Learning Plan (Data organisation & presentation)							
Subject	*Mathematics*	**Week**	*22*	**Duration**	*4 HRS*	**Form**	*1*
Strand	*Making Sense of and Using Data*	**Sub-Strand**	*Statistical reasoning and its application in real life*				
Content Standard	*Demonstrate conceptual understanding of data organisation and presentation for grouped and ungrouped data, including 3D graphs/charts with appropriate digital technology.*						
Learning Outcome(s)	*Apply the knowledge of organising and presenting data (grouped/ungrouped) using frequency tables, line graphs, pie charts, multiple bar graphs, info graphics, etc.; generate 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.*						
Learning Indicator(s)	*a) Organise and present data (grouped/ungrouped) using frequency tables, line graphs, pie charts, multiple bar graphs, info graphics, etc., including generating 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.* *b) Analyse (include using appropriate computer applications) and interpret data using descriptive statistics (i.e., measures of central tendency/location and minimum & maximum values) and justify which of the averages best represent the data.*						
Essential Question(s)	*(A) What are the best practices for organizing and presenting data to ensure clarity, accuracy and relevance to the audience or users of the data?* *(B) How do the different types of data influence the choice of data analysis methods and statistical techniques used to interpret and draw conclusions from the data?* (C) *How do measures of central tendencies vary in their interpretation and applicability based on the distribution and characteristics of the data, and what insights can be gained from analysing these measures?*						
Pedagogical Strategies	*Experiential Learning, Problem – Based Learning, Collaborative Learning.*						
Teaching & Learning Resources	*Calculator, whiteboard, marker, Mathematics Teacher Manual (Page 72 – 83), NTS handbook, Concise Core Mathematics Textbook (Page 252 – 296), Digital devices (laptops, tablets), Sample data sets for practice, Software (Excel, Google sheets, Canva, or any infographic making tool), Printed worksheets for frequency tables, projector for demonstrations, Real – life scenarios (e.g., average income, most common shoe size, median house prices), Data sets for calculations.*						
Key Notes on Differentiation							
Learning Tasks: *a) Learners organise data in frequency tables, bar charts, pie charts, line graphs, etc.* *b) Learners determine the measures of central tendencies for grouped data and justify which of the averages best represent a given data.* ***Pedagogical Approach:*** *Group & pair activities.* *Learners are assigned a variety of data to organise them into, frequency tables, pie charts, line graphs, bar charts, etc.* *To ensure a differentiated class you may consider the following varied activities.*							

a) *Provide step-by-step guidance on how to organize data into frequency tables and create basic graphs (e.g., bar graphs, line graphs).*
b) *Offer simplified explanations of descriptive statistics like mean, median, and mode.*
c) *Use concrete examples and visual aids to help students understand the concepts.*
d) *Allow students to work in small groups or pairs to create simple frequency tables and graphs using provided data sets.*
e) *Provide templates and tools (such as graphing software or apps) to assist with creating visual representations of data.*
f) *Introduce the use of technology (e.g., spreadsheet software) for creating and analyzing data.*
g) *Challenge students to create advanced visualizations, such as 3D graphs, using specialized software or programming languages.*

Key assessment

a) Assessment Level 2

i. *Suppose we conduct a survey in which we ask 15 households how many pets they have in their home. The results are as follows: 1, 1, 1, 1, 2, 2, 2, 3, 3, 4, 5, 5, 6, 7, 8. Construct both a grouped and an ungrouped frequency tables for the data.*
ii. *Estimate the mean, median and mode for the data set.*

Length (mm)	***Frequency***
150 - 154	*5*
155 - 159	*2*
160 - 164	*6*
165 - 169	*8*
170 - 174	*9*
175 - 179	*11*
180 - 184	*6*
185 - 189	*3*

b) Assessment Level 3

State and explain, with practical examples two differences between mean and median.

Keywords	*Frequency Table, Line graph, Pie Chart, Infographics, 3D Graphs/Charts, Digital tools, Mean, Mode, Median, Central tendency, Data set*

Lesson 1

Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual

Teacher Activity	***Learner Activity***
Starter ***Activity (e.g., 10 minutes)*** ***Teacher Activity:*** *Review learners' previous knowledge on data presentation methods such as bar charts, frequency tables, pie charts, line graphs, etc. from JHS.* *Note any misconceptions that they have and address them immediately or later where appropriate.* ***Learner Activity:*** *Learners recollect on the data presentation methods and write some of them down.*	
Introductory Activity (e.g., 15 minutes) *Using talk for learning, provide a brief detailed lecture on the various methods of organising and presenting data such using frequency tables, bar charts, pie charts,*	***Introductory Activity*** *Learners take key notes on the brief lecture on the various methods of organising and presenting data such using frequency tables, bar charts, pie charts, line graphs, etc.*

line graphs, etc. ***Activity 1 (e.g., 40 minutes)*** ❖ *Using talk for learning, explain how to create a frequency table for both grouped and ungrouped data.* ❖ *Provide step – by – step guidance on how to convert frequency tables into basic graphs like line graphs, bar charts, pie charts, etc.* ❖ *Demonstrate how to create line graphs, pie charts, and bar graphs, using both manual methods and digital tools such as Excel or Google sheets.* ***Activity 2 (e.g., 45 minutes)*** ❖ *Present learners with a set of data and task them to organise them into a frequency distribution table and use pie chart to illustrate the data graphically.* ***Hint:*** *Move round to supervise assigned task and offer help where necessary.* ❖ *In mixed ability and gender groupings, present learners with a set of data and assign them to construct both a grouped and an ungrouped frequency tables for the data.* ***Hint:*** *Move round to supervise assigned task and offer help where necessary.* ❖ *Introduce learners to the use of digital technology in generating 3D graphs and infographics, explaining their relevance in professional settings.*	***Activity 1*** • *Learners pay attention and take key notes on how to create a frequency table for both grouped and ungrouped data.* • *Learners follow along with the guidance on how to convert frequency tables into basic graphs like line graphs, bar charts, pie charts, etc.* • *Learners follow along with the demonstration on how to create line graphs, pie charts, and bar graphs, using both manual methods and digital tools such as Excel or Google sheets.* ***Activity 2*** • *Learners organise given set of data into a frequency distribution table and illustrate the data on pie chart.* • *Learners in their respective groupings, work cooperatively and present their solutions to the class.* • *Learners use digital tools to create 3D graphs and infographics, presenting their data in a visually appealing and informative manner.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Assessment Level 2: *1. Suppose we conduct a survey in which we ask 15 households how many pets they have in their home. The results are as follows: 1, 1, 1, 1, 2, 2, 2, 3, 3, 4, 5, 5, 6, 7, 8. Construct both a grouped and an ungrouped frequency tables for the data.*	

2. The data below shows the amount of money that Akosua spent on buying some items:
• pepper - GH4
• onions - GH4
• salt - GH2
• fish - GH10
Draw a pie chart for the data.

Lesson Closure

In completing this part, refer to the Essential Questions to check that learning has taken place.

Activity (e.g. minutes)

(A) Summarize key points discussed during the lesson about organizing data and its importance in decision – making processes.

(B) Encourage learners to think about how they might use these skills outside the classroom.

(C) Assign a task where learners must collect data at home (e.g., daily temperature readings) and organise and present the techniques learned in class.

Reflection & Remarks

(A) Reflect on learners' engagement during activities.
(B) Note which areas were challenging for learners or particularly successful in promoting understanding of statistical reasoning.

Lesson 2

Main Lesson drawing on Concepts, Skills, and Competencies to reinforce as in the Subject Teacher Manual

Teacher Activity	*Learner Activity*
Starter ***Activity (e.g., 10 minutes)***	
Teacher Activity: *Review learners' ideas on calculating the mode, median and mean for raw unorganised data as well as ungrouped data from JHS by giving them a question to do.*	
Question: *The marketing department of a company has collected the following sales figures (in thousands of Ghana cedis) for its top 10 sales representatives for the previous quarter: 11, 18, 15, 22, 19, 14, 17, 20, 16, 22. Calculate the following measures of central tendency for the given sales figures: 1. Mode 2. Mean 3. Median.*	
	Learner Activity: *Learners compute the Mode, Mean and Median for the question having most of the answers right.*
Introductory activity (e.g., 15 minutes)	***Introductory activity***
Using talk for learning, briefly explain the concepts of mean, mode and median using the question that was assigned to them	*Learners take notes and ask questions to clarify the concept.*

from the starter activity. ***Activity 1 (e.g., 25 minutes)*** ❖ *Write down the definitions and formulas of mean, mode, and median on the board for learners.* ❖ *Walk learners through the process of calculating the mean, mode, and median for ungrouped data, followed by grouped data.* ***Activity 2 (e.g., 30 minutes)*** ❖ *Distribute a worksheet with different sets of data (e.g., ages, scores, etc) for learners to calculate the mean, mode, and median for each data set.* ***Hint:*** *Move round to supervise assigned task and offer help where necessary.* ❖ *In mixed ability and gender groupings, present a real – life scenario (e.g., analysing the average household income in a community) and ask learners to apply their understanding of mean, mode, and median to interpret the data.* ***Hint:*** *Move round to supervise assigned task and offer help where necessary.* ***Activity 3 (e.g., 30 minutes)*** ❖ *Lead a class discussion on when it might be more appropriate to use mean, mode, or median depending on the data set and context.* ❖ *Ask learners to think critically about the strengths and limitations of each measure of central tendency.*	***Activity 1*** • *Learners take key notes on the definitions and formulas written on the board.* • *Learners follow along with the process and take key notes on the calculations of the mean, mode, and median for both ungrouped and grouped data.* ***Activity 2*** • *Learners work individually to complete the worksheet.* • *Learners in their respective groups engage in the real – life scenario activity and discuss the application of central tendencies in the given context.* ***Activity 3*** • *Learners participate in the class discussion, share their thoughts on the use of mean, mode, and median.* • *Learners brainstorm to come out with the strengths and limitations for each measure.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	

Assessment Level 2

1. Find the mode of the data {14, 16, 16, 16, 17, 16, 18}.

2. The ages of the members of a community centre have been listed below: {42, 38, 29, 37, 40, 33, 41}. Calculate the median of the given data.

3. Find the mean, median and mode for the following list of values:13, 18, 13, 14, 13, 16, 14, 21, 13.

Assessment Level 3

1. Estimate the mean, median and mode for the data set. AP

Seconds	Frequency
51 – 55	2
56 – 60	7
61 – 65	8
66- 70	4

2. The ages of the 112 people who live on a tropical island are grouped as follows: P

Age	Number
0 – 9	20
10 – 19	21
20 – 29	23
30 – 39	16
40 – 49	11
50 – 59	10
60 – 69	7
70 – 79	3
80 – 89	1

i. Estimate the mean, median and mode for the data.
ii. Analyse the three central scores (mean, median and mode) calculated and justify why a particular one best represents the data.

3. State and explain, with practical examples two differences between mean and median.

4. Explain, with practical examples the effect of an extreme value on the mean.

Lesson Closure

In completing this part, refer to the Essential Questions to check that learning has taken place.

Activity (e.g., 10 minutes)

(A) Summarize the key points of the lesson.

(B) Assign a brief homework task to reinforce the day's lesson, such as finding the mean, mode, and median of data.

Reflection & Remarks

(A) Evaluate the effectiveness of the problem – based learning approach in helping learners understand the practical application of mean, mode, and median.

(B) Reflect on learners' engagement during the discussion and their ability to critically analyse when to use each measure of central tendency.

(C) Note any challenges faced during the lesson and plan for adjustments in future lessons.

(D) Record any outstanding questions or misconceptions that need to be addressed in subsequent lessons.