

Grade 10 Mathematics Lesson Plan

Probability in Real-Life

Strand:	Statistics and Probability
Sub-Strand:	Probability 1: Probability in Real-Life
Specific Learning Outcome:	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, chart paper, markers, real-world scenario cards

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

Anchor Activity: Weather Station Field Trip

Objective: Students work in groups to explore how probability is used in real-life decision-making, focusing on weather forecasting.

Work in groups to discuss the following scenario:

Grade 10 learners went on a field trip to a weather station to learn about how meteorologists use probability to predict the weather.

The weather forecast says: There is a 70% chance of rain tomorrow.

Discuss and answer the following questions:

- (a) What does 70% probability mean?
- (b) Should students carry an umbrella? Why?
- (c) Does 70% probability guarantee that it will rain? Explain your answer.
- (d) What could happen if you ignore the probability?
- (e) How do people use probability in daily life without realising it?
- (f) Share your work with the class.

Discussion prompts for teachers:

- What does 70% mean in everyday language?
- Is 70% a high or low probability? How do you know?
- Can you think of other situations where we use percentages to make decisions?
- What's the difference between "likely" and "certain"?

- What examples of probability have you seen today? (traffic, sports, weather)

Phase 2: Structured Instruction (10 minutes)

Key Takeaways

1. Probability in Real-Life

Probability is used in real-life situations to make predictions and informed decisions.

2. Nine Real-World Applications

1. Weather forecasting: Meteorologists use probability to predict the likelihood of rain, sunshine, or storms.

2. Sports: Coaches and analysts use probability to assess the chances of winning a game or making a successful play.

3. Quality control: Manufacturers use probability to determine the likelihood of defects in their products and to improve their production processes.

4. Traffic management: Authorities use probability to analyze traffic patterns and make decisions about road construction and traffic light timing.

5. Gambling: Players use probability to calculate the odds of winning a bet or a lottery.

6. Healthcare: Doctors use probability to assess the risk of diseases and determine the best treatment options for patients.

7. Finance: Investors use probability to evaluate the potential returns and risks of different investments.

8. Elections: Political analysts use probability to predict the outcome of elections based on polling data and historical trends.

9. Everyday decision-making: Individuals use probability to assess the risks and benefits of various choices, such as whether to carry an umbrella or not based on the chance of rain.

3. Key Understanding

- Probability helps us make informed decisions, but it does NOT guarantee outcomes.
- High probability (like 80%) means "very likely" but not "certain".
- Low probability (like 5%) means "unlikely" but still possible.
- We use probability every day without realizing it!

Phase 3: Practice and Application (15 minutes)

Worked Example 3.2.34 (Revision Session Time Slots)

Problem: A class of 30 students is planning a revision session for their upcoming exams. They have three time slots to choose from: 4 PM, 5 PM, and 6 PM. The students were asked to vote for their preferred time slot, and the results are as follows:

- 12 students prefer 4 PM
- 10 students prefer 5 PM
- 8 students prefer 6 PM

Based on the votes, determine the probability of each time slot being chosen for the revision session.

Solution:

Step 1: Identify the total number of students

Total students = 30

Step 2: Calculate probability for each time slot

Probability = (Number of votes for that time) / (Total students)

Probability of 4 PM = $12/30 = 2/5 = 0.4$ (40%)

Probability of 5 PM = $10/30 = 1/3 \approx 0.33$ (33%)

Probability of 6 PM = $8/30 = 4/15 \approx 0.27$ (27%)

Answer: 4 PM has the highest probability (40%), so it is most likely to be chosen.

Phase 4: Assessment (5 minutes)

Exit Ticket

1. A weather report states that the probability of rain is 0.8.

- (a) Should farmers prepare for rainfall?
- (b) Explain your answer.
- (c) Does 0.8 mean it will definitely rain?

2. In a manufacturing factory, the probability that a product is defective is 0.02.

- (a) What does 0.02 mean?
- (b) Out of 100 products, how many are expected to be defective?
- (c) Why is probability important in quality control?

Differentiation Strategies

For Struggling Learners:

- Use visual probability scales (0 to 1) with labels: impossible, unlikely, equally likely, likely, certain.

- Provide real-world scenario cards with probabilities already calculated.
- Use percentages instead of decimals (70% instead of 0.7).
- Connect to familiar experiences: "How likely is it to rain today?"
- Work in groups with peer support.
- Focus on interpreting probabilities rather than calculating them.

For Advanced Students:

- Research how probability is used in a specific career (medicine, engineering, finance).
- Calculate expected values: If $P(\text{defect}) = 0.02$, how many defects in 1000 products?
- Explore conditional probability in real-world contexts.
- Investigate how insurance companies use probability to set premiums.
- Analyze real weather data and compare predictions with actual outcomes.
- Create their own real-world probability scenarios and present to the class.

Extension Activity: Probability Career Exploration

Scenario: Explore how professionals use probability in their daily work.

Choose one of the following careers and research how they use probability:

- Doctor or nurse (disease risk, treatment success rates)
- Weather forecaster (predicting rain, storms, temperature)
- Sports analyst (predicting game outcomes, player performance)
- Insurance agent (calculating premiums based on risk)
- Quality control manager (detecting defects in products)
- Financial advisor (investment risks and returns)

Tasks:

1. Research: How does this professional use probability in their work?
2. Example: Find a specific example of probability in action (e.g., "70% chance of recovery").
3. Decision-making: How does probability help them make better decisions?
4. Impact: What could happen if they ignored probability?
5. Presentation: Create a poster or short presentation explaining your findings.
6. Reflection: Would you like to work in a field that uses probability? Why or why not?