Unit 6 - Probability

Content Area: **Mathematics**
Course(s): **Math 7**
Time Period: **May**
Length: **4 weeks**
Status: **Published**

Unit Summary

In this unit, students will use probability models to determine the likelihood of an event, as well as the probability of compound events. Students will understand that probability ranges from 0 (cannot occur) to 1 (must occur). Students will compare theoretical and experimental probabilities to understand the natural outcome of events. Students will use their prior knowledge of fraction operations and apply it to probability concepts. Students will develop their understanding of probability through calculating theoretical probabilities. Students will use a variety of manipulatives including spinners, dice, coins, etc., and organizational tools such as organized lists, tables, and tree diagrams. Students will use concepts and skills from ratios and proportions to write probability as ratios (desired outcomes to total outcomes).

Standards

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-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
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.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.

Student Learning Objectives

- Students will learn to determine simple probability of events using primes, composites, factors, multiples, spinners, and dice.
- Students will learn to understand and model the difference between experimental and theoretical probability using manipulatives.
- Students will learn to determine probability of independent and dependent events.
- Students will learn to use an organized list to determine probability of compound events.

Essential Questions

- How do you determine probability?
- Why does a difference sometimes occur between experimental and theoretical probability?

Enduring Understandings

- Students will understand that probability represents the likelihood of an outcome.

Application

- Students will be able to independently use their learning to express probability as a number from 0 (impossible) to 1 (certain) that an event will occur.
- Students will be able to independently use their learning to express experimental probability based on the results of an actual experiment.
- Students will be able to independently use their learning to determine the theoretical probability that is based on an assumption that certain outcomes are equally likely.
- Students will be able to independently use their learning to understand that two events are independent if one event does not affect the sample space of the other event.
- Students will be able to independently use their learning to understand that two events are dependent if one event affects the sample space of the other event.
- Students will be able to independently use their learning to predict the probability of an event's occurrence with varying degrees of confidence.
- Students will be able to independently use their learning to appropriately use mathematical vocabulary such as probability, theoretical probability, experimental probability, sample space, random events, independent events, dependent events, relative frequency, simple event, compound event, organized list, tree diagram, simulation.

Skills

Students will be skilled at:

- Representing sample spaces of compound events using tree diagrams, organized lists, and/or tables.
- Utilizing an organized list to determine probability of compound events.
- Utilizing a tree diagram to determine probability of compound events.
- Analyzing theoretical and experimental probability (using a frequency table).
- Predicting relative frequency of a probability event (determine the number of times something will occur based on probability).
- Calculating the probability of dependent and independent events.
- Determining simple probability of one event.
- Calculating and design a simulation for a simple and compound event. Use manipulatives to represent real world situations. (Ex: use a coin to determine sex of child).
- Understanding that the probability of a chance event lies between 0 (certain) and 1 (impossible).
- Recognizing and utilizing different probability manipulatives (coins, dice, spinners).
- Utilizing manipulatives and computers to model experimental probability problems.