CBC Grade 10 Mathematics Lesson Plan

Interpretation of Data

Strand:	**Statistics and Probability**
Sub-Strand:	Interpretation of Data
Learning Outcome:	Collect data from real-life sources, Interpret data from histograms and frequency polygons, and Promote data collection, organisation and representation for informed decision making
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, Graph paper, Rulers, Calculators, Chart paper, Colored markers
Duration:	40 minutes

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

Anchor Activity: Household Water Consumption Analysis

Work in groups

The histogram below represents a household's daily water consumption (in liters) recorded over a month.

[Histogram showing water consumption with intervals: 20-25, 25-30, 30-35, 35-40, 40-45 liters]

Tasks:

1. Determine the day when the water consumption was high.
2. Determine the day when the water consumption was low.
3. Discuss and share with other groups.

Teacher's Role:

- Distribute the histogram to each group
- Ensure students understand what the axes represent
- Circulate and listen to group discussions
- Ask guiding questions: "What do you notice about the bars?", "Which bar is tallest?", "What does that tell us?"
- Encourage students to explain their reasoning
- Select 2-3 groups to share their findings with the class
- Use student responses to bridge to formal instruction

Phase 2: Structured Instruction (10 minutes)

Key Takeaway

Interpretation of data helps us understand collected information by finding patterns, trends, and connections so we can make better decisions.

Core Concepts to Teach:

1. Definition of Data Interpretation

Data interpretation is the process of examining and explaining the meaning of organized or represented data in order to draw conclusions, make decisions or solve problems.

Once data is collected and represented in tables, graphs or charts, we look for patterns, relationships and trends to understand what the data is telling us.

2. Reading Histograms

- X-axis: Shows the class intervals (ranges of values)
- Y-axis: Shows frequency (number of observations)
- Bar height: Represents how many observations fall in that interval
- Tallest bar: Indicates the modal class (most common interval)
- Total frequency: Sum of all bar heights

3. Key Interpretation Skills

- Counting: How many groups/intervals? How many total observations?
- Identifying extremes: Which interval has highest/lowest frequency?
- Calculating totals: Add all frequencies together
- Finding modal class: Identify the tallest bar
- Comparing: How do different intervals compare?
- Describing shape: Is distribution symmetrical or skewed?

4. Distribution Shapes

- Symmetrical: Data evenly distributed around center (bell-shaped)
- Skewed to the right (positively skewed): Tail extends to the right, most data on left
- Skewed to the left (negatively skewed): Tail extends to the left, most data on right

5. Histogram vs Bar Graph

- Histogram: Continuous data, bars touch, shows distribution (e.g., heights, test scores)
- Bar graph: Categorical data, bars have gaps, compares categories (e.g., favorite colors, subjects)

Phase 3: Practice and Application (15 minutes)

Worked Example: Community Event Ages

The histogram below represents the ages of attendees recorded by the organizers at a community event.

[Histogram showing age groups: 5-10, 10-15, 15-20, 20-25, 25-30 with frequencies 25, 50, 40, 35, 15]

Questions:

4. How many age groups are represented in the histogram?
5. What is the total number of attendees recorded in the histogram?
6. Which age group has the highest number of attendees?

Solution:

a) Counting age groups:

By counting the number of bars in the histogram, we can determine the number of age groups.

The bars are 5.

Therefore, there were five age groups that attended the event.

b) Total number of attendees:

The total number of attendees is the sum of all frequencies (heights of the bars).

50 + 25 + 40 + 35 + 15 = 165

Therefore, the number of attendees was 165.

c) Age group with highest attendance:

The age group corresponding to the tallest bar has the highest number of attendees.

Therefore, the age group 10-15 had the highest number of attendees, with a total of 50 participants.

Teaching Strategy:

- Work through part (a) together - count bars as a class
- For part (b), have students calculate individually, then verify together
- For part (c), ask "Which bar is tallest?" before identifying the interval
- Emphasize the connection: tallest bar = modal class = most common age group

- Ask: "What decisions could event organizers make based on this data?"

Phase 4: Assessment (5 minutes)

Exit Ticket: Student Heights

The following histogram shows the height of students in a grade 10 class.

[Histogram showing student heights in cm]

Use the information from the graph to answer the following questions:

7. Calculate the frequency of individuals with heights between 145 cm and 155 cm. Show your working.
8. Identify the modal class.
9. Estimate the total number of individuals represented in the histogram.
10. Explain one difference between a histogram and a bar graph.
11. Describe the overall shape of the height distribution shown in the histogram.

Assessment Criteria:

- Can students read and extract information from histograms?
- Do they understand how to calculate totals by adding frequencies?
- Can they identify the modal class correctly?
- Do they understand the difference between histograms and bar graphs?
- Can they describe distribution shapes using appropriate terminology?

Differentiation Strategies

For Struggling Learners:

- Provide histograms with clearly marked frequencies on each bar
- Use smaller datasets with fewer intervals (3-4 bars instead of 6-8)
- Give step-by-step guides for reading axes and counting bars
- Use highlighters to mark tallest/shortest bars
- Provide sentence starters: "The tallest bar is...", "The total is..."
- Work in pairs with stronger students for peer support
- Use physical objects (blocks stacked to represent bars) for tactile learning

For Advanced Learners:

- Analyze histograms with unequal class widths (frequency density)
- Compare two distributions using overlapping frequency polygons
- Calculate mean, median, and mode from grouped data in histograms
- Identify and explain skewness in distributions
- Create their own histograms from raw data
- Critique misleading graphs and suggest improvements
- Research real-world applications of data interpretation in careers

Extension Activity: Comparing Distributions Project

Students will collect data, create histograms, and interpret patterns to make informed decisions.

Task:

Collect data on two different groups (e.g., Grade 10A vs Grade 10B test scores, boys vs girls heights, morning vs afternoon temperatures) and compare their distributions.

Steps:

12. Choose two groups to compare (get teacher approval)
13. Collect data for both groups (at least 20 observations each)
14. Organize data into frequency distribution tables with same class intervals
15. Draw histograms for both groups on separate axes
16. Draw frequency polygons for both groups on the same axes (use different colors)
17. Answer interpretation questions:
18. - Which group has higher average?
19. - Which group has more variation?
20. - What is the modal class for each group?
21. - Describe the shape of each distribution
22. - What patterns or trends do you notice?
23. Write a short report (1 page) explaining your findings
24. Make a recommendation based on your data analysis

Learning Goals:

- Apply data collection and organization skills
- Create accurate histograms and frequency polygons
- Compare and contrast distributions
- Draw evidence-based conclusions
- Communicate findings clearly
- Make informed decisions based on data

Reflection and Homework

Class Reflection Questions:

- What did you learn today about interpreting data?
- How can you use these skills in real life?
- What was challenging about reading histograms?
- How does data interpretation help us make better decisions?

Homework Assignment:

Find a histogram or frequency polygon in a newspaper, magazine, or online. Bring it to class and be prepared to:

- Explain what the axes represent
- Identify the modal class
- Calculate the total frequency
- Describe the shape of the distribution
- Explain what decisions could be made based on this data