything but Eight from the Big Ideas Game Library.

Interdisciplinary Connections:
Science:

1. Big Ideas STEAM Video and corresponding questions on TB page 281.
2. Big Ideas STEAM Performance Task. QR Code on TB page 313.
3. Question #31 on TB page 317: Your science teacher sets up six flasks. Two of the flasks contain water and four of the flasks contain hydrogen peroxide. A reaction occurs when you add yeast to hydrogen peroxide. You add yeast to two of the flasks. What is the probability that at least one reaction will occur?

Social Studies:

1. Motivate Section on Teacher's Edition page T-283: A county in a U.S. state is often named after a person, such as a president. In fact, there are 31 states in the U.S. with a county named Washington. Sometimes the county is named after a historical figure. Madison is a county name in 20 states and Calhoun is a county name in 11 states. Draw a spinner representing this information. If you spin the spinner 100 times, how many times would you expect it to land on Washington? Explain.

Physical Education:

1. Question #8 on TB page 287: In a football game, the teams pass the ball on 40% of the plays. Of the passes thrown, greater than 75% are completed. You watch the film of a randomly chosen play. Describe the likelihood that the play results in a complete pass. Explain your reasoning.
2. Question #35 on TB page 317: You and your friends form a team in gym class. You have an 80% chance of winning a game of basketball and a 10% chance of winning a game of soccer. Design and use a simulation involving 50 randomly generated numbers to estimate the probability of winning both games.

Language Arts:

1. Vocabulary Question #6 on TB page 294: Explain what it means for an event to have a theoretical probability of 0.25 and an experimental probability of 0.3.

Spot Light On: Gladys West

Social and Emotional Learning: *Competencies*	**Social and Emotional Learning: *Sub-Competencies***
SEL Competencies: • Self-Awareness • Social Awareness • Self-Management • Relationship Skills • Responsible Decision-Making	• Recognizing the importance of self-confidence in handling daily tasks and challenges. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Identify and apply ways to persevere through alternative methods to achieve goals. • Utilize positive communication and social skills to interact effectively with others. • Develop, implement, and model effective problem solving and critical thinking skills.
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Teacher Observations • Exit Tickets • Quizzes • Self Assessments • Big Ideas Student Journals • Homework/Classwork • Teacher Created Assessments • Progress Monitoring Items • Formative Assessment Tips in Big Ideas Teacher Edition	**Benchmarks & Summative Assessments:** • Chapter/Unit Assessments • Standardized Tests • Project-based Assessments • Benchmark Tests

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Big Ideas Student Journal, Dynamic Assessment System, iReady, Khan Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core,	Reteach worksheets, Extra Practice worksheets, Math manipulatives, Scaffolding Instructions in each section of textbook, Tutorial Videos, Skills Review Handbook, Skills Trainer	Dictionary for native language, Video tutorial in native language, ELL Support in each section of Big Ideas Teacher's Edition	ST Math Challenge Objectives, G&T tasks, Enrichment and Extension worksheets, Art of Problem Solving, Leveled assessments

Desmos			
Supplemental Resources			
Technology: • Chromebooks • Scientific Calculators • Online math manipulatives **Other:** • Google Classroom, Google Meets, Schoology, Interactive Workbooks • Illustrative Mathematics • insidemathematics.org • National Library of Virtual Manipulatives			
Differentiated Student Access to Content: **Recommended *Strategies & Techniques***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics.	Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related content.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept(s):** Critical Thinking and Problem Solving	
	Core Ideas:	An essential aspect of problem solving is being able to self-reflect on why possible solutions for solving problems were or were not successful.
	Performance Expectation/s:	9.4.8.CT.3: Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	**X**	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*