SECOND TERM
WEEKLY LESSON NOTES
WEEK 1

Week Ending: 12-01-2024	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Number	
Class: B9	**Class Size:**	**Sub Strand:** Ratios and Proportion	
Content Standard: B9.1.4.1 Apply the understanding of ratio, rate and proportions to solve problems that involve rates, ratios, and proportional reasoning and use it to solve real world mathematical problems		**Indicator:** B9.1.4.1.1 Represent proportional relationships by equations.	**Lesson:** 1 of 1
Performance Indicator: Learners can interpret the slope and y-intercept in the context of proportionality and apply equations to solve problems involving proportional relationships.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 175			
New words: Proportional Relationship, Constant**,** interpret			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin with a class discussion about real-world scenarios involving proportional relationships. List these scenarios on the board. • *The cost of apples is directly proportional to the number of apples bought.* • *The time it takes to complete a task is directly proportional to the number of workers.* Discuss how these relationships might be represented mathematically. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Introduce the concept of representing proportional relationships using equations. Discuss the form y = kx, where k is the constant of proportionality. Consider this example: If total cost (t) is proportional to the number of items (n) purchased at a constant price (p), the relationship between the total cost and the number of items can be expressed as t = pn. Work through examples with the class. Discuss how to identify the constant of proportionality from a scenario. Example 1: If the cost (C) of 5 notebooks (N) is GH₵15, write the equation representing this relationship.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Provide learners with several scenarios and guide them in representing these relationships using equations. Work through problems together, emphasizing identifying the constant of proportionality. Discuss different ways to express proportional relationships. Example 2: The total cost (T) of renting bikes is directly proportional to the number of hours (H) they are rented. If it costs GH₵8 for 2 hours, write the equation representing this relationship. <u>Solution</u> T: The total cost of renting bikes. GH₵4/hour: The constant of proportionality, representing the cost per hour of renting a bike. H: The number of hours the bikes are rented. b: The y-intercept, representing any fixed costs (unknown in this case). But with the given information, the equation T = GH₵4/hour * H + b is the most accurate representation of the proportional relationship. Show learners how to plot points from the proportional relationship table on graph paper. Connect the points to form a straight line, highlighting the consistent slope. Discuss how the slope reveals the direction and steepness of the proportional relationship. Offer an optional activity where learners try to guess the equation based on the graph's slope and intercepts. <u>Assessment</u> 1. The total cost (T) of buying apples is directly proportional to the number of kilograms (H) purchased. If it costs GH₵5 for 1 kilogram. write the equation representing this relationship 2. The total cost (T) of making long-distance calls is directly proportional to the call duration (H) in minutes. If it costs GH₵2 for a 5-minute call. write the equation representing this relationship 3. The total cost (T) of buying movie tickets is directly proportional to the number of tickets (H) purchased. If it costs GH₵10 for 2 tickets. write the equation representing this relationship	
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: 12-01-2024	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B9	**Class Size:**	**Sub Strand:** Ratios and Proportion

Content Standard: B9.1.4.1 Apply the understanding of ratio, rate and proportions to solve problems that involve rates, ratios, and proportional reasoning and use it to solve real world mathematical problems	**Indicator:** B9.1.4.1.2 Use proportional relationships to solve multistep ratio and percent problems, examples: simple interest, tax, discount and commissions, NHIL, depreciation, insurance, etc.	**Lesson:** 1 of 1

Performance Indicator: Learners can use proportional relationships to solve multistep ratio and percent problems	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 175	
New words:	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by reviewing ratios and percent with learners. Use familiar examples like percentages in class grades or ratios in recipes. Introduce the concept of proportional relationships and how they can be used to solve real-world problems. Discuss the importance of proportional reasoning in financial transactions, decision-making, and understanding everyday situations. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Ask learners to bring an item with a price tag (toy, clothes, book) and share its actual price along with any discounts or taxes they encountered. Use their examples to introduce different concepts like discount calculation and tax application. Divide learners into small groups and give each group a hypothetical budget for a weekend outing or school event. Challenge them to plan activities (movies, meals, games) within their budget, factoring in prices, discounts, and taxes. You can even provide flyers or online menus for them to research options. Set up a simulation where learners open "fake" bank accounts with a small initial deposit. Allow them to earn "interest" on their deposits based on real-world interest rates and have them calculate their growing savings over time. Assign learners different everyday items or services (phone plan, haircut, groceries) and challenge them to research the current prices, tax rates, and potential discounts.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Have them compare options and present their findings to the class, focusing on cost-effectiveness and responsible consumer choices. Prepare cards with different percentages (10%, 25%, 50%) and product prices. Learners pick a card and a price, then calculate the discounted price. Provide magazine clippings with pictures of items from different price ranges. Challenge learners to create a collage representing a specific budget by selecting and cutting out items within their imaginary limits. Discussing their choices and budget considerations adds another layer of engagement. Set up a "mini-market" with real or toy products labelled with prices. Have learners "shop" using pretend money and practice calculating their total cost with tax before "paying" at a designated cashier. Rotate roles so everyone gets to shop and calculate. Use toy cars (or pictures) with different starting prices and depreciation rates. Learners roll dice to represent time passing and calculate the decreasing value of their cars over time. The "richest" car owner at the end wins, sparking discussion about depreciation and its real-world implications.	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 2

Week Ending: 19-01-2024	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B9	**Class Size:**	**Sub Strand:** Ratios and Proportion

Content Standard: B9.1.4.1 Apply the understanding of ratio, rate and proportions to solve problems that involve rates, ratios, and proportional reasoning and use it to solve real world mathematical problems	**Indicator:** B9.1.4.1.2 Use proportional relationships to solve multistep ratio and percent problems, examples: simple interest, tax, discount and commissions, NHIL, depreciation, insurance, etc.	**Lesson:** 1 of 1

Performance Indicator: Learners can solve problems involving simple interest, tax, discount and commissions, NHIL, depreciation, insurance.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 175	
New words:	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Guide learners to solve problems on simple interest. *Example 1: A girl deposited GH₵ 4500 at the bank at a rate of 3% per annum for three years. Find the simple interest. What is the amount at the end of the fifth year?* *Solution* $I = \frac{P\ X\ R\ X\ T}{100} = \frac{4500\ X\ 3\ X\ 3}{100} = GHC\ 405$ *Amount at the end of the fifth year = 4500 +* $\frac{4500\ X\ 3\ X\ 5}{100}$ *= 4500 + 675 = GHc 5,175.00* Guide learners to solve problems on tax (VAT). The VAT rate of Ghana is 12.5%. *Example 2: A man bought an item at GH₵ 4500.00, VAT inclusive. Calculate: b) the basic cost of the item. c) the VAT paid by the man.* *Solution* *VAT =* $\frac{100}{112.5} * 4500 = 4{,}000$ *b) the basic cost of the item = GHc 4,000*	Counters, bundle and loose straws base ten cut square, Bundle of sticks

c) the VAT paid by the man $= \frac{12.5}{100} * 4000 = 500$

Guide learners to solve problems on discount.

Example 3: If a car costs GH₵ 80,500.00, what is its new value if there is a discount of 10%?

Solution

$\frac{10}{100} * 80{,}500 = 8050$

New value = 80,500 – 8,050 = 72,450

Guide learners to solve problems on commission.

Example 4: A car agent's commission on the sale of a car is $3\frac{1}{2}\%$. *Calculate the commission on a car sold for GH₵68,000.00.*

Solution

$\frac{3.5}{100} * 68000 = 2{,}380$

Guide learners to solve problems involving depreciation. The value of a mobile phone depreciates at the following rate:

Year of manufacturing	Depreciation on the original value
In the first year	5%
In the second year	10%
In the third year	15%
In the fourth year	22%

The original value of the mobile phone is GH₵ 1800.00. Find the value of the mobile phone at the end of each of the first four years.

Guide learners to solve problems involving NHIL.

Example 5: The NHIL inclusive price of a television set is GH₵1200.00. If the NHIL is charged at a rate of 2.5%, find
b) The cost of the television set (NHIL exclusive). c) The NHIL charged.

Solution
*b) the cost of the television set (NHIL exclusive) = 100/102.5 * 1200 = 1170*

c) The NHIL charged. = 1200 – 1170 = 30

Assessment
Kofi Mireku insured his house and paid a premium of GH₵ 30,000.00. If the insurance company fixed the rate at 5% of the value of the house, calculate the insured value of the house.

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: 19-01-2024	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B9	**Class Size:**	**Sub Strand:** Ratios and Proportion

Content Standard: B9.1.4.1 Apply the understanding of ratio, rate and proportions to solve problems that involve rates, ratios, and proportional reasoning and use it to solve real world mathematical problems	**Indicator:** B9.1.4.1.3 Use knowledge of rates and proportional reasoning to solve problems involving SSNIT benefits and contributions.	**Lesson:** 1 of 1

Performance Indicator: Learners can apply knowledge of rates and proportional reasoning to solve problems involving SSNIT contributions and benefits	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)

References: Mathematics Curriculum Pg. 175

New words:

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by asking learners what they know about social security or retirement plans. Introduce the concept of SSNIT in Ghana and its importance in providing financial security for workers after retirement. Briefly explain the main benefits offered by SSNIT (lump sum payment, monthly pension, survivors' benefits) and discuss who is eligible for these benefits. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Describe the obligations of the employer/employee and the contribution rates. Divide learners into small groups and assign each group a hypothetical salary. Provide them with information sheets about different salary levels and their corresponding SSNIT contributions. Challenge them to calculate their monthly deductions and discuss the impact of different earning levels on contributions. Example 1: Calculate employee/employer contributions to SSNIT under Act 766.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Act 766	PNDC Law 247
Employer	13.0% of basic salary	12.5 of basic salary
Worker	5.5% of basic salary	5.0% of basic salary
Total	18.5% of basic salary	17.5% of basic salary

A worker's basic monthly salary is GH₵3,256.50.
a. Calculate the SSNIT contributions under Act 766;
i) by the employer ii) by the employee
b. What is the total SSNIT contributions at the end of every month?

Solution
*i) by the employer = 0.13 * 3256.50 = 423.35*
*ii) by the employee = 0.055 * 3256.50 = 179.11*
b) total SSNIT contributions = 423.35 + 179.11 = 602.46

Example 2: Calculate employee/employer contributions to SSNIT under PNDCL 247.

Mr Bediako's monthly SSNIT contribution under PNDCL 247 is GH₵440.54. How much does his employer contribute to SSNIT on his salary? Hence, calculate his basic salary per month.

Solution

Let a *represent his basic salary per month*

total SSNIT contributions = employer + employee

$GH₵440.54 = (0.125 * a) + (0.05 * a)$

$GH₵440.54 = a (0.125 + 0.05)$

$GH₵440.54 = a\ 0.175$

$$a = \frac{440.54}{0.175} = GH₵2517.37$$

therefore the basic salary of Mr Bediako is GH₵2517.37

Guide learners to calculate employee benefits from SSNIT under Act 766.

Example: Mr Addai retired at age 60 last year after working and contributing for 20years. If the average of his best salary for 3 years (36 months) over the 20-year period was GH₵15,000.00, calculate his full pension under the National Pension Act 2008, (Act 766).

Calculation for full pension
Qualifying age = 60years
Average best 3years' salary = GH₵15,000
Pension right for 20years = 43.13% (refer to the table on Pension Rights above)
Annual pension to Mr. Addai = 43.13/100 × 15,000 = GH6,469.5
Monthly pension to Mr Addai = 6469.5/12 = 539.13

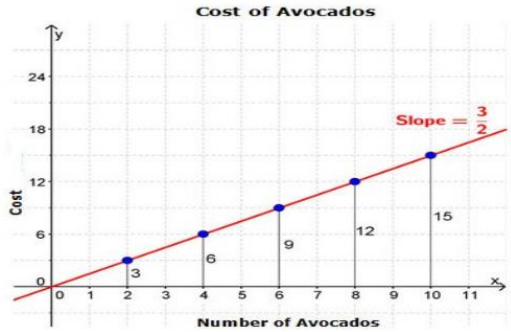
Guide learners to calculate employee benefits from SSNIT under PNDCL 247.

Example: *Mr Bema, a history teacher at Academicals Senior High School, retired in 2009 after 25 years of service. Throughout this 25-year period he had been*

	an active contributor to the SSNIT Pension Scheme. As the student who has learnt about social security, you are to help Mr Bema to calculate his annual pension using his best three years' salary of GH₵19,500. <u>Calculation for full pension</u> Qualifying age = 60years Average best 3years' salary = GH₵19,500 Pension right for 25years = 57.5% (refer to the table on Pension Rights above) *Annual pension to Mr. Bema = 57.5/100 × 19.500 = GH11,212.5* *Monthly pension to Mr Addai = GH11,212.5/12 = GH934.38* Give learners a simulated monthly budget and have them factor in their estimated SSNIT contribution based on their hypothetical salary. Challenge them to adjust their spending or income sources to manage their finances responsibly with the contribution deduction. Learners can role-play job interviews where they ask and answer questions about SSNIT benefits and contributions, simulating real-life scenarios where understanding these aspects is crucial <u>Assessment</u> 1. A worker contributed for seven and half years before being rendered incapacitated. If the best salary for over the 3-year (36 months) period was GH₵ 8,450.40, calculate the invalidity benefit for the worker. 2. Mr Mensah's total SSNIT contribution stood at GH₵ 112,426.29 at the time of his demise. Calculate his survivor's benefit if the current interest rate is 15%.	
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: 19-01-2024	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Number	
Class: B9	**Class Size:**	**Sub Strand:** Ratios and Proportion	
Content Standard: B9.1.4.1 Apply the understanding of ratio, rate and proportions to solve problems that involve rates, ratios, and proportional reasoning and use it to solve real world mathematical problems	**Indicator:** B9.1.4.1.4 Recognise and graph proportional relationships, interpreting the unit rate as the slope of the graph and use these to solve problems	**Lesson:** 1 of 1	
Performance Indicator: Learners can calculate and interpret unit rates as the slope of a graph and solve problems involving proportional relationships.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 179			
New words: proportional relationship, unit rate, slope			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Engage learners with examples of proportional relationships in their daily lives (e.g., buying items by weight or quantity, earning money for hours worked). Introduce the terms "proportional relationship," "unit rate," and "slope." Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Divide learners into teams and provide grocery items. Challenge them to find proportional relationships between different items (e.g., cost of bananas per pound, number of cookies per package). Have them create tables to organize data and identify constant ratios. Distribute graph paper and guide learners to graph their data points. Discuss the characteristics of graphs of proportional relationships (straight lines passing through the origin). Introduce the concept of slope as "rise over run" and demonstrate how to calculate it. Slope = $\frac{(y2-y1)}{(x2-x1)}$ From the graph below, lets pick x coordinates to (4, 8) and y coordinates (6, 12) Slope = $\frac{(12-6)}{(8-4)} = \frac{6}{4} = \frac{3}{2}$	Choose items sold by weight or quantity (e.g., bananas, apples, cereal boxes, cookies). Scales or measuring cups. Graph paper or whiteboard.

	Emphasize that slope represents the unit rate in proportional relationships. Present scenarios involving proportional relationships (e.g., distance traveled, recipe proportions, costs). Guide learners to use graphs, slopes, and unit rates to solve problems. Example: The graph below shows the cost of avocados.  The unit rate, from the data, is ₵1.50 per avocado, which is the same as the slope of the line connecting the data points $\binom{3}{2}$. i. From the graph, how much does eight avocados cost? ii. Also, using the graph how much does 15 avocados cost? <u>Solution</u> i. eight avocados cost = GH12 ii. We can't use the graph to determine the cost of 15 avocados. So if 8 avocados = GH12 then 15 avocados = ? $\frac{15}{8} * 12 = 22.5$ Therefore 15 avocados cost GH22.50 <u>Assessment</u> i. From the graph, how much does 3 avocados cost? ii. From the graph, how much does 5 avocados cost? iii. Also, using the graph how much does 20 avocados cost? iv. Using the graph how much does 12 avocados cost? v. From the graph, how much does 11 avocados cost?	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 3

Week Ending: 26-01-2024	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Patterns and Relations	
Content Standard: B9.2.1.1 Demonstrate the ability to construct tables of values for pairs of linear relations, graph the relations in a number plane and determine the intersection of the lines to solve simultaneous linear equations	**Indicator:** B9.2.1.1.1 Construct a table of values for two linear relations and graph the relation.	**Lesson:** 1 of 1	
Performance Indicator: Learners can o graph linear relations on a coordinate plane and interpret the slope and y-intercept of a graph.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 180			
New words: values, relation, linear, relations, graph			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Review the concept of linear relationships, emphasizing that they represent a constant rate of change. Introduce the terms "table of values" and "graph of a linear relation." Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Explain how to create a table of values by choosing input values (x) and calculating corresponding output values (y) using the given equation or rule. Demonstrate with an example, such as y = 2x + 1. **x** | **2x-3** | **y** | **Ordered pairs** -1 | 2(-1) -3 | -5 | (-1,-5) 1 | 2(1) -3 | -1 | (1,-1) 3 | 2(3) -3 | 3 | (3,3) Three solutions to the equation y = 2x + 1 are; (-1,-5) (1,-1) (3,3)	Graph paper, Rulers, Real-world examples of linear relationships (e.g., distance vs. time, cost vs. quantity)

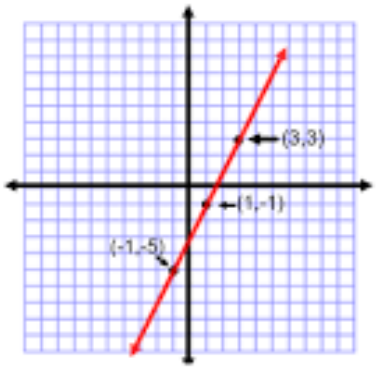
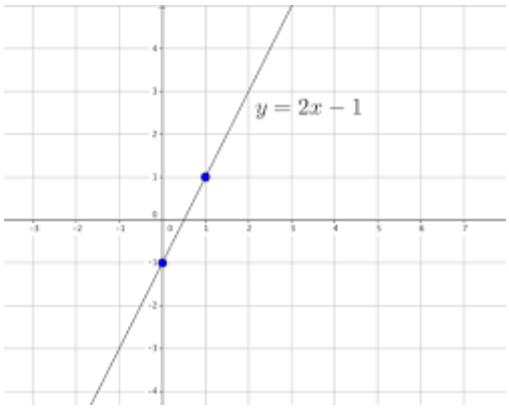


table of values for y = 2x + 1

Guide learners through the process of graphing linear relations on a coordinate plane.

Emphasize labeling the axes and choosing appropriate scales. Demonstrate how to plot points from a table of values and connect them with a straight line.



Discuss the characteristics of graphs of linear relations (always straight lines).

Introduce the concept of slope as the "steepness" of the line and the y-intercept as the point where the line crosses the y-axis.

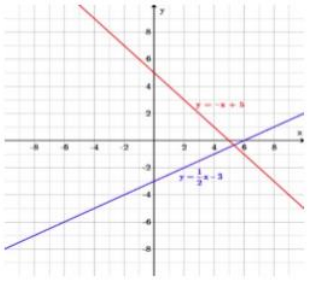
Demonstrate how to calculate slope using the rise-over-run formula (m = (y2 - y1) / (x2 - x1)).

Explain how the y-intercept can be found by setting x = 0 in the equation.

Provide learners with various equations and real-world scenarios involving linear relations.

Have them create tables of values, graph the relations, and interpret the slope and y-intercept.

Example 1: Copy and complete the table of values for the relations

	$y_1 = -x + 5$ and $y_2 = \frac{1}{2}x - 3$ foe x from 4 to 3 x | -3 | -2 | -1 | 0 | 1 | 2 | 3 $y_1 = -x + 5$ | 8 | | | | 4 | | $y_2 = \frac{1}{2}x - 3$ | | -4 | | | | | -1.5 Solution x | -3 | -2 | -1 | 0 | 1 | 2 | 3 $y_1 = -x + 5$ | 8 | 7 | 6 | 5 | 4 | 3 | 2 $y_2 = \frac{1}{2}x - 3$ | -4.5 | -4 | -3.5 | -3 | -2.5 | -2 | -1.5 Assessment 1. Copy and complete the table of values for the relations $x-2y=-2$ and $x-2y=2$ for x from -2 to 2 x | x | -2 | -1 | 0 | 1 $x - 2y = -2$ | $y_1 = -x + 5$ | 0 | | | 4 $x - 2y = 2$ | $= (x - 2)/2$ | | $-1\frac{1}{2}$ | | 2. Draw graph for two linear relations 	
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: 26-01-2024	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Patterns and Relations	
Content Standard: B9.2.1.1 Demonstrate the ability to construct tables of values for pairs of linear relations, graph the relations in a number plane and determine the intersection of the lines to solve simultaneous linear equations		**Indicator:** B9.2.1.1.2 Use graphs of two linear relations to determine subsequent missing elements in ordered pairs of the relation	**Lesson:** 1 of 1
Performance Indicator: Learners can interpret and analyze graphs of linear relations to determine missing elements in ordered pairs.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 181			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Briefly review key concepts from previous lessons: linear relationships, tables of values, graphs, slope, and y-intercept. Engage learners with a quick graphing activity to refresh their skills. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Display a graph of a linear relation with several ordered pairs plotted, but some missing elements (e.g., (2, ?), (?, 6)). Challenge learners to determine the missing values using only the graph's information. Guide learners to use the graph's patterns and characteristics to predict missing elements: • Emphasize the constant rate of change (slope). • Encourage them to visualize the line extending beyond plotted points. • Demonstrate how to use slope to "count up" or "count down" to find missing y-values. • Show how to trace back to the y-axis to find missing x-values. Provide opportunities for learners to practice with various graphs and missing elements. Divide learners into pairs or small groups. Distribute a set of graphs with different missing elements to each group. Task them with working together to determine the missing values and justify their reasoning.	Graph paper, Rulers

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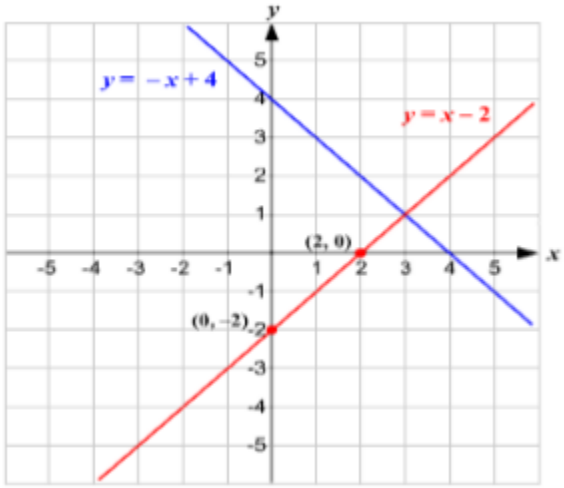
<td>Example: Find the missing elements of ordered pairs on graphs of two linear relations.
 

The graph below is drawn from two linear relations:
y = -x + 4
y = x - 2

i. Determine the coordinates for the intersection of the two lines.
ii. Determine the corresponding values for y for both straight lines if x = -1.
iii. Use the graph to find the values for y for the two relations

<table>
<tr><td>X</td><td>6-3</td><td>7-2</td><td>8-1</td><td>9-0</td><td>1</td><td>2</td></tr>
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Take feedback from learners and summarize the lesson.</td>
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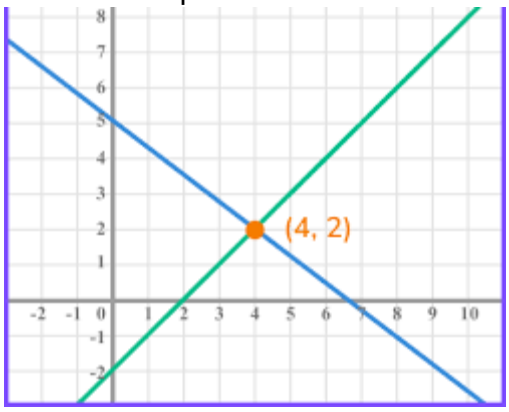
SECOND TERM
WEEKLY LESSON NOTES
WEEK 4

Week Ending: WEEK 4	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Patterns and Relations	
Content Standard: B9.2.1.1 Demonstrate the ability to construct tables of values for pairs of linear relations, graph the relations in a number plane and determine the intersection of the lines to solve simultaneous linear equations		**Indicator:** B9.2.1.1.3 Use graphs to solve equations involving two linear relations	**Lesson:** 1 of 1
Performance Indicator: Learners can identify the variables and coefficients in linear equations.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 182			
New words: graphs, equations, linear, relations			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by discussing situations where two linear relations might intersect in real life (e.g., paths of two moving objects). Connect the concept of intersections to solutions of systems of linear equations. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Review the structure of linear equations (e.g., y= mx + b). Identify variables, coefficients, and constants in sample linear equations. Discuss the importance of having two equations to find a unique solution. Demonstrate graphing linear equations on a coordinate plane. Use simple examples and guide learners through plotting points and drawing lines. Emphasize labeling axes, choosing appropriate scales, and representing equations visually. Provide practice problems involving systems of linear equations. Guide learners in graphing the equations and finding the point(s) of intersection.	Graphing paper or access to online graphing tools

	Discuss different scenarios based on the number of intersections (one, none, or infinite solutions). Present real-world problems that can be modeled with systems of linear equations. Guide learners in translating problems into equations, graphing, and interpreting solutions. Encourage discussions on the significance of intersection points in practical scenarios. Distribute worksheets with problems of varying difficulty levels. Allow learners to independently graph equations and find solutions.	
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: WEEK 4	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Patterns and Relations	
Content Standard: B9.2.1.1 Demonstrate the ability to construct tables of values for pairs of linear relations, graph the relations in a number plane and determine the intersection of the lines to solve simultaneous linear equations		**Indicator:** B9.2.1.1.3 Use graphs to solve equations involving two linear relations	**Lesson:** 1 of 1
Performance Indicator: Learners can graph linear relations on a coordinate plane and interpret the coordinates of the intersection point as the solution to a system of equations.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 182			
New words: graphs, equations, linear, relations			

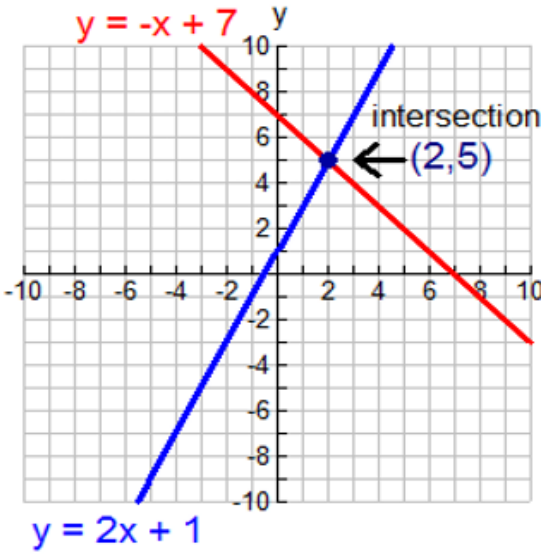
Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Display two graphs of linear relations intersecting at a single point. Ask learners to describe what they see and what the point of intersection represents.  Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Review the process of graphing linear equations using slope and y-intercept. Emphasize that each point on a graph represents a solution to the equation. Demonstrate how to check solutions by substituting coordinates into the equations. Explain that the point where two graphs intersect represents a solution that satisfies both equations simultaneously. Guide learners through examples to identify intersection points and interpret their coordinates as solutions.	Graph paper, Rulers

Highlight that multiple intersection points indicate multiple solutions. Discuss cases where graphs are parallel or coincident (infinite or no solutions).

Provide learners with pairs of linear equations and challenge them to:

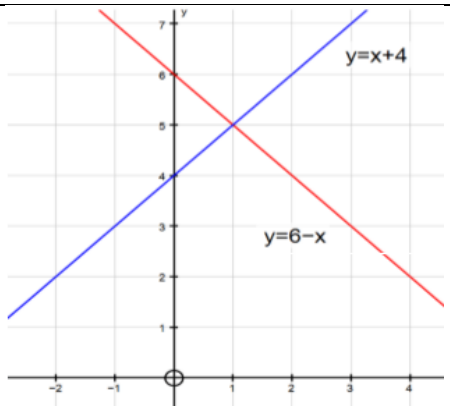
- Graph each equation on the same coordinate plane.
- Identify the point of intersection (if it exists).
- State the solution as an ordered pair.

Check the solution by substituting into the equations.
Example 1: Solve the following equations simultaneously using a graph.
y = -x + 7
y = 2x + 1



Hint: Draw the graph and find the coordinates for the intersection of the two lines
In the graph shown the values of (x, y) = (2, 5)

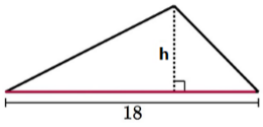
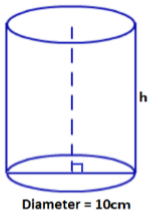
<u>Assessment</u>
Solve two linear equations simultaneously using the graph.
From the graph, determine the values of x and y that makes the linear equations true.
y = x + 4
y = 6 - x

		
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 5

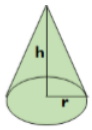
Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Algebraic Expressions	
Content Standard: B9.2.2.1 Demonstrate an understanding of (i) change of subject (ii) substituting values to evaluate expressions, and (iii) factorize expressions that have simple binomial as a factor	**Indicator:** B9.2.2.1.1 Perform change of subject of a given formula and use it to solve problems.	**Lesson:** 1 of 1	
Performance Indicator: Learners can perform algebraic manipulations to isolate the desired variable and apply formula manipulation to solve problems in various contexts		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 184			
New words: formula, substituting, factorize, manipulations			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by reviewing familiar formulas learners encounter in everyday life (e.g., area of a rectangle, perimeter of a triangle). Ask them to identify the variables involved and discuss why manipulating formulas might be useful. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Explain the concept of changing the subject of a formula as rearranging it to isolate a specific variable. Use a simple formula like distance = speed × time and visually demonstrate isolating each variable step-by-step. Emphasize the importance of balancing the equation throughout the process. Provide guided practice with problems involving formulas like: • Area of a circle: πr^2 (isolate r) • Volume of a cylinder: $\pi r^2 h$ (isolate h) • Pythagorean theorem: $a^2 + b^2 = c^2$ (isolate a or b) Encourage learners to verbalize their thought process at each step and explain the algebraic operations used. Provide differentiated problems of varying difficulty levels. Allow learners to apply their newly acquired skills independently and assess their understanding.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Offer support and personalized feedback as needed. Example 1: Make x the subject of the following formulae 1) q = x + 7 x = 7 – q 2) r = x -3 x = -3 – r 3) 5x = s $x = \frac{s}{5}$ <u>Assessment</u> 1) $\frac{3x+1}{2} = h$ 2) $3z = \frac{x}{4} + 1$ 3) Use the concept of change of subject to solve problems involving formulae i. The area of a rectangle is 24cm^2. If the length is 8cm, find the value of the width. ii. The formula for calculating the area of a circle is given as $\pi\pi oo2$. If a circle has an area of 154cm^2, what is its radius?[take π=22/7] 4) The triangle below has an area of 54cm2. Find the value of the height of the triangle.  5) The cylinder below has a volume of 330cm^3. Find the value of the height of the cylinder. [take π=22/7] 	
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:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Algebraic Expressions	
Content Standard: B9.2.2.1 Demonstrate an understanding of (i) change of subject (ii) substituting values to evaluate expressions, and (iii) factorize expressions that have simple binomial as a factor	**Indicator:** B9.2.2.1.2 Substitute values into given formulae to evaluate it and use it to solve problems	**Lesson:** 1 of 1	
Performance Indicator: Learners can substitute values into formulas correctly to evaluate them and apply formula evaluation to solve problems in various contexts	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)		
References: Mathematics Curriculum Pg. 182			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Engage learners with a fun superhero-themed warm-up activity (e.g., create superhero identities based on mathematical powers). Review familiar formulas from previous lessons (e.g., area, perimeter, volume). Discuss the role of variables and values within formulas. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Introduce the concept of substituting values into formulas to unlock their secrets. Provide a visual demonstration using a simple formula like area of a rectangle ($A = l \times w$). Emphasize the importance of matching variables with corresponding values. Provide guided practice with various formulas, encouraging student participation: • Area of a triangle ($A = 1/2 \times b \times h$) • Perimeter of a square ($P = 4s$) • Volume of a rectangular prism ($V = l \times w \times h$) Incorporate student whiteboards for individual practice and formative assessment. Present real-world scenarios requiring formula substitution and problem-solving: • Determining the cost of painting a rectangular wall given its dimensions and paint price per square meter. • Calculating the amount of fencing needed for a square garden.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	• Finding the volume of a gift box to ensure a present fits. Encourage learners to think critically, identify relevant formulas, and apply substitution skills. Provide differentiated worksheets with problems of varying difficulty levels. Allow learners to work independently, showcasing their formula-solving powers. Offer support and feedback as needed. Example 1: Find the value of $(x-b)^2 - 3(x-b)$ *if* $x=2$ and $b=-5$ <u>Solution</u> $(x-b)^2 - 3(x-b)$ *if* $x=2$ and $b=-5$ $= (2--5)^2 - 3(2--5)$ $= (7)^2 - 3(7)$ $= 49 - 21$ $= 28$ <u>Assessment</u> 1. Make k the subject of the formula $\frac{1}{n} = \sqrt{\left(\frac{k^2+a^2}{hg}\right)}$ If n = $\frac{1}{n}$, a =3, h= 2, g= 32, find the value of k. 2. The formula for finding the volume of the shape below is given as $\frac{1}{n}\pi r^2 h$. find the volume if r=, h=21 	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 6

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Algebraic Expressions	
Content Standard: B9.2.2.1 Demonstrate an understanding of (i) change of subject (ii) substituting values to evaluate expressions, and (iii) factorize expressions that have simple binomial as a factor		**Indicator:** B9.2.2.1.3 Factorize expressions that have simple binomial	**Lesson:** 1 of 1
Performance Indicator: Learners can Identify common factors in expressions and apply the distributive property to factorize expressions with simple binomials.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 182			
New words: Factorize, distributive, property, binomials			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Capture attention with a secret code-breaking activity or a "factorization treasure hunt" around the classroom. Introduce factorization as a way to decode expressions and reveal hidden structures. Review basic terms like factors, product, and monomial. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Guide learners to identify common factors in expressions using examples: $6x + 4 = 2(3x + 2)$ $15y - 10 = 5(3y - 2)$ Emphasize the distributive property as the key to "unlocking" common factors. Introduce factorization of simple binomials: $x^2 + 5x = x(x + 5)$ $6y - 4y^2 = 2y(3 - 2y)$ Provide guided practice with various examples, encouraging student participation. Highlight patterns and strategies for efficient factorization. Present more complex expressions involving multiple binomials: Example 1: factorize completely $2x^2 + 6x - 4$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Solution $2x^2 + 6x - 4 = 2(x^2 + 3x - 2)$ $= 2(x + 2)(x + 1)$ Example 2: factorize completely $10y^2 - 5y - 15$ Solution $10y^2 - 5y - 15 = 5(2y^2 - y - 3)$ $= 5(2y + 1)(y - 3)$ Encourage teamwork and problem-solving skills. Provide differentiated worksheets for individual practice. Offer support and feedback as needed. Assessment Factorize the following expressions i. 3x + 4xy = x (3 +4y) ii. 12ab + 16b = 4b (3a + 4) iii. -13xy + 39x= -13x(y-3) iv. 5y-2y2+3y=-3y+3y v. 8y-2y2= 2y(4-y) vi. -6x+12=-3(2x-4)	
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:** Algebra
Class: B9	**Class Size:**	**Sub Strand:** Algebraic Expressions

Content Standard: B9.2.2.1 Demonstrate an understanding of (i) change of subject (ii) substituting values to evaluate expressions, and (iii) factorize expressions that have simple binomial as a factor	**Indicator:** B9.2.2.1.4 Use the knowledge of simplifying and factorizing expressions to solve real world problems	**Lesson:** 1 of 1

Performance Indicator: Learners can translate real-world scenarios into mathematical models using formulas and solve real-world problems involving simplification and factorization	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)

References: Mathematics Curriculum Pg. 182

New words: real-world, scenarios, formulas, simplification, factorization

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin by showcasing engaging images or scenarios highlighting applications of mathematics in everyday life (e.g., construction, sports, cooking). Discuss how formulas and calculations power these activities. Briefly review key simplification and factorization skills. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Introduce the concept of translating real-world situations into mathematical expressions. Use a simplified example like calculating the total cost of buying fruits based on their price per kilogram. Guide learners through identifying relevant variables, writing expressions, and simplifying to obtain the final answer. Present a problem involving more complex calculations, requiring factorization for efficient solution. For example, calculating the area of a garden after combining rectangular sections with different dimensions. Demonstrate how factorization can simplify the expression and streamline the calculations. Encourage learners to explain their reasoning and steps. Provide a variety of real-world problem scenarios on worksheets or projected images. Each scenario should involve variables, formulas, and potential for simplification and/or factorization.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Encourage individual or group work, fostering collaboration and discussion. Offer support and guidance as needed. Example 1: You purchased 10 items from a shopping plaza, and now you need plastic bags to carry them home. If each bag can hold only 3 items, how many plastic bags will you need to accommodate the10 items? <u>Solution</u>: We use simple algebraic formula $\frac{x}{y}$ to calculate the number of bags. x = Number of items purchased = 10 y = Capacity of 1 bag = 3 Hence, $\frac{10}{3}$ = 3.333 bags = 4 bags So, we need 4 shopping bags to carry 10 items. Example 2: You have to buy two dozen of eggs priced at GH₵10, three loaves breads (each bread is GH₵5), and five bottles of juice (each bottle is GH₵8). How much money will you need to take to the grocery store? <u>Solution</u> The prices are a = Price of two dozen eggs = GH₵10 b = Price of one bread = GH₵5 c = Price of one bottle of juice = GH₵8 => Money needed = a + 3b + 5c => Money needed = GH₵10 + 3(GH₵5) + 5(GH₵8) = GH₵10 + GH₵15 + GH₵40 = GH₵65 Dedicate time for learners to share their solutions and approaches to different problems. <u>Assessment</u> 1. The area of a rectangle is 72 cm2. The length is twice its width. What is the length and width of the rectangle?	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 7

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients	**Indicator:** B9.2.3.1.1 Solve single variable linear inequalities with rational coefficients		**Lesson:** 1 of 1
Performance Indicator: Learners can identify key terms like inequality symbols (<, >, ≤, ≥), variables, and coefficients and apply algebraic operations to solve single-variable linear inequalities.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 182			
New words: variables, single-variable, linear, inequalities, coefficients			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Introduce inequalities as mathematical expressions representing "unequal" relationships, using balance scales as a visual analogy. Demonstrate how weights on each side represent expressions and how the inequality symbol indicates which side is "heavier." Compare inequality symbols to equality symbols to highlight the difference. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Review inequality symbols (<, >, ≤, ≥) and their meanings in words and on a number line. Provide examples and practice with comparing numbers and identifying correct symbols. Explain how algebraic operations (addition, subtraction, multiplication, division) affect inequalities, emphasizing the importance of "flip-flopping" the inequality symbol when multiplying or dividing by a negative number.	Number line models (printable or interactive)

- Adding a constant to both sides of an inequality does not change the direction of the inequality. For example, if a<b, then a+c<b+c.

- Similarly, subtracting a constant from both sides of an inequality preserves the direction of the inequality. If a<b, then a−c<b−c.

- Multiplying both sides of an inequality by a positive constant preserves the direction of the inequality. If a<b and c>0, then ac < bc.

- This is where the "flip-flopping" occurs. If you multiply both sides of an inequality by a negative constant, the direction of the inequality flips. If a<b and c<0, then ac>bc.

- Similar to multiplication, dividing both sides of an inequality by a positive constant preserves the direction of the inequality. If
- a<b and c>0, then $\frac{a}{c} < \frac{c}{b}$
- Just like multiplication, dividing both sides of an inequality by a negative constant flips the direction of the inequality.
- If
- a<b and c<0, then $\frac{a}{c} > \frac{c}{b}$

When dealing with negative numbers, it's crucial to be mindful of the "flip-flopping" effect. This is because multiplying or dividing by a negative number essentially reverses the order of the numbers on the number line. As a result, the relationship between the two values also reverses, and the inequality symbol needs to be flipped.

For example:
If x < 3, multiplying both sides by -2 gives −2x > −6.
If y > −4, dividing both sides by -2 gives y<2.

Provide guided practice with examples:
Example 1: Solve 3x + 5 < 14

Solution
3x + 5 < 14
To solve the inequality 3x+5<14, we first need to isolate the x term. To do this, we subtract 5 from both sides of the inequality.

This gives us: 3x < 9

	We then divide both sides of the inequality by 3. *This gives us: x < 3* Example 2: Solve -2y ≥ 10 *Solution* *-2y ≥ 10 = -2y / -2 ≥ 10 / -2 = y ≤ -5* Example 3: Solve 4x - 7 > 3x + 2 *Solution* *we first need to isolate the x term = 4x – 3x > 2 + 7* *= x > 9* Demonstrate how to represent solutions of linear inequalities on a number line, using shading or arrows to indicate the range of values. Provide practice with graphing solutions individually or in pairs. Assessment 1. $2x + 7 > \frac{5}{2}$ 2. $\frac{4}{5} - \frac{1}{5}x > \frac{2}{7}$ 3. $\frac{3}{2}y - \frac{2}{5} < \frac{4}{5}$ 4. $\frac{1}{2}(5x - 4) < x + \frac{11}{24}$ 5. $\frac{1}{3} > x - \frac{4}{5}$ 6. $\frac{1}{2}(x + 3) \leq x + 1$	
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:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients	**Indicator:** B9.2.3.1.1 Solve single variable linear inequalities with rational coefficients		**Lesson:** 1 of 1
Performance Indicator: Learners can represent solutions graphically on a number line	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)		
References: Mathematics Curriculum Pg. 182			
New words: variables, single-variable, linear, inequalities, coefficients			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson by inviting volunteers to solve questions on the board. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Introduce inequalities as mathematical expressions representing "unequal" relationships, using the balance as a visual metaphor. Explain how weights on each side represent expressions and how the inequality symbol shows which side "outweighs" the other. Play a quick memory game or matching activity with inequality symbols (<, >, ≤, ≥) to solidify their recognition. Discuss the difference between these symbols and the equal sign (=), emphasizing the "tipping point" aspect of inequalities. Provide guided practice with examples: ● 3x + 5 > 14 (Solve for x and flip the sign when dividing by 3) ● -2y ≤ 10 (Isolate y and flip the sign when multiplying by -1) ● 4x - 7 < 3x + 2 (Combine like terms before comparing) Introduce the number line as a court of justice for inequalities, where each point represents a potential solution.	Dice or spinners (optional, for generating practice problems

	Demonstrate how to shade or mark the regions on the number line that satisfy the inequality based on the symbol. Encourage learners to practice graphing solutions individually or in pairs, discussing their reasoning. <u>ASSESSMENT</u> 1. $\frac{1}{2}(2x+3) \geq x + 1$ 2. $-\frac{2}{3}x + 3 \geq 0$ 3. $\frac{1}{2}(x + 3) \leq x + 1$	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 8

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients	**Indicator:** B9.2.3.1.2 Illustrate solution sets of linear inequalities on the number line	**Lesson:** 1 of 1	
Performance Indicator: Learners can Illustrate solution sets of linear inequalities on the number line	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)		
References: Mathematics Curriculum Pg. 182			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Play a quick "true or false" game to activate prior knowledge of equality and order of operations. Show examples like 5 + 3 = 8 (true), 4 × 2 < 6 (true), 10/2 > 4 (false). Introduce the concept of inequalities as comparisons that are not "equal to." Ask learners for examples of situations where "less than," "greater than," etc. are used in real life. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Show and explain each inequality sign with clear visualizations: ● "<" as an open mouth "eating" the larger number. ● ">" as an open mouth "swallowing" the smaller number. ● "≤" as a closed mouth including the larger number as a possibility. ● "≥" as a closed mouth including the smaller number as a possibility. Write clear examples of each symbol used in inequalities like 4 < 9, 7 > 2, 3 ≤ 5, and 1 ≥ 0.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

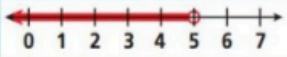
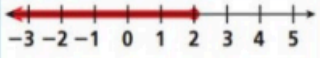
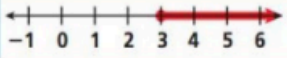
Explain the difference between open and closed circles on the number line.

Present verbal statements like "John has less than 10 marbles" or "The temperature is greater than 30 degrees Celsius."

Guide learners to translate these statements into mathematical inequalities using the correct symbols.

Practice several such examples as a class, ensuring comprehension.

Introduce the concept of graphing inequalities on a number line.

Word Phrase	Inequality	Solution Set
x is less than 5	$x < 5$	
a is greater than 0 a is more than 0	$a > 0$	
y is less than or equal to 2 y is at most 2	$y \leq 2$	
m is greater than or equal to 3 m is at least 3	$m \geq 3$	

Use an example inequality like $2x < 6$ to demonstrate the steps:

- Solve for x to find the boundary point ($x < 3$).
- Draw a line to the right of 3 (excluding it) as 3 is not included in the solution.
- Shade the region to the left of the line, as all values smaller than 3 satisfy the inequality.

Repeat with other examples, involving both open and closed circles on the number line.

Encourage learners to work individually or in pairs, offering support as needed.

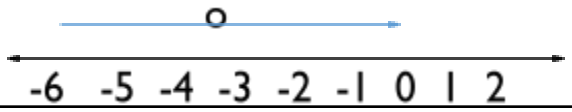
Example 1: Solve $-3x - 8 > -26$

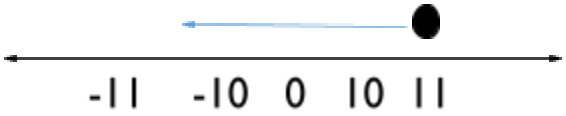
<u>Solution</u>

$-3x - 8 > -26 = -3x > -26 + 8$

$-3x < 18$

$x > -6$



	Example 2: Solve $2x - 3 \leq 19$ <u>Solution</u> $2x - 3 \leq 19 = 2x \leq 19 + 3$ $2x \leq 22 = x \leq 11$  <u>Assessment</u> 1. $2x + 7 \geq \frac{5}{2}$ 2. $\frac{4}{5} - \frac{1}{5}x \geq \frac{2}{7}$ 3. $\frac{3}{2}y - \frac{2}{5} \leq \frac{4}{5}$ 4. $\frac{1}{2}(5x - 4) \leq x + \frac{11}{24}$ 5. $\frac{1}{3} \geq x - \frac{4}{5}$ $\frac{1}{2}(x + 3) \leq x + 1$	
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:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients		**Indicator:** B9.2.3.1.2 Illustrate solution sets of linear inequalities on the number line	**Lesson:** 1 of 1
Performance Indicator: Learners can illustrate solution sets of linear inequalities on the number line		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 182			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Review previous knowledge of inequalities with a quick quiz or game. Ask learners to recall the symbols and their meanings (<, >, ≤, ≥) and give examples of each. Discuss real-life scenarios where inequalities are used, like budget limitations or competition rankings Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Start with simple inequalities like $2x < 6$. Demonstrate the process of isolating x by dividing both sides by 2. Explain how the inequality sign remains unchanged if we multiply or divide both sides by a positive number. Reverse the inequality if necessary to ensure x is isolated on the left. Introduce the concept of "boundary points" and their role in solutions. Start with simple inequalities like $2x < 6$. Demonstrate the process of isolating x by dividing both sides by 2. Explain how the inequality sign remains unchanged if we multiply or divide both sides by a positive number. Reverse the inequality if necessary to ensure x is isolated on the left.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Introduce the concept of "boundary points" and their role in solutions. Introduce the concept of graphing linear inequalities on a Cartesian plane (coordinate system). Explain how linear inequalities translate to linear equations with specific shading regions. Start with simple examples like $y \leq 2x$, where the equation forms a boundary line and we shade the region below it. Discuss how the direction of the inequality determines the shading direction (above or below the line).	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 9

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients		**Indicator:** B9.2.3.1.3 Solve real-life problems involving linear equations and inequalities	**Lesson:** 1 of 1
Performance Indicator: Learners can translate word problems into mathematical equations and inequalities.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 193			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Engage learners with a "guess the mystery number" game. Give clues that lead to an equation, and let learners solve for the unknown number. Discuss real-life examples where they might use math in their daily lives (e.g., budgeting, cooking, sports). Ask them if they ever encounter situations where equations or inequalities might be helpful. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Present several scenario-based word problems involving linear equations and inequalities. Examples could include: ● Planning a movie night with popcorn and drinks on a limited budget. ● Calculating the distance traveled based on speed and time. ● Determining the age range eligible for a school bus pass. Guide learners through analyzing each problem, identifying key information, and recognizing which mathematical concepts apply.	manipulatives like counters or algebra tiles

Break down each scenario into simpler components. Show learners how to translate words like "total cost," "speed," or "age range" into mathematical variables and expressions.

Demonstrate how relationships between variables can be written as equations with equal signs or inequalities with comparison signs.

Example 1: A man has 260metres of fencing which he is going to put around a rectangular field which is 50metres wide. How long is the field?

Solution:
Since we need to find the length of the field, let x meters be the length.

$x + 50 + x + 50$ *or* $2(x + 50)$

But this expression is given as 260m ∴
$2(x + 50) = 260$
$x + 50 = 130$
$x = 80$m

Example 2: A man paid GH₵ 290 for 11 books. Some of the books were geography books, and the rest were history books. If each geography book cost GH₵ 30 and each history book cost GH₵20, how many geography books did he buy?

Solution:
i. Total cost of the books is GH₵290; total number of books is 11.
ii. 1 geography book costs GH₵30; 1 history book costs GH₵20,
Total cost of all the books is $30xx + 20(11 - x) = 290$
∴ $30x + 20\ (11 - x) = 290$
$30x + 220 - 20x = 290$
$10x + 220 = 290$
$x = 77$

Hence the number of geography books bought is 7.

	Example 3: Two sides of a triangle have lengths 6 cm and 8 cm. What is the length of the third side? Note: The sum of the lengths of the two sides of a triangle is greater than the length of the third side If the third side is $x$cm long then, 6 + 8 > x giving x < 14 Also, 6 + x < 8 giving x > 2. Also, 8 + x > 6 which gives x > -2h Hence, 2 < x < 14. That is, the third side has length between 2cm and 14cm. Example 4: Encourage learners to ask questions and clarify any confusion before moving on. Guide learners through the process of solving their mathematical equations or inequalities. Emphasize proper steps like isolating variables, combining like terms, and using appropriate operations. Encourage the use of manipulatives or visuals to aid understanding when necessary. Celebrate finding the solutions and discuss their meaning in the context of the original problem. <u>Assessment</u> A student scores 70 and 76 marks in two tests. How many marks must she score in the third test to be put in Grade A if all learners scoring an average of 80 or higher in three tests are put in grade A?	
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:** Algebra	
Class: B9	**Class Size:**	**Sub Strand:** Variables and Equations	
Content Standard: B9.2.3.1 Demonstrate understanding of single variable linear inequalities with rational coefficients		**Indicator:** B9.2.3.1.3 Solve real-life problems involving linear equations and inequalities	**Lesson:** 1 of 1
Performance Indicator: Learners can translate word problems into mathematical equations and inequalities.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 193			
New words:			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Engage learners with a "guess the mystery number" game. Give clues that lead to an equation, and let learners solve for the unknown number. Discuss real-life examples where they might use math in their daily lives (e.g., budgeting, cooking, sports). Ask them if they ever encounter situations where equations or inequalities might be helpful. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Guide learners through analyzing each problem, identifying key information, and recognizing which mathematical concepts apply. Break down each scenario into simpler components. Show learners how to translate words like "total cost," "speed," or "age range" into mathematical variables and expressions. Demonstrate how relationships between variables can be written as equations with equal signs or inequalities with comparison signs. Example 1: If a student needs an average of 85 in four tests to get Grade A, and their scores in the first three tests are 80, 90, and 88, what must they score in the fourth test?	manipulatives like counters or algebra tiles

Solution
(a) Total needed marks: 85 * 4 = 340 marks.
(b) Existing marks: 80 + 90 + 88 = 258 marks.
(c) Marks needed in fourth test: 340 - 258 = 82 marks.

Example 2: In a class, Grade A requires an average of 75 or higher in two tests. A student scored 72 on the first test. What is the minimum score needed on the second test to get Grade A?

Solution
(a) Minimum average for Grade A: 75.
(b) Minimum total marks needed: 75 * 2 = 150 marks.
(c) Marks needed in second test: 150 - 72 = 78 marks (minimum).

Example 3: A school gives Grade A to learners who score an average of 82 or higher, or a total of 250 marks or more in three tests. A student scored 85 and 80 on the first two tests. What is the minimum score needed for the third test to get Grade A?

Solution
(a) Option 1: Minimum average needed: 82.
(b) Option 1: Minimum total marks needed: 82 * 3 = 246 marks.
(c) Option 1: Marks needed in third test: 246 - 85 - 80 = 81 marks (minimum).
(d) Option 2: Minimum total needed: 250 marks.
(e) Option 2: Marks needed in third test: 250 - 85 - 80 = 85 marks (minimum).
(f) Comparing options: Either 81 or 85 can secure Grade A, depending on whether the student wants to meet the minimum average or minimum total.

Example 4: A bakery offers a discount if the total bill reaches ₵50 or more. You already purchased items for ₵32. How much more do you need to spend to get the discount?

Solution
(a) Total needed for discount: ₵50.
(b) Amount needed to spend further: ₵50 - ₵32 = ₵18.

Assessment
1. A bookstore offers a 15% discount if you buy more than 3 fiction books. Each fiction book costs ₵10, and each non-fiction book

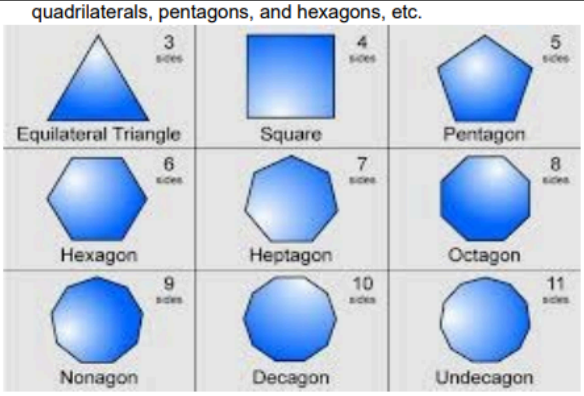
	costs ₵15. If you spend ₵85 without exceeding the discount limit, how many fiction books did you buy? 2. A library charges different fees for fiction and non-fiction books. Fiction books cost ₵2 each, and non-fiction books cost ₵3 each. A student borrowed 7 books in total and paid ₵17. How many fiction and non-fiction books did they borrow? 3. At a school fundraiser, you sell homemade cookies for ₵1.50 each and cupcakes for ₵2.00 each. Your goal is to raise ₵60. If you only sold 40 items in total, how many of each type did you sell? 4. A toy store offers a special pricing structure where the price of a toy is equal to the child's age multiplied by ₵3. If a child with 7 years old and another child with 9 years old spend ₵54 together, how many toys did they buy in total? 5. Five friends decide to buy a used textbook together. The book costs ₵30, and they want to split the cost equally. However, one friend forgets to pay their share. How much does each of the remaining friends need to pay now?	
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.	

SECOND TERM
WEEKLY LESSON NOTES
WEEK 10

Week Ending:	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Geometry & Measurement	
Class: B9	**Class Size:**	**Sub Strand:** Shapes and Space	
Content Standard: B9.3.1.1 Apply the properties of angles at a point, angles on a straight line, vertically opposite angles, corresponding, angles to` solve problems		**Indicator:** B9.3.1.1.1 Derive the formula for calculating the sum of angles in any polygon and use this to calculate the value of missing angles in polygons	**Lesson:** 1 of 1
Performance Indicator: Learners can apply the formula to find missing angles and solve problems involving polygons.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 196			
New words: Polygon, Triangle, Quadrilateral, Pentagon, Hexagon, Interior Angle			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Play a quick "name the polygon" game. Show various shapes (triangles, squares, rectangles, etc.) and have learners identify them by name. Briefly introduce the concept of interior angles: the angles formed inside a polygon by its sides. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Review the characteristics of different polygons: triangles (3 sides, 180° interior angle sum), quadrilaterals (4 sides, varied interior angle sums), pentagons (5 sides), hexagons (6 sides), etc.	manipulatives like counters or algebra tiles

quadrilaterals, pentagons, and hexagons, etc.



Create a visual chart on the board, classifying polygons by their number of sides and using different colors or shapes for each category.

Engage learners in identifying and naming new examples of polygons.

Introduce the concept of the angle sum formula for polygons: (n - 2) × 180°, where n is the number of sides.

Guide learners through the derivation of the formula using a simple triangle and gradually adding sides to form various quadrilaterals and pentagons.

Emphasize that the formula applies to any polygon, regardless of its shape or regularity.

Practice using the formula to calculate the sum of interior angles in different polygons. Provide examples with triangles, quadrilaterals, pentagons, and hexagons.

Challenge learners to find missing angles in polygons if given some angles and the number of sides.

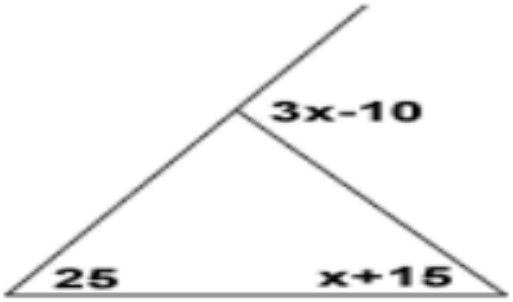
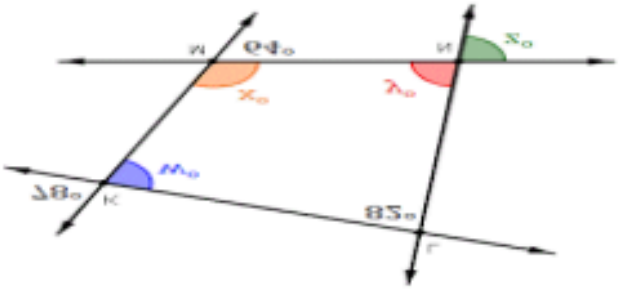
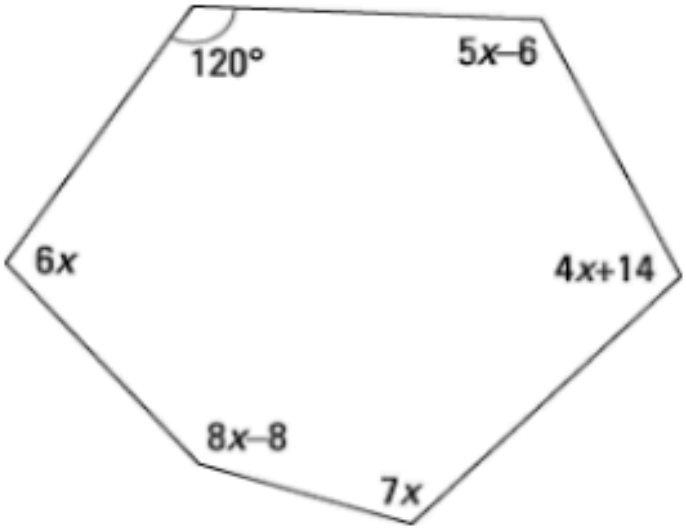
Encourage them to explain their reasoning and calculations clearly.

Present a more challenging problem involving a complex polygon with missing angles.

Have learners work in pairs or small groups to solve it using the formula and their understanding of interior angles.

<u>Assessment</u>

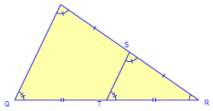
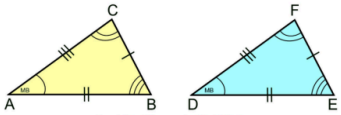
1: Derive and use the formula (n - 2) × 180 ° and calculate the value of x (interior and angles of a triangle)

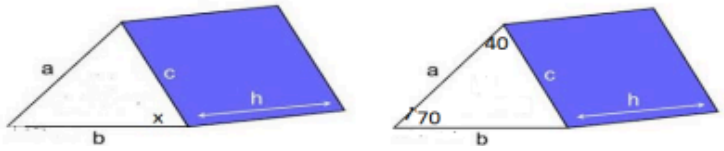
	 2: Derive and use the formula (n - 2) × 180 ° and calculate the interior angles of a quadrilateral  3: Derive and use the formula (n - 2) × 180 ° and calculate the interior angles of polygons, pentagons, hexagons,  (i) Find the value of x and the various angles in the hexagon	
PHASE 3: **REFLECTION**	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:** Shapes and Space

Content Standard: B9.3.1.1 Apply the properties of angles at a point, angles on a straight line, vertically opposite angles, corresponding, angles to` solve problems	**Indicator:** B9.3.1.1.2 Identify similar and congruent triangles and use the knowledge to solve related problems	**Lesson:** 1 of 1

Performance Indicator: Learners can apply the AA, SSS, and SAS similarity criteria to solve for missing angles in similar triangles.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 198	
New words: Triangle, Similar, Congruent, Corresponding Angles, Proportional Sides, AA Similarity,	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Play a "Guess the Triangle" game. Describe different triangles by their properties (number of sides, side lengths, angle measures) and have learners guess if they are similar, congruent, or neither. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Define and differentiate between similar and congruent triangles, emphasizing corresponding angles and proportional sides in similar triangles and identical side lengths and angles in congruent triangles. Explain the AA, SSS, and SAS similarity criteria with clear visuals and examples. Example 1: Recognise similar triangles and solve for the values of the indicated angles in the diagram below:  Example 2: Recognise congruent triangles and solve for the values of the indicated angles in the diagram below  $\Delta ABC \cong \Delta DEF$	manipulatives like counters or algebra tiles

	Example 3: Determine the value of x (using knowledge in similarity and congruency).  Briefly introduce the HL congruence rule, focusing on right triangles with hypotenuse and a leg having the same length. Practice recognizing similar and congruent triangles based on the given diagrams you mentioned. Guide learners through identifying corresponding angles and proportional sides to justify their answers. Ask learners to solve for missing angles in the similar triangles using the appropriate similarity criteria and proportional side ratios. For the congruent triangle, apply the HL congruence rule to find the missing angle based on the given hypotenuse and leg lengths. Present a real-world problem involving similar triangles, such as calculating the height of a tree based on its shadow and another object's height. Challenge learners to solve the problem using the AA similarity criteria and their understanding of proportional sides. Encourage them to think of other situations where similar or congruent triangles might be present in daily life.	
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.	