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| **Learning Planner** |
| **Subject** | *Mathematics* | **Week** | *3* | **Duration** | *4 hrs.* | **Form** |  *1* |
| **Strand** | *Numbers for everyday life* | **Sub-Strand** | *Real number and numeration system* |
| **Content Standard** | 1. *Demonstrate knowledge and understanding of the real number system and the operations of the various subsets.*
2. *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.*
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| **Learning Outcome(s)** | 1. *Apply the relationship and differences between the set of rational and irrational numbers and use these to solve problems.*
2. *Analyse and solve real world problems involving union, intersection and complements and their applications to three sets problems using simple surveys.*
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| **Learning****Indicator(s)** | * + - 1. *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.*
			2. *Establish the relationship between and among three sets, including set equations and the De Morgan’s law.*
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| **Essential Question(s)**  | * *How can students effectively organize information visually to demonstrate the relationship between three sets of items*
* *What methods can be employed to apply the understanding of set equations and De’Morgan’s law to analyze and establish relationship among three set*
* *How can mini surveys within the school community and beyond be designed and conducted using information visually and understanding set relationships*
* *What instructional strategies can be employed to facilitates students investigation of subsets, union, intersection and region within a three-set Venn diagram while also emphasizing the properties of these operations and their practical application in real life problem*
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| **Pedagogical Strategies** | *Think-pair-share, Experiential learning, etc.* |
| **Teaching & Learning Resources** | *Models such as number lines; number tracks; algebraic tiles; Multibase Arithmetic Blocks, Graph board/sheets, right-angle triangle (wheel of theodorus), etc.* |
| **Key Notes on Differentiation** |
| ***Learning Tasks:***1. *Learners state and use the vocabulary and operations of three sets.*
2. *Learners investigate subsets, unions, intersections, regions of three sets Venn diagram, their properties of operations and application to real life problems.*
3. *Learners to 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:*** 1. *Provide examples and non-examples to help them understand the concepts.*
2. *Provide additional practice problems and support as needed.*
3. *Provide more complex three-set problems that require critical thinking and multiple steps to solve.*
4. *Encourage them to analyse and compare different solution strategies, such as using the inclusion-exclusion principle.*
5. *Have them create their own three-set problems for their classmates to solve.*

***Key Assessment:***1. ***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\}.$1. *Find (A ∪ B)'*
2. *Find (A ∩ B)'*
3. *Verify de Morgan's laws for the sets A and B.* ***Level 3***
4. ***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.*
5. *Draw a Venn diagram for this information.* ***Level 2***
6. *Find how many students study:* ***Level 3***
* *One course only,*
* *Exactly two courses,*
* *At least two courses*
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| **Keywords** | *de’Morgan’s ;law, Association, commutative and Distributive property*  |

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| **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)*** ***Folks song grouping learners in group or set … obira wowono Monday get upp,….. obira wowno Tuesday ….get up …..up to Sunday or use of ICT (Phone song--)******Learner activity*** ***Learners get up and moving in grouping according to days they were born***  |
| ***Introductory Activity (15minutes)******Activity 1 (40 minutes)**** Teachers prepares card board with two sets and three sets and write examples of sets on white board

***Activity 2 (40 minutes)**** Teachers introduce the concept of sets to the students, providing clear explanations and examples to help learners understand the concept.

 | ***Introductory Activity*** ***Activity 1 (40 minutes)**** Learners draw Venn diagram with numerical input and give examples of sets

***Activity 2 (40 minutes)**** Learners actively participate in sorting challenge (A int. B) and (B n A) to achieve commutative property
* working collaboratively in groups or pairs to sort the objects into sets based on common characteristics or properties to establish Associative. (A n B) n C= A n (B n C)
* Learners apply critical thinking skills to determine how to group the objects effectively. They discuss and negotiate with their peers to establish criteria for sorting and categorizing the objects.
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| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** |
| ***Level 1: what is commutative property*** *Level 3: strategic reasoning* * + - 1. *Find* $(A⋃B)^{'}$ *if* $n\left(A\right)=42$*,* $n\left(B\right)=70$ *and* $n\left(A∩B\right)=20$
			2. *In a survey of 115 pet owners, 26 said they own a dog, and 64 said they own a cat. 5 said they own both a dog and a cat. Use a Venn diagram to determine how many of the pet owners surveyed owned neither a cat nor a dog*
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| **Lesson Closure** ***In completing this part, refer to the Essential Questions to check that learning has taken place.*** |
| ***Activity (15 minutes)*** 1. *Ask students in the ability groupings write and share the summary of lesson taught.*
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| **Reflection & Remarks** |
| *Where the different subgroups in the class catered* *What did the learners find difficult to understand, and what activities did learner complete with ease*  |
| **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)*** *Encourage algebraic thinking with number logic**Challenge students with a logic puzzle, quadrilateral puzzles, hand and numbers template, mental mathematics Test.* |
| ***Introduction ( 20 minutes)*** *1. Help learners to organize themselves in mixed-ability groups, then present them with of problems Venn diagram.* *II. Using experiential learning let the learners use the various properties of set operation and task them to solve problems consisting Venn diagram.*  *Encourage learners to show respect for individual diverse views as they interact and collaborate in their groups.****Activity 1 ( 30 minutes)***1. *Using the KWL strategy, transition learners from consolidating their previous knowledge to the new learning.*

1. *In mixed-gender groups, present learners*

*Apply the various properties under the set operation involving Venn diagram* 1.
 | ***Introductory activity (25 minutes)******Activity 1(30 minutes)***1.

***Activity 2 (25 minutes)******Activity 3 (25 minutes)*** |
| **Assessment DoK aligned to the Curriculum and Subject Teacher Manual** |
| ***Level 3***1.
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| **Lesson Closure** ***In completing this part, refer to the Essential Questions to check that learning has taken place.***  |
| ***Activity (15 minutes)*** 1.
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| **Reflection & Remarks** |
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