THIRD TERM
WEEKLY LESSON NOTES
WEEK 1

Week Ending: 30-06-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B8	**Class Size:**	**Sub Strand:** Multiplying & Dividing Fractions

Content Standard: B8.1.3.1 Apply the understanding of operation on fractions to solve problems involving fractions of given quantities and round the results to given decimal and significant places.	**Indicator:** B8.1.3.1.2 Multiplying & Dividing given fractions, by using the principle of the order of operations and apply the understanding to solve problems	**Lesson:** 1 of 1

Performance Indicator: Learners can multiplying & Dividing given fractions	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 102	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Engage learners in simple brain teaser. Example: I have GH₵200, and I want to give half of it to my son for transport. How much will I give to my son? Learners in pairs discuss the question and find the answer. Ask them to share their answers with the class. Share performance indicators and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Guide learners to use the order of operations (BODMAS or PEDMAS) to simplify whole number expressions with more than two operations. Have learners understand the meaning of PEDMAS as Parenthesis, Exponents, Multiply/Divide (going from left to right), Add/Subtract (going from left to right). Write this question on the board. i. 21 ÷ 3 + (3 × 9) × 9 + 5. Learners in pairs solve it using the PEDMAS principle and present their solutions to the class. <u>Solution</u> Parentheses: We do not have any parentheses in this expression, so we move to the next step. Exponents: We do not have any exponents in this expression, so we move to the next step. Multiplication and Division: We have multiplication and division in this expression, and we must perform them from left to right. So, first we perform 3 x 9, which is 27. Then, we perform 27 x 9, which is 243. Finally, we perform 21 ÷ 3, which is 7.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	The expression now becomes: 7 + 243 + 5 Addition and Subtraction: We have addition in this expression, so we add 7, 243, and 5 to get the final answer: 7 + 243 + 5 = 255 Therefore, 21 ÷ 3 + (3 × 9) × 9 + 5 equals 255. Write another question on the board and have learners solve in groups. 18 ÷ 6 × (4 - 3) + 6. Learners solve using the BODMAS principle. <u>Solution</u> Brackets: We have a bracket in this expression, so we must perform the operation inside it first. 4 - 3 equals 1. The expression now becomes: 18 ÷ 6 × 1 + 6 Division: We have division in this expression, so we must perform it next. 18 ÷ 6 equals 3. The expression now becomes: 3 × 1 + 6 Multiplication: We have multiplication in this expression, so we must perform it next. 3 × 1 equals 3. The expression now becomes: 3 + 6 Addition: We have addition in this expression, so we must perform it next. 3 + 6 equals 9. Therefore, 18 ÷ 6 × (4 - 3) + 6 equals 9. <u>Assessment</u> Solve the following using the PEDMAS OR BODMAS principle. i. 21 ÷ 3 + (3 × 9) × 9 + 5 ii. 18 ÷ 6 × (4 - 3) + 6 iii. 34 ÷ 9 + 40 – 23 × 32 ÷ 9 Through illustrations, guide learners to use the order of operations (BODMAS or PEDMAS) to simplify whole number expressions with more than two operations. <u>STEPS</u> • Begin by identifying any operations that are enclosed in brackets or parentheses. Simplify these operations first, starting with the innermost set of brackets and working outward. If there are nested brackets, work from the innermost to the outermost brackets.	

	• If there are any exponents (powers or roots), perform these operations next, from left to right. • Next, perform any multiplication or division operations from left to right, whichever comes first in the expression. • Finally, perform any addition or subtraction operations from left to right, whichever comes first in the expression. Example; Simplify the expression: 5 + 3 × 4 ÷ 2 - 1 There are no operations in brackets or parentheses, so we move on to the next step. There are no exponents, so we move on to the next step. We perform the multiplication and division operations from left to right. 3 × 4 equals 12, and 12 ÷ 2 equals 6. The expression now becomes: 5 + 6 – 1 We perform the addition and subtraction operations from left to right. 5 + 6 equals 11, and 11 - 1 equals 10. Therefore, 5 + 3 × 4 ÷ 2 - 1 equals 10. Write this question on the board and have learners work it out in pairs. $\frac{2}{4} + \frac{5}{8} * \frac{4}{5} - \frac{1}{6}$ <u>Solution</u> = 1/2 + (5/8 * 4/5) - 1/6 (multiplication first) = 1/2 + (20/40) - 1/6 (simplify 5/8 * 4/5 = 20/40) = 1/2 + 1/2 - 1/6 (simplify 20/40 = 1/2) = 3/2 - 1/6 (addition/subtraction from left to right) = (9/6) - (1/6) (convert 3/2 to a fraction with a common denominator) = 8/6 (subtract 1/6 from 9/6) = 4/3 (simplify 8/6 to lowest terms) Therefore, the solution is 4/3. <u>Assessment</u> Solve the following 1. $\frac{3}{4} \div \frac{3}{8} + (\frac{4}{5} - \frac{1}{2})$ 2. $(\frac{3}{4} + \frac{5}{8}) * \frac{4}{11} - \frac{1}{2}$	
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: 30-06-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B8	**Class Size:**	**Sub Strand:** Fractions

Content Standard: B8.1.3.1 Apply the understanding of operation on fractions to solve problems involving fractions of given quantities and round the results to given decimal and significant places.	**Indicator:** B8.1.3.1.3. Review word problems involving basic operations on fractions and related concepts.	**Lesson:** 1 of 1

Performance Indicator: Learners can review fractions and solve problems involving basic operations on fractions	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 102	

<table>
<tr><td>Phase/Duration</td><td>Learners Activities</td><td>Resources</td></tr>
<tr><td>PHASE 1:
STARTER</td><td>Let learners determine the missing number in the box

<table>
<tr><td>1</td><td>2</td><td>3</td><td rowspan="4">Answer: 43</td></tr>
<tr><td>5</td><td>7</td><td>9</td></tr>
<tr><td>15</td><td>18</td><td>21</td></tr>
<tr><td>35</td><td>39</td><td>?</td></tr>
</table>

Share performance indicators and introduce the lesson.</td><td></td></tr>
<tr><td>PHASE 2: NEW LEARNING</td><td>Revise with learners the steps involved in solving word problems involving basic operations on fractions.
<u>Steps</u>

Read the problem carefully and identify the important information. Pay attention to the quantities, units, and any keywords or phrases that indicate what operation you need to perform.
Write down what you know and what you need to find. Use variables to represent unknown quantities if necessary.
Decide which operation to use based on the problem. For example, if the problem involves finding a fraction of a whole number, you might use multiplication of fractions. If the problem involves dividing a fraction by another fraction, you might use division of fractions.
Perform the operation and simplify the answer if possible. Remember to follow the rules for adding, subtracting, multiplying, and dividing fractions.

Write an example on the board and have learners work in pairs.
Jane has 2/3 of a pizza left. If she divides it equally among herself and two friends, how much pizza will each person get?

<u>Solution</u>:
To divide the pizza equally among three people, we need to find 2/3 ÷ 3. Using division of fractions, we get (2/3) ÷ (3/1) = 2/9.</td><td>Counters, bundle and loose straws base ten cut square, Bundle of sticks</td></tr>
</table>

	Therefore, each person will get 2/9 of the pizza. If it takes 3/4 of an hour to drive 30 miles, how long will it take to drive 45 miles? <u>Solution</u>: We can use a proportion to solve this problem. Let x be the number of hours it takes to drive 45 miles. Then, we have the proportion: 3/4 = 30/x. Cross-multiplying, we get 3x = 120, which means x = 40 minutes or 2/3 of an hour. A recipe calls for 3/4 cup of sugar to make 12 cookies. How much sugar is needed to make 36 cookies? <u>Solution</u>: To make 36 cookies, we need to triple the recipe. So, we need to triple both the amount of sugar and the number of cookies. 3/4 cup of sugar for 12 cookies is equivalent to (3/4) ÷ (12/12) = 1/4 cup of sugar per cookie. Therefore, to make 36 cookies, we need (1/4) x 36 = 9 cups of sugar. <u>Assessment</u> i. Faako answers 42 out of 60 questions correctly. What percentage of her answers are correct? <u>Solution</u> Percentage of correct answers = (Number of correct answers / Total number of questions) x 100 In this case, Faako answered 42 out of 60 questions correctly, so: Percentage of correct answers = (42 / 60) x 100 Percentage of correct answers = 0.7 x 100 Percentage of correct answers = 70% Therefore, Faako answered 70% of the questions correctly. ii. John ran 2/3 of a mile in 4 minutes. At the same pace, how long will it take him to run 1 mile?	
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 2

Week Ending: 07-07-2023	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Number	
Class: B8	**Class Size:**	**Sub Strand:** Ratios and Proportion	
Content Standard: B8.1.4.1Demonstrate an understanding of ratio, rate and proportions and use it these to solve real-world mathematical problems	**Indicator:** B8.1.4.1.1 Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities		**Lesson:** 1 of 1
Performance Indicator: Learners can use ratio reasoning to convert measurement units		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 102			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Using blackboard illustrations, review learners understanding in the previous lesson. Introduce the lesson by sharing the performance indicators.	
PHASE 2: **NEW LEARNING**	Revise with learners on some common units of measurement. Brainstorm learners for the difference between ratio and rates. *A ratio is a comparison of two quantities that are related in some way, usually expressed in the form of a fraction or a colon. For example, if there are 10 boys and 20 girls in a classroom, the ratio of boys to girls is 10:20, which can be simplified to 1:2.* *A rate, on the other hand, is a comparison of two quantities that have different units of measurement, often expressed in the form of a fraction or a percentage. Rates are used to describe how quickly or how often something occurs. For example, if a car travels 60 miles in one hour, its rate of speed is 60 miles per hour (mph).* Guide learners to convert (cm to m; km to m; ml to cm; etc.) one unit of measure to another using ratio reasoning. *To convert centimeters to meters, you need to divide the number of centimeters by 100. This is because there are 100 centimeters in one meter.* *The formula for converting centimeters to meters is:* *meters = centimeters / 100* *For example, if you have a length of 150 centimeters, the calculation would be:* *meters = 150 / 100* *meters = 1.5* *Therefore, 150 centimeters is equivalent to 1.5 meters.*	Counters, bundle and loose straws base ten cut square, Bundle of sticks

To convert meters to centimeters, you can multiply the value in meters by 100. For example, if you have a distance of 2 meters, you can convert it to centimeters by multiplying 2 by 100, giving you a result of 200 centimeters.

The formula for the conversion of meters to centimeters is:
Centimeters = Meters x 100

For instance, if you have a measurement of 5.5 meters, the conversion to centimeters would be:

Centimeters = 5.5 meters x 100

Centimeters = 550 centimeters

Therefore, 5.5 meters is equivalent to 550 centimeters.

To convert meters to kilometers, you can divide the value in meters by 1000. For example, if you have a distance of 5000 meters, you can convert it to kilometers by dividing 5000 by 1000, giving you a result of 5 kilometers.

The formula for the conversion of meters to kilometers is:

Kilometers = Meters / 1000

For instance, if you have a measurement of 8000 meters, the conversion to kilometers would be:

Kilometers = 8000 meters / 1000

Kilometers = 8 kilometers

Therefore, 8000 meters is equivalent to 8 kilometers.

To convert millimeters to centimeters, you can divide the value in millimeters by 10. For example, if you have a length of 50 millimeters, you can convert it to centimeters by dividing 50 by 10, giving you a result of 5 centimeters.

The formula for the conversion of millimeters to centimeters is:

Centimeters = Millimeters / 10

For instance, if you have a measurement of 250 millimeters, the conversion to centimeters would be:

Centimeters = 250 millimeters / 10

Centimeters = 25 centimeters

Therefore, 250 millimeters is equivalent to 25 centimeters.

Guide learners to manipulate and use units appropriately to solve problems.
Example: Agbo walks 4km to school every day. He uses 60minutes. Rukiya uses 45minutes to cover 4200m. Which of the two learners is faster?

<u>Solution</u>
Let's convert Rukiya's distance to kilometers:
4200 meters = 4.2 kilometers

Rukiya covers 4.2 kilometers in 45 minutes, which can be expressed as:
Speed = Distance / Time = 4.2 km / 0.75 hours = 5.6 km/hour

Now let's calculate Agbo's speed:
Speed = Distance / Time = 4 km / 1 hour = 4 km/hour

<u>Assessment</u>

	• Convert 3200cm to meters • How many centimeters are in 60m? • Change 7.2m to centimeters. • Convert 800m to km.	
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.	

<table>
<tr><td>Week Ending: 07-07-2023</td><td>DAY:</td><td colspan="2">Subject: Mathematics</td></tr>
<tr><td colspan="2">Duration: 60MINS</td><td colspan="2">Strand: Number</td></tr>
<tr><td>Class: B8</td><td>Class Size:</td><td colspan="2">Sub Strand: Ratios and Proportion</td></tr>
<tr><td>Content Standard:
B8.1.4.1Demonstrate an understanding of ratio, rate and proportions and use it these to solve real-world mathematical problems</td><td colspan="2">Indicator:
B8.1.4.1.2 Solve unit rate problems including those involving unit pricing and constant speed; and speed translation.</td><td>Lesson:
1 of 1</td></tr>
<tr><td colspan="2">Performance Indicator:
Learners can solve unit rate problems including those involving unit pricing and constant speed; and speed translation.</td><td colspan="2">Core Competencies:
Communication and Collaboration (CC)
Critical Thinking and Problem solving (CP)</td></tr>
<tr><td colspan="4">References: Mathematics Curriculum Pg. 105</td></tr>
</table>

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Using blackboard illustrations, review learners understanding in the previous lesson. Introduce the lesson by sharing the performance indicators.	
PHASE 2: **NEW LEARNING**	Guide learners to solve unit rate problems including those involving unit pricing and constant speed. Unit pricing problems involve calculating the price per unit of a particular item. To solve a unit pricing problem, divide the total cost of the item by the quantity of the item. For example: If a 24-pack of bottled water costs ₵5.99, what is the price per bottle? Solution: *Price per bottle = Total cost of 24-pack / Quantity of bottles* *Price per bottle = ₵5.99 / 24* *Price per bottle = ₵0.25* *Therefore, the price per bottle of water is $0.25.* <u>Constant speed problem</u>: Constant speed problems involve calculating the distance or time taken to travel a certain distance at a constant speed. To solve a constant speed problem, use the formula: distance = speed x time or time = distance / speed For example: If a car travels at a constant speed of 60 miles per hour, how far will it travel in 2.5 hours? Solution: *distance = speed x time* *distance = 60 mph x 2.5 hours* *distance = 150 miles* *Therefore, the car will travel 150 miles in 2.5 hours at a constant speed of 60 miles per hour.*	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	<u>Assessment</u> If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? Solution: To find out how many lawns could be mowed in 35 hours, we can use the following proportion: 4 lawns / 7 hours = x lawns / 35 hours Solving for x, we can cross-multiply: 4 lawns * 35 hours = 7 hours * x lawns 140 lawns = 7x x = 20 4 lawns / 7 hours = 0.57 lawns per hour So, the rate at which lawns were being mowed is 0.57 lawns per hour.	
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: 14-07-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B8	**Class Size:**	**Sub Strand:** Ratios and Proportion
Content Standard: B8.1.4.1Demonstrate an understanding of ratio, rate and proportions and use it these to solve real-world mathematical problems	**Indicator:** B8.1.4.1.4 Recognize and represent proportional relationships between quantities by deciding whether two quantities are in a proportional relationship.	**Lesson:** 1 of 1
Performance Indicator: Learners can recognize and represent proportional relationships between quantities by deciding whether two quantities are in a proportional relationship		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 105		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Using blackboard illustrations, review learners understanding in the previous lesson. Introduce the lesson by sharing the performance indicators.	
PHASE 2: **NEW LEARNING**	Brainstorm and discuss with learners the meaning of proportional relationship. *A proportional relationship is a type of relationship between two quantities in which their ratio remains constant. In other words, when one quantity is multiplied by a constant factor, the other quantity is also multiplied by the same constant facto.* For example, consider a situation where the distance traveled by a car is proportional to the time it takes to travel that distance. If the car travels 60 miles in 2 hours, then the distance-time ratio is 60/2 = 30 miles per hour. If the car then travels 90 miles, we can use the proportional relationship to find the corresponding time. Since the ratio is 30 miles per hour, the time it takes to travel 90 miles is 90/30 = 3 hours.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

Number of Hours	Miles	Ratio of miles to Hours
1	30	$\frac{30}{1} = 30$
2	60	$\frac{60}{2} = 30$
3	90	$\frac{90}{3} = 30$

Guide learners to solve examples on proportional relations.
Example: the table below shows the ime spent by kofi to cover certain distance on his motor bike. Determine whether the table is proportional or not.

Time (hr)	Distance (km)
0	0

2	6
4	12
6	18

Solution

Time (hr)	Distance (km)	Ratio of distance to time
0	0	0
2	6	$\frac{6}{2} = 3$
4	12	$\frac{12}{4} = 3$
6	18	$\frac{12}{4} = 3$

From the table, we can deduce that since the ratios are equivalent, the table is proportional.

<u>Assessment</u>

Study the table below and determine whether the table is proportional or not.

Time (hr)	Distance (km)
0	4
2	10
4	16
6	22

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: 14-07-2023	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Number	
Class: B8	**Class Size:**	**Sub Strand:** Ratios and Proportion	
Content Standard: B8.1.4.1Demonstrate an understanding of ratio, rate and proportions and use it these to solve real-world mathematical problems	**Indicator:** B8.1.4.1.5 Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.		**Lesson:** 1 of 1
Performance Indicator: Learners can make tables of equivalent ratios relating quantities that are proportional		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 102			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Using blackboard illustrations, review learners understanding in the previous lesson. Introduce the lesson by sharing the performance indicators.	
PHASE 2: **NEW LEARNING**	Guide learners to explain constant of proportionality. When two variables are directly proportional, it means that they increase or decrease at the same rate. In other words, if one variable doubles, the other variable doubles as well. The equation that expresses this relationship is of the form: y = kx Where y and x are the two variables, and k is the constant of proportionality. The value of k remains the same for any given set of values of y and x. For example, if y is directly proportional to x, and y = 4 when x = 2, then the constant of proportionality, k, is given by: k = y/x = 4/2 = 2 So the equation that expresses the relationship between y and x is: y = 2x This means that if x is multiplied by any number, y will also be multiplied by the same number, and the ratio between y and x will remain constant at 2. An ant travels 9 8inches in 45 seconds and 27 8 inches in 2 minutes and 15 seconds. What is the constant of proportionality?	Counters, bundle and loose straws base ten cut square, Bundle of sticks
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 4

Week Ending: 21-07-2023	**DAY:**	**Subject:** Mathematics	
Duration: 60MINS		**Strand:** Number	
Class: B8	**Class Size:**	**Sub Strand:** Algebraic Expressions	
Content Standard: B8.2.1.1 Demonstrate the ability to draw table of values for a linear relation	**Indicator:** B8.2.2.1.3 Substitute values to evaluate algebraic expressions including fractions and use these to solve problems.		**Lesson:** 1 of 2
Performance Indicator: Learners can substitute values to evaluate algebraic expressions including fractions and use these to solve problems		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 119			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Guide learners to substitute values to evaluate algebraic expressions including fractions and use these to solve problems. Take learners through the steps in substituting values into algebraic expressions. To substitute values to evaluate algebraic expressions including fractions: 1. Identify the variables in the expression that you want to substitute values for. 2. Replace each variable with the corresponding value. 3. Simplify the expression by performing any necessary arithmetic operations, such as addition, subtraction, multiplication, and division. Example, Evaluate the expression (3x - 2)/(x + 1) when x = 4. *1. The variable in this expression is x.* *2. We replace x with the value 4:* *(3x - 2)/(x + 1) = (3(4) - 2)/(4 + 1)* *3. Simplify the expression by performing the arithmetic operations:* *(3(4) - 2)/(4 + 1) = (10/5) = 2* *Therefore, when x = 4, the value of the expression (3x - 2)/(x + 1) is 2.* Example 2: Evaluate the expression $\frac{(2x+3)}{(x-4)}$ when x = 5.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	1. Identify the variable in the expression: x. *2. Replace x with the value 5:* $\frac{(2x+3)}{(x-4)}$ *= (2(5) + 3)/(5 - 4)* *3. Simplify the expression by performing the arithmetic operations: (2(5) + 3)/(5 - 4) = (13/1) = 13* *Therefore, when x = 5, the value of the expression (2x + 3)/(x - 4) is 13.* Example 3: Evaluate the expression (5y - 2)/(2y + 1) when y = -3. *1. Identify the variable in the expression: y.* *2. Replace y with the value -3:* *(5y - 2)/(2y + 1) = (5(-3) - 2)/(2(-3) + 1)* *3. Simplify the expression by performing the arithmetic operations: (5(-3) - 2)/(2(-3) + 1) = (-17/-5) = 3.4* *Therefore, when y = -3, the value of the expression (5y - 2)/(2y + 1) is 3.4.* Example 4: Evaluate the expression ($4a^2$ - 3b)/(2a - b) when a = 2 and b = 1. *1. Identify the variables in the expression: a and b.* *2. Replace a with the value 2 and b with the value 1:* *($4a^2$ - 3b)/(2a - b) = ($4(2)^2$ - 3(1))/(2(2) - 1)* *3. Simplify the expression by performing the arithmetic operations: ($4(2)^2$ - 3(1))/(2(2) - 1) = (13/3)* *Therefore, when a = 2 and b = 1, the value of the expression (4a^2 - 3b)/(2a - b) is 13/3.*	
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: 21-07-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Algebra
Class: B8	**Class Size:**	**Sub Strand:** Algebraic Expressions

Content Standard: B8.2.2.1 Solve problems involving algebraic expressions	**Indicator:** B8.2.2.1.4 Factorize given expressions involving the four operations and use the experiences gained to solve problems	**Lesson:** 1 of 2

Performance Indicator: Learners can factorize given expressions involving the four operations and use the experiences gained to solve problems	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 120	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Revise with learners of the concept of algebraic expressions and their role in solving mathematical problems. Recap the basic operations of addition, subtraction, multiplication, and division in algebraic expressions. Explain the concept of factorization and its importance in simplifying algebraic expressions. Introduce the technique of factorizing using common factors by identifying the greatest common factor (GCF) of the terms in an expression. Demonstrate the step-by-step process of factorization using common factors with examples. *Example 1:* *Factorize the expression: $3x + 6y$* *Solution:* *Step 1: Identify the greatest common factor (GCF) of the terms. In this case, the GCF is 3.* *Step 2: Factor out the GCF from each term:* $3x + 6y = 3(x + 2y)$ *Answer:* $3(x + 2y)$ *Example 2:* *Factorize the expression: $4ab + 8b$* *Solution:* *Step 1: Identify the GCF of the terms. In this case, the GCF is 4b.* *Step 2: Factor out the GCF from each term:* $4ab + 8b = 4b(a + 2)$ *Answer:* $4b(a + 2)$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Provide practice problems for learners to solve individually or in pairs. Introduce the technique of factorizing by grouping when common factors are not evident. Explain how to group terms in pairs and factor out the GCF from each pair. Guide learners through the step-by-step process of factorization by grouping with examples. *Example 4:* *Factorize the expression:* $6a^2 - 12ab + 3a - 6b$ *Solution:* *Step 1: Group the terms in pairs:* $(6a^2 - 12ab) + (3a - 6b)$ *Step 2: Factor out the GCF from each pair:* $6a(a - 2b) + 3(a - 2b)$ *Step 3: Notice that both terms have a common factor of* $(a - 2b)$*.* *Factor out the common factor:* $(a - 2b)(6a + 3)$ *Answer:* $(a - 2b)(6a + 3)$ *Example 5:* *Factorize the expression:* $9x^2 + 12xy + 4y^2$ *Solution:* *Step 1: Notice that the expression is a perfect square trinomial. Rewrite it as the square of a binomial.* $9x^2 + 12xy + 4y^2 = (3x + 2y)^2$ *Answer:* $(3x + 2y)^2$ Provide practice problems for learners to solve individually or in pairs. Guide learners in identifying the key information and translating it into algebraic expressions. Learners to apply the factorization techniques learned to solve the problems. Encourage learners to show their step-by-step work and provide answers with proper units if applicable. <u>Assessment</u> 1. Factorize the expression: $4p - 8q$ Answer: $4(p - 2q)$ 2. Factorize the expression: $7mn + 14m$ Answer: $7m(n + 2)$ 3. Factorize the expression: $10x^2 - 20xy$ Answer: $10x(x - 2y)$	

	4. Factorize the expression: $3a^2 - 6ab + 9a - 18b$ Answer: $(a - 2b)(3a + 9)$ 5. Factorize the expression: $16x^2 + 32xy + 16y^2$ Answer: $(4x + 4y)^2$	
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.	

THIRD TERM
WEEKLY LESSON NOTES
WEEK 5

Week Ending: 28-07-2023	**DAY:**		**Subject:** Mathematics	
Duration: 60MINS			**Strand:** Number	
Class: B8	**Class Size:**		**Sub Strand:** Linear Inequalities	
Content Standard: B8.2.3.1 Demonstrate an understanding of linear inequalities of the form $x + a \geq b$	**Indicator:** B8.2.3.1.1 Translate word problems into linear inequalities in one variable and vice versa			**Lesson:** 1 of 2
Performance Indicator: Learners can translate word problems into linear inequalities in one variable			**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 120				

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Discuss the importance of understanding and solving inequalities in various real-life scenarios. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Review the concept of linear equations and inequalities from previous lessons. Introduce the concept of linear inequalities and their representation on a number line. Remind learners of the symbols used in linear inequalities, such as < (less than), > (greater than), ≤ (less than or equal to), and ≥ (greater than or equal to). Provide a few word problems to the class and discuss strategies for translating them into linear inequalities. Model the process of identifying key information, variables, and the inequality symbol in each word problem. *Example 1;* *A store sells T-shirts for ₵10 each. Write a linear inequality to represent the number of T-shirts you can buy with ₵50 or less.* *Solution:* *Let's represent the number of T-shirts as 'x'.* *The cost of each T-shirt is ₵10.* *The total amount spent on T-shirts can be calculated by multiplying the number of T-shirts (x) by the cost of each T-shirt (₵10).* *Linear Inequality:* $10x \leq 50$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Example 2: Translating Linear Inequality into Word Problem *Linear Inequality: $3y > 15$* *Solution:* *Let's represent the unknown quantity as 'y'.* *The inequality states that three times the value of 'y' is greater than 15.* *Word Problem: Three times a number is greater than 15.* Write the corresponding linear inequality on the board and explain how it represents the given situation. Have the learners practice translating word problems into linear inequalities individually or in pairs. Present learners with linear inequalities in one variable and ask them to convert them into word problems. Discuss the steps involved in this process, such as identifying the variable, determining the inequality symbol, and writing a description of the situation based on the inequality. Allow learners to work individually or in pairs to practice translating linear inequalities into word problems using worksheets or handouts. Discuss the concepts of shading, open and closed circles, and graphing linear inequalities on a number line or coordinate plane. Provide a few examples and demonstrate how to solve and graph linear inequalities. <u>Assessment</u> 1. Convert the linear inequality $3x + 5 < 10$ into a word problem. 2. Solve the linear inequality $2y - 3 \geq 7$ and write the solution set. 3. Translate the following word problem into a linear inequality: "The temperature is at least 20 degrees Celsius." 4. Translate the word problem "You must be at least 13 years old to ride the roller coaster" into a linear inequality. 5. Convert the linear inequality $-4z + 6 > 10$ into a word problem. 6. Solve the linear inequality $5x - 2 \leq 18$ and write the solution set.	
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: 28-07-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Number
Class: B8	**Class Size:**	**Sub Strand:** Linear Inequalities

Content Standard: B8.2.3.1 Demonstrate an understanding of linear inequalities of the form $x + a \geq b$	**Indicator:** B8.2.3.1.2 Solve simple linear inequalities	**Lesson:** 1 of 2

Performance Indicator: Learners can solve simple linear inequalities	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 121	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Recap the concept of linear inequalities and their symbols (<, >, ≤, ≥). Discuss the difference between solving an equation and solving an inequality. Remind learners of the importance of representing solutions on a number line. Start with an example of a simple linear inequality, such as $2x + 3 > 7$. Explain the steps to solve the inequality: a) Treat the inequality sign as an equal sign and solve the equation. b) Represent the solution on a number line using an open circle for < or > and a closed circle for ≤ or ≥. c) Shade the region to the left (for < or ≤) or to the right (for > or ≥) of the solution point on the number line. Solve a few more examples together as a class, guiding learners through the steps. *Example 1: Solve the linear inequality: $3x + 5 > 10$* *Solution:* *Subtract 5 from both sides of the inequality:* $3x > 10 - 5$ $3x > 5$ *Divide both sides by 3 (remember to flip the inequality symbol when dividing by a negative number):* $x > 5/3$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	The solution to the inequality is x > 5/3. *Example 2: Solve the linear inequality: 2y - 3 ≤ 7* *Solution:* *Add 3 to both sides of the inequality:* *2y ≤ 7 + 3* *2y ≤ 10* *Divide both sides by 2:* *y ≤ 10/2* *y ≤ 5* *The solution to the inequality is y ≤ 5.* *Example 3: Solve the linear inequality: -4z + 6 ≥ 10* *Solution:* *Subtract 6 from both sides of the inequality:* *-4z ≥ 10 - 6* *-4z ≥ 4* *Divide both sides by -4 (remember to flip the inequality symbol when dividing by a negative number):* *z ≤ 4/(-4)* *z ≤ -1* *The solution to the inequality is z ≤ -1.* Provide worksheets with linear inequalities for learners to solve individually or in pairs. Demonstrate the process by using an example and discuss the difference between an open circle and a closed circle. Allow learners to practice graphing the solutions of linear inequalities on graph paper or using graphing software if available. <u>Assessment</u> a. Solve the linear inequality: 2x - 4 < 10. b. Find the solution set for the linear inequality: 3y + 7 ≥ 22. c. Solve the linear inequality: -5z + 2 > -8. d. Determine the solution to the linear inequality: 4x + 3 ≤ 15. e. Find the solution set for the linear inequality: 2m - 5 ≥ 7. f. Solve the linear inequality: 3y + 2 < -4. g. Determine the solution to the linear inequality: -2z + 6 > 10. h. Find the solution set for the linear inequality: 5x - 3 ≤ 12. i. Solve the linear inequality: 2m + 5 ≥ 17. j. Determine the solution to the linear inequality: -3y - 2 > -8.	
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: 04-08-2023	**DAY:**		**Subject:** Mathematics	
Duration: 60MINS			**Strand:** Algebra	
Class: B8	**Class Size:**		**Sub Strand:** Linear Inequalities	
Content Standard: B8.2.3.1 Demonstrate an understanding of linear inequalities of the form x + a ≥ b. by modelling problems as a linear inequalities and solving the problems concretely, pictorially, and symbolically.		**Indicator:** B8.2.3.1.3 Determine solution sets of simple linear inequalities in given domains		**Lesson:** 1 of 2
Performance Indicator: Learners can determine solution sets of simple linear inequalities in given domains.			**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 123				

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Review the symbols used in inequalities, such as < (less than), > (greater than), ≤ (less than or equal to), and ≥ (greater than or equal to). Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Display a few examples of simple linear inequalities on the chalkboard. Discuss the meaning of each symbol and how it represents the relationship between two quantities. Emphasize that the solution to a linear inequality is a set of values that make the inequality true. Provide simple linear inequalities and ask learners to identify the solution sets. Write some examples with linear inequality problems on the board. E.g.1 Find solution sets for the following linear inequalities. i. If $x < 4$ for whole numbers, then the domain is whole numbers and the solution set. = {0, 1, 2, 3} Learners in pairs solve each inequality by isolating the variable on one side. Review the concept of a solution set as the set of values that satisfy the inequality.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Let learners identify the range of values that make the inequality true and write the solution set. Emphasize the use of appropriate notation, such as interval notation or set notation, to represent the solution set. Provide additional practice problems for learners to determine solution sets independently or in pairs. Example 1: Solve the inequality: $3x + 5 < 10$ Solution: Subtracting 5 from both sides: $3x < 5$ Dividing both sides by 3: $x < 5/3$ The solution set is $\{x:x < 5/3\}$ Example 2: Solve the inequality: $-2x + 7 \geq 1$ Solution: Subtracting 7 from both sides: $-2x \geq -6$ Dividing both sides by -2 (note the change in the direction of the inequality): $x \leq 3$ The solution set is $\{x:x \leq 3\}$. Example 3: Solve the inequality: $2 - 4x > -6$ Solution: Subtracting 2 from both sides: $-4x > -8$ Dividing both sides by -4 (note the change in the direction of the inequality): $x < 2$ The solution set is $\{x:x < 2\}$. Example 4: Solve the inequality: $3x - 4 \leq 5$ Solution: Adding 4 to both sides: $3x \leq 9$ Dividing both sides by 3: $x \leq 3$ The solution set is $\{x:x \leq 3\}$. Example 5: Solve the inequality: $2x + 3 > 7$ Solution: Subtracting 3 from both sides: $2x > 4$ Dividing both sides by 2: $x > 2$ The solution set is $\{x:x > 2\}$.	
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: 04-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Algebra
Class: B8	**Class Size:**	**Sub Strand:** Linear Inequalities

Content Standard: B8.2.3.1 Demonstrate an understanding of linear inequalities of the form x + a ≥ b. by modelling problems as a linear inequalities and solving the problems concretely, pictorially, and symbolically.	**Indicator:** B8.2.3.1.3 Determine solution sets of simple linear inequalities in given domains	**Lesson:** 2 of 2

Performance Indicator: Learners can determine solution sets of simple linear inequalities in given domains.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 123	

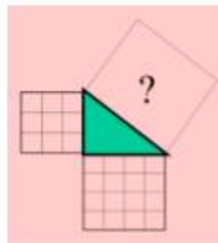
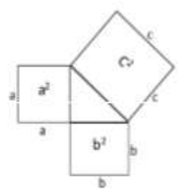
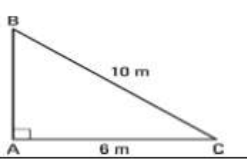
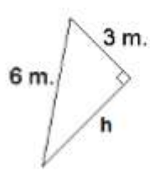
Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Divide students into pairs or small groups and provide them with a set of linear inequalities to solve. Encourage discussion and collaboration to reach a consensus on the solution sets. Have each group present their findings to the class, allowing for comparisons and discussions on different approaches or strategies used. Example 1: Solve the inequality: $3x + 2 > 5x - 4$ Solution: Subtract 3x and add 4 to both sides: $6 > 2x$ Divide by 2: $3 > x$ The truth set is $\{x : x < 3\}$. Example 2: Solve the inequality: $2(x - 3) \leq 5 - 3x$ Solution: Distribute on the left side: $2x - 6 \leq 5 - 3x$ Add 3x and 6 to both sides: $5x \leq 11$ Divide by 5: $x \leq 2.2$ The truth set is $\{x : x \leq 2.2\}$. Example 3: Solve the inequality: $4x + 3 > 2(x + 1) + 5$ Solution: Distribute on the right side: $4x + 3 > 2x + 2 + 5$ Combine like terms: $4x + 3 > 2x + 7$ Subtract 2x and 3 from both sides: $2x > 4$ Divide by 2: $x > 2$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	The truth set is $\{x : x > 2\}$. Example 4: Solve the inequality: $2x + 3 \leq 5 - (x + 1)$ Solution: Distribute and simplify on the right side: $2x + 3 \leq 5 - x - 1$ Combine like terms: $2x + 3 \leq 4 - x$ Add x and subtract 3 from both sides: $3x \leq 1$ Divide by 3: $x \leq 1/3$ The truth set is $\{x : x \leq 1/3\}$. Example 5: Solve the inequality: $3(x + 2) + 4 > 2(2x - 1) + 1$ Solution: Distribute on both sides: $3x + 6 + 4 > 4x - 2 + 1$ Combine like terms: $3x + 10 > 4x - 1$ Subtract 3x and add 1 to both sides: $11 > x$ The truth set is $\{x : x < 11\}$. Example 6: Solve the inequality: $3(x - 4) - 2(2x + 1) < 2(x + 3) - 5$ Solution: Distribute on both sides: $3x - 12 - 4x - 2 < 2x + 6 - 5$ Combine like terms: $-x - 14 < 2x + 1$ Add x and subtract 1 from both sides: $-15 < 3x$ Divide by 3 (reversing the inequality sign since dividing by a negative number): $x > -5$ The truth set is $\{x : x > -5\}$.	
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: 11-08-2023	**DAY:**		**Subject:** Mathematics
Duration: 60MINS			**Strand:** Geometry & Measurement
Class: B8	**Class Size:**		**Sub Strand:** Pythagoras Theorem
Content Standard: B.8.3.2.1 Apply the Pythagoras theorem, the primary trigonometric ratios and the formulas for determining the area of a circle to solve real problems	**Indicator:** B8.3.2.1.2 Establish the relationship between the hypotenuse ‘c’ and the two other sides ‘a’ and ‘b’ of a right-angled triangle.		**Lesson:** 2 of 2
Performance Indicator: Learners can establish the relationship between the hypotenuse ‘c’ and the two other sides ‘a’ and ‘b’ of a right-angled triangle			**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 143			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Ask learners if they know what a right-angled triangle is and if they have heard of Pythagoras Theorem. Explain that a right-angled triangle has one angle measuring 90 degrees, and Pythagoras Theorem is a fundamental mathematical concept used to find the relationship between the sides of such triangles. Present the Pythagoras Theorem formula: $c^2 = a^2 + b^2$ Explain that in a right-angled triangle, 'c' represents the length of the hypotenuse (the side opposite the right angle), and 'a' and 'b' represent the lengths of the other two sides. Emphasize that this theorem applies only to right-angled triangles and allows us to calculate the length of any side if we know the lengths of the other two. Provide each learners or group with a right-angled triangle cutout or draw right-angled triangles on the board. Instruct learners to measure the lengths of 'a' and 'b' using rulers and record the values. Guide the learners through the process of calculating the length of the hypotenuse 'c' using Pythagoras Theorem.	Geometric shapes or cutouts of right-angled triangles Rulers

	Have learners share their findings with the class and compare results. Discuss some practical applications of Pythagoras Theorem in real life, such as measuring distances, calculating diagonals in rectangular fields, or determining cable lengths in electronics. Let learners construct squares on the three sides of a right-angled triangle in a square grid and compare the area of the square on the hypotenuse to the squares on the other two sides to state the relationship between the hypotenuse 'c' and the two other sides 'a' and 'b' of a right-angled triangle i.e. $a^2 + b^2 = c^2$  Learners in groups use a pair of compasses and ruler, construct squares on the three sides of a right-angled triangle and measure the area of the square on the hypotenuse and compare to the squares on the other two sides to state the relationship between the hypotenuse 'c' and the two other sides 'a' and 'b' of a right-angled triangle i.e. $a^2 + b^2 = c^2$  Encourage learners to use Pythagoras Theorem to find the unknown side lengths. Review the solutions as a class and address any questions or challenges that learners may have encountered. <u>Assessment</u> Solve problems involving the Pythagoras theorem. i. Determine the missing side marked h in the figure. ii. Find the height AB. 	
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: 11-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Pythagoras Theorem

Content Standard: B.8.3.2.1 Apply the Pythagoras theorem, the primary trigonometric ratios and the formulas for determining the area of a circle to solve real problems	**Indicator:** B8.3.2.1.3 Use the Pythagorean theorem to solve problems on right-angled triangle	**Lesson:** 2 of 2

Performance Indicator: Learners can establish the relationship between the hypotenuse 'c' and the two other sides 'a' and 'b' of a right-angled triangle	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 143	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Draw a right-angled triangle on the board and label its sides as a, b, and c (with c being the hypotenuse, the side opposite the right angle). Explain the Pythagorean theorem: $a^2 + b^2 = c^2$ Discuss how this theorem can only be applied to right-angled triangles, where one angle measures 90 degrees. Provide learners with problems to solve. Demonstrate the process of using the Pythagorean theorem to solve a problem step-by-step, guiding the learners through the calculation. Example 1: A right-angled triangle has one side measuring 5cm and another side measuring 12cm. Find the length of the hypotenuse. Solution: Let's label the sides of the triangle as follows: Side a = 5cm Side b = 12cm Side c (hypotenuse) = ? Using the Pythagorean theorem: $a^2 + b^2 = c^2$ $5^2 + 12^2 = c^2$ $25 + 144 = c^2$ $169 = c^2$ Taking the square root of both sides: $c = \sqrt{169}$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	c = 13 units Therefore, the length of the hypotenuse is 13 units. Example 2: A ladder is leaning against a wall. The base of the ladder is 6 meters away from the wall, and the ladder itself is 8 meters long. How high does the ladder reach on the wall? Solution: Let's label the sides of the triangle as follows: Side a (base) = 6 meters Side b (height) = ? Side c (ladder) = 8 meters Using the Pythagorean theorem: $a^2 + b^2 = c^2$ $6^2 + b^2 = 8^2$ $36 + b^2 = 64$ $b^2 = 64 - 36$ $b^2 = 28$ Taking the square root of both sides: $b = \sqrt{28}$ $b \approx 5.29$ meters Therefore, the ladder reaches a height of approximately 5.29 meters on the wall. Example 3: In a triangle with sides measuring 9 cm, 12 cm, and x cm, the longest side (hypotenuse) measures 15 cm. Find the value of x. Solution: Let's label the sides of the triangle as follows: Side a = 9 cm Side b = 12 cm Side c (hypotenuse) = 15 cm Using the Pythagorean theorem: $a^2 + b^2 = c^2$ $9^2 + 12^2 = 15^2$ $81 + 144 = 225$ $225 = 225$ Therefore, the value of x is 15 cm. Have learners work individually or in pairs to solve the problems. Circulate the classroom to assist learners and clarify any doubts they may have. Review the solutions to the problems as a class, either by having learners present their answers or by going through the solutions on the board.	

	Briefly discuss real-life scenarios where the Pythagorean theorem is applied, such as measuring the distance between two points in a grid, calculating the diagonal of a rectangular room, or finding the distance traveled by a hiker on a zigzag path. <u>Assessment</u> 1. A right-angled triangle has one side measuring 6 units and another side measuring 8 units. Find the length of the hypotenuse. 2. A square garden has sides measuring 10 meters. A diagonal path cuts across the garden. Find the length of the diagonal path. 3. An isosceles triangle has equal sides, 6cm long and a base of 4cm long. Find the altitude of the triangle.	
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: 11-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Pythagoras Theorem

Content Standard: B8.3.1.2 Demonstrate the ability to perform geometric constructions of the angles (75˚, 105˚, 60˚, 135˚ and 150˚), and construct triangles and find locus of points under given conditions	**Indicator:** B8.3.2.1.3 Use the Pythagorean theorem to solve problems on right angled triangle.	**Lesson:** 1 of 2

Performance Indicator: Learners can use the Pythagorean theorem to solve problems on right angled triangle.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 127-132	

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Gide learners to use a pair of compasses and a ruler to construct an equilateral triangle when a side is given and justify why it is an equilateral triangle • *Draw a straight line segment to serve as the base of your triangle. Label the endpoints as points A and B.* • *Use a ruler to measure the length of the given side. Let's say the length is "a". Mark a point C on the line segment AB, at a distance of "a" from point A.* • *With a compass, set the width to the length "a". Place the compass tip on point C and draw an arc that intersects the line segment AB. Label the intersection points as D and E.* • *Without changing the compass width, place the compass tip on point D and draw another arc that intersects the arc drawn in the previous step. Label the intersection point as F.* • *Draw a straight line connecting point C and point F.* • *Draw a straight line connecting point F and point B.* Guide learners to use a pair of compasses and a ruler to construct an equilateral triangle • *Draw a straight line segment to serve as the base of your triangle. Label the endpoints as points A and B.* • *Use a ruler to measure and mark a second point, C, on the same line but at a different distance from point A than point B. This will determine the length of one side of the triangle.*	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	• *With a compass, set the width to the length of the second side of the triangle. Place the compass tip on point B and draw an arc that intersects the line segment AB.* • *Without changing the compass width, place the compass tip on point A and draw another arc that intersects the line segment AB.* • *Label the intersection point of the arcs as point D.* • *Draw a straight line connecting point C and point D. This will be the second side of the triangle.* • *Draw a straight line connecting point C and point B. This will be the third side of the triangle.* Using a pair of compasses and a ruler, guide learners to perform geometric construction of an isosceles right-angled triangle when the base line is given. *1. Draw a straight line segment to serve as the base of your triangle. Label the endpoints as points A and B.* *2. Use a ruler to measure and mark a point C on the line segment AB. This will be the midpoint of AB.* *3. With a compass, set the width to the length of AC. Place the compass tip on point C and draw an arc that intersects the line segment AB. Label the intersection points as D and E.* *4. Without changing the compass width, place the compass tip on point D and draw another arc that intersects the arc drawn in the previous step. Label the intersection point as F.* *5. Draw a straight line connecting point C and point F.* *6. Draw a straight line connecting point F and point B.* <u>Assessment</u> 1. Use a pair of compasses and a ruler to perform geometric construction of an isosceles triangle when all the sides are given. 2. Use a pair of compasses and a ruler to perform geometric construction of an isosceles triangle when the base angles and base side are known 3. Use a pair of compasses and a ruler to construct acute-angled triangles, obtuse-angled triangles and right-angled triangles when a side and two angles are given 4. Use a pair of compasses and a ruler to construct triangles when all the sides are given.	
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: 18-08-2023	**DAY:**		**Subject:** Mathematics
Duration: 60MINS			**Strand:** Geometry & Measurement
Class: B8	**Class Size:**		**Sub Strand:** Pythagoras Theorem
Content Standard: B.8.3.2.1 Apply the Pythagoras theorem, the primary trigonometric ratios and the formulas for determining the area of a circle to solve real problems		**Indicator:** B8.3.2.1.4 Use the Pythagoras theorem to calculate the area of a triangle in real life problems	**Lesson:** 2 of 2
Performance Indicator: Learners can apply the Pythagorean Theorem to calculate the area of a triangle in real-life problem-solving situations.			**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 145			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Begin the lesson by engaging the learners with a question: "Have you ever wondered how to calculate the length of a side of a right-angled triangle when you know the lengths of the other two sides?" Allow learners to share their ideas and experiences, and lead the discussion towards the need for a theorem to solve such problems. Introduce the Pythagorean Theorem as a fundamental concept in geometry, explaining that it allows us to find the length of the missing side in a right-angled triangle.	
PHASE 2: **NEW LEARNING**	Define a right-angled triangle and its three sides: hypotenuse, base, and perpendicular. Write the Pythagorean Theorem on the board: $a^2 + b^2 = c^2$, where 'a' and 'b' are the lengths of the legs, and 'c' is the length of the hypotenuse. Explain the meaning of each term in the theorem and how it applies to a right-angled triangle. Demonstrate a few examples of applying the Pythagorean Theorem to calculate the length of a side in different right-angled triangles. Review the concept of the area of a triangle: Area = 1/2 × base × height. Explain that the Pythagorean Theorem can also be used to find the area of a right-angled triangle. Derive the formula for the area of a right-angled triangle using the Pythagorean Theorem: Area = 1/2 × a × b.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Distribute worksheets with real-life problem scenarios that involve right-angled triangles. Example 1: *A triangular piece of land has two sides measuring 15 meters and 20 meters. Find the length of the third side and calculate the area of the triangle.* *Solution:* *Given:* *Side a = 15 meters* *Side b = 20 meters* *Using the Pythagorean Theorem:* $c^2 = a^2 + b^2$ $c^2 = 15^2 + 20^2$ $c^2 = 225 + 400$ $c^2 = 625$ $c = \sqrt{625}$ *c = 25 meters* *To calculate the area:* *Area = 1/2 × a × b* *Area = 1/2 × 15 × 20* *Area = 150 square meters* *Therefore, the length of the third side is 25 meters, and the area of the triangle is 150 square meters.* *Example 2:* *A ladder is leaning against a wall. The base of the ladder is 6 feet away from the wall, and the ladder is 8 feet long. What is the height at which the ladder reaches the wall, and what is the area of the triangle formed by the ladder, the wall, and the ground?* *Solution:* *Given:* *Base (b) = 6 feet* *Hypotenuse (c) = 8 feet* *Using the Pythagorean Theorem:* $a^2 = c^2 - b^2$ $a^2 = 8^2 - 6^2$ $a^2 = 64 - 36$ $a^2 = 28$ $a = \sqrt{28}$ *a ≈ 5.29 feet* *To calculate the area:* *Area = 1/2 × b × a* *Area = 1/2 × 6 × 5.29* *Area ≈ 15.87 square feet* *Therefore, the height at which the ladder reaches the wall is approximately 5.29 feet, and the area of the triangle is approximately 15.87 square feet.* In pairs or small groups, ask learners to read and analyze the problems, identify the right-angled triangles involved, and apply the Pythagorean Theorem to find the missing side or calculate the area.	

	After solving the problems, encourage learners to share their solutions and explain their reasoning. Provide a few additional examples for further practice, <u>Assessment</u> 1. A flagpole is 10 meters tall. A rope is tied from the top of the flagpole to a point on the ground, forming a right-angled triangle. If the rope is 12 meters long, what is the distance from the flagpole to the point on the ground, and what is the area of the triangle? 2. The sides of a right-angled triangle are in the ratio 3:4:5. If the length of the shortest side is 6 cm, find the lengths of the other two sides and calculate the area of the triangle. 3. A boat travels 2m South and then 9m east. How far is the boat from its starting point? 4. Yeboah hangs a picture frame of width 15cm on the wall. The distance from the nail to the edge of the picture frame is 10cm. (i) find the length of the wire used to hang the picture frame. (ii) Find the area of the triangle. 5. A ladder leans against a vertical wall of height 13m. If the foot of the ladder is 6m away from the wall, calculate the length of the ladder. 6. The length of a side of an equilateral triangle is 12cm. Find i. the height of the triangle ii. The area of the triangle iii. the perimeter of the triangle	
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: 18-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Pythagoras Theorem

Content Standard: B.8.3.2.1 Apply the Pythagoras theorem, the primary trigonometric ratios and the formulas for determining the area of a circle to solve real problems	**Indicator:** B8.3.2.1.5 Establish the relationship between the basic trigonometric ratios and solve problems involving right-angled triangles	**Lesson:** 2 of 2

Performance Indicator: Learners can; • Establish the relationship between trigonometric ratios and the sides of a right-angled triangle. • Apply trigonometric ratios to solve problems involving right-angled triangles.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)

References: Mathematics Curriculum Pg. 145

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Discuss briefly that trigonometry is the study of relationships between angles and sides in triangles. Explain that trigonometric ratios are used to define these relationships and help solve problems involving right-angled triangles. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Introduce the three primary trigonometric ratios: sine (sin), cosine (cos), and tangent (tan). Write the ratios on the board and explain their definitions: • Sine (sin) = Opposite/Hypotenuse • Cosine (cos) = Adjacent/Hypotenuse • Tangent (tan) = Opposite/Adjacent Emphasize that these ratios are specific to right-angled triangles. Illustrate the meaning of each ratio using diagrams on the board and examples. Draw a right-angled triangle on the board and label its sides: opposite, adjacent, and hypotenuse. Explain how each trigonometric ratio relates to the sides of the triangle using the definitions from Step 2. Highlight that the ratios remain constant for any similar right-angled triangle, as long as the corresponding sides are used.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

Discuss the importance of understanding these ratios for solving problems involving right-angled triangles.

Distribute worksheets with practice problems involving right-angled triangles and trigonometric ratios.

Example 1:
In a right-angled triangle, the length of the hypotenuse is 13 cm, and the length of one of the legs is 5 cm. Find the measure of angle A and the length of the other leg.

Solution:
Given:
Hypotenuse (c) = 13 cm
Leg (b) = 5 cm

To find angle A:
Using the cosine ratio:
$\cos(A) = b/c$
$\cos(A) = 5/13$
$A \approx 66.42°$

To find the length of the other leg (a):
Using the sine ratio:
$\sin(A) = a/c$
$\sin(A) = a/13$
$a = 13 \times \sin(A)$
$a \approx 10.66$ cm

Therefore, angle A is approximately 66.42°, and the length of the other leg is approximately 10.66 cm.

Example 2:
In a right-angled triangle, the measure of angle B is 30°, and the length of the adjacent side is 8 cm. Find the lengths of the hypotenuse and the opposite side.

Solution:
Given:
Angle B = 30°
Adjacent side (b) = 8 cm

To find the length of the hypotenuse (c):
Using the cosine ratio:
$\cos(B) = b/c$
$\cos(30°) = 8/c$
$c = 8 / \cos(30°)$
$c \approx 9.24$ cm

To find the length of the opposite side (a):
Using the sine ratio:
$\sin(B) = a/c$
$\sin(30°) = a/9.24$
$a = 9.24 \times \sin(30°)$
$a \approx 4.62$ cm

Therefore, the length of the hypotenuse is approximately 9.24 cm, and the length of the opposite side is approximately 4.62 cm.

In pairs or small groups, ask learners to read and analyze the problems, identify the relevant sides and angles, and apply the appropriate trigonometric ratio to find the missing side or angle.

Highlight real-life applications of trigonometry, such as measuring heights, distances, and angles in various fields (e.g., architecture, engineering, navigation).

<u>Assessment</u>

	1. In a right-angled triangle, the length of the hypotenuse is 10 m, and the length of the opposite side is 6 m. find the measure of angle C and the length of the adjacent side. 2. In a right-angled triangle, the measure of angle A is 45°, and the length of the adjacent side is 12 cm. Find the lengths of the hypotenuse and the opposite side. 3. A hunter, on top of a tower, sees a fire at an angle of depression of 30˚. The height of the tower is 18m. What is the distance between the fire and the hunter? Round off your answer to 2 significant figures.	
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: 25-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Add & subtract Vectors.
Content Standard: B8.3.2.2 Demonstrate understanding of addition and subtraction of vectors and their applications in solving basic problems	**Indicator:** B8.3.2.2.1 Add, subtract and find the scalar multiplication of vectors in the component form.	**Lesson:** 1 of 2
Performance Indicator: Learners can add, subtract and find the scalar multiplication of vectors in the component form.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 153		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Explain how vectors are added graphically. Use the 'tip-to-tail' method and demonstrate with examples. Allow learners to follow along with their own vectors on graph paper. Introduce the concept of vector addition and subtraction in component form. Demonstrate how to add and subtract the 'i' (horizontal) and 'j' (vertical) components separately. Example: Add the following vectors A = $\binom{3}{2}$ and vector B = $\binom{2}{4}$ = $\binom{3}{2}$ + $\binom{2}{4}$ = $\binom{3+2}{2+4}$ = $\binom{5}{6}$ Example: Subtract A=$\binom{5}{7}$ and B=$\binom{3}{4}$ = $\binom{5}{7}$ - $\binom{3}{4}$ = $\binom{5-3}{7-4}$ = $\binom{2}{3}$ Explain scalar multiplication. Show how multiplying a vector by a scalar affects both the magnitude and direction of the vector. Provide learners with practice problems involving vector addition, subtraction, and scalar multiplication. Work through these problems as a class, demonstrating each step and checking for understanding. Example: if p=$\binom{-1}{2}$, q=$\binom{4}{3}$, and r=$\binom{3}{-2}$, find i. 3q-2p ii. r-3p iii. q-p=2r <u>solution</u> i. 3q-2p = 3$\binom{4}{3}$ - 2$\binom{-1}{2}$ = $\binom{3x4}{3x3}$ - $\binom{-2x-1}{-2x2}$ = $\binom{12}{9}$ - $\binom{2}{-4}$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	$= \binom{12-2}{9-(-4)} = \binom{10}{13}$ ii. r-3p = $\binom{3}{-2}$ - $3\binom{-1}{2}$ = $\binom{3}{-2}$ - $\binom{3x-1}{-3x2}$ = $\binom{3}{-2}$ - $\binom{-3}{-6}$ = $\binom{6}{4}$ Encourage questions and be sure to address any misconceptions or difficulties learners may have with the process. Give learners additional problems to work on individually.	
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: 25-08-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Add & subtract Vectors.

Content Standard: B8.3.2.2 Demonstrate understanding of addition and subtraction of vectors and their applications in solving basic problems	**Indicator:** B8.3.2.2.2 Demonstrate understanding of vector equality.	**Lesson:** 1 of 2
Performance Indicator: Learners can demonstrate understanding of vector equality.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 153		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Draw vectors on the board that are equal but in different positions in the plane. Show learners how even though their starting points differ, their lengths (magnitudes) and directions are the same, thus they are equal. Explain the properties of equal vectors, that is, if vector A = vector B, then they have the same i and j components. Meaning Ai = Bi and Aj = Bj. Also, they have the same magnitude and direction. Explain that vector equality is transitive (if A = B and B = C, then A = C), reflexive (A = A), and symmetric (if A = B, then B = A). Let us consider A= $\binom{1}{2}$, B=$\binom{1}{2}$, C=$\binom{1}{2}$ 1. Transitive: we can say that A=B since both have the same components. Similarly, B=C for the same reason. Using transitivity, A=C 2. Reflexivity: let's consider the vector- D=$\binom{3}{4}$ D=D since a vector is always equal to itself. 3. Using vectors A and B in the first example Since A=B. It's also true that B=A Discuss how these properties are similar to normal number equality, thus emphasizing the power and convenience of the vector notation. <u>Assessment</u> 1. Given the vectors X=$\binom{4}{-1}$, Y=$\binom{4}{-1}$, Z=$\binom{7}{2}$	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	If **X**=**Y** and **Y**≠**Z**, can you determine the relationship between **X** and **Z**? 2. Consider the vector: P=$\binom{-3}{4}$. Is **P** equal to itself? 3. Given the two vectors: M=$\binom{2}{0}$, N=$\binom{2}{0}$ If **M**=**N**, can you deduce the relationship between **N** and **M**?	
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 10

Week Ending: 01-09-2023	**DAY:**		**Subject:** Mathematics
Duration: 60MINS			**Strand:** Geometry & Measurement
Class: B8	**Class Size:**		**Sub Strand:** Position & Transformation
Content Standard: B8.3.3.1 Perform a single transformation (i.e. rotation) on a 2D shape using graph paper.	**Indicator:** B8.3.3.1.1 Understand rotation and identify real-life situations involving rotation.		**Lesson:** 1 of 2
Performance Indicator: Learners can understand rotation and identify real-life situations involving rotation.			**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 150			

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Start by spinning a bottle top or use the clock. Engage learners with a question: "Have you noticed how things rotate around us every day?" Define rotation in mathematical terms, relating it to a central point. Using a clock, explain how the hands move in a particular direction. Introduce the terms "clockwise" and "anti-clockwise". Use the whiteboard to draw examples of both rotational movements. Discuss everyday scenarios where rotation is evident: • Turning a doorknob • Spinning a bicycle tire • Opening a jar lid • The rotation of a ceiling fan Ask learners to identify the nature of the rotation for each example as clockwise or anti-clockwise. Use interactive digital tools or apps to show different items rotating.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Let learners change the direction of rotation to see the difference between clockwise and anti-clockwise movements. Discuss why understanding the direction of rotation might be important in certain situations. <u>Assessment</u> Divide learners into small groups. Task them with identifying 3-5 objects or scenarios in the classroom or their memory where rotation is essential and determining the nature of that rotation (clockwise or anti-clockwise). Allow learners a few minutes to discuss and list down their 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.	

Week Ending: 01-09-2023	**DAY:**	**Subject:** Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Position & Transformation
Content Standard: B8.3.3.1 Perform a single transformation (i.e. rotation) on a 2D shape using graph paper.	**Indicator:** B8.3.3.1.2 Draw rotation image in a coordinate plane and determine the angle of rotation.	**Lesson:** 1 of 2
Performance Indicator: Learners can draw rotation image in a coordinate plane and determine the angle of rotation.		**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)
References: Mathematics Curriculum Pg. 152		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Give a brief review of what rotation means in math. Introduce the concept of rotating a shape on a coordinate plane. Explain the importance of a center of rotation. Show how the angle of rotation is measured using a protractor. Discuss the most common angles of rotation: 90°, 180°, and 270°. Highlight the difference between clockwise and anti-clockwise rotations. Introduce the rules for rotating points on a coordinate plane: • 90° clockwise: (x, y) becomes (y, -x) • 90° anti-clockwise: (x, y) becomes (-y, x) • 180°: (x, y) becomes (-x, -y) • 270° clockwise: (x, y) becomes (-y, x) • 270° anti-clockwise: (x, y) becomes (y, -x) Use the whiteboard to demonstrate a few examples. Distribute graph paper and protractors to each student. Plot a simple shape (e.g., a triangle) on the coordinate plane on the whiteboard or projector. Ask learners to draw the same shape on their graph paper.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Guide learners in rotating the shape 90° clockwise, plotting the new points based on the rotation rules. Let learners verify the rotation using protractors. Repeat with other angles and directions. <u>Assessment</u> Plot the point A(2,3) on graph paper. Now, rotate it 90° clockwise about the origin. Plot the new point and label it A'. What are the coordinates of A'? Using a protractor and graph paper, plot the point B(4,2). Rotate this point 180° about the origin. Mark and label the new position B'. What are the coordinates of B'? Plot a triangle with vertices at C(1,1), D(4,1), and E(2,5). Rotate the triangle 270° anti-clockwise about the origin. Draw the new triangle and label its vertices C', D', and E'. What are their coordinates?	
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: 01-09-2023	DAY:	Subject: Mathematics
Duration: 60MINS		**Strand:** Geometry & Measurement
Class: B8	**Class Size:**	**Sub Strand:** Position & Transformation

Content Standard: B8.3.3.1 Perform a single transformation (i.e. rotation) on a 2D shape using graph paper	**Indicator:** B8.3.3.1.3 Investigate the concept of congruent shapes.	**Lesson:** 1 of 2
Performance Indicator: Learners can investigate the concept of congruent shapes.	**Core Competencies:** Communication and Collaboration (CC) Critical Thinking and Problem solving (CP)	
References: Mathematics Curriculum Pg. 152		

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Show how the angle of rotation is measured using a protractor. Discuss the most common angles of rotation: 90°, 180°, and 270°. Highlight the difference between clockwise and anti-clockwise rotations. Introduce the rules for rotating points on a coordinate plane: • 90° clockwise: (x, y) becomes (y, -x) • 90° anti-clockwise: (x, y) becomes (-y, x) • 180°: (x, y) becomes (-x, -y) • 270° clockwise: (x, y) becomes (-y, x) • 270° anti-clockwise: (x, y) becomes (y, -x) Use the whiteboard to demonstrate a few examples. Distribute graph paper and protractors to each student. Plot a simple shape (e.g., a triangle) on the coordinate plane on the whiteboard or projector. Ask learners to draw the same shape on their graph paper. Guide learners in rotating the shape 90° clockwise, plotting the new points based on the rotation rules. Let learners verify the rotation using protractors. Repeat with other angles and directions. Divide learners into pairs or small groups. Assign each group a different shape and angle of rotation.	Counters, bundle and loose straws base ten cut square, Bundle of sticks

	Allow groups a few minutes to draw the original and rotated shapes. <u>Assessment</u> On graph paper, draw two seemingly congruent trapezoids, with one trapezoid's orientation different from the other. By rotating one of them, prove if they are congruent or not. Plot a square with vertices at F(1,1), G(3,1), H(3,3), and I(1,3). Now, plot another square with vertices at J(-1,-1), K(-1,-3), L(-3,-3), and M(-3,-1). By rotating one of the squares, determine if the two squares are congruent. Draw a rhombus on the coordinate plane. Next to it, draw another rhombus that looks congruent but is oriented differently. Using the rules of rotation, demonstrate (by rotating and marking the new coordinates) whether or not the two shapes are congruent.	
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 11

REVISION AND END OF TERM ASSESSMENT

<table>
<tr><td>Week Ending: 08-09-2023</td><td colspan="2">DAY:</td><td colspan="2">Subject: Mathematics</td></tr>
<tr><td colspan="3">Duration: 60MINS</td><td colspan="2">Strand: Data</td></tr>
<tr><td>Class: B8</td><td colspan="2">Class Size:</td><td colspan="2">Sub Strand: Chance or Probability</td></tr>
<tr><td colspan="2">Content Standard:
B8.4.2.1 Identify the sample space for a probability experiment involving two independent events and express the probabilities of given events.</td><td colspan="2">Indicator:
B8.4.2.1.1.Perform a probability experiment involving two independent events such as drawing colored bottle tops from a bag with replacement and list the elements of the sample space.</td><td>Lesson:

1 of 2</td></tr>
<tr><td colspan="3">Performance Indicator:
Learners can understand the concept of independent events and be able to perform a probability experiment involving two independent events.</td><td colspan="2">Core Competencies:
Communication and Collaboration (CC)
Critical Thinking and Problem solving (CP)</td></tr>
<tr><td colspan="5">References: Mathematics Curriculum Pg. 161</td></tr>
</table>

<table>
<tr><td>Phase/Duration</td><td>Learners Activities</td><td>Resources</td></tr>
<tr><td>PHASE 1: STARTER</td><td>Revise with learners on the previous lesson.

Brainstorm learners to discuss what probability is and why it's important in daily life.
Introduce the terms "event", "sample space", and "independent events".

Share performance indicators with learners and introduce the lesson.</td><td></td></tr>
<tr><td>PHASE 2: NEW LEARNING</td><td>Guide learners to explain the key terms in context.

• Independent Events: Describe that two events, A and B, are independent if the occurrence of A does not affect the occurrence of B.
• Sample Space: The set of all possible outcomes of an experiment.
• Demonstration: Show a single draw from the bag. Put it back (replacement). Repeat.

Place different colored bottle tops in a bag. Ask a student to draw one bottle top, note its color, and put it back into the bag.
Repeat for a second draw.

If using red (R), blue (B), and green (G) bottle tops, ask students to list all the possible outcomes of two draws.
RR, RB, RG, BR, BB, BG, GR, GB, GG.
Ask students:</td><td>A bag
Colored bottle tops (e.g., red, blue, green)</td></tr>
</table>

	• What's the probability of drawing two reds in a row? • What's the probability of drawing a red and then a blue? Allow students to perform the experiment in pairs. Each student will draw two bottle tops in succession, replacing after each draw. They should record their results. After several trials, students should calculate their experimental probabilities for each combination. Write this questions on the board. In an experiment, Emmanuel was asked to pick one bottle top from a bag, three times, which contains 3 red, 2 green and 1 pink bottle tops. i. List the elements of the sample space of the events. ii. The sample space of the event of picking a red bottle top, R, with replacement is? iii. The probability of picking a red bottle top is ………… Learners in pairs solve and present their solution to the class for discussions. <u>Solution</u> ***i. List the elements of the sample space of the events***. *Given that Emmanuel picks one bottle top three times with replacement, the possible outcomes for each draw are:* *- Red (R)* *- Green (G)* *- Pink (P)* *For three consecutive draws, the sample space (all possible outcomes) is:* *RRR, RRG, RRP, RGR, RGG, RGP, RPR, RPG, RPP,* *GRR, GRG, GRP, GGR, GGG, GGP, GPR, GPG, GPP,* *PRR, PRG, PRP, PGR, PGG, PGP, PPR, PPG, PPP* ***ii. The sample space of the event of picking a red bottle top, R, with replacement is?*** *If we're only looking at the event of picking a red bottle top with replacement, and Emmanuel is picking three times:* *The sample space for picking red all three times is: RRR* ***iii. The probability of picking a red bottle top is …………*** *To determine this:* *Probability = (Number of favorable outcomes) / (Total possible outcomes)*	

	In the bag, there are: *- 3 red bottle tops* *- 2 green bottle tops* *- 1 pink bottle top* *Total bottle tops = 3 + 2 + 1 = 6* *Probability of picking a red bottle top = (Number of red bottle tops) / (Total bottle tops)* *= 3/6* *= 1/2 or 0.5* *So, the probability of picking a red bottle top is 0.5 or 1/2.* Learners in their groups solve the following; E.g. 2 *Consider the following two events: (a) throwing of a fair six-sided die and (b) tossing a fair coin* *i. What is the sample space for (a) and for (b)?* *ii. Does the occurrence of event (a) affect the occurrence of event (b)?* *iii. What is the probability of an even number showing up in (a)?* *iv. What is the probability of a head showing up in (b)?* *v. What is the relationship between the two events?* *E.g. 3 Ampofo and Serwa are two learners from a school. Ampofo walks to school daily and Serwa travels to school on a bus daily.* *i. Does the event of Ampofo affect that of Serwa?* *ii. Can the two events occur together?* <u>Assessment</u> 1. In a bag, you have 4 red (R) bottle tops, 3 blue (B) bottle tops, and 3 green (G) bottle tops. You draw two bottle tops in succession, with replacement. a) What is the probability of drawing two blues in a row? 2. Using the same bag as above, you draw two bottle tops in succession, without replacement. a) What is the probability of drawing a red followed by a blue? 3. You now add 2 yellow (Y) bottle tops to the bag, making a total of 12 bottle tops. You draw two bottle tops in succession, with replacement. a) What is the probability of drawing a yellow followed by a green?	
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.	

<table>
<tr><td>Week Ending: 08-09-2023</td><td>DAY:</td><td colspan="2">Subject: Mathematics</td></tr>
<tr><td colspan="2">Duration: 60MINS</td><td colspan="2">Strand: Data</td></tr>
<tr><td>Class: B8</td><td>Class Size:</td><td colspan="2">Sub Strand: Chance or Probability</td></tr>
<tr><td colspan="2">Content Standard:
B8.4.2.1 Identify the sample space for a probability experiment involving two independent events and express the probabilities of given events.</td><td>Indicator:
B8.4.2.1.2. Express the probabilities of the events as fractions, decimals, percentages and/or ratios.</td><td>Lesson:
1 of 2</td></tr>
<tr><td colspan="2">Performance Indicator:
Learners can express probabilities of events in different formats, including fractions, decimals, percentages, and ratios using graphic organizers.</td><td colspan="2">Core Competencies:
Communication and Collaboration (CC)
Critical Thinking and Problem solving (CP)</td></tr>
<tr><td colspan="4">References: Mathematics Curriculum Pg. 162</td></tr>
</table>

Phase/Duration	Learners Activities	Resources
PHASE 1: **STARTER**	Revise with learners on the previous lesson. Share performance indicators with learners and introduce the lesson.	
PHASE 2: **NEW LEARNING**	Start with a simple probability scenario, e.g., flipping a coin. Ask students: "If you flip a coin, what are the chances it will land on heads?" Discuss the answers. Most will probably say "50-50" or "half and half". Introduce the various ways this probability can be expressed: fraction (1/2), decimal (0.5), percentage (50%), and ratio (1:1). Demonstrate how to convert between these formats. • Fraction to Decimal: 1/2=0.51/2=0.5 • Decimal to Percentage: 0.5=50 • Fraction to Ratio: 1/2=1:1 Discuss why different contexts might prefer one format over another (e.g., sales discounts in percentages, odds in ratios, etc.). Using a dice roll, draw out a tree diagram for rolling a 6 in two consecutive rolls. Calculate and label probabilities at each stage. Create a table for a card drawing experiment. Record probabilities for drawing face cards (King, Queen, Jack) from a deck. Together, calculate the probability in a fraction, convert it to a decimal, then to a percentage, and finally express it as a ratio. Students replicate the process with guidance. Students choose or are assigned a specific graphic organizer (tree diagram, table, etc.).	Blank paper or graph paper for each student Rulers & pencils Colored pencils or markers Dice, coins, or cards for hands-on probability experiments

<table>
<tr><td></td><td>They record their probabilities on the organizer, then convert and express the probability in all formats (fraction, decimal, percentage, ratio).
Circulate the room to assist and ensure understanding.

Learners in pairs solve the questions writing on the board.

Example: The arrow on the spinner if spun twice and the number of wins recorded;
i. identify the sample space.
ii. calculate the probability of a win P(W) and the probability of a lose, P(L).

<u>Solution</u>
Let's assume:
- The spinner has 4 sections in total.
- 2 sections are labeled as "win" (W) and the other 2 as "lose" (L).

i. Identify the sample space.

If the spinner is spun twice, the sample space (all possible outcomes) consists of:
WW, WL, LW, LL

ii. Calculate the probability of a win P(W) and the probability of a loss P(L)

For a single spin:
P(W) = Number of win sections / Total number of sections = 2/4 = 1/2
P(L) = Number of lose sections / Total number of sections = 2/4 = 1/2

<u>Assessment</u>
1. A box contains 3 blue pens and 4 pink pens. A pen is taken from the box, its colour noted, and then replaced. Another pen is taken and its colour noted.
i. What is the sample space of the 1st and the 2nd trials?
ii. Draw a probability tree diagram to represent the event.

2. A die is thrown at most three times. If 6 is scored the game stops.
i. Copy and complete the probability tree diagram.
ii. Explain why some of the branches of the tree diagram have disappeared</td><td></td></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><td></td></tr>
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