



Subject Area: Mathematics
Unit Title: Probability and Statistics
Grade Level: 9th Grade
Lesson Number: 1 of 10

Duration: 60 minutes
Date: March 12, 2024
Teacher: Ms. Jane Smith
Room: Room 101

Curriculum Standards Alignment

Content Standards:

- Understand the concept of probability
- Calculate probabilities for simple events
- Analyze and interpret data to make informed decisions

Skills Standards:

- Critical thinking and problem-solving
- Data analysis and interpretation
- Communication and collaboration

Cross-Curricular Links:

- Science: understanding experimental design and data analysis
- English: communicating mathematical ideas and results

Essential Questions & Big Ideas

Essential Questions:

- What is probability, and how is it used in real-life scenarios?
- How can we calculate probabilities for simple and compound events?
- What are the implications of probability in decision-making and problem-solving?

Enduring Understandings:

- Probability is a measure of the likelihood of an event occurring
- Understanding probability is essential for making informed decisions in various contexts
- Probability can be used to model and analyze real-world phenomena

Student Context Analysis

Class Profile:

- Total Students: 25
- ELL Students: 5
- IEP/504 Plans: 3
- Gifted: 2

Learning Styles Distribution:

- Visual: 40%
- Auditory: 30%
- Kinesthetic: 30%

What is Probability?

Probability is a measure of the likelihood of an event occurring. It is a number between 0 and 1, where 0 represents an impossible event and 1 represents a certain event.

Understanding probability is essential for making informed decisions in various contexts, such as insurance, finance, engineering, and medicine.

Key Concepts in Probability

Experiment: an action or situation that can produce a set of outcomes

Outcome: a specific result of an experiment

Event: a set of one or more outcomes of an experiment

Sample Space: the set of all possible outcomes of an experiment

Union of Events

The union of two events, A and B, is the event that occurs if either A or B or both occur, denoted as $A \cup B$.

For example, if A is the event of rolling a 1 or 2 on a die, and B is the event of rolling a 3 or 4, then $A \cup B$ is the event of rolling a 1, 2, 3, or 4.

Intersection of Events

The intersection of two events, A and B, is the event that occurs if both A and B occur, denoted as $A \cap B$.

For example, if A is the event of rolling a 1 or 2 on a die, and B is the event of rolling an even number, then $A \cap B$ is the event of rolling a 2.

Probability of the Union of Events

The probability of the union of two events, A and B, can be found using the formula $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

For example, if $P(A) = 0.4$, $P(B) = 0.3$, and $P(A \cap B) = 0.1$, then $P(A \cup B) = 0.4 + 0.3 - 0.1 = 0.6$.

Probability of the Intersection of Events

If events A and B are independent, the probability of their intersection is $P(A \cap B) = P(A) * P(B)$.

For example, if $P(A) = 0.4$ and $P(B) = 0.3$, then $P(A \cap B) = 0.4 * 0.3 = 0.12$.

Insurance and Finance

Understanding probability is crucial in insurance and finance for assessing risks and making informed decisions.

For example, insurance companies use probability to determine premiums and payouts.

Engineering and Medicine

Probability is used in engineering to design and optimize systems, and in medicine to understand the effectiveness of treatments and diagnose diseases.

For example, medical researchers use probability to analyze the results of clinical trials and determine the effectiveness of new treatments.

Introduction and Engagement (10 minutes)

Introduce the concept of probability and ask students to share examples of how probability is used in real-life scenarios.

Use a think-pair-share strategy to encourage students to discuss and share their ideas.

Direct Instruction (20 minutes)

Provide a detailed explanation of the concepts of union and intersection of events, using visual aids such as Venn diagrams.

Use real-world examples to illustrate the concepts and make them more relatable to students.

Guided Practice (20 minutes)

Provide students with problems to calculate probabilities for union and intersection of events.

Circulate around the room to assist students as needed and provide feedback.

Independent Practice (20 minutes)

Provide students with more complex problems to work on independently.

Encourage students to apply the concepts to real-life scenarios and think critically about the results.

Conclusion and Assessment (10 minutes)

Review the key concepts and objectives of the lesson.

Assess students' understanding through a quiz or class discussion.

Participation and Engagement

Assess students' participation and engagement during the lesson, including their contributions to class discussions and group work.

Use a rubric to evaluate students' participation and provide feedback.

Accuracy and Completeness of Calculations

Assess the accuracy and completeness of students' calculations for union and intersection of events.

Use a rubric to evaluate students' calculations and provide feedback.

Application to Real-Life Scenarios

Assess students' ability to apply the concepts to real-life scenarios.

Use a rubric to evaluate students' applications and provide feedback.

Quiz or Class Discussion

Assess students' understanding through a quiz or class discussion at the end of the lesson.

Use a rubric to evaluate students' understanding and provide feedback.