Learning Plan							
Subject	*Mathematics*	**Week**	*1*	**Duration**	*4 hrs.*	**Form**	*1*
Strand	*Numbers for everyday life*	**Sub-Strand**	*Real number and numeration system*				
Content Standard	*Demonstrate knowledge and understanding of real number system and the operations of the various subsets.*						
Learning Outcome(s)	*Apply the relationships and differences between the set of rational and irrational numbers and use them to solve problems.*						
Learning Indicator(s)	*a) Develop the real number system using the closure property.* *b) Distinguish between rational and irrational numbers using conversion of common to decimal fractions and solve related problems.*						
Essential Question(s)	*a) What distinguishes rational numbers from irrational numbers, and how do these different types of numbers manifest in real-world situations and mathematical concepts?* *b) What are some examples of real-life situations where irrational numbers play a crucial role, and how can it significance be illustrated to learners?* *c) How can understanding the visual representation of real numbers on the number line help us in ordering and comparing quantities in real-world contexts? etc.*						
Pedagogical Strategies	*Collaborative learning: Small group and large group discussions, mixed-ability groups, mixed-gender group, think-pair-share, "Know, Want-to-know, and Learned (KWL)", Individualized practice, etc.*						
Teaching & Learning Resources	*Mathematical sets, computer with organising software like Excel, A4, A3 papers, manila cards, flip charts, markers, colour pens, projector, etc.*						
Key Notes on Differentiation							
Learning Tasks: *a) Learners classify the subsets of real numbers using diagrams, flow charts, number lines, etc.* *b) Learners differentiate rational from irrational numbers using recurring and non-recurring decimals.* *c) Learners investigate subsets of the real number system using visual aids.* *d) Learners investigate real-life application of real numbers.* ***Pedagogical Approach 1: Collaborative learning.*** *Students use discussions to establish the various subsets of the real number system through the closure property.*							

To differentiate;

a) *Provide visual aids, such as number lines or diagrams, to help learners who are struggling to visualize the subsets of the real number system.*

b) *Offer additional practice problems and examples to reinforce understanding.*

c) *Have advanced learners explore more complex subsets of the real number system, such as irrational numbers.*

d) *Challenge them to create their own examples and non-examples to demonstrate their understanding.*

Pedagogical Approach 2: Collaborative learning

Students use discussions as well as visual aids/diagrams to differentiate rational from irrational numbers then investigate subsets of the real number system and its real-life applications.

To differentiate:

For learners who are struggling to grasp the concepts:

a) *break down the activity into smaller, more manageable steps, and provide clear explanations and examples.*

b) *use concrete manipulatives or visual aids to help them understand the concept of rational and irrational numbers.*

For advanced learners:

a) *challenge them to apply their understanding to solve complex problems or real-life scenarios involving rational and irrational numbers.*

b) *provide opportunities for them to present their findings to the class or create visual aids to explain their thinking.*

Key Assessment:

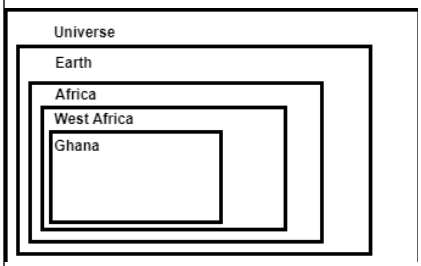
Provide a variety of assessment tasks to cater for the varied learners.

a) Assessment Level *2: Enumerate the various subsets of the real number system using a Venn diagram/flow chart or number line.*

b) Assessment Level *3: Investigate the closure properties of the various subsets of the real number system, under the operations* $(+,-,\times,\div)$.

c) Assessment Level *4: Write down the steps by which a python can swallow a grain of corn, a chick and a hawk at different places, in a single meal. If a hunter kills the python after this and put it into his bag containing a bottle of water, use Venn diagram to illustrate the content in the hunters' bag. Relate these within the real number system.*

Keywords	*Union, intersection, complements, surveys, sets, etc.*

Lesson 1: Establishing the set of real numbers using the closure property	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *<u>Activity (10 minutes)</u>* *Review learners' previous knowledge on the real number system using real life models for learners to consolidate their ideas on the concept. Encourage the use of the concept "Subset" in order to link it to the new learning for this lesson.* *Study the diagram carefully.*  	• *In mixed-ability/gender groups, learners should answer questions such as;* • *If someone is from Ho, can you assume they are also from Ghana?* • *If someone lives in China, list all the possible subsets that you can place him or her.*
<u>Introduction (e.g. 30 minutes)</u> *I. In a whole class activity lead the class to play the* ***"Closure Exploration Game".*** ***Game*** • *Distribute index cards with various numbers to the students. Include both integers and fractions.* • *Ask students to pair up and perform addition, subtraction, multiplication, and division operations on*	***<u>Introduction (e.g. 30minutes)</u>*** *I. In a whole class, learners play the* ***"Closure Exploration Game".*** ***Game*** • *Study the index cards with various numbers.* • *With a partner, perform addition, subtraction, multiplication, and division operations on the numbers. Please discuss and analyze the results.* • *Each pair should write their*

their numbers. Encourage them to discuss and analyze the results. • *Have each pair write their results on the whiteboard or jotter.* *II. Facilitate a class discussion based on the results. Ask questions such as:* • *What patterns or trends do you observe in the results?* • *Were there any instances where the closure property did not hold?* • *How does this exploration relate to the development of the real number system?* *III. Connect the activity to the concept of developing the real number system. Emphasize that the closure property ensures that performing basic operations on real numbers will always result in a real number.* *IV. In mixed-ability groups, task learners to discuss how this property is foundational for building the real number system.* ***<u>Activity 1 (e.g. 30 minutes)</u>*** *I. Help learners to organise themselves into mixed-ability groups, then task them to discuss the various subsets under the real number system then use a model **[**including using a computer application software**]** of their choice to depict it.* *II.Call groups to make presentations of their models to the class. Offer other learners*	*results on the whiteboard or in their jotters.* *II. Learners contribute to a class discussion. Answer questions such as:* • *What patterns or trends do you observe in the results?* • *Were there any instances where the closure property did not hold?* • *How does this exploration relate to the development of the real number system?* *III. Discuss with a partner how the activity connects to the concept of developing the real number system.* *IV. In mixed-ability groups, discuss how this property is foundational for building the real number system.* ***<u>Activity 1 (e.g. 30 minutes)</u>*** *I. In your mixed-ability groups, discuss the various subsets under the real number system then use a model **[**including using a computer application software**]** of your choice to depict it.* *II. Take turns to make presentations of your models to the class. You have the opportunity to contribute to the presentations. But be circumspect with your*

the opportunity to contribute to the presentations. ***Activity 2 (e.g. 30 minutes)*** *I. In mixed-groups, task learners to discuss and come out with various real-life uses of the various subsets of the real number system.* *II. Call groups to make presentations to the class.*	*comments.* ***Activity 2 (e.g. 30 minutes)*** *I. In mixed-groups, discuss and come out with various real-life uses of the various subsets of the real number system.* *II. Groups take turns to make presentations to the class.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 2 *Answer at least 2 of the following questions:* *1. Enumerate the various subsets of the real number system using a Venn diagram* *2.investigate the closure properties of the various subsets of the real number system, under the operations* $(+,-,\times,\div)$. *3. Investigate, where possible, application of the various subsets of the real number system in at least two of the following sectors:* *a) Daily transactions,* *b) Computing,* *c) technology,* *d) medicine,* *e) agriculture,* *f) food and garment production* *g) energy sector,* *h) others.* *4. Write down the steps by which a python can swallow a grain of corn, a chick and a hawk at different places, in a single act. If a hunter kills the python after this and put it into his bag containing a bottle of water, use Venn diagram to illustrate the content in the hunters' bag. Relate these the real number system.*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Activity (e.g. 10 minutes) *a. Make a seamless transition to plenary by making reference to the first* ***Essential Question****, and engage learners to brainwave ideas on them.* ***Hint: Link the concept of subset by bringing up a conversation on the need to appreciate the uniqueness of different subgroups in our society coexisting as Ghanaians.***	

(GESI).

b) Using the last part of our WWH strategy, wrap up the lesson by summarising learners' ideas for them to write in their notes. (Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any)

c) Have a general class voting to aid reflection.

Reflection & Remarks

a) What was my best moment in today's lesson and how can I create more of such situations?
b) What did the learners find difficult to understand, and what activities did learners complete with ease and accuracy?
c) Which materials best supported the delivery of the lesson and how did learners find its use in aiding their understanding of the concept taught?
d) Were the different subgroups in the class catered?
e) Were the learners enthusiastic about the activities and resources employed in the delivery of the lesson?

Lesson 2:
Distinguishing between rational and irrational numbers and their applications to the real world

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

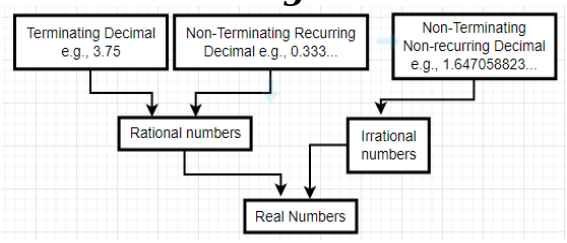
Teacher Activity	***Learner Activity***

Activity (e.g. 30 minutes)

*In a whole class play the game: **"Real Number Relay".***

Instructions

I. Prepare large sheets of paper with categories written on them, such as "Whole Numbers," "Integers," "Rational Numbers," "Irrational Numbers," and "Real Numbers." Place these sheets at different locations in the classroom or outdoor area.
II. Write various numbers on the index cards, including integers, fractions, decimals, and irrational numbers. Ensure that there is a mix of different types of numbers.
III. Divide the class into teams, and assign each team a starting point.
IV. Each team will send one member at a time to pick a number card, identify the type of number it represents, and place it on the correct category sheet.
V. Emphasize that the team members must be accurate and quick, as the goal is to complete the relay in the shortest time.
VI. After the relay race, gather the students and review the placement of numbers on each category sheet.
VII. Discuss any challenging numbers and clarify any misconceptions.
VIII. Score the teams based on accuracy and speed. Celebrate the winning team and acknowledge individual efforts.

Introduction (e.g. 25 minutes) *I. In mixed-ability groups, present learners with a model of the real number system and tasked them to identify numbers that are rational and those that are irrational. Encourage learners to show respect for individual views, beliefs, religions, and cultures as they interact and collaborate in their groups and make presentations of their work.* *II. Call groups to make presentations of their notes to the class.* ***Activity 1 (e.g. 30 minutes)*** *I. In an all-inclusive group discussion, task learners to discuss, with examples, the differences between rational and irrational numbers.* *II. Task groups to use a model to distinguish between rational and irrational numbers.* ***E.g.***  ***Activity 2 (e.g. 25 minutes)*** *I. In their groups, task them to discuss with examples the concept and establish recurring and non-recurring decimals using simple fractions.* *Also, task them to investigate their applications to real life problems.*	***Introduction (e.g. 25 minutes)*** *I. In mixed-ability groups, use the model of the real number system given and identify numbers that are rational and those that are irrational. Encourage learners to show respect for individual views, beliefs, religions, and cultures as they interact and collaborate in their groups and make presentations of their work.* *II. Call groups to make presentations of their notes to the class.* ***Activity 1 (e.g. 30 minutes)*** *I. In an all-inclusive group discussion, learners discuss, with examples, the differences between rational and irrational numbers.* *II. Use a model to distinguish between rational and irrational numbers.* ***Activity 2 (e.g. 25 minutes)*** *I. In groups, discuss with examples the concept and establish recurring and non-recurring decimals using simple fractions.* *II. Also, investigate the applications of recurring and non-recurring decimals to real life problems.*

	Example: *I. A recipe calls for 1/3 cup of a certain ingredient. If you want to make a larger batch of the recipe and need to measure out 5 times the original amount, calculate the total quantity of the ingredient needed in decimal form. Determine whether the result is a recurring or non-recurring decimal.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 3 *Answer at least two of the following questions.* *1. Establish at least two real life applications or uses of rational and irrational numbers.* *2. investigate and classified each of the following as either rational or irrational number.* *a.* 75% *b.* $0.7142857142857143\ldots$ *c.* $\frac{125}{11050}$ *d.* $\sqrt{8}$ *e.* $3.14159265358979\ldots$ *f.* $2\sqrt{7}$ *3. Convert the following decimals into fractions* *a.* $0.\dot{5}$ *b.* $0.\dot{6}\dot{2}$ *c.* $1.\dot{6}$ *d.* $2.\dot{8}\dot{1}$	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Activity (e.g. 10 minutes) *b. Make a seamless transition to plenary by making reference to the second and third "**Essential Question**", and engage learners to brainwave ideas on them.* *d) Lead the class to summarise the main ideas in the lesson for learners to write in their notes. (Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any)* *e) Have a general class voting to aid reflection.*	

Reflection & Remarks
a) What was my best moment in today's lesson and how can I create more of such situations? *b) What did the learners find difficult to understand, and what activities did learners complete with ease and accuracy?* *c) Which materials best supported the delivery of the lesson and how did learners find its use in aiding their understanding of the concept taught?* *d) Were the different subgroups in the class catered?* *e) Were the learners enthusiastic about the activities and resources employed in the delivery of the lesson?*

Learning Planner							
Subject	*Mathematics*	**Week**	*2*	**Duration**	*240 mins*	**Form**	*1*
Strand	*Numbers for everyday life*	**Sub-Strand**	*Real number and numeration system*				
Content Standard	*a) Demonstrate knowledge and understanding of the real number system and the operations of the various subsets.* *b) Demonstrate knowledge and understanding of the real number system with respect to the concepts and vocabulary of sets, establish their relationships and carry out simple surveys using the properties of sets.*						
Learning Outcome(s)	*a) Apply the relationship and differences between the set of rational and irrational numbers and use these to solve problems.* *b) Analyse and solve real world problems involving union, intersection and complements and their applications to three sets problems using simple surveys.*						
Learning Indicator(s)	*a) Establish the properties of real numbers with respect to commutative, associative, identity, inverse, distributive, etc.* *b) Review the properties of subsets (two and three), their vocabulary and operations and use it to solve real life problem.*						
Essential Question(s)	1. *How do the properties of closure, commutative, associative and distributive impact the outcome of arithmetic operations, and how are these properties applied in solving real – world problems?* 2. What pedagogical strategies can best help learners to investigate the concept of closure, commutative, associative and distributive for them to establish the properties related to them? 3. In what ways do the concepts of identify and inverse elements contribute to the understanding of addition, subtraction, multiplication and division, and how are these concepts relevant in solving real – life problems? 4. How can the understanding of the properties of operations enhance our ability to manipulate and simplify mathematical expressions, and how do these properties lay the foundation for more advanced and mathematical concepts?						
Pedagogical Strategies	*Mixed ability groupings* *Problem based learning* *Group presentation* *Using think – pair share*						

Teaching & Learning Resources	*Mathematical sets, number line, manila cards, flip charts, markers, colour pens, projector, Teachers manual.*

Key Notes on Differentiation

Learning Tasks:

a) *Enumerating the properties of operations, commutative, associative, distributive, and their connections to real life and their inter connections.*

b) *Extend content expectation to include classifying the properties of operations, commutative, associative, distributive, etc. and their existence with respect to the four operations.*

c) *Extend content expectation to include applying the properties of operations, commutative, associative, distributive, etc. to real life and solving simple problems involving them.*

Pedagogical Approach 1: Collaborative learning.

Students use flowcharts/Venn diagram/number lines as well as strategies used in the class to establish the properties of operations, commutative, associative, distributive, etc.

To differentiate

a) *Use concrete examples and visual aids to help them understand the properties of operations.*

b) *Break down the activity into smaller, more manageable steps, and provide scaffolding as needed.*

c) *Encourage them to create their own flowcharts, Venn diagrams, or number lines to illustrate the properties of operations.*

d) *Challenge them to apply the properties to solve complex problems or create their own problems for their classmates to solve.*

Key Assessment:

a) ***Assessment Level 2:*** *Identify the property of operation in the following*

a. $\frac{4*1}{4}=\frac{1}{4}*4=1$

b) ***Assessment Level 3:*** *Establish that for any given set of numbers* $a, b \wedge c$ *the following properties hold.*

i. commutative

ii. associative

iii. distributive

c) ***Assessment Level 3:*** *A woman created a 2m fire belt around, but within, her 200m by 250m rice farm. She later created a circular fishpond of diameter 6m at the middle of the farm. Determine the actual land area covered by the rice farm before the creation of the fishpond*

Keywords	*Commutative, associative, distributive, identity, union, subsets, intersection.*

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (10 minutes)* Put learner in a mixed groups, write the next three terms of the sequence and tell us how you got the next three numbers. e.g. 1. $2, 5, 8, 11, \ldots$ 2. $5, 9, 13, 17, \ldots$ 3. 1, 4, 9, 16, ...	
Introductory Activity (15 minutes) *In a mixed gender groupings, w*rite series of arithmetic statement on the marker board and allow the learners to state whether the statement is true/false. *E.g.* *1.* $4+5=5+4$ *2.*$8-5=5-8$ *3.* $8\div 4=4\div 8$ *4.* $3+(4+5)=7+4$ *5.* $5\times 48=(5\times 40)+(5\times 8)$ ***Activity 1 (40 minutes)*** Guide learners in a whole class discussion to investigate the properties of real numbers (commutative, associative, distributive and closure) numbers using series of arithmetic activities. ***Activity 2 (40 minutes)*** i. Guide learners in an all-	***Introductory Activity*** In your mixed groups state whether the following statements are true or false. *1.* $4+5=5+4$ *2.*$8-5=5-8$ *3.* $3\times 8=8\times 3$ *4.* $3+(4+5)=7+4$ *5.* $5\times 48=(5\times 40)+(5\times 8)$ ***Activity 1*** Through a series of arithmetic activities, discuss and investigate the properties of real numbers (commutative, associative, distributive and closure) ***Activity 2*** *ii.* In groups apply the properties of operations on real numbers (commutative, associative, distributive, etc.) to real life and

inclusive grouping to apply the properties of operations on real numbers (commutative, associative, distributive, etc.) to real life and solving simple problems involving them.	solve simple problems involving them.
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 1 *Identify the property used in each of the following statement?* *1.* $4+7=7+4$ *2.* $(6\times5)\times7=(5\times7)\times6$ *3.* $4\times17=(4\times10)+(4\times7)$ ***Level 3*** *1) Establish that for any given set of numbers a, b and c the following properties hold.* *a) Commutative,* *b) Associative,* *c) Distributive,*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
(15 minutes) Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any. Give learners take home assignment.	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***

Starter Activity (10 minutes)

In whole class let learners recite the multiples of 5, 6, 7, 8 and 9 up to the 12^{th} multiple.

Introductory activity (15 minutes) In a mixed gender groupings, guide learners to draw a number line with a scale ranging from -10¿10. Give a number to the learners to identify the number of steps they will move from the number to get to zero without ignoring the direction. **Activity 1 (40 minutes)** Support learners in a problem solving activities to establish that for a given set of numbers a, b and c, 1 is the multiplicative identity and 0 is the additive identity **Activity 2 (40 minutes)** In a problem based activity, guide learners to establish that; i. the product of a number and its inverse gives the multiplicative identity. ii. the sum of and its inverse gives the additive identity	**Introductory activity** In a mixed gender groupings, draw a number line with a scale ranging from -10¿10. Identify the number of steps you will move from the following numbers to get to zero, taking into consideration, the direction. 1. 3 2. .-7 e.t.c **Activity 1** In a problem solving activities establish that for a given set of numbers a, b and c, 1 is the multiplicative identity and 0 is the additive identity. **Activity 2** In a problem based activity, establish that; i. the product of a number and its inverse gives the multiplicative identity. ii. the sum of and its inverse gives the additive identity

Assessment DoK aligned to the Curriculum and Subject Teacher Manual

Level 3

2) identify the property of operation in each of the following

a) $\frac{4*1}{4}=\frac{1}{4}*4=1$

b) $4*3=3*4=12$

c) $4*0=0*4=0$

Level 1

State the multiplicative inverse of the following numbers?

1. 3

2. $\frac{5}{2}$

3. $\frac{-7}{5}$

Lesson Closure

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

(15 minutes)

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Give learners take home assignment.

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*3*	**Duration**	*4hrs*	**Form**	*1*
Strand	*Numbers for \ everyday life*	**Sub-Strand**	*Real number and numeration system*				
Content Standard	*a) Demonstrate knowledge and understanding of the real number system and the operations of the various subsets.* *b) Demonstrate knowledge and understanding of the real number system with respect to the concepts and vocabulary of sets, establish their relationships and carry out simple surveys using the properties of sets.*						
Learning Outcome(s)	*a) Apply the relationship and differences between the set of rational and irrational numbers and use these to solve problems.* *b) Analyse and solve real world problems involving union, intersection and complements and their applications to three sets problems using simple surveys.*						
Learning Indicator(s)	*a) Organise information visually to establish the relationship between and among sets of items (three sets) and apply these to conduct mini surveys in the school community and beyond.* *b) Establish the relationship between and among three sets, including set equations and the De Morgan's law.*						
Essential Question(s)	*1.* How does the use of Venn diagrams enhance learners' ability to compare and contrast the relationships between three sets, and how can these diagrams be utilized to illustrate complex set relationships in a clear and concise manner? 2. In what situations do the concepts of union and intersection of three sets arise in practical scenarios, and how can these operations be used to analyse and solve problems involving multiple sets? *3.* In what ways does De Morgan's law contribute to the understanding of set theory and its applications, and how does this law extend the principles of logic to set operations involving multiple sets?						
Pedagogical Strategies	*Think pair share, building on what others say, interactive activity, using the diamond nine.*						
Teaching & Learning Resources	*Manella cards* *· Bundles of sticks and loose ones, abacus* *· Graph board/sheets and square papers Technology tools*						

	such as computer, mobile phone etc. *· Computer software applications like GeoGebra.* *· Tape measure, carpenters square, compass, geodot, Mathematical sets*

Key Notes on Differentiation

Learning Tasks:

a) Learners state and use the vocabulary and operations of three sets.

b) Learners investigate subsets, unions, intersections, regions of three sets Venn diagram, their properties of operations and application to real life problems.

c) Learners establish the de Morgan's Law and apply it to solve real-life problems involving three sets.

Pedagogical Approach 1: Collaborative learning.

Students use Venn diagram organiser to solve three set problems.

To differentiate:

a) Provide examples and non-examples to help them understand the concepts.

b) Provide additional practice problems and support as needed.

c) Provide more complex three-set problems that require critical thinking and multiple steps to solve.

d) Encourage them to analyse and compare different solution strategies, such as using the inclusion-exclusion principle.

e) Have them create their own three-set problems for their classmates to solve.

Key Assessment:

a) ***Levels 2&3 Assessment:*** *Suppose* $U=\{1,2,3,4,5,6,7,8,9,10\}$, $A=\{2,4,6,8,10\}$, *and* $B=\{1,3,5,7,9\}$.

i. Find $(A \cup B)'$

ii. Find $(A \cap B)'$

iii.*Verify de Morgan's laws for the sets A and B.* ***Level 3***

b) ***Assessment Levels 2&3:*** *A survey conducted by students in Yendi Secondary School revealed that, 84 students study mathematics, 114 study ICT and 78 study Clothing. It was also realised that 48 study mathematics and ICT, 46 study mathematics and Clothing, 42 study Clothing and ICT and 34 study all the three courses.*

i. Draw a Venn diagram for this information. ***Level 2***

ii. Find how many students study: ***Level 3***

- *One course only,*
- *Exactly two courses,*
- *At least two courses*

Keywords	

Lesson 1
Main Lesson drawing on Concepts, Skills and Competencies to

<table>
<tr><th colspan="2">reinforce as in the Subject Teacher Manual</th></tr>
<tr><th>Teacher Activity</th><th>Learner Activity</th></tr>
<tr><td colspan="2">Starter <u>Activity (10 minutes)</u>
Venn Diagram fun; guide learners mention to mention some real life object that can be used to draw venn diagram; food, plants and food and plants, food, round object and food and round objects etc.</td></tr>
<tr><td><u>Introductory Activity (15 minutes)</u>
In mixed gender groupings, write names of different objects/nouns on the marker boards and ask learners in groups to sort them into categories. (e .g. colour, fruits, shape, countries etc.)

<u>Activity 1 (40 minutes)</u>
In a whole class discussion, guide learners to explain the various concepts of two or three sets.

<u>Activity 2 (45 minutes)</u>
In a mixed gender groupings, guide learners to investigate subsets, unions, intersections, regions of three sets Venn diagram, their properties of operations and application to real life problems.</td><td><u>Introductory Activity</u>

In mixed gender groupings, sort the names of the objects written on the board into categories (e.g. colour, fruits, shape, countries etc.)

<u>Activity 1</u>
In a whole class discussion, explain the concepts of two or three sets.

<u>Activity 2</u>
In a mixed gender groupings, investigate subsets, unions, intersections, regions of three sets venn diagram, their properties of operation and application to real life problems.</td></tr>
<tr><td colspan="2">Assessment DoK aligned to the Curriculum and Subject Teacher Manual</td></tr>
<tr><td colspan="2">1. level 2
Given that sets A ¿ $\{1,2,3,4\}, B=\{3,4,5,6\} \wedge C=\{5,6,7,8\}$
Find; a) AUB b) $A \cap C$ c) $B \cap C$ d) $A \cup B \cup C$</td></tr>
<tr><td colspan="2">Lesson Closure
In completing this part, refer to the Essential Questions to check that learning has taken place.</td></tr>
<tr><td colspan="2">10 minutes

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Give learners take home assignment.</td></tr>
</table>

Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (15 minutes)* *Ask students to identify their favourite foods and guide them to create venn diagram to illustrate which hobbies are shared with others.*	
Introductory activity (10 minutes) *Using building on what others says, lead learners to review the various concepts associated with sets; subsets, union, intersection, etc.* ***Activity 1 (20 minutes)*** In a mixed gender groupings guide learners to establish the following properties of sets; 1. $(AUB)^1=A^1\cap B^1$ 2. $(A\cap B)^1=A^1\cap B^1$ 3. $(AUBUC)^1=A^1\cap B^1\cap C^1$ 4. $(A\cap B\cap C)^1=A^1\cup B^1\cup C^1$ ***Activity 2 (20 minutes)*** *In an interactive group presentation, guide learners to establish the identities and venn diagrams of; for any three sets A, B and C, the following holds:* *1. $AUB=BUA$* *2. $AU(B\cap C)=(A\cap B)U(A\cap C)$* *3. $A\cap(BUC)=(A\cap B)U(A\cap C)$* ***Activity 3 (50 minutes)*** *In an interactive activity, assist learners to establish the de Morgan's Law and*	***Introductory activity*** *Using building on what others say, review the various concepts associated with sets; subsets, union, intersection etc.* ***Activity 1*** In a mixed gender groupings, establish the following properties of sets; 1. $(AUB)^1=A^1\cap B^1$ 2. $(A\cap B)^1=A^1\cap B^1$ 3. $(AUBUC)^1=A^1\cap B^1\cap C^1$ 4. $(A\cap B\cap C)^1=A^1\cup B^1\cup C^1$ ***Activity 2*** In an interactive group presentation, *establish the identities and venn diagrams of; for any three sets A, B and C, the following holds:* *1. $AUB=BUA$* *2. $AU(B\cap C)=(A\cap B)U(A\cap C)$* *3. $A\cap(BUC)=(A\cap B)U(A\cap C)$* ***Activity 3*** In an interactive activity, establish the de Morgan's Law and apply it to solve real life

apply it to solve real life problems involving three sets.	problems involving three sets.

Assessment DoK aligned to the Curriculum and Subject Teacher Manual

c) ***Levels 2&3 Assessment:*** *Suppose* $U=\{1,2,3,4,5,6,7,8,9,10\}$, $A=\{2,4,6,8,10\}$, *and* $B=\{1,3,5,7,9\}$.

i. Find $(A \cup B)'$

ii. Find $(A \cap B)'$

iii. Verify de Morgan's laws for the sets A and B. ***Level 3***

d) ***Assessment Levels 2&3:*** *A survey conducted by students in Yendi Secondary School revealed that, 84 students study mathematics, 114 study ICT and 78 study Clothing. It was also realised that 48 study mathematics and ICT, 46 study mathematics and Clothing, 42 study Clothing and ICT and 34 study all the three courses.*

i. Draw a Venn diagram for this information. ***Level 2***

ii. Find how many students study: ***Level 3***

- *One course only,*
- *Exactly two courses,*
- *At least two courses*

Lesson Closure

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

10 minutes

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Give learners take home assignment.

Reflection & Remarks

Learning Plan							
Subject	*Mathematics*	**Week**	*4*	**Duration**	*4hrs*	**Form**	*1*
Strand	Number for Everyday life	**Sub-Strand**	*Real Number and Numeration System*				
Content Standard	*Demonstrate understanding of proportional reasoning involving fractions and its operations and use it to solve real-life problems including rounding off (decimal places and significant figures).*						
Learning Outcome(s)	*Make connections between fractions and decimals and use them to solve daily problems.*						
Learning Indicator(s)	*e) Establish the concept of fractions and investigate the connections between fractions and decimal numbers.* *f) Establish basic rules for operations on fractions: addition, subtraction, multiplication, and division.*						
Essential Question(s)	1. How can learners be guided to establish the concept of fractions and investigate the connections between fractions and decimal numbers? 2. What are the operations involved in working with fractions, and how can these operations be applied to solve problems involving measurement, comparison, and combination of fractional quantities? 3. How do fractions relate to other mathematical concepts, such as decimal and percentages, and what insight can be gained from exploring these relationships in various mathematical and real life situations?						
Pedagogical Strategies	*Experiential learning, collaborative learning, talk for learning*						
Teaching & Learning Resources	*Fractional boards, realia,, number line, paper strips or graph sheets and Teacher manual, projector.*						
Key Notes on Differentiation							
Learning Tasks: *a) models the concept of fractions as part of a whole, a group or a ratio of two integers* *b) reviews, parts of fractions, types of fraction, including* *c) initiate interactive activities that relates fractions to learners' real-life experiences* *d) apply these experiences to operations on fractions.* ***Pedagogical Approach 1: Problem-Based Learning***							

Students use verbal discuss to establish concept of fractions and investigate concept of fractions with respect to part-whole, ratio and group using manipulative and modelling.

To differentiate, consider the following to support learners who maybe struggling:

a) Guide them through the concepts of fractions using manipulatives and models.

b) Provide opportunities for them to practice using fractions in different contexts, such as sharing objects, comparing quantities, and solving problems.

For learners who you identify as advanced:

a) Encourage them to analyze relationships between fractions, decimals, and percentages.

b) Challenge them to apply their understanding of fractions to real-world problems and mathematical reasoning tasks.

Key Assessment:

a) ***Assessme***

b) ***nt Level 1****: Add the fractions* $\frac{1}{4}+\frac{5}{6}$.

c) ***Assessment Level 2****: Solve the problem* $1\frac{1}{2}\times\frac{2}{5}+2\frac{3}{4}\div\frac{3}{7}$

d) ***Assessment Level 3****: A library has a collection of* 90 *books, and* $\frac{3}{5}$*of them are fiction books. How many fiction books are in the collection?*

Keywords	Fractions, mixed fractions, proper fractions, numerator, denominator, operations

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (10 minutes)* Use mental drill games to let learners find half, one third etc. of given numbers.	
Introductory Activity (15 minutes) In a mixed gender groups, give sheet of papers to learners and guide them to fold them into equal parts such as ½ , ¼ , $\frac{1}{8}$ etc. and	**Introductory Activity** In mixed gender groupings, fold the sheet of papers into equal parts such as ½ , ¼ , $\frac{1}{8}$ etc and shade parts such as ½ , ¾ $\frac{5}{8}$.

let the students shade parts such as ½ ¾ , $\frac{5}{8}$ etc. **<u>Activity 1 (30 minutes)</u>** In mixed gender grouping guide learners to model fractions of similar nature, such as $\frac{1}{2}, \frac{1}{4}, \frac{3}{7}, \frac{5}{12}$ etc. using paper strips, and number lines, etc. **<u>Activity 2 (50 minutes)</u>** Use talk for learning to discuss the types of fractions citing examples each.	**<u>Activity 1</u>** In your mixed gender groups model fractions of similar nature such as $\frac{1}{2}, \frac{1}{4}, \frac{3}{7}, \frac{5}{12}$ etc. using paper strips, and number lines, etc. **<u>Activity 2</u>** Use talk for learning to discuss the types of fractions and cite examples each.
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Assessment Level 1 1. Give two examples each of the following types of fractions a. proper fraction b. improper fraction c. mixed fraction d. unlike fraction **Assessment level 2** 2. Locate the following fractions on a number line. a. $\frac{3}{5}$ b. $4\frac{2}{3}$ c. $\frac{7}{2}$	
Lesson Closure (15 minutes) ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
1. Lead the class to summarize the main ideas in the lesson for learners to write in their notes. 2. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any. 3. Let each student state one type of fraction and give an example	

each before leaving the class. (exit ticket)	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (10 minutes)* *Mentions some examples or set of fractions and call learners to identify the type of fraction in each.*	
Introductory activity (15 minutes) In a mixed gender groups give learners a set of story problems involving fractions and ask them to identify the operations needed to solve the problems. **Activity 1 (15 minutes)** In a talk for learning approach, initiate interactive activities that relate fractions to learners' real-life experiences. **Activity 2 (45 minutes)** In a mixed gender groups guide learners to apply their experiences to operations (addition, subtraction, multiplication and division) on fractions and establish rules on those operations. **Activity 3 (25 minutes)** In a mixed gender groups, project set of word problems involving fraction for learners to apply their	**Introductory activity** In a mixed gender groups, identify the operations needed to solve each of the story problem. **Activity 1** In a talk for learning relate fractions to your real life experiences. **Activity 2** In your mixed gender groups apply your experiences to basic operations (addition, subtraction multiplication and division) on fractions and establish rules on those operations. **Activity 3** In a mixed gender groups, solve the set of word problems involving fractions displayed on the screen.

knowledge on operations on fraction to solve.	

Assessment DoK aligned to the Curriculum and Subject Teacher Manual

Assessment level 1

1. Simplify the following;

a. $\frac{2}{5}+\frac{1}{5}$

b. $\frac{2}{3}-\frac{3}{4}$

c. $\frac{2}{3}\times\frac{5}{6}$

d. $\frac{2}{3}\div\frac{3}{4}$

Assessment level 3

2. In a school choir of 45 members $\frac{3}{5}$ of the members are female. How many females are in the choir?

3. A bakery has a stock of 75 loaves of bread, $\frac{3}{5}$ of them are whole wheat bread. How many loaves of whole wheat bread are there?

Lesson Closure (10 minutes)

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

i. Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

ii. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

iii. Give take home assignment to learners to solve word problems involving fraction.

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*5*	**Duration**	*4hrs*	**Form**	*1*
Strand	*Number for Everyday life*	**Sub-Strand**	*Real Number and Numeration System*				
Content Standard	Demonstrate understanding of proportional reasoning involving fractions and its operations and use it to solve real-life problems including rounding off (decimal places and significant figures).						
Learning Outcome(s)	Make connections between fractions and decimals and use them to solve daily problems.						
Learning Indicator(s)	a) Investigate the connections between fractions and decimal numbers. b) Establish additive and multiplicative inverses of fractions using multi-purpose model charts.						
Essential Question(s)	1. What pedagogical strategies can be used to help learners understand the connection between fractions, decimal fractions and percentages. 2. How can the knowledge of the relationship between percentages and decimal numbers help in converting them and solve problems that involve both types of numbers? 3. How can the operations used on decimal numbers and percentages be applied in solving problems involving measurement, data analysis and probability? 4. How can learners be guided to use the knowledge of multiplicative and additive inverses in solving real life problems?						
Pedagogical Strategies	Problem based learning, think pair share, mixed ability/gender groupings.						
Teaching & Learning Resources	Fractional charts, realia, (currency notes and coins), number line, graph sheet/paper strip, Teacher Manual.						
, **Key Notes on Differentiation**							
Learning Tasks: *a) Learners establish decimals as fractions.* *b) Learners convert the different types of fractions into decimals and vice versa.* *c) Learners establish percentages as a fraction and/or a decimal.*							

d) *Learners convert the different types of fractions into percentages and vice versa.*

e) *Learners converting the Decimal Number into Decimal Fraction.*

Pedagogical Approach 1: Problem-Based Learning

Students use verbal discuss to establish decimals and percentages as fractions and make conversions among decimals, fractions and percentages.

To differentiate:

a) *Scaffold the concepts into simpler steps and provide concrete examples to illustrate the conversions.*

b) *Use visual aids, such as number lines and grids, to help them visualize the relationships between decimals, fractions, and percentages.*

c) *Provide more complex conversions involving repeating decimals, mixed numbers, and percentages greater than 100%.*

d) *Encourage them to explore patterns and relationships between decimals, fractions, and percentages.*

e) *Challenge them to apply their understanding to solve real-world problems and explain their reasoning.*

Key Assessment:

a) ***Assessment Level 1****: Using the expanded form, express the following decimal numbers in the form of* $\frac{a}{b}$ *,where* $b \neq 0$

I. 0.75 *(Hint:* $75 \times \frac{1}{100} = \frac{75}{100} = \frac{3}{4}$*)*

II. 0.45

b) ***Assessment Level 3****: A fraction of students in a class have access to online learning resources. If 15 out of 32 students can access these resources, convert the fraction to a decimal simplify it to show the ratio of students with online access.*

c) **Assessment Level 3:** A line manager is calculating the percentage of progress for a school project, and has completed 5 out of the 8 planned tasks. How will you help him to represent the completion rate as a decimal rounded to two decimal places?

Keywords	*Fractions, decimals, comparing, LCM, numerator, denominator*

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter Activity (10 minutes) Use talk for learning for students to state the number of quantities needed to make a dozen, a score, a crate and percent.	

Introductory Activity (10 minutes) In a mixed gender groups give some Ghanaian currency coins (Ghana Pesewas) such as 50Gp, 20Gp, 10Gp to the learners and allow them to; 1. come out with the number of each coin that will make One Ghana cedi 2. state the value of each coin in Ghana cedi. **Activity 1 (30 minutes)** i. In a mixed gender groups guide learners to establish percentage and decimal numbers as fractions using graph sheets/square paper or currency coins. ii. In a talk for learning approach, assist learners to identify decimal names of given fractions. Eg. $\frac{1}{2}, \frac{3}{5}, \frac{1}{10} etc$ (one half, three – fifth one – tenth etc.) **Activity 2 (50 minutes)** In mixed gender groups assist students to use currency coins, paper strips/graph sheet and number line to convert; i. fractions to decimals (vice versa) ii. fractions to percentages (vice versa) iii. decimals to percentages (vice versa)	**Introductory Activity** In a mixed gender groups, study the currency coins given and; 1. come out with the number of each coin that will make One Ghana cedi 2. state the value of each coin in Ghana cedi. **Activity 1** i. In a mixed gender group establish percentage and decimal numbers as fractions using the graph sheet/square paper or currency coins. ii. In a talk for learning approach, identify the decimal names of the following fractions. $\frac{1}{2}, \frac{3}{5}, \frac{1}{10} etc.$ **Activity 2** In mixed gender groups use currency coins, paper strips/graph sheet and number line to convert; i. fractions to decimals and vice versa ii. fractions to percentages and vice versa iii. decimals to percentages and vice versa
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Assessment Level 1 1. Convert the following fraction into decimals	

a. $\frac{3}{4}$

b. $\frac{8}{17}$

Assessment level 2

3. In a class of 25 students, 15 are boys. Find the percentage of boys in the class?

Assessment Level 3

4. Your mother bought a crate of eggs yesterday. Your family fried 8 of them during breakfast, express the number of eggs left as
a. a percentage of the crate
b. a fraction of the crate

Lesson Closure (15 minutes)

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

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Give assignment of word problems involving fractions to the learners.

Reflection & Remarks

Lesson 2

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

Teacher Activity	***Learner Activity***
Starter *Activity (10minutes)* Lead the learners to sing the song **Paracetamol**	
Introductory activity (20 minutes) In mixed gender groups guide learners to express the number of 'a' in the song Paracetamol, as fraction, decimal and percentages of the total number of letters in the word.	***Introductory activity*** In mixed gender groups learners to express the number of 'a' in the song Paracetamol, as fraction, decimal and percentages of the total number of letters in the word.

Activity 1 (40 minutes) i. In mixed gender groups, present fractional charts to learners and let the them identify two fractions whose product is 1and help them to establish that the two fractions are multiplicative inverse to each other. ii. In a mixed gender groups, give examples of fraction including negative and positive fractions and ask learners to state another fraction that will be added to each fraction to make the result zero. ***Activity 2 (40 minutes)*** *In a mixed gender groups, guide learners to use the knowledge of percentages, decimals and fractions to solve real life problems.*	**Activity 1** i. In mixed gender groups, use the charts to identify two fractions whose product is 1. ii. In a mixed gender group, give an example of a fraction that will be added to each of the given fractions to make the fractions zero. ***Activity 2*** In a mixed gender groups, use the knowledge of percentages, decimals and fractions to solve real life problems.
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Assessment Level 1 *1. Find the multiplicative inverse of the following fractions;* $a.\ \frac{4}{7}$ $b.\ \frac{13}{15}$ $c.\ \frac{9}{2}$ ***Assessment Level 2*** *2. identify the additive inverse of the following fractions;* $a.\ \frac{3}{8}$ $b.\ \frac{-5}{7}$ ***Assessment Level 3*** *3. A fraction of students in a class have access to online learning*	

resources. If 15 out of 32 students can access these resources, convert the fraction to a decimal simplify it to show the ratio of students with online access.
Lesson Closure (15 minutes) ***In completing this part, refer to the Essential Questions to check that learning has taken place.***
Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.
Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*6*	**Duration**	*4hrs*	**Form**	*1*
Strand	*Number for Everyday life*	**Sub-Strand**	*Real Number and Numeration System*				
Content Standard	*Demonstrate understanding of proportional reasoning involving fractions and its operations and use it to solve real-life problems including rounding off (decimal places and significant figures).*						
Learning Outcome(s)	*Make connections between fractions and decimals and use them to solve daily problems.*						
Learning Indicator(s)	*a) Review the concept of fractions and investigate the connections between fractions and decimal numbers.* *b) Develop models to examine connections between and among fractions, percentages and decimal numbers and generalize.*						
Essential Question(s)	*1. How are percentages used in real – life scenarious such as shopping, budgeting and data analysis?* *2. In what ways do concepts such as percentage increase, decrease and change help in making informed decisions and analysing trends in various fields such as finance, economics and demographics?* *3. How can percentages be applied to solve problems involving discounts, taxes, insurance and other practical situations, and how do these applications enhance our understanding of percentages in everyday life?*						
Pedagogical Strategies	*Talk for learning, experiential learning, group work, mixed gender groupings, think – pair - share*						
Teaching & Learning Resources	*Bundles of sticks, number line, fractional boards, Teacher's Manual, marker boards, calculators*						
Key Notes on Differentiation							
Learning Tasks: *a) Convert fractions to decimals and to percentages and use these representations in estimations, computations, and applications.* *b) Play mental mathematics games: - learners use simple mental strategies to perform the following: addition, subtraction, multiplication and division of fractions using appropriate words and make connections.* *c) Models additive and multiplicative inverses of fractions using multi-purpose model charts.*							

d) Model additive and multiplicative inverses of fractions using multi-purpose model charts.
e) Convert fractions from one form into other forms.

Pedagogical Approach 1: Problem-Based Learning

Students use verbal discuss to establish decimals and percentages as fractions. Then establish the relationship between and among the decimals, percentages and fractions using models. They also investigate the additive and multiplicative inverses of fractions.

To differentiate:

a) Provide additional practice and support as needed to build fluency with these concepts.
b) Provide opportunities for them to practice making conversions and comparing fractions, decimals, and percentages.
c) Encourage them to explain their thinking and strategies for working with these concepts.
d) Challenge them to explore the relationship between fractions, decimals, and percentages in more depth, possibly including conversions between mixed numbers and improper fractions.
e) Encourage them to investigate more advanced concepts related to the additive and multiplicative inverses of fractions.

Key Assessment:

*a) **Assessment Level 1:** What is 3 out of 5 expressed as a percentage?*
*b) **Assessment Level 2:** If 18 out of 30 students prefer gablee, what percentage of the students prefer gablee?*
*c) **Assessment Level 3:** A recipe calls for $\frac{5}{6}$ cup of sugar. However, you want to make only half of the recipe. How much sugar should you use in the reduced recipe?*

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)* *Sing the song PARACETAMOL*	
Introductory Activity (e.g. minutes) Use think pair share to let learners come out with fields/areas where the concepts of fractions, decimals	***Introductory Activity*** *In a think pair share state the fields/areas where the concepts of fractions, decimals and percentages are used and explain your choice.*

and percentages are used and explain why they select those areas. ***Activity 1 (e.g. minutes)*** In a mixed gender groupings, guide learners to convert fractions to decimals and to percentages and vice versa and use these representations in estimations, computations and applications. ***Activity 2 (e.g. minutes)*** *In a mixed gender groupings, guide learners to model additive and multiplicative inverses of fractions using multi-purpose model chart.*	***Activity 1*** *In a mixed gender groupings* convert fractions to decimals and to percentages and use these representations in estimations, computations and applications. ***Activity 2*** *In a mixed gender groupings, model additive and multiplicative inverses of fractions using multi-purpose model chart.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 1, 2 and 3 *1. Express 60% as a fraction in its simplest form.* *2. Convert 0.6 to a proper fraction in its simplest form.* *3. What is 3 out of 5 expressed as a percentage?* *4. Express* $\frac{5}{8}$ *as a decimal (correct to two decimal places)* *5. If 18 out of 30 students prefer gablee, what percentage of the students prefer gablee?*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.	
Reflection & Remarks	

<table>
<tr><th colspan="2">Lesson 2</th></tr>
<tr><th colspan="2">Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual</th></tr>
<tr><th>Teacher Activity</th><th>Learner Activity</th></tr>
<tr><td colspan="2">Starter <u>Activity (e.g. minutes)</u>
Play a fractional game: ask students to convert given fractions to percentages and decimal and vice versa and award students who get the answer quickly.</td></tr>
<tr><td><u>Introductory activity (e.g. minutes)</u>
In a whole class discussion, lead students to review fractions as part of a whole, part of a group or ratio of two integers.

<u>Activity 1 (e.g. minutes)</u>

In a mixed gender groupings guide students to use mental strategies to perform addition, subtraction, multiplication and division of fractions.

<u>Activity 2 (e.g. minutes)</u>

In mixed gender groupings guide learners to solve word problems involving addition, subtraction, multiplication and division of fraction.</td><td><u>Introductory activity</u>
In a whole class discussion, review fractions as part of a whole, part of a group or ratio of two integers.

<u>Activity 1</u>

In a mixed gender groupings use mental strategies to perform addition, subtraction, multiplication and division of fractions.

<u>Activity 2</u>

In mixed gender groupings guide learners to solve word problems involving addition, subtraction, multiplication and division of fraction.</td></tr>
<tr><th colspan="2">Assessment DoK aligned to the Curriculum and Subject Teacher Manual</th></tr>
<tr><td colspan="2">Level 1 & 2
Simplify the following;
1. $\frac{7}{2}+\frac{5}{3}$
2. $3\frac{1}{2}\times 2\frac{1}{5}$</td></tr>
</table>

3. $\frac{3}{4} \div \frac{5}{6}$

4. without using tables or calculators, evaluate $37\frac{1}{2} \div \frac{5}{9} of \left(\frac{4}{7} + \frac{1}{5}\right) - 80\frac{1}{3}$

Level 3

5. A boy spent $\frac{2}{7}$ of his pocket money on transport and $\frac{1}{5}$ on sweets.

i. What fraction of his pocket money did he spend on transport and sweet?

ii. Calculate the fraction of his money left?

Lesson Closure

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

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*7*	**Duration**	*4hrs*	**Form**	*1*
Strand	*Number for Everyday life*	**Sub-Strand**	*Real Number and Numeration System*				
Content Standard	*a) Demonstrate conceptual understanding of proportional reasoning on percentages and use it to solve everyday life problems including simple interest, discount, profit, loss, commission, etc.* *b) Create strategies for solving percent problems involving personal or household finance.*						
Learning Outcome(s)	*Create strategies for solving percent problems involving personal or household finance.*						
Learning Indicator(s)	*a) Analyse daily activities/issues/businesses involving fractions, percentages and decimals.* *b) Apply fractions, percentages and decimals to problems involving personal or household finance (such as utility bills, exchange rates, project budgeting, school sees, shopping, etc.)*						
Essential Question(s)	*1. What pedagogical strategies can best explain the activities involving fractions, percentages and decimals?* *2. How can percentages be applied to solve problems involving discounts, taxes, insurance and other practical situations and how do these application enhance our understanding of percentages in every day?* *3. How can the knowledge of percentages be used to make informed decisions such as comparing prices or evaluating investment?* *4. What appropriate TLRs can be used to enhance learners' understanding on application of percentages?*						
Pedagogical Strategies	*Problem based learning, experiential learning, collaborative learning*						
Teaching & Learning Resources	*Computers, Projectors, Calculators, pictures showing prices of items with discounts, Teacher Manual, Textbooks.*						
Key Notes on Differentiation							
Learning Tasks: *a) Learners review fractions, percentages and decimals and apply them to percentage increase and percentage decrease of given quantities.*							

b) Learners model real-life examples of percentage increase and percentage decrease. *c) Learners extend the ideas to calculating other concepts such as discount, commission, utility bills, exchange rates, project budgeting, etc.* ***Pedagogical Approach 1: Problem-Based Learning*** *Students use verbal discussions to apply their knowledge in fractions to percentage increase and percentage decrease of given quantities.* ***To differentiate:*** *a) Break down the concepts into simpler steps and provide concrete examples to illustrate the calculations.* *b) Use visual aids, such as diagrams or pictures, to help them understand the concept of percentage change.* *c) Guide learners through the process of calculating percentage increase and decrease using fractions and decimals.* *d) Encourage them to explain their reasoning and justify their answers.* ***Key Assessment:*** *a)* ***Assessment Level 3:*** *A company's sales increased by 20% this year compared to the previous year. If the sales for the previous year were GH¢250,000, what were the sales for the current year?* *b)* ***Assessment Level 3:*** *A retail store purchases a television set for GH¢800 and plans to sell it with a mark-up of 30%. If the VAT rate is 12.5%, what will be the final selling price of the television set, including VAT?* *c)* ***Assessment Level 3:*** *A small business has to pay a monthly Internet service fee of GH¢120 and a usage charge based on the amount of data consumed. If the usage rate is GH¢0.10 per gigabyte (GB) and the business consumed 250 GB of data in a month, calculate the total Internet bill for that month.*	
Keywords	*Percentages, profit, loss, simple interest, compound interest, discount, commission.*

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (5 minutes)* *Let learners sing Paracetamol.*	
Introductory Activity (e.g. minutes) *Use talk for learning to review*	***Introductory Activity*** *Participate in the talk for learning and share knowledge and*

learners' knowledge on fractions, percentages and decimals. ***Activity 1 (e.g. minutes)*** In a mixed gender groupings guide learners to differentiate between percentage increase and percentage decrease of given quantities by displaying fliers of percentage increase and decrease of utility tarrifs on the projector. ***Activity 2 (e.g. minutes)*** *In problem based learning, guide learners to apply percentage decrease and increase to find new prices of items using real life examples.*	*experiences on fractions, percentages and decimals.* ***Activity 1*** *In mixed gender groupings examine the fliers on the screen and differentiate between percentage increase and percentage decrease.* ***Activity 2*** *In problem based learning, apply percentage decrease and increase to find new prices of items using real life examples.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 1 *1. Increase GHC500 by 20%* *2. Decrease a population of 1200 by 25%* *Level 2* *3. A television set cost GHC3400 in 2022. Find the percentage increase of the same television if it is sold now at GHC5000.*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.	
Reflection & Remarks	

Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)* *Play a percentage change game using the following questions.* *1. Find the percentage increase from 20 to 24.* *2. Find the percentage decrease from 50 to 40.*	
Introductory activity (e.g. minutes) In a mixed gender groupings guide learners to open to an online shop which has discounts (e.g. JUMIA) and ask them to explain the concept of discount. ***Activity 1 (e.g. minutes)*** In a problem based learning guide learners find profit and loss percentages on trading activities using real life. ***Activity 2 (e.g. minutes)*** In a mixed gender groupings guide learners to extend their idea of percentage change to calculate other concepts such as discount, commission, utility bills, exchange rates, project budgeting etc.	***Introductory activity*** In a mixed gender groupings open to an online shop which has discounts (e.g. JUMIA) and ask explain the concept of discount. ***Activity 1*** In a problem based learning find profit and loss percentages on trading activities using real life. ***Activity 2*** In a mixed gender groupings extend their your of percentage change to calculate other concepts such as discount, commission, utility bills, exchange rates, project budgeting etc.
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
d) ***Assessment Level 3:*** *A company's sales increased by 20% this year compared to the previous year. If the sales for the previous year were GH¢250,000, what were the sales for the current year?*	

e) ***Assessment Level 3:*** *A retail store purchases a television set for GH¢800 and plans to sell it with a mark-up of 30%. If the VAT rate is 12.5%, what will be the final selling price of the television set, including VAT?*

Assessment Level 3: *A small business has to pay a monthly Internet service fee of GH¢120 and a usage charge based on the amount of data consumed. If the usage rate is GH¢0.10 per gigabyte (GB) and the business consumed 250 GB of data in a month, calculate the total Internet bill for that month.*

Lesson Closure

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

Lead the class to summarize the main ideas in the lesson for learners to write in their notes.

Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*8*	**Duration**	*4hrs*	**Form**	*1*
Strand	*Number for Everyday life*	**Sub-Strand**	*Real Number and Numeration System*				
Content Standard	*a) Demonstrate conceptual understanding of proportional reasoning on percentages and use it to solve everyday life problems including simple interest, discount, profit, loss, commission, etc.* *b) Create strategies for solving percent problems involving personal or household finance.*						
Learning Outcome(s)	*Create strategies for solving percent problems involving personal or household finance.*						
Learning Indicator(s)	*a) Apply fractions, percentages, decimals to real life problems involving Percentage increase and percentage decrease, Profit, and loss,* *b) Establish appropriate procedures solving problems involving simple and compound interests.*						
Essential Question(s)	*1. How do simple and compound interest differ in terms of calculation methods and outcomes, and how are these concepts applied in financial transactions and investment?* *2. What factors influence the amount of interest earned or paid in simple and compound interest calculations, and how can these factors be manipulated to optimized financial outcomes?* *3. How does understanding the concepts of principal, interest rate and time affect decision – making in borrowing, lending and investment scenarios involving simple and compound interest?*						
Pedagogical Strategies	*Experiential learning, problem based learning, mixed gender groupings, talk for learning.*						
Teaching & Learning Resources	*Teacher Manual, Textbook, Loan charts, calculators, marker boards*						
Key Notes on Differentiation							
Learning Tasks: a) *Learners calculate the simple interest earned on a fixed deposit or savings account for a given principal amount, interest rate, and time periods.* b) *Learners solve word problems involving simple interest calculations in various contexts, such as loan repayments or rental income.*							

c) *Learners calculate the future value of an investment after a certain period, considering the principal amount, compound interest rate, and compounding frequency (annually, semi-annually, quarterly, etc.).*

d) *Learners analyze the difference between simple interest and compound interest calculations for long-term investments and understand the impact of compounding.*

Pedagogical Approach 1: Problem-Based Learning

Students in groups discuss to solve real-life problems involving simple and compound interest.

To differentiate:

a) Provide support and guidance as they work through the problems, focusing on building their confidence and understanding

b) Encourage them to apply their knowledge to different situations and explain their reasoning.

c) Provide examples that require them to compare and contrast simple and compound interest in different contexts.

d) Provide opportunities for them to explore advanced concepts related to interest calculations, such as continuous compounding and the impact of inflation on investment returns.

Key Assessment:

a) Assessment Level 1: conduct a mini-project by obtaining information on how to calculate any of the household utilities

b) Assessment Level 2: conduct a mini-project by obtaining information on how to calculate any of the household utilities and record their findings

c) Assessment Level 3: conduct a mini-project by obtaining information on how to calculate any of the household utilities and record their findings and apply to solve every day problems.

d) Assessment Level 4: conduct a mini-project by obtaining information on how to calculate any of the household utilities and record their findings and apply to solve every day problems and design similar mini projects.

Keywords	*Percentages, rate, principal, interest, compound interest*

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)* Lead a discussion on the advantages and disadvantages of saving in a bank and borrowing from a bank.	
Introductory Activity (e.g.	***Introductory Activity***

minutes) *Using talk for learning to guide learners to discuss the concept of simple interest.* ***Activity 1 (e.g. minutes)*** In a mixed gender groupings guide learners to calculate the simple interest earned on a fixed deposit or savings account for a given principal amount, interest rate and periods. ***Activity 2 (e.g. minutes)*** *In a problem based learning guide learners to solve word problems involving simple interest calculations in various contexts, such as loan repayment, savings, or rental income.*	*Using talk for learning to discuss the concept of simple interest.* ***Activity 1*** In a mixed gender groupings calculate the simple interest earned on a fixed deposit or savings account for a given principal amount, interest rate and periods. ***Activity 2*** *In a problem based learning solve word problems involving simple interest calculations in various contexts, such as loan repayment, savings, or rental income.*
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Level 2 *1. John deposited Ghc10,000 in a bank account that pays 6% simple interest per annum. How much interest will he earn after 3 years.* *2. A company borrowed GHC40,000 from a bank at a simple interest rate of 8% per year. If the loan is repaid after 4 years, how much interest will the company have to pay?*	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.	

Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)* *Give scenarios to learners for them to make some decision based on simple interest.* *E.g. A bank gives you 10% interest per annum when you save an amount of GHC1000 for 3 years and 7% per annum when you save the same amount of money for less than 3 years.*	
Introductory activity (e.g. minutes) *Use talk for learning to guide learners to discuss the concept of compound interest and explain how it differs from simple interest.*	***Introductory activity*** *Use talk for learning to discuss the concept of compound interest and explain how it differs from simple interest.*
Activity 1 (e.g. minutes) *In a mixed gender groupings guide learners to calculate the future value of an investment after a certain period, considering the principal amount, compound interest rate and compounding frequency (annually, semi-annually, quarterly etc.*	***Activity 1*** *In a mixed gender groupings calculate the future value of an investment after a certain period, considering the principal amount, compound interest rate and compounding frequency (annually, semi-annually, quarterly etc.*
Activity 2 (e.g. minutes) *In a problem based learning guide learners to analyse the difference between simple interest and compound interest calculation for long – term investments and understand the impact of compounding.*	***Activity 2*** *In a problem based learning analyse the difference between simple interest and compound interest calculation for long – term investments and understand the impact of compounding.*

Assessment DoK aligned to the Curriculum and Subject Teacher Manual
Level 2 *1. A sum of GHC30,000 is deposited in a bank account that pays 6% interest compounded semi – annually. What will be the maturity value of the investment after 4 years?* *2. Calculate the present value of GHC50,000 due in 8 years, if the interest is 4% compounded annually.* *Level 3* *Bank A offers 10% simple interest on savings made for 5 years whilst bank B offers 6% interest compounded annually on savings made for 5 years. Your father has an amount of GHC50,000 which he want to use for his building project after the next five years. Which of the two banks will you recommend your father to save? (show all necessary calculations)*
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***
Lead the class to summarize the main ideas in the lesson for learners to write in their notes. Offer learners the opportunity to ask questions for further clarification and address any misconceptions if any.
Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*9*	**Duration**		**Form**	*1*
Strand	*Algebraic Reasoning*	**Sub-Strand**	*Applications of Expressions, Equations and Inequalities*				
Content Standard	*Demonstrate knowledge and understanding of algebraic expressions and solve real-life problems on them.*						
Learning Outcome(s)	*Formulate algebraic expressions using patterns to create models and solve real life problems (e.g., linear and quadratic models).*						
Learning Indicator(s)	*a) Use number patterns and variables to formulate mathematical expressions and apply the algebraic order of the four operations to solve.* *b) Factorisation of algebraic expressions.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							

Key Notes on Differentiation

Learning Tasks:

a) Learners expand and simplify given algebraic expressions.
b) Factorise expressions using algebraic tiles; and regrouping of terms.
c) Factorise quadratic trinomials using standard identities.
d) Factorise quadratic equation using formula approach; splitting the middle term and quadratic formula.

Pedagogical Approach 1: *Collaborative learning:*

Make use of group and pair activities to engage learners to explore simple patterns to generate rules and write them in algebraic form. Learners formulate mathematical expressions by investigating patterns and its applications in everyday life. For example, house numbers in the street, seating in the café and church.

To differentiate:

a) Ensure to include a wide range of tasks that appeal to the various groups of learners. Particularly, make accommodations for learners who may be struggling by using advance learners to support them.

b) Ensure to include simple, intermediate as well as advanced tasks to cater for all groups of learners.

Pedagogical Approach 2: *Problem-based learning*

Learners to simplify the addition, subtraction, multiplication and division of algebraic expressions. Then investigate the concept of factorisation by reviewing expansion of algebraic expressions and apply the idea to factorise expressions. They are also learners to explore how to factorise algebraic expressions using the common factor approach.

To differentiate:

a) Please ensure to include tasks for beginning learners, intermediate learners as well as advance learners.

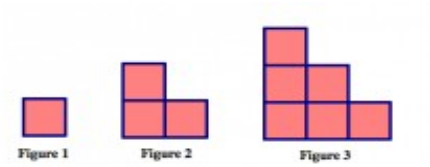
b) Break down the concepts into simpler steps, providing clear explanations and using concrete examples to illustrate the process.

c) Use visual aids and manipulatives to help them understand the concepts of simplification and factorization.

d) Present them with complex algebraic expressions containing multiple variables and terms of higher degrees.

Key Assessment

a) ***Assessment Level 2:*** *How many squares will be in the 5^{th} pattern?*



b) ***Assessment Level 2:*** *The length of a rectangular garden is 4 meters longer than its width. Write an expression to find the area of the garden.*

c) ***Assessment Level 3:*** *Ama is collecting seashells on the beach. On her first day, she collected 1 seashell. Each day after that she collected 2 more seashells than the previous day. How many seashells will she have on the fifth day? Generate a pattern and use it to formulate mathematical expression.*

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)***	***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes)	***Introductory activity***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*10*	**Duration**		**Form**	*1*
Strand	*Algebraic Reasoning*	**Sub-Strand**	*Applications of Expressions, Equations and Inequalities*				
Content Standard	*Demonstrate knowledge and understanding of algebraic expressions and solve real-life problems on them.*						
Learning Outcome(s)	*Formulate algebraic expressions using patterns to create models and solve real life problems (e.g., linear and quadratic models).*						
Learning Indicator(s)	*a) Recognize perfect squares and apply the idea to solve problems including the difference of two squares of binomials.* *b) Analyse and apply operations on simple algebraic fractions including monomial and binomial denominators and determine the conditions under which algebraic fraction is zero or undefined.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							

Key Notes on Differentiation

Learning Tasks:

Learners Engage learners with perform operations on algebraic fractions including monomial and binomial denominators on all the four operations.

Pedagogical Approach 1: *Problem-based learning approach: Learners investigate the concept of perfect square using paper cut /graph sheet and stickers out. They also brainstorm the meaning of perfect squares, identify differences of two squares, and use problem-solving strategies to apply the concepts of perfect squares.*

To differentiate:

a) Offer practice problems to help them identify perfect squares and understand the concept of the

b) Use manipulatives and visuals to demonstrate perfect squares and the difference of two squares.

c) Provide complex problem-solving tasks that require the use of perfect squares in unique ways.

Pedagogical Approach 1: *Collaborative learning: Learners discuss and explain what an algebraic fraction is and apply operations on simple algebraic fractions. They also identify and explain*

the condition under which an algebraic fraction is zero or undefined and simplify algebraic fractions which involves monomial and binomial denominators.

To differentiate:

a) Provide a clear definition of algebraic fractions and use concrete examples with visuals.

b) Encourage students to explain algebraic fractions in their own words and discuss examples with peers.

c) Assign students to create their own examples of algebraic fractions and explain the concept to the class.

d) Provide a list of conditions under which an algebraic fraction is zero or undefined, and ask students to match them with examples.

e) Discuss the importance of avoiding division by zero and provide examples for students to identify when an algebraic fraction is undefined.

f) Present complex algebraic expressions and ask students to determine the conditions under which each expression is zero or undefined.

Key Assessment

a) Assessment Level 2

Given that $p=\frac{2x}{1-x^2}$ *and* $q=\frac{2x}{1+x}$, *simplify*

$3p - 2q$

b) Assessment Level 3:

Identify with reasons which of the following fractions have monomial or binomial denominators.

$$\frac{2}{5x}, \quad \frac{y}{x+1}, \quad \frac{x-3}{x+6}, \frac{7y-1}{x^2-4}, \frac{3z+4}{z^2}$$

c) Assessment Level 3:

Find the values for the following unknown using the idea of perfect squares

a. 3z + 132 =162

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)***	***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g.	***Introductory activity***

minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*11*	**Duration**		**Form**	*1*
Strand	*Algebraic Reasoning*	**Sub-Strand**	*Patterns & Relationships*				
Content Standard	*Demonstrate understanding of mapping, relations, and functions and the ability to interpret the graph of a function and its applications in real-life problems in a different context.*						
Learning Outcome(s)	*Distinguish between relations and functions including determining the rules for functions, then draw graphs of functions and interpret them.*						
Learning Indicator(s)	*a) Construct and interpret formulae for a given task and apply to problems involving a change of subjects.* *b) Solve linear equations in One and Two variable(s); and brackets and fractions for given problems and relate it to real life situations.* *c) Find solution set or truth set of linear inequalities and illustrate on the number line.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners review and model the concepts of solving linear equations and constructing and interpreting formulae for a given task and apply them so finding solutions involving change of subjects.* *b) Learners solve linear equations involving One and Two variable(s), brackets and fractions.* *c) Learners develop and solve real-world situations involving linear equations in One variable.* *d) Learners find the solution or truth set of linear inequalities and illustrate on number lines.* ***Pedagogical Approach 1:** Collaborative learning* *Learners to construct and interpret formulae for a given equation and apply to problems involving a change of subjects. Learners also use demonstrations and one-on-one discussions to formulate and solve linear equations in one and two variables and those involving brackets and fractions.*							

To differentiate:

a) Make sure that enough examples of varying difficulty are provided to cater for the different group of learners to grasp the concept well.

b) Give learners the opportunity to make group presentations (oral and written) with each member of the pair/group taking their turn to help in solving assigned task.

c) Give learners the platform to work out enough examples whilst you also address challenges faced by learners through one-on-one discussions.

Pedagogical Approach 1: *Collaborative learning*

Learners to solve word problems involving linear equations and inequalities and translate them into mathematical statements and solve. Learners also find solution set or truth set of linear inequalities and illustrate them on the number line and solve real-world/life problems involving linear equations in one variable.

To differentiate:

a) Encourage learners to share solutions to the whole class whiles you provide feedback which promotes further explanations on the strategies they used and how they arrived at their answers.

b) Equal opportunities should be given to all groups to present their findings/solutions to the class whiles those struggling to grasp the concepts are supported.

Key Assessment

a) ***Assessment Level 2:*** *Solve for y in the following equations;*

$6+y-2=12$

b) Assessment Level 3:

Find the solution set of the following equations and illustrate your answer on the number line;

$$x-\frac{2}{3}(x+1)\leq\frac{1}{2}(4-x)-5$$

c) Assessment Level 3:

The perimeter of a football field in a rectangular form of a certain school is 296m. If the breadth is $\frac{2}{3}$ of the length, find the length.

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory Activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory Activity*** ***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*12*	**Duration**		**Form**	*1*
Strand	*Algebraic Reasoning*	**Sub-Strand**	*Patterns & Relationships*				
Content Standard	*Demonstrate understanding of mapping, relations, and functions and the ability to interpret the graph of a function and its applications in real-life problems in a different context.*						
Learning Outcome(s)	*Distinguish between relations and functions including determining the rules for functions, then draw graphs of functions and interpret them.*						
Learning Indicator(s)	*a) Identify relations from functions and differentiate between the types of relations and functions using models such as graphs.* *b) Investigate relationships between two number sets and determine the rules of given mappings or functions.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners review and model the concepts and types of relations and functions.* *b) Learners develop the concept of mapping and make investigations of the relationships between two number sets and determine the rules of given mappings or functions.* *c) Learners develop and solve real-world situations involving the concepts of relations, functions and mappings.* *d) Learners draw graphs of linear functions and interpret them.* ***Pedagogical Approach 1:*** *Collaborative learning* *Learners use models to explain examples and types of relations. Learners identify functions out of the relations and establish the meaning of a function as a relation which derives one output for each given input and give the types of function as one-to-one and one-to-many function.* ***To differentiate:*** *a) Use diagrams (e.g., Venn diagrams, graphs) to represent relations and ask students to interpret the relationships shown.* *b) Introduce mathematical notation and symbols (e.g., ordered pairs,*							

mappings) to represent relations and explain their meaning.

c) Provide examples of relations and ask students to identify which ones are functions and which are not.

d) Engage students in a discussion about why functions are useful in mathematics and real-life situations.

e) Ask students to create their own examples of one-to-one and one-to-many functions and explain their choices.

Pedagogical Approach 2: *Experiential and Problem-Based Learning Approaches:*

Learners develop and solve real-world situations involving the concepts of relations, functions and mappings.

To differentiate:

a) Offer the opportunity for learners to make oral and written presentations to the class for discussion and also ensuring that every learner in the group makes a presentation.

b) Also, as part of activities to perform at home, task learners each to develop and solve at least two real-world situations involving relations, functions and mapping and submit for scoring and continuous assessment.

c) Present more complex scenarios (e.g., mapping of customers to their purchases) and ask students to create diagrams or tables to represent the relations.

d) Challenge students with open-ended scenarios (e.g., mapping of social media users to their interactions) and ask them to develop functions to model the relationships.

Key Assessment

a) Assessment Level 2:

Which of the following relations defined on the set of real numbers are functions? $A=(x, y): y=3x+1$

b) Assessment Level 3:

Draw mapping diagrams to represent the following

$y = 2x^2 - 1$

c) Assessment Level 3:

Draw the following linear graphs and interpret them

$y = 2x + 1$

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*13*	**Duration**		**Form**	*1*
Strand	*Algebraic Reasoning*	**Sub-Strand**	*Patterns & Relationships*				
Content Standard	*Demonstrate understanding of mapping, relations, and functions and the ability to interpret the graph of a function and its applications in real-life problems in a different context.*						
Learning Outcome(s)	*Distinguish between relations and functions including determining the rules for functions, then draw graphs of functions and interpret them.*						
Learning Indicator(s)	*a) Extend the knowledge of coordinates of two points to find the gradient and equation of a straight line* *b) Recognize and interpret two points on a straight line and use it to find the distance between them.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners review and draw linear graphs using linear functions.* *b) Find solutions to equations involving gradient and equations of the straight line and its real-world applications.* *c) Determine the equation of perpendicular and parallel lines.* *d) Determine the magnitude and midpoint of a straight line.* ***Pedagogical Approach 1:*** *Experiential learning:* *Learners research, using any of the available IT tools, to come out with an explanation why the graph of a linear function is a straight line.* ***To differentiate:*** *a) Provide students with a guided instruction on using graphing software (e.g., Desmos, GeoGebra) to plot linear functions and observe the resulting lines. Explain the concept of a linear function and how it relates to a straight line graph.* *b) Ask students to research online resources (videos, articles, interactive simulations) that explain the relationship between linear functions and straight line graphs. Have them summarize their findings and present to the class using presentation software (e.g., PowerPoint, Google Slides).*							

c) Challenge students to use graphing software to plot various linear functions with different slopes and y-intercepts. Ask them to analyze the patterns and relationships they observe, and then create a multimedia presentation (e.g., video, website) explaining why the graph of a linear function is always a straight line.

Pedagogical Approach 2: Collaborative learning/Talk for learning Approaches:

Learners to draw a straight line for given gradient by ensuring that the lesson is tailored-measured for learners taking into consideration the different ability learners in the class.

To differentiate:

a) Begin with a simple explanation of gradient as the steepness of a line. Demonstrate how to draw a line with a specific gradient using a ruler and graph paper. Provide worksheets with grids and gradients for students to practice drawing lines. Offer extra practice for students who need it and provide additional guidance.

b) Guide students through drawing lines with different gradients, providing tips on using the ruler effectively. Assign exercises where students draw lines independently, checking for accuracy. Challenge students to draw lines with specific gradients accurately without using a ruler for measurement.

c) Provide real-world examples where understanding gradient and drawing lines accurately are important (e.g., construction, engineering).

Key Assessment

a) Assessment Level 2:

Suppose A is the point (3, 4) and B is the point (8, 14). What is the gradient/straight line joining these points?

b) Assessment Level 3:

Find the midpoint of the line joining the points or with end points of (1,3) and (5,6).

Show that the line segment joining the points (1, 4) and (3, 10) is parallel to the line segment joining the points (−5, −10) and (−2, −1).

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory Activity	***Introductory Activity***
Activity 1	***Activity 1***
Activity 2	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g.	***Introductory activity***

minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*14*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Spatial Sense*				
Content Standard	*Demonstrate conceptual understanding of spatial sense with respect to angles, parallel lines, transversal and polygons, and apply their properties to solve everyday life problems.*						
Learning Outcome(s)	*Draw and describe angles of various measures; solve problems on Pythagorean theorem, parallel lines, perpendicular lines and transversal; use the exterior angle theorem of a triangle and calculate the sums of interior and exterior angles of polygons.*						
Learning Indicator(s)	*a) Draw and describe angles with various measures, including acute, right, straight, obtuse and reflex angles.* *b) Solve problems that involve parallel lines, perpendicular lines and transversal, and pairs of angles formed between them.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners construct given angles* *b) Learners solve for missing angles* *c) Learners find values of angles formed by parallel lines intersected by a transversal* ***Pedagogical Approach 1:*** *Experiential learning:* *Learners to explore the immediate school and classroom environment to investigate referents for angles. They are to free-hand sketch some angles they know from JHS. They then estimate, then measure the angles with protractor to compare the results with their estimates.* ***To differentiate:*** *a) Ensure to offer opportunity for a variety of ways of presentation of findings and assigned tasks.* *b) Allow for oral as well as written presentations.*							

Pedagogical Approach 2: Problem-based learning;

Learners to bisect given angles. Then discuss in groups the types of angles. Learners are also to solve problems on pairs of angles.

To differentiate:

a) Ensure to offer support to struggling learners by giving one-on-one support or tasking advanced learners to support the groups.

b) Ensure to differentiate the tasks by including tasks of different difficulty to cater for the different ability groups.

Key Assessment

*a) **Assessment Level 2:***

i. Make a free hand sketch of the following angles: 30°, 45°, 60°, 75°, 90° and 180°.

ii. Draw, analyse and name pairs of angles formed by parallel lines and a transversal by identifying corresponding angles, alternate interior angles, alternate exterior angles, and vertically opposite angles.

*b) **Assessment Level 3:***

Two angles are supplementary. The measure of the larger angle is 10 degrees more than the product of 4 and the measure of the smaller angle. What is the measure of the larger angle in degrees?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***

Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2***

Activity 3 (e.g. minutes)	***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*15*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Spatial Sense*				
Content Standard	*Demonstrate conceptual understanding of spatial sense with respect to angles, parallel lines, transversal and polygons, and apply their properties to solve everyday life problems.*						
Learning Outcome(s)	*Draw and describe angles of various measures; solve problems on Pythagorean theorem, parallel lines, perpendicular lines and transversal; use the exterior angle theorem of a triangle and calculate the sums of interior and exterior angles of polygons.*						
Learning Indicator(s)	*a) State and use the exterior angle theorem of a triangles and identify various properties of special triangles.* *b) State and use the properties of quadrilaterals and calculate the sums of interior angles and exterior angles of a polygon.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners use the exterior angle theorem to find missing angles a given triangle* *b) Learners find the interior angle and sum of the interior angles of polygons* ***Pedagogical Approach 1:*** *Group & pair activities:* *Learners find the exterior angle of a triangle. Learners also discuss and come out with the formula for determining the sum of the interior angles of polygons.* ***To differentiate:*** *a) Ensure the problems are of varying difficulty and allow learners to make use of strategies used in class as well as encouraging those who are capable of using their personal strategies to solve problems.* *b) Ensure to blend the activities by using paper folding to show number of triangles in given polygon as well as drawing to show the same concept before using symbols to generate the formula.*							

Pedagogical Approach 1: *Problem-based group learning;*

Learners solve problems on finding the sum of the interior angles of polygons.

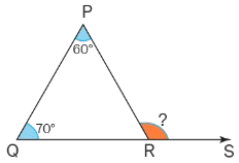
To differentiate:

Include a variety of questions and offer learners the opportunity to choose as many as they can answer.

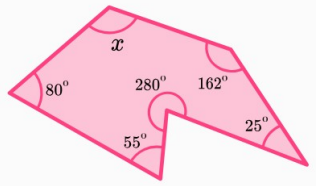
Key Assessment

a) ***Assessment Level 2:***

Find the value of the exterior angle in the triangle.



Work out the size of the angle labelled x.



b) ***Assessment Level 3***

A regular polygon's interior and exterior angles are in the ratio 9:1. How many sides does the polygon have?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***

Activity 2 (e.g. minutes)	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)***	***Introductory activity*** ***Activity 1***

Activity 2 (e.g. minutes) ***Activity 3 (e.g. minutes)***	***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*16*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Spatial Sense*				
Content Standard	*Demonstrate conceptual understanding of spatial sense with respect to angles, parallel lines, transversal and polygons, and apply their properties to solve everyday life problems.*						
Learning Outcome(s)	*Draw and describe angles of various measures; solve problems on Pythagorean theorem, parallel lines, perpendicular lines and transversal; use the exterior angle theorem of a triangle and calculate the sums of interior and exterior angles of polygons.*						
Learning Indicator(s)	*Solve problems on Pythagorean theorem by identifying situations that involve right triangles, verify the formula and apply it.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							

Key Notes on Differentiation

Learning Tasks:

a) Learners to solve problems using Pythagorean theorem.

b) Learners to use the Pythagorean theorem to determine if a given triangle is a right triangle

Pedagogical Approach 1: *Group & pair activities;*

Learners to discuss the theorem of Pythagoras and use any model of the choice to proof the theory. Learners also discuss and make presentations on the real-life uses of the Pythagoras theorem.

To differentiate:

a) Offer learners the opportunity to make presentations and summarize the main ideas as well as deal with what lacked.

b) Allow learners to make oral presentation as well as written presentations and including the use of any applicable computer application.

Pedagogical Approach 1: *Problem-based group learning;*

Learners complete task sheets of varying difficulty using the Pythagorean theorem to determine if a given triangle, is a right triangle. Learners also solve problems on real life application of Pythagorean theorem.

To differentiate:

Consider doing these for learners who are struggling:

a) Given the lengths of the two shorter sides of a triangle, students determine if it's a right triangle using the Pythagorean theorem.

b) Simple word problems involving finding the missing side of a right triangle using the Pythagorean theorem.

For learners who have grasped the concepts;

a) Determine if a triangle is a right triangle with one side length given and find the missing side.

b) Word problems involving finding the distance between two points on a coordinate plane using the Pythagorean theorem.

For advance learners:

a) Determine if a triangle is a right triangle with two side lengths given and find the missing side.

b) Real-life applications such as finding the diagonal of a rectangular field or the height of a ladder leaning against a wall using the Pythagorean theorem.

Key Assessment

Assessment Level 3

a) Explain the Theorem of Pythagoras and give reasons why it only applies to the right angled triangle.

b) Use a model to verify the Pythagoras theorem.

c) An army captain is on a hunt for a criminal. Her GPS tells her that she is 50m away from the criminal. She walks 34m due west. The GPS compass now tells her that the criminal is due south from where she is standing. How far south does she need to go to find the criminal?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***

Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes)	***Introductory activity***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)***	***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*17*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Measurement*				
Content Standard	*a) Demonstrate knowledge and understanding of the concept of measurement with respect to bearings and vectors.* *b) Demonstrate conceptual understanding of the primary trigonometric ratios and apply it to solve problems that involve right triangles.*						
Learning Outcome(s)	*a) Interpret information about real-world applications of vectors and recognize vectors with the same magnitude and direction but different positions as equal vectors.* *b) Investigate and determine the trigonometric functions of special angles and solve problems using the three primary trigonometric ratios.*						
Learning Indicator(s)	*a) Recognise a vector as a quantity with both magnitude and direction, and identify, gather, and interpret information about real-world applications of vectors.* *b) Represent a vector in two-space geometrically as a directed line segment, with directions expressed in different ways (e.g., 320°, N40°W) and algebraically; then recognise vectors with the same magnitude and direction but different positions as equal vectors.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners explain_why parallel vectors are also considered collinear vectors.* *b) Learners calculate the magnitude of a given vector* *c) Learners determine that given vectors are equal* ***Pedagogical Approach 1:*** *Problem-based learning;* *Learners discuss and represent graphically 2D vectors. They also show graphically when two vectors are considered equal. Learners solve problems on equal vectors.*							

To differentiate:

a) Create task sheets with varying levels of difficulty or complexity. For example, provide simpler problems for students who may struggle with the concept of equal vectors, while offering more challenging problems for those who grasp the concept quickly. This allows each group to work at a level appropriate for their abilities.

b) Provide additional resources such as visual aids, manipulatives, or reference materials to assist students who may require extra support in understanding the concept of equal vectors. This can help make the task more accessible to all learners regardless of their ability level.

Key Assessment

Assessment Level 3:

a) Determine if the vectors $\vec{a} = (3, -4)$ and $\vec{b} = (-6, 8)$ are equal.

b) Determine whether given pairs of vectors are equal or not. Justify your answer.

c) The vector u has an initial point at $(-2, 0, 1)$ and an endpoint at $(4, -2, 3)$. What is the vector's length?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***

Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2***

Activity 3 (e.g. minutes)	***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*18*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Measurement*				
Content Standard	*a) Demonstrate knowledge and understanding of the concept of measurement with respect to bearings and vectors.* *b) Demonstrate conceptual understanding of the primary trigonometric ratios and apply it to solve problems that involve right triangles.*						
Learning Outcome(s)	*a) Interpret information about real-world applications of vectors and recognize vectors with the same magnitude and direction but different positions as equal vectors.* *b) Investigate and determine the trigonometric functions of special angles and solve problems using the three primary trigonometric ratios.*						
Learning Indicator(s)	*a) Investigate the three basic trigonometric ratios (tangent, sine and cosine) of an acute angle in degrees.* *b) Find the trigonometric functions of special angles 30^0, 45^0 and 60^0, including using the calculator to determine the values of sine, cosine and tangent of angles up to 360^0.* *c) Solve problems, using the three primary trigonometric ratios for angles from 0° to 360° in standard position.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners compute for the various trig ratios.* *b) Learners apply the three primary trigonometric ratios to solve real-life problems* ***Pedagogical Approach 1:*** *Group & pair activities;* *Learners investigate and discuss the three basic trig ratios and use the knowledge to solve problems. They also discuss and present on the application of the three primary trigonometric ratios to solving real-life problems.* ***To differentiate;***							

a) Monitor each pair/group's progress closely and provide personalized feedback to address specific misconceptions or difficulties that arise.
b) Encourage peer teaching within the groups so that students can learn from one another and clarify any misunderstandings together.
c) For students who grasp the concept quickly and need additional challenge, offer extension activities or open-ended tasks that allow them to apply their understanding in new and creative ways. This keeps them engaged and motivated while providing opportunities for deeper exploration of the topic.

Pedagogical Approach 1: *Problem-based group learning; Learners complete task sheets on trig ratios, including their word/real-life problems.*

To differentiate:

a) Use concrete examples and visuals to demonstrate how to calculate sine, cosine, and tangent for simple angles. Use manipulatives or drawings to help visualize triangles. Start with straightforward problems involving angles from 0° to 90°. Provide guided practice and use real-life examples to make the concepts more relatable.
b) Focus on memorization of the values for 30°, 45°, and 60°. Provide step-by-step guidance on using a calculator to find trigonometric ratios. Introduce more complex examples involving angles beyond 90°. Encourage students to use the unit circle to find trigonometric ratios for any angle.
c) Introduce problems with angles in standard position up to 360°. Encourage students to use trigonometric identities and apply the ratios to real-world scenarios. Emphasize understanding the patterns and relationships between the trigonometric ratios of special angles.

Key Assessment

Assessment Level 3:

a) Sakumonor Skating Club has a beginner ski slope which makes a 150 angle with the ground. How far does a skier travel over a horizontal distance of 120 meters?
b) A ramp is to be built from the ground to the back of a semi-truck. The bed of the truck is 1.3 meters above the ground. The ramp makes a 22^0 angle with the ground. How long will the ramp be?
c) The angle of elevation from a boat to the top of a 48-meter lighthouse is 25^0. How far is the boat from the base of the lighthouse?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory Activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory Activity*** ***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	

Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*19*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Measurement*				
Content Standard	*Demonstrate conceptual understanding of the measurement of perimeter and area of and quadrilaterals.*						
Learning Outcome(s)	*Identify and compare referents for SI and imperial area measurements, estimate perimeter and area of 2-D shapes and solve problems that involve of a given regular, composite or irregular 2-D shapes.*						
Learning Indicator(s)	*a) Solve problems that involve identifying and comparing referents for SI and imperial area measurements of regular, composite and irregular 2-D shapes including decimal and fractional measurements and verify the solutions.* *b) Estimate the perimeter and area of a given regular, composite or irregular 2-D shapes.* *c) Solve a contextual problem that involves the perimeter and area of a regular, a composite or an irregular 2-D shape.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners solve problems on finding the perimeter and area of kites, rhombus, parallelogram and trapezium.* *b) Learners solve real-life problems on perimeter and area of 2-D shapes* ***Pedagogical Approach 1:*** *Experiential learning:* *Learners to explore the immediate school environment to investigate referents for the measuring various items.* ***To differentiate:*** *a) Encourage shy learners to share their findings from the investigations.* *b) Ensure full participation by differentiating the manner in which students go about their estimations and presentation formats. Allow for oral, written as well as use of IT tools for presentations.* ***Pedagogical Approach 2: Problem-based learning;***							

Learners to investigate the perimeter and area of kites, parallelogram, rhombus and trapezoids using geodot/graphs. Learners to solve problems, using formulae for determining the perimeter/area of kites, parallelogram, rhombus and trapezoids. Learners may use digital mathematics tools where applicable and available.

To differentiate:

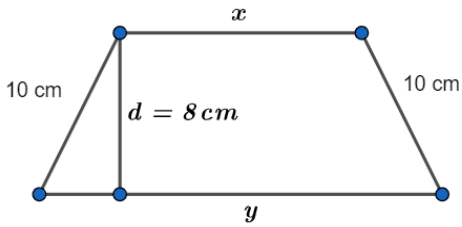
a) Provide additional resources such as visual aids, manipulatives, or reference materials to assist students who may require extra support in understanding the concept of equal vectors. This can help make the task more accessible to all learners regardless of their ability level.

b) Instead of assigning fixed mixed-ability groups all the time, allow for flexibility in grouping based on students' strengths and weaknesses. You can observe during class activities and then regroup students accordingly, ensuring that each group has a mix of abilities and can support one another effectively.

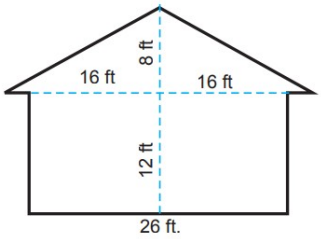
Key assessment

a) Assessment Level 2

The perimeter of the given trapezium is 104 cm. Find its area.



b) Assessment Level 3



Miss. Tackie wants to paint her house. To buy paint, she must know the area. What's the area of one side of Miss. Tackie's house?

c) Assessment Level 3

Jamila is building a deck outside her house with a rectangular area that has outer dimensions of 8m x 6m. She wants to have decorative floor tile patterns in a parallelogram shape inside the deck. Each parallelogram tile has one side measuring 1.2m and a perpendicular height of 0.8m against that side.

i. What is the area of each parallelogram tile?

ii. If Jamila covers the entire inner deck area with these tiles, how many full tiles would she need?

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*20*	**Duration**		**Form**	*1*
Strand	*Geometry Around Us*	**Sub-Strand**	*Measurement*				
Content Standard	*Demonstrate conceptual understanding of the measurement of surface area, volume and capacity of solid shapes.*						
Learning Outcome(s)	*Determine the volume and capacity of solid shapes and solve problems that involve SI and imperial units.*						
Learning Indicator(s)	*a) Solve problems that involve SI and imperial units in volume of prisms.* *b) Solve real world problems that involves the volume of prisms.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							

Key Notes on Differentiation

Learning Tasks:

a) Learners identify various prisms and indicate the type of face, number of faces, edges and vertices.

b) Learners determine the volume of given prisms.

c) Learners workout the height or width or length of a prism when the volume is given.

Pedagogical Approach 1: *Group & pair activities;*

Learners discuss and provide justification for given formulae of prisms.

Learners also *solve problems, using formulae for determining the volume of the prisms with given dimensions.*

To differentiate;

a) Offer different modes of instruction to cater to diverse learning styles. Some students may benefit from direct instruction, while others may prefer hands-on activities or collaborative learning experiences.

b) By incorporating a variety of instructional approaches, you can engage all students more effectively.

Pedagogical Approach 2: *Problem-based group learning;*

Learners complete task sheets on volume, including word/real-life problems to solve.

To differentiate;

a) Monitor each group's progress closely and provide personalized feedback to address specific misconceptions or difficulties that arise.

b) Encourage peer teaching within the groups so that students can learn from one another and clarify any misunderstandings together.

Key assessment

Assessment Level 2

a) What is the volume of a triangular prism with dimensions of 12 m, 16 m and 20 m?

b) A swimming pool in the shape of a cuboid has a length of 10 meters, a width of 5 meters, and a depth of 2 meters. If the pool is filled with water, how much water does it hold?

c) *The height of a square prism is 11 yards. The volume is 99 cubic yards. What is the length of the side of the square at the base of the prism?*

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***
Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***

Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***

Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*21*	**Duration**		**Form**	*1*
Strand	*Making Sense of and Using Data*	**Sub-Strand**	*Statistical reasoning and its application in real life*				
Content Standard	*Demonstrate conceptual understanding of the appropriateness of data collection methods to collect everyday life data.*						
Learning Outcome(s)	*Decide whether or not a selected data collection method is appropriate given a particular data, justify responses, and collect both qualitative and quantitative data with the appropriate methods.*						
Learning Indicator(s)	*a) Classify data (primary and secondary) as quantitative (discrete and continuous), qualitative (nominal and ordinal), numerical, categorical, grouped, ungrouped, etc.* *b) Identify and validate quantitative data collection methods (Survey/Questionnaire, Interviews, Observation, Existing Data, and Probability) and use it to collect everyday-life data.* *c) Identify and validate qualitative data collection methods (interviews, observations, focus groups, oral histories, online tracking, social media monitoring, etc.) and use it to collect everyday-life data.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners differentiate among the different types of data* *b) Learners organise given data into frequency tables* *c) Learners research and select an existing survey questionnaire, observation guide, etc., then discuss its features, validate its usefulness and collect quantitative data with it.* *d) Learners design a mini project where they choose a data collection method of choice and collect real-life quantitative data with it.* ***Pedagogical Approach:*** *Experiential learning;* *Learners to embark on a mini-project within the school environment by researching and selecting an existing survey questionnaire, interview*							

guide, observation guide, etc., then discuss its features, validate its usefulness and collect quantitative/qualitative data with it.

To differentiate:

a) You may have to support some learners in researching and obtaining the research tool. Where learners are capable, provide support for them to construct the tool themselves and help them validate it. To ensure that all learners participate fully, you may consider the following;

b) Choice of Data Collection Tool: Offer students a range of options for data collection tools to suit different preferences and skill levels. This could include surveys, interviews or observations. Allow students to choose the method that aligns best with their interests and strengths.

c) Flexible Grouping: Allow students to work individually, in pairs, or in small groups based on their preferences and the complexity of the project. This accommodates varying levels of collaboration and allows students to support one another in the validation and data collection processes.

d) Provide resources and support materials at different levels of complexity to accommodate diverse learning needs. This could include step-by-step guides, video tutorials, or examples of validated data collection tools. Ensure that students have access to the resources they need to succeed at their chosen level.

Key assessment

a) Assessment Level 2

The data below are the scores of 21 learners in a creative arts test. Organise it into a frequency distribution table by grouping them. 59, 65, 61, 62, 53, 55, 60, 70, 64, 56, 58, 58, 62, 62, 68, 65, 56, 59, 68, 61, 67

b) Assessment Level 3

1. Select an existing survey questionnaire and discuss its features.

2. Validate the questionnaire and collect a quantitative data with it.

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)***	***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Activity (e.g. minutes)	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes)	***Introductory activity***

Activity 1 (e.g. minutes)	***Activity 1***
Activity 2 (e.g. minutes)	***Activity 2***
Activity 3 (e.g. minutes)	***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*22*	**Duration**		**Form**	*1*
Strand	*Making Sense of and Using Data*	**Sub-Strand**	*Statistical reasoning and its application in real life*				
Content Standard	*Demonstrate conceptual understanding of data organisation and presentation for grouped and ungrouped data, including 3D graphs/charts with appropriate digital technology.*						
Learning Outcome(s)	*Apply the knowledge of organising and presenting data (grouped/ungrouped) using frequency tables, line graphs, pie charts, multiple bar graphs, info graphics, etc.; generate 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.*						
Learning Indicator(s)	*a) Organise and present data (grouped/ungrouped) using frequency tables, line graphs, pie charts, multiple bar graphs, info graphics, etc., including generating 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.* *b) Analyse (include using appropriate computer applications) and interpret data using descriptive statistics (i.e., measures of central tendency/location and minimum & maximum values) and justify which of the averages best represent the data.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners organise data in frequency tables, bar charts, pie charts, line graphs, etc.* *b) Learners determine the measures of central tendencies for grouped data and justify which of the averages best represent a given data* ***Pedagogical Approach:*** *Group & pair activities;* *Learners are assigned a variety of data to organise them into, frequency tables, pie charts, line graphs, bar charts, etc.* *To ensure a differentiated class you may consider the following varied activities;* *a) Provide step-by-step guidance on how to organize data into frequency*							

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

Key assessment

a) Assessment Level 2

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

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

b) Assessment Level 3

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

Keywords	

Lesson 1
Main Lesson drawing on Concepts, Skills and Competencies to

reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory Activity*** ***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Activity (e.g. minutes)	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to	

reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Activity (e.g. minutes)	

Reflection & Remarks

Learning Planner							
Subject	*Mathematics*	**Week**	*23*	**Duration**		**Form**	*1*
Strand	*Making Sense of and Using Data*	**Sub-Strand**	*Statistical reasoning and its application in real life*				
Content Standard	*a) Demonstrate conceptual understanding of data organisation and presentation for grouped and ungrouped data, including 3D graphs/charts with appropriate digital technology.* *b) Demonstrate the ability to embark on a project involving the collection, analysis and interpretation of quantitative and qualitative data within the school environment.*						
Learning Outcome(s)	*a) Organise and present data (grouped/ungrouped) using frequency tables, line graphs, pie charts, multiple bar graphs, info graphics, etc.; generate 3D graphs/charts with appropriate digital technology (where available) and solve problems on them.* *b) Design and execute a project by posing and refining questions to collect, analyse and interpret quantitative and/or qualitative data directly from the school community and beyond, draw useful conclusions and make recommendations.*						
Learning Indicator(s)	*a) Use mathematical arguments to support personal choices as well as incorporate the views and perspectives of others to assess and make inferences of data presented in everyday life (including class discussions, school debates, textbooks, school clubs, etc.)* *b) Develop and execute a project with a team by collecting and analysing data within the school environment and give useful conclusions and recommendations (including the use of appropriate computer applications, e.g., excel).* *c) Present a project report to your class or at a school forum including the use of presentation software such as power point, infographics, etc., and publish the report in a school magazine, school notice board, school social media platforms, etc.*						
Essential Question(s)							
Pedagogical							

Strategies	
Teaching & Learning Resources	

Key Notes on Differentiation

Learning Tasks:

Learners use mathematical language to make inferences of data

Pedagogical Approach: *Experiential learning;*

Learners design a mini-project by collecting a real-life data, organise it, make presentations on it and publish the results.

To differentiate:

a) Provide guided practice in using basic mathematical reasoning to support personal choices and assess data.

b) Offer structured activities where students work in pairs or small groups to analyze simple data sets. Scaffold discussions to help students incorporate the views of others in their assessments.

c) Teach students to use more advanced mathematical reasoning, including statistical analysis, to support their choices and assess data.

d) Provide opportunities for students to collaborate in teams to plan and execute a project, including collecting and analyzing data using computer applications.

e) Challenge students to use sophisticated mathematical arguments and statistical methods to support their choices and assess complex data sets.

f) Encourage students to think critically and creatively, incorporating diverse perspectives in their assessments.

Key assessment

Assessment Level 4

a) Collect analyse and present a real-life data (WASCE Result, Sports Records, etc.) from within the school environment.

b) From the findings, make recommendations and give reasons for such recommendations.

c) Work with colleague learners to develop a mini-research project by;

i. Developing a questionnaire

ii. Collecting data

iii. Analysing the data and

iv. Presenting the data

v. Make a publication of the findings of the project on the school notice, social media platform, etc.

Keywords	

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***

Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)***	***Introductory Activity*** ***Activity 1*** ***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***

Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes) ***Activity 1 (e.g. minutes)*** ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Introductory activity*** ***Activity 1*** ***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	

Learning Planner							
Subject	*Mathematics*	**Week**	*24*	**Duration**		**Form**	*1*
Strand	*Making Sense of and Using Data*	**Sub-Strand**	*Probability/Chance*				
Content Standard	*Demonstrate conceptual understanding of simple and compound probability experiments involving two independent events.*						
Learning Outcome(s)	*Determine the sample space for simple and compound probability experiments involving independent events; express the probabilities of given events as fractions, decimals, percentages and solve problems everyday life problems.*						
Learning Indicator(s)	*a) List the elements of the sample space from a simple or compound experiment involving two independent events.* *b) Determine the probabilities of independent events and express the results as fractions, decimals, percentages and/or ratios.* *c) Solve everyday life problems involving the probability of two-independent events.*						
Essential Question(s)							
Pedagogical Strategies							
Teaching & Learning Resources							
Key Notes on Differentiation							
Learning Tasks: *a) Learners determine whether given experiments are independent events or not.* *b) Learners list the sample space of a given probability event. Ensure to include simple scenarios as well as intermediate and complex ones to help all the different groups of learners.* *c) Learners determine the probability of independent events and express the results as fractions, decimals, percentages and/or ratios.* *d) Learners solve real-life problems involving the probability of two-independent events.* ***Pedagogical Approach:** Group & pair activities.* *Learners solve problems on probability of independent events including real-life problems.* ***To differentiate:***							

a) Please make accommodations for the various ability groups in the class as you carryout this activity. *b) For instance, for some of the learners give simple scenarios for them to identify the outcomes of two independent events and list them systematically.* *c) Then, other learners should analyse real-life scenarios to identify two independent events and construct the sample space for these events.* *d) Then for some other learners, they should evaluate complex scenarios involving multiple independent events and create sample spaces for these scenarios.* ***Key assessment*** ***a) Assessment Level 2*** *Two coins are tossed once. List the sample space for the experiment.* ***b) Assessment Level 3*** *i. Two (2) cards are chosen from a deck of cards. The first card is replaced before choosing the second card. What is the probability that they both will be face cards?* *ii. A dollar-bill changer on a snack machine was tested with 100 $1 bills. Twenty-five of the bills were found to be counterfeit, but only one was accepted by the machine. However, six of the legal bills were rejected. Draw a chart to show the number of legal and counterfeit bills that were accepted or rejected.* *• What is the probability that a bill will be rejected given that it is legal?* *• What is the probability that the counterfeit bill is accepted?*
Keywords

Lesson 1	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory Activity (e.g. minutes)	***Introductory Activity*** ***Activity 1***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)***	***Activity 2***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	
Lesson 2	
Main Lesson drawing on Concepts, Skills and Competencies to reinforce as in the Subject Teacher Manual	
Teacher Activity	***Learner Activity***
Starter *Activity (e.g. minutes)*	
Introductory activity (e.g. minutes)	***Introductory activity*** ***Activity 1***

Activity 1 (e.g. minutes) ***Activity 2 (e.g. minutes)*** ***Activity 3 (e.g. minutes)***	***Activity 2*** ***Activity 3***
Assessment DoK aligned to the Curriculum and Subject Teacher Manual	
Lesson Closure ***In completing this part, refer to the Essential Questions to check that learning has taken place.***	
Reflection & Remarks	