Grade 10 Mathematics Lesson Plan

Mean

Strand:	**Statistics and Probability**
Sub-Strand:	Ungrouped Data
Specific Learning Outcome:	Determine mean, mode and median of grouped and ungrouped data
Duration:	40 minutes
Key Inquiry Questions:	What is statistics? How do we represent data? How do we use statistics in day to day life?
Learning Resources:	CBC Grade 10 textbooks, calculators, chart paper, markers

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

Anchor Activity: Class Shoe Size Analysis

Objective: Students work in groups to collect real data, construct a frequency distribution table, calculate the mean, and discuss the steps and meaning of the mean.

Work in groups to complete the following tasks:

Task 1: Measure the shoe size of students in your class and record the data.

Example data format: 34, 32, 33, 35, 36, 38, 28, ...

Collect data from at least 15-20 students in your group or class.

Task 2: Construct a frequency distribution table for the data.

Create a table with columns: Shoe Size | Tally | Frequency

Task 3: Find the Mean of the data.

Use any method you know to calculate the average shoe size.

Task 4: How did you calculate the mean? Discuss the steps you took to find the mean and how it helps to understand the data.

Think about: What does the mean tell us? Is it useful?

Task 5: Share your findings with other groups.

Discussion prompts for teachers:

- What shoe sizes did you find? What is the range?
- How did you calculate the mean? What steps did you follow?
- Did you add all the values and divide? Or did you use the frequency table?
- What does the mean shoe size tell us about your class?
- Is the mean a whole number or decimal? What does that mean in real life?
- How is the mean different from just looking at all the individual values?

Phase 2: Structured Instruction (10 minutes)

Key Takeaways

1. What is Mean?

Definition: Mean is the sum of all values divided by the total number of values. It is also known as the Arithmetic Average.

Purpose: The mean represents the typical or central value in a dataset. It summarizes all the data into one number.

2. Formula for Mean (Simple Data)

Mean = ΣX / N

Where:

- ΣX = Sum of all values (Σ is the Greek letter sigma, meaning "sum")
- N = Total number of values
- X = Individual values in the dataset

3. Formula for Mean (Using Frequency Distribution Table)

$\bar{x} = \Sigma fx / \Sigma f$

Where:

- $\bar{x}$ (x-bar) = The mean
- x = Values in the dataset
- f = Frequency of each value
- Σfx = Sum of products (multiply each value by its frequency, then add)
- Σf = Sum of all frequencies (total number of data points)

4. Steps to Calculate Mean

Method 1: Simple Data

1. 1. Add all the values together (ΣX)
2. 2. Count how many values there are (N)
3. 3. Divide the sum by the count (ΣX ÷ N)

Method 2: Using Frequency Table

4. 1. Multiply each value by its frequency (x × f)
5. 2. Add all the products (Σfx)
6. 3. Add all the frequencies (Σf)
7. 4. Divide Σfx by Σf

Phase 3: Practice and Application (15 minutes)

Worked Example 3.1.21 (Simple Data)

Problem: In a class of 30 students, the test scores are:

45, 67, 89, 56, 45, 78, 90, 67, 81, 73, 55, 62, 77, 84, 91, 69, 58, 72, 88, 95, 60, 75, 45, 67, 80, 92, 87, 79, 68, 55

Find the mean.

Solution:

Step 1: Add all values (ΣX)

ΣX = 45 + 67 + 89 + ... + 68 + 55 = 2096

Step 2: Count the values (N)

N = 30 students

Step 3: Calculate mean

Mean = ΣX / N = 2096 / 30 = 69.87

Answer: The mean test score is 69.87 marks

Worked Example 3.1.22 (Frequency Distribution Table)

Problem: The frequency distribution table below shows marks of 20 students in a Grade 10 class. Find the mean.

Marks (x)	Frequency (f)	fx	Calculation
2	3	6	2 × 3 = 6
4	2	8	4 × 2 = 8
6	4	24	6 × 4 = 24
7	3	21	7 × 3 = 21
9	5	45	9 × 5 = 45
11	2	22	11 × 2 = 22
12	1	12	12 × 1 = 12

Solution:

Step 1: Calculate fx for each row (multiply marks by frequency)

Step 2: Find $\Sigma fx = 6 + 8 + 24 + 21 + 45 + 22 + 12 = 138$

Step 3: Find $\Sigma f = 3 + 2 + 4 + 3 + 5 + 2 + 1 = 20$

Step 4: Calculate mean = $\Sigma fx / \Sigma f = 138 / 20 = 6.9$

Answer: The mean mark is 6.9

Phase 4: Assessment (5 minutes)

Exit Ticket

1. The number of books borrowed by students from a school library in a week is as follows:

3, 5, 2, 4, 6, 3, 5, 7, 4, 3, 6, 2, 4, 5, 3, 6

Find the Mean (Average) number of books borrowed.

2. The following frequency distribution table represents the number of goals scored by a football team in different matches:

Goals (x)	Frequency (f)
0	2
1	5
2	4
3	3
4	1

Find the mean number of goals scored per match.

Differentiation Strategies

For Struggling Learners:

- Provide calculators for all calculations.
- Use smaller datasets (5-10 values) to start.
- Provide step-by-step calculation templates.
- Use visual aids showing the formula with labeled parts.
- Work with whole numbers before introducing decimals.
- Allow students to work in pairs for calculations.
- Provide worked examples as reference during practice.

For Advanced Students:

- Calculate mean for larger datasets (30-40 values).
- Compare means of different datasets and interpret differences.
- Explore how outliers affect the mean.
- Calculate mean using both methods and verify they give the same answer.
- Create their own data collection project and calculate means.

- Investigate when mean is useful vs when it might be misleading.

Extension Activity: Class Performance Analysis

Scenario: Analyze test scores from different subjects to compare class performance.

Tasks:

8. Collect test scores from three different subjects (e.g., Mathematics, English, Science) for your class.
9. Calculate the mean score for each subject using the simple formula.
10. Create frequency distribution tables for each subject.
11. Calculate the mean using the frequency table method and verify it matches your first calculation.
12. Compare the means: Which subject has the highest average? The lowest?
13. Discuss: What does the mean tell us about class performance? What doesn't it tell us?
14. Investigate: If one student scored very high or very low, how does it affect the mean?
15. Present your findings with tables and calculations to the class.