# Grade 10 Mathematics Lesson Plan

## Mode

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| **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, chart paper, markers, colored pens |

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

#### Anchor Activity: Scheduling Revision Time

**Objective:** Students work in groups to construct a frequency table and discover the concept of mode as the most frequently occurring value.

Work in groups to analyze the following scenario:

Your class is scheduling a favourable revision time. Students voted for their preferred time and the recorded votes are:

Afternoon, Evening, Afternoon, Morning, Afternoon, Evening, Morning, Afternoon, Evening, Morning, morning, Afternoon, Evening, Morning, Afternoon, Evening, Morning, Afternoon, Evening, Morning

Tasks:

- (a) Construct an ungrouped frequency distribution table.
- (b) Identify the mode
- (c) If the class chooses the most preferred time, when will the revision be held?
- (d) Explain why the mode is important in making this decision.
- (e) If the class had chosen the least preferred time, when would the revision have been held?
- (f) Share your work with the class

Discussion prompts for teachers:

- Which time appears most often in the votes?

- How did you count the frequencies?
- Why is the most frequent choice a good decision for the class?
- What does "mode" mean in everyday language? How does it connect to statistics?
- Can there be more than one mode? When would that happen?

## Phase 2: Structured Instruction (10 minutes)

### Key Takeaways

#### *1. Definition of Mode*

**The mode is the value that occurs most frequently in a data set.**

#### *2. Four Possible Cases*

Case 1: One mode (unimodal)
One value appears most frequently.

Example: In the dataset 2, 3, 2, 5, 2, 7, the mode is 2 (appears 3 times).

Case 2: Two modes (bimodal)
Two values appear with equal highest frequency.

Example: In the dataset 5, 6, 5, 7, 6, 8, the modes are 5 and 6 (both appear 2 times).

Case 3: More than two modes (multimodal)
More than two values appear with equal highest frequency.

Example: In the dataset 1, 2, 3, 1, 2, 3, the modes are 1, 2, and 3 (all appear 2 times).

Case 4: No mode
All values occur once (or all occur with equal frequency).

Example: In the dataset 75, 60, 85, 65, 90, there is no mode (all appear once).

#### *3. Key Characteristics of Mode*

- The mode is useful in identifying the most common occurrence in real-life situations.
- The mode does NOT require calculation — it requires counting and comparison.
- Mode is the easiest measure of central tendency to find.
- Mode can be used with categorical data (like colors, names, preferences) — unlike mean and median.

#### *4. Real-World Applications*

- Most popular product in a store
- Most common shoe size for manufacturing
- Most preferred time slot for meetings
- Most frequent error type in exams

## Phase 3: Practice and Application (15 minutes)

### Worked Example 3.1.31 (Unimodal - Goals Scored)

Problem: The following data set represents the number of goals scored by a football team in 20 matches:

2, 3, 1, 4, 2, 5, 3, 2, 4, 1, 3, 2, 4, 5, 3, 2, 1, 4, 3, 2

Determine the mode of the data set.

***Solution:***

Step 1: Count the frequency of each value

• 1 appears 3 times

• 2 appears 6 times

• 3 appears 5 times

• 4 appears 4 times

• 5 appears 2 times

Step 2: Identify the value with highest frequency

The value 2 appears 6 times, which is more than any other value.

Answer: Mode = 2 goals

### Worked Example 3.1.32 (Bimodal - Study Hours)

Problem: The following data set represents the number of hours spent studying by a group of students in a week:

5, 6, 7, 5, 8, 6, 7, 5, 6, 8

Determine the mode of the data set.

***Solution:***

Step 1: Count the frequency of each value

• 5 appears 3 times

• 6 appears 3 times

• 7 appears 2 times

• 8 appears 2 times

Step 2: Identify values with highest frequency

Both 5 and 6 appear 3 times (highest frequency)

Answer: The data set is bimodal with modes = 5 and 6 hours

## Phase 4: Assessment (5 minutes)

### Exit Ticket

1. The following data set represents the number of pets owned by a group of people:

   0, 1, 2, 3, 1, 0, 2, 4, 1, 3

   Determine the mode.

2. The following data set represents the number of books read by a group of students in a month:

   2, 3, 1, 4, 2, 5, 3, 2, 4, 1, 3, 2, 4, 5, 3

   Determine the mode.

3. The shoe sizes of students are:

   38, 39, 40, 38, 41, 39, 38, 40, 39, 42

   Find the common shoe size among the students.

4. The mathematics test scores of Grade 10 students are:

   75, 60, 85, 65, 90, 80, 50, 45, 70, 95

   What is the mode of the test scores?

## Differentiation Strategies

### For Struggling Learners:

- Use tally marks to count frequencies visually.
- Provide pre-drawn frequency tables to fill in.
- Use colored markers to highlight the most frequent value.
- Start with smaller datasets (5-8 values).
- Use physical objects (colored blocks, cards) to represent data.
- Work in pairs with peer support.

### For Advanced Students:

- Explore bimodal and multimodal datasets.
- Compare mode, mean, and median for the same dataset.
- Investigate when mode is more useful than mean or median.
- Create their own datasets with specific mode characteristics.
- Research real-world applications: market research, quality control, fashion industry.
- Analyze categorical data (favorite colors, preferred subjects) where mode is the only applicable measure.

## Extension Activity: Mode in Business Decisions

Scenario: A shoe store wants to decide which shoe sizes to stock more of.

Dataset: Shoe sizes sold in one week:

38, 39, 40, 38, 41, 39, 38, 40, 39, 42, 38, 39, 40, 38, 39, 41, 38, 39, 40, 39

Tasks:

1. Construct a frequency distribution table for the shoe sizes.

2. Determine the mode(s) of the dataset.

3. If the store can only stock extra inventory of two sizes, which sizes should they choose? Why?

4. Calculate the mean shoe size. Compare it to the mode. Which is more useful for the store owner? Explain.

5. Discuss: Why is mode more practical than mean for this business decision?

6. Extension: If the store serves mostly children (sizes 30-35), how would this change the data and the mode?

Expected Findings:

- Mode = 38 and 39 (both appear 7 times)
- Store should stock more of sizes 38 and 39
- Mean ≈ 39.1, but you cannot stock "size 39.1" — mode is more practical
- Mode directly identifies the most popular sizes
- Real-world connection: Fashion, manufacturing, retail all use mode for inventory decisions