MATHEMATICS – BASIC 9

THIRD TERM SCHEME OF LEARNING

WEEKS	STRAND	SUB STRAND	INDICATORS	RESOURCES
1	Handling Data	**Data** ● B9.4.1.1Select, justify, and use appropriate methods of collecting data (grouped/ungrouped), use the data to construct and interpret frequency tables and histogram and use it to determine the mode and to solve and/or pose problems.	B9.4.1.1.1 Select and justify a method to collect data (quantitative and qualitative) to answer a given question.	Rule, pencils
2	Handling Data		B9.4.1.1.2-3 Organize data (grouped/ungrouped) present it in frequency tables, line graphs, pie graphs, bar graphs and/or pictographs and analyze it to solve and/or pose problems. Use a histogram to determine the mode of a given data to solve and/or pose real life cases.	Rule, pencils
3	Handling Data	**Data** ● 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).	B9.4.1.2.1-2 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. Organize and analyze data and interpret the results using the descriptive statistics (i.e. minimum, maximum, measures of central tendency and range) to answer a given question.	Rule, pencils
4	Geometry & Measurement	**Measurement**	B9.4.1.2.3	Protractor, rule

		• B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	Demonstrate the effect on the mean, median, and mode when extreme data is included in a data set B9.3.2.1.1 Identify cuboids and triangular prisms; draw their nets to construct the 3-D shapes and use it to determine the surface area.	
5	Geometry & Measurement	**Measurement** • B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	B9.3.2.1.2-3 Use the net of a cuboid to determine its surface area. Use the net of a triangular prism to determine its surface area.	Protractor, rule
6	Geometry & Measurement		B9.3.2.1.4 Express points in the Cartesian plane as position vectors	Protractor, rule
7	Geometry & Measurement	**Measurement** • B9.3.2.2 Solve problems involving bearings and addition/subtraction of vectors	B9.3.2.2.1-2 Show an understanding of parallel vectors and perpendicular vectors. Apply the triangular and parallelogram laws of addition to resolve vectors.	Protractor, rule
8	Geometry & Measurement	**Position and Transformation** • B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	B9.3.3.1.1 Know examples of situations in everyday life that depict enlargement situations in everyday life.	Protractor, rule
9	Geometry & Measurement		B9.3.3.1.2 Understand enlargement and identify real-life situations involving enlargement.	Protractor, rule

10	Geometry & Measurement	**Position and Transformation** ● B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	B9.3.3.1.3 Investigate the concept of congruent and similar shapes	Protractor, rule
11	Handling Data	**Chance or Probability** ● B9.4.2.1 Identify the sample space for a probability experiment involving two dependent events and express the probabilities of given events as fractions, decimals, percentages and/or ratios to solve problems.	B9.4.2.1.1 -2 Perform a probability experiment involving two dependent events e.g. drawing colored bottle tops from a bag without replacement Express the probabilities of the events as fractions, decimals, percentages and/or ratios; e.g. using a tree diagram, table or another graphic organizer	Coins, dice, etc.
12	REVISION			
13	EXAMINATION AND VACATION			

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THIRD TERM
WEEKLY LESSON NOTES
WEEK 1

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Handling Data	
Class: B9	**Class Size:**	**Sub Strand:** Data	
Content Standard: B9.4.1.1Select, justify, and use appropriate methods of collecting data (grouped/ungrouped), use the data to construct and interpret frequency tables and histogram and use it to determine the mode and to solve and/or pose problems.		**Indicator:** B9.4.1.1.1 Select and justify a method to collect data (quantitative and qualitative) to answer a given question.	**Lesson:** 1 of 1
Performance Indicator: Learners can identify the type of data needed to answer a question (quantitative vs. qualitative).		**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**	Write "data" on the board and ask learners what it means. Encourage them to share examples of data they encounter in daily life (e.g., weather reports, sports scores, opinion polls). Briefly introduce the two study areas (Musa's book club and travel mode in schools). Ask learners: How can we find out the information needed for these studies?	
PHASE 2: **NEW LEARNING**	Present a real-life scenario where data is needed to make a decision (e.g., choosing a movie to watch with friends). Ask learners: What kind of information would be helpful to make a decision? (e.g., Reviews, genre preferences)	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Introduce the concept of data (quantitative - numerical, qualitative - descriptive) and its role in decision making. Divide learners into small groups. Assign each group one of the following case studies: Case Study A: Musa's Book Club (Quantitative and Qualitative Data) Question: What are the most popular books among Ayisha's friends? Case Study B: Travel Modes in Oyoko Schools (Quantitative Data) Question: What is the most common mode of travel used by learners in Oyoko Junior and Senior High Schools? Each group will discuss and answer the following questions for their assigned case study: ● What type of data is needed to answer the question (quantitative or qualitative)? Why? ● Where/whom should we collect data from (target audience)? ● What data collection methods would be most appropriate? Consider factors like efficiency, accuracy, and practicality. (e.g., Survey, Interview, Observation) Each group will present their case study and choices for data collection methods. Facilitate a discussion on the reasoning behind their choices. Encourage justifications based on data type, target audience, and practicality. Introduce additional data collection methods like questionnaires and online polls.	
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Handling Data
Class: B9	**Class Size:**	**Sub Strand:** Data

Content Standard: B9.4.1.1Select, justify, and use appropriate methods of collecting data (grouped/ungrouped), use the data to construct and interpret frequency tables and histogram and use it to determine the mode and to solve and/or pose problems.	**Indicator:** B9.4.1.1.2 Organize data (grouped/ungrouped) present it in frequency tables, line graphs, pie graphs, bar graphs and/or pictographs and analyze it to solve and/or pose problems	**Lesson:** 1 of 1

Performance Indicator: Learners can construct frequency tables for grouped and ungrouped data.	**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**	Begin with a simple question like "What is your favorite color?" and collect responses from learners. Show how to organize the responses into a frequency table, counting the number of times each color is chosen.	
PHASE 2: **NEW LEARNING**	Present two data sets, one grouped (e.g., test scores grouped into ranges like 70-79, 80-89) and the other ungrouped (e.g., individual test scores). Ask learners to identify which data set shows individual values and which one groups the values together. Explain the terms "grouped data" and "ungrouped data." Provide learners with counters or small objects and ask them to create their own ungrouped data set (e.g., sorting the objects by color). Have them group the objects based on a certain criteria (e.g., size) and create a grouped data set. Discuss the difference in representation.	Data sets (e.g., heights of learners, temperatures over a week, sales data) Graph paper

Introduce the concept of a frequency table. Explain that it helps us organize and count data sets.

Show learners an example of a frequency table with labeled columns (value/category, frequency).

Provide a data set (e.g., ages of learners in the class) and guide learners in creating a frequency table.

Explain how to determine the frequency of each data point and organize it in a table format.

Solve an example together to ensure understanding.
Example 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		

What is the modal group? Justify your decision for that choice.

Write this on the board. Test Scores: 85, 78, 92, 88, 75, 82, 95, 80

Travel Time to School (minutes): 0-15 (5 learners), 16-30 (10 learners), 31-45 (3 learners)

Instruct learners to create frequency tables for their assigned data sets. Guide them through labeling the columns and tallying the occurrences of each value/category.

Have learners share their completed frequency tables with a partner. Encourage them to discuss what the data reveals (e.g., most common test score range, most popular travel time to school).

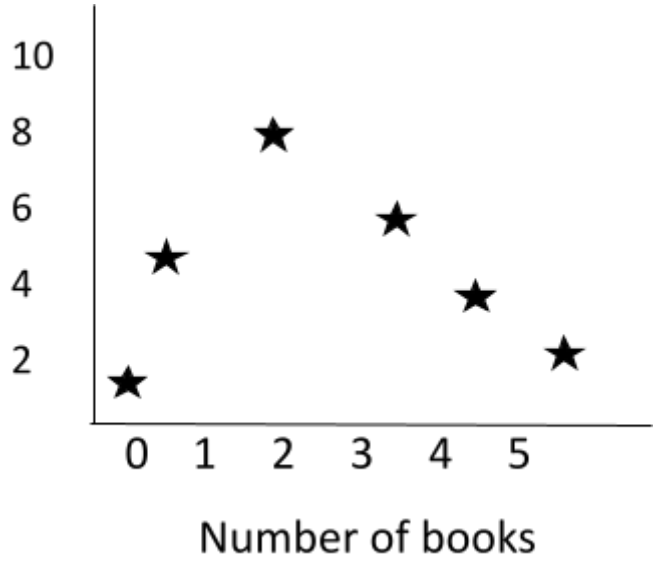
Introduce line graphs and their use in representing data trends over time or categories.

Demonstrate how to label the axes (x-axis for categories, y-axis for frequencies) and plot the data points.

Discuss the importance of a title and labeling units on the axes.

Use the frequency table below to create a line graph.

Number of Books	**Frequency**
0	2
1	5
2	8
3	6
4	4
5	3



Guide learners to analyze the graph.

- The line graph shows that most learners read between 1 and 3 books per month, with fewer learners reading 0 or 4 books.

	• This data can be used to discuss reading habits and preferences among learners. Have learners work in pairs or small groups to create their own frequency tables and line graphs using different data sets provided. Encourage them to choose data relevant to their interests or experiences (e.g., favorite sports, daily temperatures). Circulate to provide assistance and check understanding.	
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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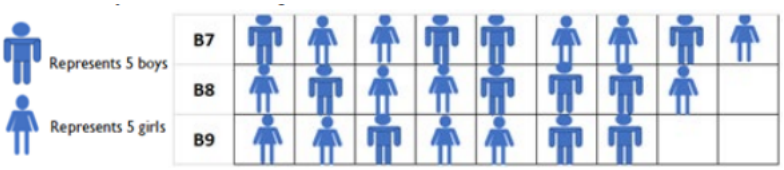
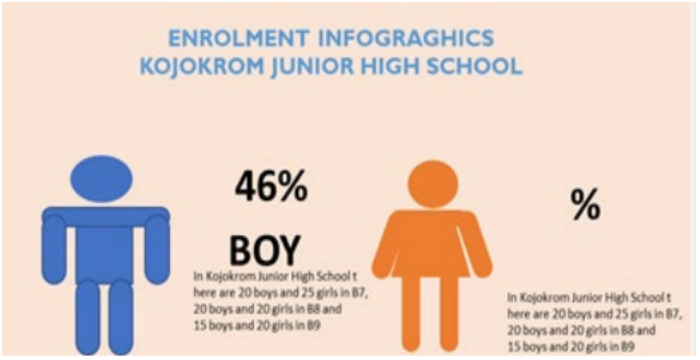
THIRD TERM
WEEKLY LESSON NOTES
WEEK 2

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Handling Data	
Class: B9	**Class Size:**	**Sub Strand:** Data	
Content Standard: B9.4.1.1Select, justify, and use appropriate methods of collecting data (grouped/ungrouped), use the data to construct and interpret frequency tables and histogram and use it to determine the mode and to solve and/or pose problems.	**Indicator:** B9.4.1.1.2 Organize data (grouped/ungrouped) present it in frequency tables, line graphs, pie graphs, bar graphs and/or pictographs and analyze it to solve and/or pose problems	**Lesson:** 1 of 1	
Performance Indicator: Learners can construct stem and leaf plots, pie charts, bar graphs, and pictographs for data sets and analyze data represented in different formats and solve/pose problems based on the information.		**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**	Show learners pie charts and bar graphs representing data on topics relevant to them (e.g., favorite movie genres, preferred music styles). Ask them to identify what information these graphs convey and how they differ from frequency tables. Introduce the concept of data visualization through various graphical methods.	
PHASE 2: **NEW LEARNING**	Introduce stem and leaf plots as an alternative way to organize data, especially for ungrouped numerical data. Explain how stems represent the leftmost digits and leaves represent the rightmost digits of the data points. Show an example of a stem and leaf plot with labeled stems and leaves. Distribute a sample ungrouped data set (prepared beforehand, see example below). Test Scores: 85, 78, 92, 88, 75, 82, 95, 80 Guide learners through creating a stem and leaf plot for the data set. Explain how to arrange the data points by their stems and leaves, providing a clear visual representation of the distribution of scores.	Markers or pens Sample data sets

	Introduce pie charts as a way to represent categorical data where slices of the pie represent the proportion of each category. Show an example of a pie chart with labeled slices and corresponding data percentages. Introduce bar graphs as a way to visually compare different categories or values. Explain how bars represent the frequency or quantity for each category/value. Show an example of a bar graph with labeled categories/values on the x-axis and frequency/quantity on the y-axis. Introduce pictographs as a way to represent data using pictures. Explain that each picture symbol represents a certain quantity of data points. Show an example of a pictograph with a legend explaining the symbol and its corresponding value. Provide learners with a new data set; Favorite Movie Genres: Action (8 learners), Comedy (10 learners), Drama (5 learners), Animation (2 learners) Have learners represent the data set in; ● Create a stem and leaf plot (if ungrouped data). ● Construct a pie chart showing the proportion of learners who prefer each genre. ● Design a bar graph where each bar represents the number of learners in each genre. Once learners have created their various data representations, have them analyze the information presented in each format. Ask questions that encourage them to compare and contrast the different visualizations (e.g., which genre is most popular according to the pie chart and bar graph?). <u>Assessment</u> 1. Complete the stem and leaf plots below to display the raw data. Use the plot to solve the following problems. a. Find the range of the lifespan of bulbs b. What is the mode lifespan? c. What is the median lifespan?	

	d. What other problems can you pose? **Stem** **Leaf** 16 | 4 5 17 | 1 1 2. The pictograph below describes the number of boys and girls in each class in Kojokrom Junior High School.   What is the percentage of boys and of girls in the school? ii. Use your answers in (i) to represent the data by copying and completing the following infographic.	
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Handling Data
Class: B9	**Class Size:**	**Sub Strand:** Data

Content Standard: B9.4.1.1Select, justify, and use appropriate methods of collecting data (grouped/ungrouped), use the data to construct and interpret frequency tables and histogram and use it to determine the mode and to solve and/or pose problems.	**Indicator:** B9.4.1.1.3 Use a histogram to determine the mode of a given data to solve and/or pose real life cases	**Lesson:** 1 of 1

Performance Indicator: Learners can construct histograms for data sets and identify the mode (most frequent value) of a data set using a histogram.	**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**	Distribute data sets (prepared beforehand) showing the number of pencils learners have in their pencil cases (e.g., 5 learners with 3 pencils, 8 learners with 4 pencils). Have learners create a frequency table showing how many learners have each number of pencils. Ask them what the most common number of pencils learners have. Introduce the concept of histograms as a visual tool to identify this information.	
PHASE 2: **NEW LEARNING**	Introduce histograms as a graphical representation of data distribution. Explain that data is divided into intervals (bins) along the x-axis, and the y-axis represents the frequency of data points within each interval. Demonstrate how to create a histogram using a frequency table: ● Determine the range of the data (highest value - lowest value). ● Choose an appropriate number of intervals (bins) to represent the data effectively (usually 5-10 intervals). ● Calculate the width of each interval by dividing the data range by the number of intervals.	Markers or pens Sample data sets

	• Label the x-axis with the interval values and the y-axis with frequency. • Draw rectangles for each interval, with the height of each rectangle representing the frequency of data points within that interval. (Use different colors for the rectangles) Distribute a new data set; Plant heights (cm): 25, 32, 40, 35, 28, 38, 45, 30 Guide learners through creating a histogram for the data set. They can estimate the width of each interval based on the data range and the desired number of intervals (e.g., 5 intervals). Explain that the mode of a data set is the most frequent value. Ask learners to analyze their histograms and identify the interval with the highest rectangle. The value in the center of that interval represents the mode of the data set. Pose questions for learners to analyze their data and histograms (e.g., what is the range of plant heights, what is the most common plant height range?). Encourage them to discuss the distribution of data points based on the histogram's shape. Show learners examples of real-life applications of histograms (e.g., distribution of test scores in a class, age ranges of movie viewers). Discuss how histograms help us visualize trends and patterns in data sets. Challenge learners to create their own word problems based on the data they analyzed (e.g., If 2 more plants fall within the 33-37 cm height range, how many plants would be in that category?). Assessment E.g. 1- The waiting times, x minutes, for 60 patients at a certain clinic are as follows	

	25 12 53 8 26 5 19 73 67 18 87 42 6 21 14 19 12 15 13 36 36 16 72 36 13 37 11 51 39 32 30 47 6 22 68 25 98 23 45 22 7 9 26 35 27 48 58 56 29 20 32 62 80 41 58 17 54 15 14 74 i. Construct a frequency table using class intervals 0 – 10.5; 10.5 – 20.5; 20.5– 30.5, and so on. ii. Construct a frequency table using class intervals 0<x<10; 10<x<20; 20<x<30, and so iii. Draw a histogram and find the modal class	
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.	

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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Handling Data
Class: B9	**Class Size:**	**Sub Strand:** Data

Content Standard:	**Indicator:**	**Lesson:**
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)	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	1 of 1

Performance Indicator:	**Core Competencies:**
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)	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. <u>Assessment</u> 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:	

<table>
<tr>
<td></td>
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<table>
<tr><th>Lifespan of Bulbs (hours)</th><th>Tally</th><th>Frequency</th></tr>
<tr><td>164 - 167</td><td></td><td></td></tr>
<tr><td>168 – 171</td><td></td><td></td></tr>
<tr><td>172 - 175</td><td></td><td></td></tr>
<tr><td>176 – 179</td><td></td><td></td></tr>
</table>

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?
</td>
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</tr>
<tr>
<td>PHASE 3:
REFLECTION</td>
<td>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.</td>
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THIRD TERM
WEEKLY LESSON NOTES
WEEK 4

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:** B9.4.1.2.3 Demonstrate the effect on the mean, median, and mode when extreme data is included in a data set	**Lesson:** 1 of 1
Performance Indicator: Learners can demonstrate the effect on the mean, median, and mode when extreme data is included in a data set		**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 number line with several data points marked and one point significantly far away from the others. Ask learners if this point seems unusual compared to the rest of the data. Introduce the concept of outliers as extreme values that fall outside the overall pattern of a data set.	
PHASE 2: **NEW LEARNING**	Distribute a data set with a clear outlier: Test Scores: 78, 85, 92, 80, 100 (outlier), 88, 75 Ask learners to analyze the data and identify the outlier based on its significant difference from the other values. They can use a number line or dot plot to visualize the data distribution. Explain that the mean (average) is sensitive to outliers. Calculate the mean for the data set with and without the outlier Revisit the concept of the median as the middle value when data is ordered from least to greatest. Calculate the median for the data set with and without the outlier. Demonstrate how the median is less affected by the outlier compared to the mean. Remind learners that the mode is the most frequent value. Identify the mode for the data set with and without the outlier.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	In most cases, the outlier will not be the mode as it is an extreme value. Discuss how the mode is generally not affected by outliers. • Mean is sensitive to outliers and can be misleading if outliers are • present. • Median is a more robust measure of central tendency and is less affected by outliers. • Mode is typically not affected by outliers but might not be informative for all data sets. 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: i. Find the mean of the data, if one of the bulbs is replaced with a new bulb with lifespan of 300 hours, find the new mean of the bulbs and compare it to the original mean ii. In small groups, find the mean of the data, if the lifespan of one of the bulbs tested was 70 hours, and compare it to the original mean. iii. Continue to replace the values of the lifespan in the data with extreme values (small and large), calculate the mean, median, and mode and discuss the findings.	

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

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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Measurement

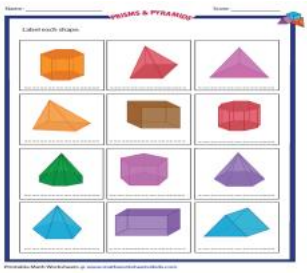
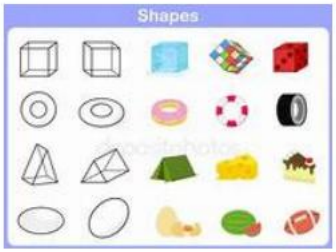
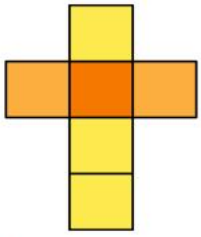
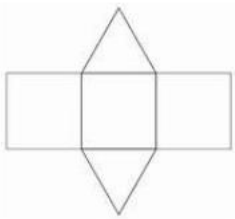
Content Standard: B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	**Indicator:** B9.3.2.1.1 Identify cuboids and triangular prisms; draw their nets to construct the 3-D shapes and use it to determine the surface area	**Lesson:** 1 of 1

Performance Indicator: Learners can identify cuboids and triangular prisms; draw their nets to construct the 3-D shapes and use it to determine the surface area	**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**	Show learners various 3D shapes (models or pictures) including cuboids and triangular prisms. Ask them to identify any common features they observe in these shapes (e.g., flat faces, edges, vertices). Introduce the vocabulary of cuboids and triangular prisms.	
PHASE 2: **NEW LEARNING**	Define a cuboid as a 3D shape with six rectangular faces. Show learners a model or picture of a cuboid and highlight its key features (all faces are rectangles; opposite faces are congruent). Introduce the concept of a net as a flat pattern that can be folded to form a 3D shape. Show a net of a cuboid with labeled faces. Explain how the net reflects the arrangement and size of the faces in the 3D shape. Distribute worksheets with a blank net of a cuboid. Challenge learners to draw the missing flaps on the net, ensuring all faces are rectangles and connect appropriately. Define a triangular prism as a 3D shape with two congruent triangular bases and rectangular lateral faces. Show learners a model or picture of a triangular prism and highlight its key features (triangular bases, rectangular sides). Show a net of a triangular prism with labeled faces. Explain how this net unfolds the triangular bases and the rectangular sides of the prism. Distribute worksheets with a blank net of a triangular prism. Guide learners through drawing the triangular bases and connecting them with rectangular flaps to form the lateral faces. Encourage them to use their understanding of the 3D shape to create an accurate net. Introduce the concept of surface area as the total area of all the faces of	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	a 3D shape. Explain how a net can be used to calculate the surface area by finding the areas of each individual face and adding them together. Demonstrate how to calculate the surface area of a cuboid using its net. Measure or estimate the lengths and widths of each rectangle on the net. Calculate the area of each rectangle (length x width) and add all the areas to find the total surface area. Challenge learners to calculate the surface area of a triangular prism using its net. Guide them through measuring or estimating the sides of the triangular bases and the rectangles. Learners calculate the area of each triangle using the appropriate formula (1/2 * base * height) and add the areas of all faces to find the surface area. Provide learners with materials (scissors, colored pencils/markers) to cut out the nets they created and fold them to construct cuboids and triangular prisms. <u>Assessment</u> 1. Sort out shapes that are triangular prisms and cuboids   2. Identify each of the nets below:  A net of……  A net of…… 3. Measure and find the area of each of the sections in the net and adding all together to give the surface area.	
PHASE 3:	Use peer discussion and effective questioning to find out from learners	

REFLECTION	what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

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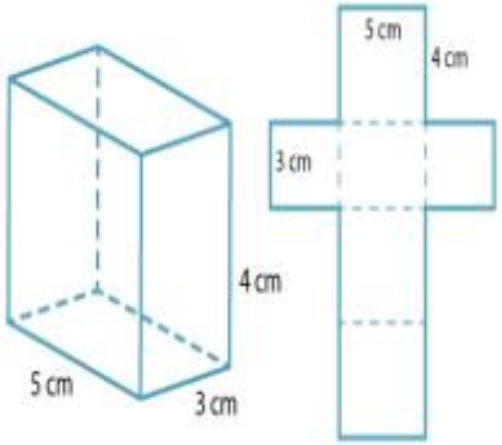
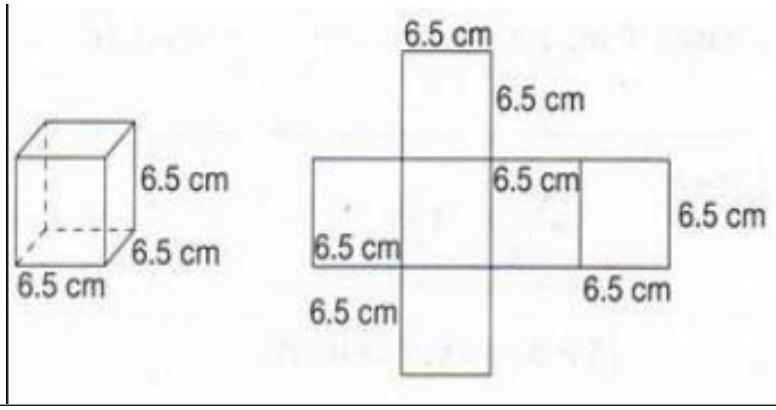
THIRD TERM
WEEKLY LESSON NOTES
WEEK 5

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Measurement

Content Standard: B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	**Indicator:** B9.3.2.1.2 Use the net of a cuboid to determine its surface area.	**Lesson:** 1 of 1

Performance Indicator: Learners can identify the faces of a cuboid in its net and calculate the surface area of a cuboid using its net.	**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**	Show a model of a cuboid and ask learners to identify its faces (top, bottom, sides). Discuss the properties of a cuboid (6 faces, all rectangles, opposite faces congruent).	
PHASE 2: **NEW LEARNING**	Introduce the concept of a net as a 2D representation of a 3D shape that can be folded to form the complete shape. Explain how a net shows all the faces laid out flat, but keeps track of how they connect. Show a net of a cuboid with labeled faces. Point out how the net reflects the arrangement of the faces in the cuboid (top, bottom, sides). Discuss how some opposite faces might appear next to each other on the net. Distribute a worksheet with a blank net of a cuboid. Challenge learners to identify which faces of the cuboid each flap of the net represents (top, bottom, sides). Introduce the concept of surface area as the total area of all the faces of a 3D shape. Explain how a net can be helpful in calculating the surface area because it shows all the individual faces. Present the formula for calculating the surface area of a cuboid: Surface Area = 2 (lw + lh + wh) where l, w, and h represent the length, width, and height of the cuboid (dimensions can be all the same for a cube).	Model of a cuboid

	Explain how this formula considers the areas of each rectangular face twice (since opposite faces are congruent). Distribute rulers to learners. Guide them through measuring or estimating the lengths and widths of each rectangle on the net. Label these dimensions on the net itself. Instruct learners to calculate the area of each rectangle on the net using the formula area = length x width. Prompt them to write the calculated area next to each rectangle. Ask learners to add all the individual areas of the rectangles on the net. This sum represents the total surface area of the cuboid. Show learners examples of how nets are used in real life (e.g., packaging boxes, designing furniture). Discuss the importance of calculating surface area for tasks like estimating material needed to create a box. <u>Assessment</u> 1. Find the surface area of each of the cuboids   	
PHASE 3:	Use peer discussion and effective questioning to find out from learners	

REFLECTION	what they have learnt during the lesson. Take feedback from learners and summarize the lesson.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Measurement

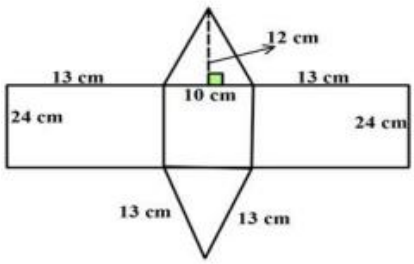
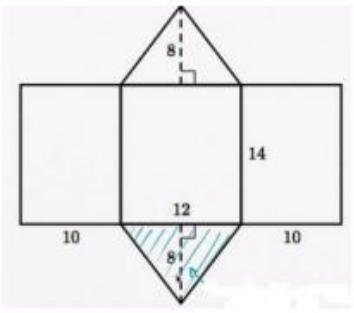
Content Standard: B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	**Indicator:** B9.3.2.1.3 Use the net of a triangular prism to determine its surface area	**Lesson:** 1 of 1

Performance Indicator: Learners can identify the faces of a triangular prism in its net and calculate the surface area of a triangular prism using its net.	**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**	Show a model of a triangular prism and ask learners to identify its faces (bases, lateral faces). Discuss the properties of a triangular prism (two triangular bases, rectangular lateral faces).	
PHASE 2: **NEW LEARNING**	Introduce the concept of a net as a 2D representation of a 3D shape that can be folded to form the complete shape. Explain how a net shows all the faces laid out flat, but keeps track of how they connect. Show a net of a triangular prism with labeled faces. Point out how the net reflects the arrangement of the faces (triangular bases, rectangular sides). Discuss how some faces might appear next to each other on the net. Distribute a worksheet with a blank net of a triangular prism. Challenge learners to identify which faces of the triangular prism each flap of the net represents (bases, sides). Introduce the concept of surface area as the total area of all the faces of a 3D shape. Explain how a net can be helpful in calculating the surface area because it shows all the individual faces. Present the formula for calculating the surface area of a triangular prism: Surface Area = 2 * Area of Base + Perimeter of Base x Height where "Area of Base" represents the area of one triangular base, "Perimeter of Base" is the total length of all sides of the triangular base, and "Height" is the vertical height of the prism.	Model of a triangular prism

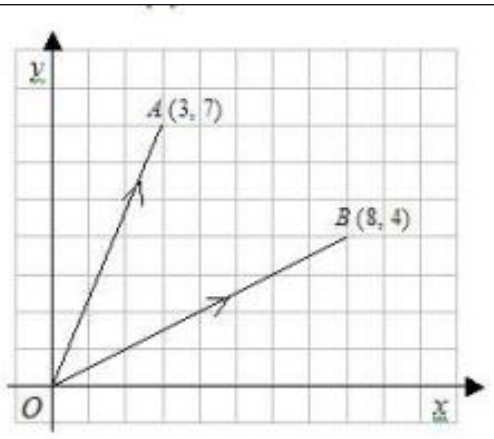
	Distribute rulers to learners. Guide them through measuring or estimating the lengths of the sides of the triangular bases and the rectangles on the net. Label these dimensions on the net itself. Instruct learners to calculate the area of each triangular base using the formula Area = 1/2 * base * height (where base is the length of one side of the triangle and height is the corresponding perpendicular height from that base to the opposite vertex). Prompt them to write the calculated area next to each triangle. Ask learners to find the perimeter of each triangular base by adding the lengths of all its sides. Record the perimeter next to each base on the net. Instruct learners to follow the formula: • Multiply the area of one base by 2 (since there are two triangular bases). • Add the product to the perimeter of one base multiplied by the height of the prism. • This sum represents the total surface area of the triangular prism. Show learners examples of how nets are used in real life (e.g., roof structures, packaging for certain products). Discuss the importance of calculating surface area for tasks like estimating material needed to build a model. <u>Assessment</u> 1. Find the surface area of each of the triangular prims.   	
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.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 6

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Geometry & Measurement	
Class: B9	**Class Size:**	**Sub Strand:** Measurement	
Content Standard: B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	**Indicator:** B9.3.2.1.4 Express points in the Cartesian plane as position vectors	**Lesson:** 1 of 1	
Performance Indicator: Learners can represent points on the Cartesian plane using ordered pairs and translate between points and position vectors.		**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**	Draw a simple coordinate plane on the board. Mark a few hidden "treasures" (points) at specific coordinates (e.g., A $\binom{2}{3}$, B $\binom{1}{1}$). Challenge learners to use their knowledge of the x and y axes to locate the hidden treasures on the grid. Discuss the importance of using ordered pairs $\binom{x}{y}$ to represent points.	
PHASE 2: **NEW LEARNING**	Review the concept of the Cartesian plane with its horizontal x-axis and vertical y-axis. Remind learners how points are represented using ordered pairs $\binom{x}{y}$ where x indicates the horizontal position and y indicates the vertical position. Distribute graph paper or use the whiteboard with a drawn coordinate plane. Ask learners to plot a few points based on their coordinates (e.g., C$\binom{4}{0}$, D$\binom{0}{5}$). Encourage them to label the axes and the plotted points. Introduce the concept of a position vector as an arrow that represents the location of a point in the Cartesian plane. Explain how the arrow starts at the origin $\binom{0}{0}$ and its tail points to the specific point. Show an example of a position vector. Highlight that the length of the	Graph paper (optional) Rulers

	arrow represents the distance from the origin to the point, and the direction of the arrow follows the movement from the origin to the point (right for positive x values, up for positive y values). Demonstrate how to convert a point's coordinates into a position vector. For a point P$\binom{a}{b}$, the position vector would be denoted by an arrow pointing from the origin $\binom{0}{0}$ to P $\binom{a}{b}$. The vector can be written in two ways: • Over right arrow {OP} (where O is the origin and P is the point) • (a, b) (treating the x and y coordinates as the vector's horizontal and vertical components) Provide learners with a set of points (e.g., Q $\binom{3}{-2}$, R $\binom{-1}{4}$). Guide them through converting each point's coordinates into a position vector using the two notations mentioned above. Challenge learners with the reverse task. Show them position vectors and ask them to determine the coordinates of the points they represent. For example, an arrow pointing 5 units to the right (positive x-axis) and 3 units up (positive y-axis) would represent the point $\binom{5}{3}$. <u>Assessment</u> 1. Identity the following using the diagram below: (i) the origin (ii) the position vector If $a = \begin{pmatrix} 3 \\ 7 \end{pmatrix}$, then the coordinates of A will be (3, 7). Similarly, if $b = \begin{pmatrix} 8 \\ 4 \end{pmatrix}$, then coordinates of B will be (8, 4) 1. Draw and write the position vectors of the following with 0 as the origin: (i) M(2,3) (ii) N(-1,2)	

		
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Measurement

Content Standard: B.9.3.2.1 Derive the formulas for determining the surface area of prisms (i.e. cuboid and triangular prism) and use to solve problems.	**Indicator:** B9.3.2.1.4 Express points in the Cartesian plane as position vectors	**Lesson:** 1 of 1

Performance Indicator: Learners can perform calculations involving position vectors (sum and difference) and explore applications of position vectors in solving geometric problems.	**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**	Play a quick matching game. Write statements about points, coordinates, and position vectors on separate cards. Ask learners to match the cards that correctly describe each other (e.g., "$\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ " - "Point Q", overrightarrow {OP} - "Position vector starting at the origin and ending at point P").	
PHASE 2: **NEW LEARNING**	Introduce the concept of vector addition. Explain how adding two vectors involves placing their tails together and drawing a new vector from the first vector's tail to the second vector's head. Visually demonstrate vector addition on the board. Present the formula for adding two position vectors with components (a1, b1) and (a2, b2): (a1 + a2, b1 + b2). Explain how this formula adds the horizontal and vertical components separately. Provide practice problems for learners to add position vectors. Start with simple cases where the vectors point in the same or opposite directions. Gradually introduce problems with vectors at angles. Learners can use graph paper and rulers to draw the vectors and perform the addition visually Introduce vector subtraction as the difference between two vectors. Explain how it can be visualized by placing the tail of the second vector on the head of the first vector, then drawing a new vector from the tail of the first vector to the head of the second vector (essentially reversing the direction of the second vector before adding). Present the formula for subtracting two position vectors with components (a1, b1) and (a2, b2): (a1 - a2, b1 - b2).	Graph paper (optional) Rulers

	Explain how this formula subtracts the corresponding components of the vectors. Provide practice problems for learners to subtract position vectors. Follow a similar approach as with addition, starting with simpler cases and gradually increasing complexity. Show learners how position vectors can be used to represent movement on the Cartesian plane. For example, the difference of two position vectors representing starting and ending points of an object's movement can represent the overall displacement vector. Introduce a geometric problem that can be solved using position vectors. For example, learners can find the midpoint of a line segment by calculating the average of the position vectors of its endpoints. Encourage learners to use tools like compasses and straightedges to verify their solutions geometrically.	
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.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 7

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Geometry & Measurement	
Class: B9	**Class Size:**	**Sub Strand:** Measurement	
Content Standard: B9.3.2.2 Solve problems involving bearings and addition/subtraction of vectors	**Indicator:** B9.3.2.2.1 Show an understanding of parallel vectors and perpendicular vectors		**Lesson:** 1 of 1
Performance Indicator: Learners can determine if two vectors are parallel or perpendicular and apply knowledge to solve problems involving vector relationships.		**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**	Introduce the concept of vectors and review basic vector operations (addition, subtraction, scalar multiplication). Define parallel vectors as vectors that have the same direction but may differ in magnitude. Define perpendicular vectors as vectors that form a right angle (90 degrees) with each other.	
PHASE 2: **NEW LEARNING**	Explain that two vectors are parallel if they are scalar multiples of each other. Demonstrate how to determine if two vectors are parallel by comparing their direction vectors (components). Solve an example together: Vector A = $\begin{pmatrix}2\\-3\end{pmatrix}$, Vector B = $\begin{pmatrix}4\\-6\end{pmatrix}$ Check if Vector B is a scalar multiple of Vector A. Explain that two vectors are perpendicular if their dot product is zero (i.e., $\vec{A}\cdot\vec{B}=0$). Demonstrate how to determine if two vectors are perpendicular using the dot product formula. Solve an example together: Vector A = $\begin{pmatrix}3\\4\end{pmatrix}$, Vector B = $\begin{pmatrix}-4\\3\end{pmatrix}$ Calculate the dot product and check if it equals zero. Have learners work individually or in pairs to solve the problems. Circulate to provide assistance and check understanding.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	<u>Assessment</u> 1. Investigate conditions for parallel vectors and perpendicular vectors. E.g.2 Use the result from the investigation to solve the following questions: (i) Find the value(s) of x, if the vectors $\begin{pmatrix}3x\\2\end{pmatrix}$ and $\begin{pmatrix}6\\x\end{pmatrix}$ are parallel. (ii) Which of the vectors is perpendicular to $\begin{pmatrix}3\\4\end{pmatrix}$ (a) $\begin{pmatrix}-3\\4\end{pmatrix}$ (b) $\begin{pmatrix}-3\\-4\end{pmatrix}$ (c) $\begin{pmatrix}-4\\3\end{pmatrix}$ (d) $\begin{pmatrix}-4\\-3\end{pmatrix}$	
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Measurement

Content Standard:	**Indicator:**	**Lesson:**
B9.3.2.2 Solve problems involving bearings and addition/subtraction of vectors	B9.3.2.2.2 Apply the triangular and parallelogram laws of addition to resolve vectors	1 of 1

Performance Indicator:	**Core Competencies:**
Learners can understand the Triangular and Parallelogram Laws of Vector Addition and solve problems involving vector addition and resolution.	Communication and Collaboration (CC) Critical Thinking and Problem solving

References: Mathematics Curriculum Pg.

New words:

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Review basic concepts of vectors and vector addition. Introduce the Triangular and Parallelogram Laws of Vector Addition. Explain that these laws are used to resolve vectors into their components.	
PHASE 2: **NEW LEARNING**	Explain the Triangular Law: If two vectors are represented by the adjacent sides of a triangle, then their resultant is represented by the third side of the triangle. Demonstrate how to resolve vectors using the Triangular Law with a simple example. Solve an example together: Vector A = $\binom{3}{2}$, Vector B = $\binom{2}{-1}$ Find the resultant vector using the Triangular Law. Explain the Parallelogram Law: If two vectors are represented by the adjacent sides of a parallelogram, then their resultant is represented by the diagonal of the parallelogram. Demonstrate how to resolve vectors using the Parallelogram Law with a geometric representation. Solve an example together: Vector A = (34), Vector B = (−23) Find the resultant vector using the Parallelogram Law. Distribute a worksheet with vector addition problems that require resolving vectors using the Triangular and Parallelogram Laws. • Vector A = (32), Vector B = (2−1) • Resultant Vector = Vector A + Vector B =	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	(32)+(2−1)=(51)(32)+(2−1)=(51) • Vector A = (34), Vector B = (−23) • Resultant Vector = Diagonal of Parallelogram formed by Vector A and Vector B. • Use the magnitude and direction of the diagonal to find the resultant vector. Have learners work individually or in pairs to solve the problems. Encourage them to draw diagrams or use a protractor for visual representation if needed. <u>Assessment</u> 1. Deduce the triangle law of vector addition. $\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC}$ Where ABC are points in the 0xy plane. 2. The vertices of a triangle are P(1,-3), Q(7,5) and R(-3,5) (i) Express $\overrightarrow{PQ}, \overrightarrow{QR}$, and $\overrightarrow{PR}$ as column vectors. (ii) Show that triangle PQR is an isosceles. (iii) Find the equation of the line $\overrightarrow{PR}$. 3. Investigate the parallelogram law of vector addition. Eg.4P,Q,R,S is a parallelogram whose vertices are P (x ,y), Q (5,7), R(2,4) and S(1,3) (i) Find $\overrightarrow{PQ}$, and $\overrightarrow{SR}$ hence find the values of x and y.	
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.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 8

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Position and Transformation

Content Standard: B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	**Indicator:** B9.3.3.1.1 Know examples of situations in everyday life that depict enlargement situations in everyday life.	**Lesson:** 1 of 1

Performance Indicator: Learners can understand the concept of enlargement in transformations and recognize the scale factor that relates the original size to the enlarged size.	**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**	Show images of familiar objects on the board (e.g., a toy car, a house). Ask learners if they can imagine these objects being bigger or smaller. Introduce the concept of transformations and how enlargements specifically make objects larger.	
PHASE 2: **NEW LEARNING**	Show various pictures or illustrations depicting enlargements in everyday life. Examples can include: • A photo being zoomed in on a computer screen. • A blueprint used to construct a building being much larger than the actual building. • A magnifying glass enlarging an image. • A photocopier set to make enlarged copies  	Pictures or illustrations of everyday objects (printed or digital) Rulers

	  Introduce the concept of the scale factor in enlargements. Explain that the scale factor is a number that tells you by how much the object is enlarged. A scale factor greater than 1 indicates an enlargement. For simpler examples (e.g., photocopied image with a specific enlargement percentage), guide learners through calculating the scale factor by dividing the enlarged size by the original size. Distribute pictures or illustrations containing various objects (a mix of original sizes and enlargements). Challenge learners to identify the images that depict enlargements. Ask learners to estimate the scale factor for the enlargements they identified. Encourage them to discuss their reasoning (e.g., how much bigger does the object appear compared to its usual size?). Provide learners with materials to draw or create simple pictures of everyday objects. Challenge them to create enlarged versions of their drawings, keeping the same proportions but increasing the size. Ask learners to think of a story where enlargements play a role (e.g., shrinking down to the size of an ant, finding a giant magnifying glass). Encourage them to describe how the scale factor would be important in their stories. Pose a real-world scenario where learners need to identify an enlargement and estimate the scale factor. For example, describe a billboard that is much larger than the actual product it advertises. Ask learners to estimate how many times bigger the image on the billboard is compared to the real product.	
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Position and Transformation

Content Standard: B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	**Indicator:** B9.3.3.1.1 Know examples of situations in everyday life that depict enlargement situations in everyday life.	**Lesson:** 1 of 1

Performance Indicator: Learners can calculate the enlarged size of an object given the original size and scale factor and apply their knowledge of enlargements to solve real-world problems.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving

References: Mathematics Curriculum Pg.

New words:

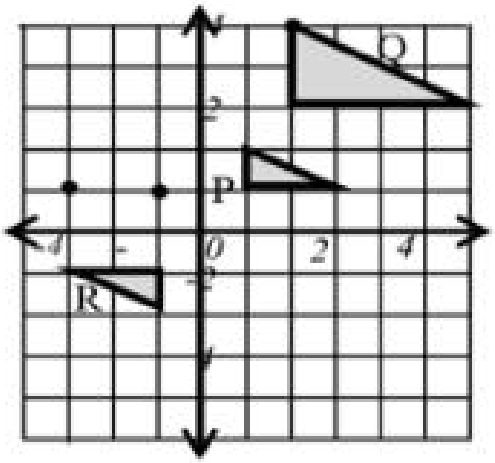
Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Play a quick memory game. Show learners a series of pictures for a short time (originals and enlargements). Challenge them to recall which objects were depicted in their enlarged versions. Discuss the importance of scale factor in recognizing enlargements.	
PHASE 2: **NEW LEARNING**	Introduce the formula for calculating the enlarged size of an object in an enlargement: Enlarged size = Original size x Scale factor. Explain how this formula allows us to find the new size based on the original size and the factor by which it's being enlarged. Distribute worksheets with practice problems. Provide examples of enlargements with given original sizes and scale factors. Guide learners through calculating the enlarged size using the formula. Encourage them to show their work and label units (e.g., cm, m). Explore the concept of scale factor less than 1. Explain how this represents a reduction (shrinkage) and how the formula can be used to find the reduced size as well. Present real-world situations involving enlargements. Examples can include: • A map with a scale (e.g., 1 cm on the map represents 5 km in real life). • A blueprint for a building with a specific scale. • An architect's model of a house at a smaller scale.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Pose problems based on the presented scenarios. For example, ask learners to calculate the actual distance on the ground represented by a certain distance on a map using the scale factor. Encourage them to set up the problem using the formula and solve for the unknown size. Challenge learners with more open-ended problems. For example, ask them to design a miniature garden based on a larger existing garden, considering the scale factor they would need to use. Introduce the concept of ratios as a way to represent the scale factor. Explain how the scale factor can be written as a ratio between the enlarged size and the original size (e.g., 3:1 for an enlargement by a factor of 3). Provide learners with pictures of objects with different scales (models, real objects, pictures). Challenge them to work in pairs or small groups to determine the scale factor between the objects based on their measurements or observations.	
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.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 9

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Geometry & Measurement	
Class: B9	**Class Size:**	**Sub Strand:** Position and Transformation	
Content Standard: B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	**Indicator:** B9.3.3.1.2 Understand enlargement and identify real-life situations involving enlargement.	**Lesson:** 1 of 1	
Performance Indicator: Learners can understand the concept of scale factor and its relationship to enlargement and identify and analyze real-life situations involving enlargement.	**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**	Introduce the concept of enlargement as a transformation that increases or decreases the size of a shape while preserving its shape and proportions. Define scale factor as the ratio of corresponding lengths in the original and enlarged shapes. Discuss how scale factor influences the degree of enlargement or reduction.	
PHASE 2: **NEW LEARNING**	Explain the process of enlargement using a scale factor. Demonstrate how to calculate the coordinates of an enlarged shape given the scale factor. Solve an example together: Original shape ABCD with vertices (1, 2), (3, 2), (3, 4), (1, 4) Enlarge the shape by a scale factor of 2 about the origin. Present real-life scenarios involving enlargement, such as map scaling, architectural designs, and resizing images. Discuss how scale factor is used to enlarge or reduce objects in these contexts. Show examples or pictures of real-life objects before and after enlargement. Distribute a worksheet with enlargement problems involving different scale factors and shapes.	Examples or pictures of real-life objects

	Example 1: Original Shape ABCD with vertices (1, 2), (3, 2), (3, 4), (1, 4) Enlarged Shape A'B'C'D' with vertices (2, 4), (6, 4), (6, 8), (2, 8) using a scale factor of 2 about the origin. Example 2: Given a map with a scale of 1 cm representing 10 km, enlarge the map by a scale factor of 2 to represent 20 km for every 1 cm. Have learners work individually or in pairs to solve the problems. Encourage them to use scale factor calculations to determine enlarged dimensions. <u>Assessment</u> Draw an enlargement of shapes using a given scale factor. i. State the single transformation that maps triangle P onto Q. ii. State the single transformation that maps triangle P onto R.  iii. Investigate the characteristics of enlargements under the following conditions of scale factor: • if the scale factor (K) is negative • if the scale factor (K) is greater than 1 or less than –1 • if the scale factor (K) is between –1 and 1 (i.e., fraction) Using an object, and its image, determine the scale factor in a transformation?	
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.	

Week Ending:	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B9	**Class Size:**	**Sub Strand:** Position and Transformation

Content Standard: B9.3.3.1 Demonstrate understanding of how to perform an enlargement on a geometrical shape given a scale factor and describe the properties of the image under the transformation (i.e. congruence, similarity, etc.)	**Indicator:** B9.3.3.1.2 Understand enlargement and identify real-life situations involving enlargement.	**Lesson:** 1 of 1

Performance Indicator: Learners can identify real-life situations that involve enlargements and recognize the visual characteristics of enlargements.	**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**	Show images of familiar objects on the board (e.g., a toy car, a house). Ask learners if they can imagine these objects being bigger or smaller. Introduce the concept of transformations and how enlargements specifically make objects larger.	
PHASE 2: **NEW LEARNING**	Show various pictures or illustrations depicting enlargements in everyday life. Examples can include: • A photo being zoomed in on a computer screen. • A blueprint used to construct a building being much larger than the actual building. • A magnifying glass enlarging an image. • A photocopier set to make enlarged copies (optional - demonstrate with a photocopier if available). Guide learners to observe the pictures and identify visual clues that suggest enlargements. These clues can include: • The enlarged object is clearly bigger than a familiar version of the same object. • Details in the enlarged object are more visible compared to the original size. • The proportions of the object remain the same, only the size increases. Discuss real-world applications of enlargements. Explain how enlargements are used in various fields like: • Architecture (blueprints for buildings) • Cartography (creating maps with a scale) • Science (microscopic images) • Design and engineering (creating models) Distribute pictures or illustrations containing various objects (a mix of original sizes and enlargements). Challenge learners to identify the images that depict enlargements based on the visual clues discussed	Pictures or illustrations of everyday objects (printed or digital) Rulers

	earlier. Ask learners to choose an image with an enlargement and compare it to a similar object in its original size (if possible). Encourage them to describe the differences in size and detail level. If time permits, learners can create a small gallery showcasing enlargements they find in magazines, newspapers, or online. They can present their findings to the class, explaining why each image represents an enlargement. Challenge learners to embark on a short scavenger hunt around the classroom or schoolyard. Ask them to find and list as many examples of enlargements as possible within a set time limit.	
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.	