Grade 10 Mathematics Lesson Plan

Frequency Distribution Tables (Grouped)

Strand:	**Statistics and Probability**
Sub-Strand:	Grouped Data
Specific Learning Outcome:	Draw a frequency distribution table for 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, calculators

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

Anchor Activity: Organizing Test Scores

Objective: Students work in groups to organize raw data into class intervals and discover how grouping helps reveal patterns in large datasets.

Work in groups to analyze the following scenario:

A mathematics teacher recorded the test scores (out of 50) for a class of 25 students. The raw data is listed below. It is difficult to see how the class performed just by looking at this jumbled list. Let's organize this data into a grouped frequency table to better understand the class performance.

Raw Scores:

12, 34, 45, 23, 8, 36, 41, 29, 15, 48, 33, 25, 38, 19, 44, 27, 31, 49, 22, 14, 5, 42, 39, 28, 35

Tasks:

- (a) First, determine the range of the data. Identify the lowest score and the highest score in the list.
- (b) Construct a frequency distribution table using class intervals of width 10. Use the following intervals: 0–9, 10–19, 20–29, 30–39, 40–49
- Create three columns in your table: Class Interval, Tally, Frequency
- (c) Look at your completed table. Which class interval has the highest frequency? What does this tell you about the overall performance of the class?

Discussion prompts for teachers:

- Why is it hard to understand the data when it's jumbled?
- How does grouping into intervals help us see patterns?
- What is the lowest score? Highest score? Range?
- Which interval has the most students? What does this mean?
- Do we know the exact scores after grouping? What do we lose?

Phase 2: Structured Instruction (10 minutes)

Key Takeaways

1. Purpose of Grouping Data

Grouping data helps us see patterns and trends in large datasets that would otherwise be hidden.

When dealing with hundreds or thousands of data points, listing each value individually is impractical. Grouping into class intervals makes data manageable and reveals patterns.

2. Important Trade-off

Once data is grouped into class intervals, we lose the specific identity of the individual numbers. For this reason, calculations performed on grouped data are always considered estimates rather than exact values.

3. Key Terms

Class Interval:
A range of values that groups similar data points together (e.g., 0–9, 10–19, 20–29)

Class Width:
The number of values included in an interval. Count the values, don't just subtract!

Example: Interval 0–4 includes 0, 1, 2, 3, 4 → Class width = 5

Frequency:
The count of how many data points fall into each class interval

Tally Marks:
A visual counting tool used before writing the final frequency (grouped in fives: ||||)

4. Structure of Grouped Frequency Table

Three-column format:

- Column 1: Class Interval (the ranges)
- Column 2: Tally (visual counting)
- Column 3: Frequency (final count)

5. Benefits of Grouped Data

- Quickly identify patterns

- See where the majority of data lies
- Spot outliers or unusual values
- Make large datasets manageable

Phase 3: Practice and Application (15 minutes)

Worked Example 3.1.36 (Daily Earnings)

Problem: The following data represents the daily earnings (in dollars) of 20 freelance workers:

45, 62, 58, 41, 75, 50, 48, 66, 72, 55, 43, 60, 52, 78, 49, 64, 57, 70, 44, 69

Construct a grouped frequency distribution table using class intervals of width 10. Start with the interval 40–49.

Solution:

Step 1: Define the intervals

Since we start with 40–49 and use width 10:

40–49, 50–59, 60–69, 70–79

Step 2: Count how many earnings fall into each group

40–49: 45, 41, 48, 43, 49, 44 → 6 values

50–59: 58, 50, 55, 52, 57 → 5 values

60–69: 62, 66, 60, 64, 69 → 5 values

70–79: 75, 72, 78, 70 → 4 values

Step 3: Create the frequency table

Daily Earnings	Frequency
40–49	6
50–59	5
60–69	5
70–79	4

Step 4: Verify total frequency = 6 + 5 + 5 + 4 = 20 ✓

Phase 4: Assessment (5 minutes)

Exit Ticket

1. Consider the following frequency distribution table representing the ages of members in a chess club:

Age Group	Frequency
10–19	8
20–29	12
30–39	5

How many members are in the chess club in total, and how many members are aged 20 or older?

2. A dataset is grouped into the following class intervals: 0–4, 5–9, 10–14, and 15–19.

Determine the class width of these intervals.

(Hint: Be careful not to just subtract the limits; count the number of values included in the interval).

3. The following is a list of distances (in km) cycled by a group of students over a weekend:

5, 12, 8, 24, 15, 9, 28, 11, 6, 21

Construct a frequency table with the class intervals: 0–9, 10–19, and 20–29.

Differentiation Strategies

For Struggling Learners:

- Provide pre-drawn frequency table templates with intervals already filled in.
- Use smaller datasets (10-15 values) to build confidence.
- Provide colored highlighters to mark data points as they're tallied.
- Work in pairs with peer support.
- Use physical objects (cards with numbers) that can be physically sorted into groups.
- Provide step-by-step worksheets with guided practice.

For Advanced Students:

- Explore larger datasets (50+ values) with more intervals.
- Investigate how changing class width affects the table and patterns.
- Compare grouped vs ungrouped data - what information is lost?
- Create their own datasets and determine appropriate intervals.
- Research real-world applications: census data, market research, quality control.
- Calculate mean, median, mode from grouped data (introduces next lessons).

Extension Activity: Impact of Class Width

Scenario: Explore how different class widths affect data interpretation.

Dataset: Monthly electricity usage (in kWh) for 20 households:

125, 178, 145, 210, 189, 156, 234, 167, 198, 142, 223, 181, 159, 207, 173, 192, 164, 215, 188, 151

Tasks:

1. Construct a frequency table using class width 20 (intervals: 120–139, 140–159, 160–179, etc.)

2. Construct another frequency table using class width 50 (intervals: 100–149, 150–199, 200–249)

3. Compare the two tables. Which one gives more detailed information? Which is easier to read?

4. Discuss: What are the advantages and disadvantages of using narrow vs wide class intervals?

5. Extension: What happens if class width is too narrow (e.g., width 5)? Too wide (e.g., width 100)?

Expected Findings:

- Narrow intervals (width 20): More detail, but more intervals to manage
- Wide intervals (width 50): Simpler table, but less detail about distribution
- Trade-off: Detail vs simplicity - choose based on purpose
- Too narrow: Too many intervals, loses grouping benefit
- Too wide: Loses too much information, can't see patterns
- Real-world: Class width depends on data range and analysis goals