THIRD TERM
WEEKLY LESSON NOTES
WEEK 3

Week Ending:		DAY:		Subject: Mathematics	
Duration: 60MINS				Strand: Handling Data	
Class: B9		Class Size:		Sub Strand: Data	
Content Standard: B9.4.1.2 Select, justify, and use appropriate methods of collecting data (quantitative and qualitative), organise and analyse the data (grouped/ungrouped) to interpret the results using the descriptive statistics (measures of central tendency and range)		Indicator: B9.4.1.2.1 - Select a method for collecting data (quantitative and qualitative), taking into consideration how bias (use of language, ethics, cost, time and timing, privacy or cultural sensitivity) may influence data.			Lesson: 1 of 1
Performance Indicator: Learners can explore different methods for collecting quantitative and qualitative data and identify potential biases in various data collection methods.				Core Competencies: Communication and Collaboration (CC) Critical Thinking and Problem solving	
References: Mathematics Curriculum Pg.					
New words:					

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Conduct a quick survey in class about a preferred learning activity (e.g., group work, presentations, quizzes). Ask learners to raise hands or use response cards to indicate their choices. Discuss how this method collects data (quantitative) and highlight the importance of clear question wording to avoid bias.	
PHASE 2: **NEW LEARNING**	Introduce the concept of quantitative data (numerical) and qualitative data (descriptive, non-numerical). Explain that data collection methods can be chosen based on the type of data needed. Present different data collection methods: • Surveys (questionnaires): Structured questions gather quantitative data. • Interviews: In-depth conversations gather qualitative data.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

- Observations: Recording behavior or events gathers both quantitative and qualitative data (depending on the observation method).
- Focus groups: Group discussions gather qualitative data on opinions and experiences.

Guide learners to identify a bias data
Example: Suppose in a school survey form the following question was asked:

> **Overall, don't you think the teaching of mathematics is very good?**

The designer of the survey form has a bias for the methodology used in math lessons and the bias influences how the question was written. The language used in writing the question may lead people to just answer yes or no. A better question would be: Overall, how will you rate the teaching of mathematics?

○ **Very poor**   ○ **Poor**   ○ **Fair**   ○ **Good**   ○ **Very Good**

Example 2: Ama Mereku in B9 wants to write an article for their school magazine on sport-related injuries. The responses for the survey question stated below were collected from only the schools' football team.
The influencing factors in this survey question are: time and bias.

Football is a contact sport. The chances are that the answers from her targeted respondents will be high in favour of injuries and thus negatively affect the conclusion/report.

In order to report accurately on sport-related injuries Ama needs to ask more people (time needed) who participate in a variety of sports, including contact and non-contact sports (e.g. athletics tennis, volleyball, and so on)

Example 3: Learners in B9 are asked by their physical education teacher to complete a survey related to "Overall Physical Health". One question on the survey form is;

> **What is your current body weight?**

Identify the influencing factor in the survey and provide a solution.

Example 4: Suppose you tell your classmates that the response to the question in the Class Survey Question Form is to help you plan remedial classes.

> **What is your worst subject?**

If you then use the information collected to write an article for the school magazine how would your actions be described and how would that influence future surveys you conduct?

Example 5: Suppose in a survey questionnaire you wanted to know the favourite method of cooking pork and you asked:

Please tick the box against your favourite method of cooking pork

☐ Boiling   ☐ Grilling   ☐ Frying

Please tick the box against your favourite method of cooking pork **(Optional)**

☐ Boiling   ☐ Grilling   ☐ Frying

This question does not apply to everyone because some people do not eat pork (i.e. the question is not culturally sensitive.) A better question would be;

If you eat pork please name the favourite method you cook it.

☐ Boiling   ☐ Grilling   ☐ Frying

OR

If you eat pork please name the favourite method you cook it.

☐ Boiling   ☐ Grilling   ☐ Frying

Divide the class into small groups. Distribute scenarios for role-playing activities (prepared beforehand) that describe a data collection situation. These scenarios can involve choosing a method for a school project or identifying potential bias in a survey.

Example 1: Your group is assigned a project on healthy eating habits. What data collection method would be most suitable (survey, interview, observation)?
How would you design the method to gather reliable information?

Example 2: A survey asks learners to rate the difficulty of different math topics. The answer choices are "very easy," "easy," "difficult," and "very difficult."

| | Might this wording introduce bias? How could the question be improved?

Have each group discuss the scenario, propose a data collection method, and identify potential biases. Encourage them to consider factors like language used, fairness, and respect for privacy.

Explain that bias can influence data collection in various ways. This can include:
● Leading questions in surveys that sway responses.
● Unrepresentative samples that don't reflect the whole population.
● Observer bias where the observer's expectations influence what they record.

Ask learners to brainstorm situations where bias might occur in different data collection methods (e.g., asking leading questions in an interview, focusing on negative aspects during observation). Use sticky notes to collect their ideas on the board.

Discuss strategies to minimize bias:
● Wording questions in a neutral and unbiased way.
● Selecting a representative sample for surveys or interviews.
● Having clear guidelines for observation to minimize subjective interpretation.

Show learners examples of biased data collection in real-world contexts (e.g., leading questions in a news poll, focusing only on positive aspects in a product review).

Discuss how identifying bias helps us evaluate the credibility of data sources. | |
| PHASE 3:
REFLECTION | Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson.

Take feedback from learners and summarize the lesson. | |

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Content Standard: B9.4.1.2 Select, justify, and use appropriate methods of collecting data (quantitative and qualitative), organise and analyse the data (grouped/ungrouped) to interpret the results using the descriptive statistics (measures of central tendency and range)	Indicator: B9.4.1.2.2 Organise and analyse data and interpret the results using the descriptive statistics (i.e. minimum, maximum, measures of central tendency and range) to answer a given question	Lesson: 1 of 1

Performance Indicator: Learners can able to calculate descriptive statistics (minimum, maximum, range, mean, median, mode) and able to calculate descriptive statistics (minimum, maximum, range, mean, median, mode)	Core Competencies: Communication and Collaboration (CC) Critical Thinking and Problem solving

References: Mathematics Curriculum Pg.

New words:

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Present a data set with descriptive statistics already calculated (e.g., minimum, maximum, mean test scores for a class). Without revealing the data itself, ask learners what they can learn about the test scores based on the statistics provided. Introduce descriptive statistics as tools to summarize and understand data.	
PHASE 2: **NEW LEARNING**	Show learners an unorganized data set (e.g., a list of random numbers representing test scores). Ask them why organizing the data is important before analyzing it. Discuss the benefits of using frequency tables or ordering data from least to greatest. Introduce the concepts of minimum (smallest value) and maximum (largest value) in a data set. Show learners how to identify these values in an ordered data set or frequency table. Define the range as the difference between the maximum and minimum values.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

Explain how it shows the spread of data points. Guide learners through calculating the range for a data set.

Introduce the mean (average) as a measure of central tendency, representing the sum of all values divided by the number of values.

Show learners how to calculate the mean for a data set using a formula or a calculator

Define the median as the middle value when the data is ordered from least to greatest.

In case of an even number of data points, the median is the average of the two middle values.

Demonstrate how to find the median in a data set.

Introduce the mode as the most frequent value in a data set. Learners can identify the mode by examining a frequency table or the distribution of data points.

Write this on the board: Ages of learners in a drama club (years):
13, 14, 15, 15, 16, 16, 17, 17

Challenge learners to calculate all the descriptive statistics (minimum, maximum, range, mean, median, mode) for this data set.

Guide them through the process and answer any questions they may have.

Assessment
1: Thirty bulbs were life-tested and their lifespan to the nearest hour are as follows:

167 171 179 167 171 165 175 179 169 171

177 169 171 177 173 165 175 167 174 177

172 164 175 179 179 174 174 168 171 168

Present the raw data in a frequency table by completing the table below:

Lifespan of Bulbs (hours)	Tally	Frequency
164 - 167		
168 – 171		
172 - 175		
176 – 179		

Find (minimum, maximum, measures of central tendency and range)

i. The minimum lifespan, to the nearest hour, of the bulbs tested.

ii. The maximum lifespan, to the nearest hour, of the bulbs tested.

iii. The range of the data collected from the life-testing.

iv. What is the mean lifespan of the bulbs?

v. What is the median of the lifespan of the bulbs?

vi. What is the mode of the lifespan of the bulbs?

vii. When placing an order for the bulbs tested to sell in your shop, which of them will you consider buying?

PHASE 3: **REFLECTION**	Use peer discussion and effective questioning to find out from learners what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	