Grade 10 Mathematics Lesson Plan

Introduction to Probability

Strand:	**Statistics and Probability**
Sub-Strand:	Probability 1
Specific Learning Outcome:	Perform experiments involving probabilities in different situations, Identify the range of probability in different situations, Appreciate the application of probability in real-life situations
Duration:	40 minutes
Key Inquiry Questions:	How is probability applied in real life situations?
Learning Resources:	CBC Grade 10 textbooks, dice, coins, colored balls/marbles, bags, playing cards

Phase 1: Problem-Solving and Discovery (15 minutes)

Anchor Activity: Predicting Daily Events

Objective: Students work in groups to identify real-world events, predict their likelihood using everyday language (likely, unlikely, certain), and begin developing intuition about probability.

Work in groups to complete the following tasks:

Task 1: Write down 3 events that could happen today.

Examples: "It will rain", "I will be late to school", "The sun will rise tomorrow", "I will win the lottery"

Task 2: Predict the probability of each event.

For each event, decide: Is it likely, unlikely, or certain?

Task 3: Discuss your predictions with your group.

Think about: Why did you classify each event that way? What makes something likely vs unlikely?

Discussion prompts for teachers:

- What events did you think of? Share some examples.
- Which events did you classify as "certain"? Why?

- Which events are "unlikely"? What makes them unlikely?
- Are there any events that are "equally likely" to happen or not happen?
- How do we decide if something is likely or unlikely? What information do we use?
- Can we be more precise than just "likely" or "unlikely"? Can we use numbers?

Phase 2: Structured Instruction (10 minutes)

Key Takeaways

1. What is Probability?

Definition: Probability is the measure of how likely an event is to occur. It is expressed as a number between 0 and 1.

Where:

- 0 means the event is impossible
- 1 means the event is certain
- A probability closer to 1 indicates a higher likelihood of the event occurring

Important: Probability is always between 0 and 1

2. Probability Scale

0 ---------- 0.25 ---------- 0.5 ---------- 0.75 ---------- 1

Impossible Unlikely Equally Likely Likely Certain

3. Key Terms in Probability

- Experiment: A process that leads to a specific result
- Outcome: A possible result of an experiment
- Event: A collection of one or more outcomes
- Sample Space (S): The set of all possible outcomes
- Probability (P): A measure of how likely an event is to occur

4. Probability Formula

P(E) = Number of favorable outcomes / Number of total outcomes

Where:

- P(E) is the probability of event E
- Favorable outcomes refer to the specific event we are interested in
- Total outcomes refer to all possible outcomes in the sample space

5. Real-Life Applications

- Weather Forecasting: Meteorologists predict the likelihood of rain based on past data
- Sports: Coaches analyze the probability of winning based on past performance
- Medicine: Doctors assess the probability of a patient responding to treatment
- Finance and Insurance: Insurance companies use probability to determine policy pricing

- Games of Chance: Dice rolling and card games use probability

Phase 3: Practice and Application (15 minutes)

Worked Example 3.2.1 (Balls in a Bag)

Problem: A bag contains 5 red balls and 3 blue balls. If one ball is picked at random, what is the probability that it is red?

Solution:

Step 1: Identify the sample space

S = {Red, Blue}

Step 2: Count total outcomes

Total number of balls = 5 + 3 = 8

Step 3: Count favorable outcomes

Number of red balls = 5

Step 4: Apply the probability formula

P(Red) = Number of favorable outcomes / Number of total outcomes

P(Red) = 5/8 = 0.625

Answer: The probability of picking a red ball is 5/8 or 0.625 or 62.5%

Worked Example 3.2.2 (Selecting a Student)

Problem: A teacher randomly selects a student from a class of 30 students. If there are 12 girls and 18 boys in the class, what is the probability that the selected student is a girl?

Solution:

Step 1: Identify the sample space

S = {Girl, Boy}

Step 2: Count favorable outcomes

Number of girls = 12

Step 3: Count total outcomes

Total number of students = 30

Step 4: Apply the formula

P(Girl) = Number of girls / Total number of students

P(Girl) = 12/30 = 0.4

Answer: The probability of selecting a girl is 0.4 or 40%

Phase 4: Assessment (5 minutes)

Exit Ticket

1. What is the probability of selecting the letter 'a' from the name "Mukabwa"?

2. A deck of standard playing cards has 52 cards. What is the probability of drawing the 5 of Hearts?

3. A bag has 3 yellow marbles, 5 black marbles, and 2 white marbles. What is the probability of selecting a white marble?

4. A month is selected at random from a year. What is the probability that it is June?

5. A coin is tossed. What is the probability of getting tails?

6. A box contains tickets numbered from 1 to 10. What is the probability of drawing a ticket with the number 7?

Differentiation Strategies

For Struggling Learners:

- Use concrete materials: actual dice, coins, colored balls for hands-on experiments.
- Start with simple two-outcome experiments (coin toss, yes/no questions).
- Provide visual probability scales with examples at each point.
- Use fraction circles or bar models to represent probabilities visually.
- Allow use of calculators for converting fractions to decimals.
- Work in pairs with peer support.
- Provide step-by-step templates for probability calculations.

For Advanced Students:

- Explore compound events (rolling two dice, drawing two cards).
- Calculate probabilities with larger sample spaces.
- Investigate how changing the number of favorable outcomes affects probability.
- Compare theoretical probability with experimental probability through repeated trials.

- Research real-world applications in their areas of interest.
- Create their own probability problems for classmates to solve.

Extension Activity: Probability Experiment and Analysis

Scenario: Design and conduct a probability experiment to compare theoretical and experimental probability.

Tasks:

1. Choose an experiment: coin toss, die roll, or drawing colored objects from a bag.
2. Calculate the theoretical probability for a specific outcome (e.g., rolling a 3, getting heads).
3. Conduct the experiment 20 times and record the results.
4. Calculate the experimental probability: (Number of times event occurred) / (Total trials)
5. Compare theoretical and experimental probabilities. Are they the same? Why or why not?
6. Repeat the experiment 50 times. Does the experimental probability get closer to the theoretical probability?
7. Present your findings with tables showing theoretical vs experimental results.
8. Discuss: What happens as we increase the number of trials?