Module 4: Teaching Aids for Counting and Operations

CONTENT OF MODULE:
Children learn by listening, seeing and manipulating objects. They develop mastery through practice and repetition. Therefore, teachers need to design lessons that incorporate teaching aids into their activities that engage pupils visually and through manipulating objects as well as through clear explanations of concepts. In this module, teachers design, make and collect teaching aids that help in teaching counting and operations. The teaching aids made during this module are Bundle of Sticks, Place Value Chart, 1 to 100 Number Chart, Multiples of 10 up to 1000 Number Chart, Number Line and Vocabulary Cards. Teachers also practice how to use the teaching aids during a lesson.

CORE CONCEPTS:
1. Children learn by listening, seeing and manipulating objects.
2. Children develop mastery through practice and repetition.
3. Children need support in using maths vocabulary correctly.

TEACHING AIDS:
1. Bundle of Sticks – a teaching aid made from sticks found in the local environment and useful in teaching children the concept of place value for counting, addition and subtraction.
2. Place Value Chart – a teaching aid in the form of a diagram that can be drawn on paper or on the board and useful in teaching children the concept of place value for counting, addition and subtraction.
3. 1 to 100 Number Chart – a 10 x 10 table of numbers from 1 to 100 mounted on the classroom wall that is useful in teaching children numbers, counting, and patterns in counting such as skipping by 2s or 5s or 10s.
4. Multiples of 10 up to 1000 Number Chart – a 10 x 10 table of numbers from 1 to 1000 mounted on the classroom wall that is useful in teaching children numbers, counting, and patterns in counting such as skipping by 10s.
5. Number Line – a teaching aid in the form of a diagram that can be drawn on paper or on the board that is useful in teaching children the concept of counting forward and backward, addition and subtraction.
6. Vocabulary Cards – pack of cards that have maths terminology and symbols written on it that is useful in teaching children correct mathematical vocabulary.

MODULE OBJECTIVES:
By the end of this module, teachers will be able to:
1. Understand that children learn and develop the number concept visually and through repeated practice and repetition.
2. Make, collect and design teaching aids useful in teaching counting skills.
3. Incorporate teaching aids through pupil activities to help them develop counting skills.
4. Explain the importance of continuously helping pupils’ use maths vocabulary correctly.

MATERIALS FOR THE SESSION:
1. INSET Module.
2. Copy of 2015 Standards syllabus and copy of Module 1.
3. Notebook, pen, flip chart and markers, or chalk and board.
4. Sticks, string, a pair of scissors, markers, flipchart paper, ruler, pencil, masking tape.
5. Teaching Aid Box.
LEARNING ENVIRONMENT FOR THE SESSION:
1. Review the ground rules established by the participants during the first meeting
2. Make revisions to the ground rules if required
3. Arrange the desks so that all participants can see and speak to each other
4. Feel free to ask questions
5. Always be supportive of your colleagues
6. Try to be creative and think about how ideas apply to your classroom
7. Put phones or pagers on silent mode

REFLECTION

SAY TO TEACHERS:

“Welcome to Module 4 of the INSET training for Counting. In this module we will learn how to design, make and collect teaching aids useful for developing counting and operations skills in pupils. We will also learn how to incorporate the teaching aids into pupil activities appropriately. Before we begin, let us each share a success and a challenge faced when putting into practice the concepts and techniques discussed in the previous session. For each challenge that a participant mentions, let’s see if we can come up with a solution. Make sure to write down solutions that you find helpful or address the challenges that you identified.”

READ ALOUD (5 MINUTES)

Since the last session we practiced one or more teaching technique to apply the following concepts developed during the module:
1. Incorporate song and music into pupil activities to introduce and reinforce maths concepts
2. Organise children in small group activities
3. Use knowledge check activities into your lesson to assess pupils’ learning progress

Take a moment to individually jot down a success as well as a challenge you experienced while conducting these lessons in your class.

WRITE INDIVIDUALLY (10 MINUTES)

• Write down individually a success and a challenge you experienced while applying these strategies in the classroom.

Successes

(Describe the practice you have used and explain how you knew it was successful)
### GROUP DISCUSSION (15 MINUTES)

- Share one of these experiences with the group.
- For each challenge, see if you can come up with solutions for your colleagues’ challenges.
- During the discussion, write down solutions that pertain to the challenges you identified.

### Potential Solutions
“In this module we will design, collect and make teaching aids useful for counting and operations and practice how to incorporate them into daily lessons.

ENSURE THAT ALL THE MATERIALS ARE AVAILABLE BEFORE BEGINNING THIS MODULE.

- Sticks
- String
- A pair of scissors
- Markers
- Flipchart paper
- Ruler
- Pencil
- Masking tape

CORE CONCEPT – CHILDREN LEARN BY LISTENING, MANIPULATING OBJECTS AND VISUALLY

SAY TO TEACHERS:

“Now we will read the core concept. We will take turns reading the text aloud. After the first teacher finishes the paragraph, he/she can call out another teacher’s name so that they read the next paragraph. While we are reading, you should mark any key information. Put an

READ ALOUD (5 MINUTES)

In this module we will:

1. Understand that children learn and develop the number concept visually and through repeated practice and repetition.
2. Make, collect and design teaching aids useful in teaching counting skills.
3. Incorporate teaching aids in lessons through pupil activities to help them develop counting skills.
4. Explain the importance of continuously helping pupils’ use maths vocabulary correctly.

In order to complete this module, we will require the following materials:

- Sticks
- String
- A pair of scissors
- Markers
- Flipchart paper or cardboard
- Ruler
- Pencil
- Masking Tape

CORE CONCEPT – CHILDREN LEARN BY LISTENING, SEEING AND MANIPULATING OBJECTS

READ ALOUD (10 MINUTES)

1. One teacher should start reading out loud. After he/she finishes the first paragraph, he/she can call out another teacher’s name so that they read the next paragraph.
2. While reading:
   - Put an exclamation point (!) next to anything that you find important

- Review the activities for Recognition of the Number Concept in the 2015 Standard 1 Syllabus (pages 27-31) and Standard 2 Syllabus (pages 26-27).
- Also review the activities for Number Operations in the Standard 1 Syllabus (pages 31-37) and Standard 2 Syllabus (pages 27-29).
- Review the example pupil activities for Recognition of the Number Concept and Number Operations described in the example Scheme of Work in Module 1 for Standard 1 and Standard 2.
- Reflect on the math concept and possible pupil activities for developing the whole number concept up to 100.
- Turn to the person to your right and rapidly share example pupil activities that can be used in your classroom for this.
Children learn by listening, manipulating objects and looking at visual representations.

There are three basic learning styles for all pupils.

1) They learn by listening,
2) They learn by seeing, and
3) They learn by touching and manipulating objects.

Pupils who learn best by listening prefer to hear clear explanations by the teacher; stories, songs and explanations of concepts help this type of pupil learn quickly. Pupils who learn visually process information by reading, looking at pictures, illustrations, photos, diagrams, graphs, symbols and other visual representations or by watching a demonstration. They are often impatient with listening to an explanation. Pupils who learn by doing and touching often have trouble sitting still and focusing on a lecture or explanation. They understand better by writing it down or doing activities themselves with objects and things. For a teacher to effectively teach pupils with all these different learning styles, it is important for the lesson to include clear explanations of concepts or use songs or stories, which are also written on the board, as well as group activities that allow pupils to manipulate objects and explore concepts.

When teaching counting and operations, teachers should know that rote drill and memorization in counting do not lead to understanding of the number concept. Instead, teachers should design lesson plans that provide opportunities for exploring the number concept. This can be done through facilitated group work using teaching aids such as Bundle of Sticks and the Place Value Chart. This approach supports pupils who learn visually because they see the quantity of a number represented by the sticks. It helps pupils who learn by doing because the child is the one who is placing sticks in their appropriate places in the Place Value Chart. It helps children who learn by listening because the teacher should be consistently providing clear instructions for activities, introducing key concepts at the beginning and summarising them at the end of each lesson.

The Bundle of Sticks is a teaching aid made from sticks found in the local environment. Branches from a locally found tree or plant are cleaned and cut into equally sized sticks.

One stick is used to represent one object and can be placed in the ones place of the Place Value Chart or Tray.

Ten sticks bundled into a group is used to represent 1 ten and can be placed in the tens place of the Place Value Chart or Tray.
Ten bundles of 10 sticks tied together represent 1 hundred and can be placed in the hundreds place of the Place Value Chart or Tray.

A digit is one of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. All numbers are made up of one or more digits. Numbers such as 2 have one digit, whereas numbers such as 89 have two digits. To understand what a number really means, you need to understand what the digits represent in a given number. The position of each digit in a number tells its value, or place value. We can use a Place Value Chart like the one below to easily see the place value for each digit. The Place Value Chart is a teaching aid in the form of a table that can be drawn on paper or on the board and used to represent the ones, tens and hundreds place or higher in numbers.

<table>
<thead>
<tr>
<th>PLACE VALUE CHART</th>
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<tbody>
<tr>
<td>HUNDREDS</td>
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<tr>
<td>TENS</td>
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<tr>
<td>ONES</td>
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</tbody>
</table>

The Place Value Tray is used for the same purpose but made out of locally found materials in the form of a tray. The only difference between the Place Value Chart and Tray is that the Chart can be drawn on any surface such as the board, notebook, ground or slate and therefore best used for group work and individual work. The Tray is made using materials and best used for demonstrating techniques to the whole class by the teacher since there may not be enough trays for group work or individual work.

Together the Bundle of Sticks and Place Value Chart or Tray are useful in teaching children the concept of place value for counting, addition and subtraction.

Since the Bundle of Sticks visually represents the quantity of a number it can be used for counting and operations related activities such as comparing the quantities of different groups. For example, the teacher can place several groups of bundles of sticks in tens and ask pupils to compare and identify which group has the most or least objects. Pupils then justify their answers.
The Place Value Chart promotes conceptual understanding of the quantity represented by a number because children can see the different sized bundles of sticks for hundreds, tens and ones such as the number 264 represented by 2 hundreds and 6 tens and 4 ones.

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<thead>
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<th>PLACE VALUE CHART</th>
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<tbody>
<tr>
<td><strong>HUNDREDS</strong></td>
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</table>

This then forms the foundation for addition and subtraction. For example, consider the addition exercise 23 + 19. This can be explored using the place value chart or tray. First, demonstrate or have children represent the number 23 using the bundles of sticks. This is done by placing two bundles of 10 in the tens column and 3 sticks in the ones column.

<table>
<thead>
<tr>
<th>PLACE VALUE CHART</th>
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<tbody>
<tr>
<td><strong>HUNDREDS</strong></td>
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<td>2</td>
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</tbody>
</table>

Now collect additional sticks to represent 19 and place it in the chart as follows: 1 bundle of ten and 9 ones sticks. Place the bundle of ten in the tens column and the 9 ones sticks in the ones column.
As you place the single sticks in the ones column, count out loud from 3 since there are already 3 sticks in that column. Say, “3, 4, 5, 6, 7, 8, 9”. As you reach 10, instruct your pupils that each time we reach 10 sticks in the ones column we must replace it by a bundle of ten and place it in the tens column. Explain that 10 ones is the same as one bundle of ten.

Once you replace the 10 ones with 1 ten, the final result is apparent. The total of 23 + 19 is 42. This approach...
should be practiced by pupils in groups and individually **before** the teacher introduced the vertical addition algorithm.

Similar to using the bundle of sticks and the place value chart or tray for addition, subtraction principles can also be explored through group activities. In particular, the concepts of carry and take away are visually conveyed through this approach.

**GROUP DISCUSSION (10 MINUTES)**

1. What were some of the new or important ideas that you marked with an exclamation (!) point?
2. What were some of the unclear ideas that you marked with an exclamation (?)?
3. What were new concepts that you circled?

**ACTIVITY – BUNDLE OF STICKS AND PLACE VALUE CHART**

**SAY TO TEACHERS:**

“Now you will do an activity with your group. We will collect and bundle together sticks to add to our Maths Teaching Aid Box and draw a large place value chart to mount in the classroom wall.

**MAKE SURE THAT YOU HAVE COLLECTED ENOUGH STICKS TO MAKE THE BUNDLES BEFORE THE SESSION. YOU CAN ALSO ENGAGE PUPILS IN BRINGING A CERTAIN NUMBER OF STICKS EACH TO CLASS BEFORE THE TEACHERS MEET FOR THIS SESSION.**

**MAKE WITH HANDS (30 minutes)**

- Read the instructions below and make a **Bundle of Sticks** and a **Place Value Chart**
- Divide the teachers—one teacher can draw the Place Value Chart while the others bundle the sticks with string

**Bundle of Sticks**

1. Collect sticks from the schoolyard and cut or break them into pieces.
2. Clean them so that there are no thorns and a roughly the same size each
3. Make at least 500 equal sized sticks.
4. Cut string into equal sizes enough to tie around a bundle of sticks.
5. Count 20 groups of 10 sticks and make 20 bundles using string; this will be use for the tens place value.
6. Make two bundles of 100s by tying together 10 bundles of ten to use for the hundreds place value.
7. Keep the remaining 100 sticks as single sticks for the ones place value.
8. Store your bundle of sticks carefully in an organized manner in your Maths Teaching Aid Box.
9. Note that you can also have pupils do the activity of making the bundles as a counting activity.
You can improvise by using any other suitable material instead of sticks such as pens or pencils; however the same object must be grouped together to represent tens and hundreds.

**Place Value Chart**

1. Take a large piece of flipchart paper or a large piece of cardboard about 60 cm x 90 cm.
2. Using markers and a ruler, make the following table.

<table>
<thead>
<tr>
<th>PLACE VALUE CHART</th>
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</thead>
<tbody>
<tr>
<td><strong>HUNDREDS</strong></td>
</tr>
<tr>
<td><strong>TENS</strong></td>
</tr>
<tr>
<td><strong>ONES</strong></td>
</tr>
</tbody>
</table>

3. Using masking tape, mount the Place Value Chart at your height level next to the board. It is mounted in the classroom so that you can make reference to it while teaching. However, you may need to make small versions on A4 size paper or on pupils' slates for group activities.

**SILENT REFLECTION (5 MINUTES)**

- Read the activities plan below silently and think about how you can try it in your classroom
- Write down any doubts or questions in your notebook to share with the group at the end

<table>
<thead>
<tr>
<th>Learning Objective: Subtract within 100</th>
<th>Lesson Objective: Subtract within 50 with borrowing</th>
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<tbody>
<tr>
<td>Material: Bundle of Sticks, Place Value Charts</td>
<td>Vocabulary or Phrase: place value, take away, subtract</td>
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<tr>
<td>Activity: Group work</td>
<td>Steps to follow:</td>
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<td></td>
<td><strong>Introduction (10 minutes):</strong></td>
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<td></td>
<td>- Pose the following problem story and ask your pupils to write their response on their slates rapidly: “Vincent went fishing by the river. It was his lucky day. He caught 10 fishes very quickly. As he kept fishing, he caught another 10. And then again he caught 10 more. On his last round of fishing he caught 3 fishes. How many fish in total did Vincent catch?”</td>
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<tr>
<td></td>
<td>- Students are expected to respond rapidly to demonstrate their mental arithmetic skills.</td>
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<td></td>
<td>- Repeat the story at least once more so that everyone has a chance to hear it clearly.</td>
</tr>
</tbody>
</table>
1. Say to students: “Good responses, Vincent went home with 33 fishes” and write 33 fishes on the board.
2. Continue the story:
   “Now Vincent gave his 33 fishes to his brother to sell at his shop. His brother decided to sell 19 fishes and save the rest for their family dinner. How many fishes were saved for the family?” and write 19 fishes on the board.
3. Pose the question to the class, “What operation do we need to use to know the answer?”
4. Accept the different pupil responses; some may say subtraction and others may give a wrong answer or may not have a response. Do not provide the correct answer.
5. Say, “Ok, let us work with the bundle of sticks and the place value chart to find the answer”.

2. New Knowledge (15 minutes):
   • Form groups of 3 to 5 children and give each group a size A4 paper or slate with the Place Value Chart drawn on it and a set of 50 sticks each (three bundles of 10 and twenty single sticks). For class sizes greater than 50 pupils, pupils seated together on one bench can do the activity.
   • Some pupils can be selected as teaching assistants to help with the group activity to develop their self-confidence and leadership abilities.
   • Restate the second part of the story:
     “Vincent gave his 33 fishes to his brother to sell at his shop. His brother decided to sell 19 fishes and save the rest for their family. How many fishes were saved for the family?”
   • Say to the groups, “Imagine that each stick is a fish. How can you represent 33 fishes in the place value chart?”
   • Allow children time to place the bundles correctly as you walk around the class. Provide guidance when needed. Teaching assistants also walk around and ensure the right number of sticks have been placed in the chart.

### PLACE VALUE CHART

<table>
<thead>
<tr>
<th>TENS</th>
<th>ONES</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
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</tbody>
</table>
• Now say to the groups, “Imagine that each stick is a fish. How can you take 19 fishes away in the place value chart?” write on the board.

33 fishes take away 19 fishes

33
- 19

• For their first step, pupils should take out a bundle of 10 from the tens column and replace it by 10 ones sticks in the ones column.

PLACE VALUE CHART

<table>
<thead>
<tr>
<th>TENS</th>
<th>ONES</th>
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<tbody>
<tr>
<td>3</td>
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• Second step is to remove 9 ones sticks from the ones column and one bundle of 10 from the tens column.

PLACE VALUE CHART

<table>
<thead>
<tr>
<th>TENS</th>
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<tbody>
<tr>
<td>3</td>
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<td>-1</td>
<td>9</td>
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</table>
ENSURE THAT TEACHERS TAKE TURNS LEADING EACH ACTIVITY. DURING THE REFLECTION, TEACHERS MAY SHARE MANY CHALLENGES THEY THINK THEY MIGHT ENCOUNTER WITH THIS ACTIVITY. HERE ARE SOME POTENTIAL CHALLENGES AND SOLUTIONS.

CHALLENGE: TEACHER DOES NOT UNDERSTAND PLACE VALUE
SOLUTION: EXPLAIN PLACE VALUE CONCEPT. IN NUMBERS EACH DIGIT HAS A PLACE AND THE ORDER OF ITS PLACE DETERMINES ITS VALUE. FOR EXAMPLE, THE NUMBER 562 MEANS 5 HUNDREDS + 6 TENS + 2 ONES. WE REPRESENT THIS IN THE PLACE VALUE CHART BY PLACE 5 BUNDLES OF 100 STICKS IN THE HUNDREDS COLUMN, 6 BUNDLES OF 10 STICKS IN THE TENS COLUMN AND 2 STICKS IN THE ONES COLUMN. THIS REPRESENTATION IS HELPFUL WHEN ADDING OR SUBTRACTING NUMBERS.

CHALLENGE: CHILDREN DON’T KNOW HOW TO WORK IN GROUPS
SOLUTION: THE FIRST FEW TIMES YOU TRY THIS STRATEGY, IT MAY NOT BE VERY SUCCESSFUL BECAUSE PUPILS ARE NOT USED TO WORKING IN GROUPS AND THE TEACHER IS NOT USED TO HAVING THE CLASSROOM IN A DIFFERENT ARRANGEMENT. BUT THE TEACHER NEEDS TO TRY IT SEVERAL TIMES, PERHAPS WITH THE HELP OF THE HEAD TEACHER UNTIL BOTH THE TEACHER AND PUPILS GET USED TO THE NEW APPROACH.

CHALLENGE: MORE THAN 50 STUDENTS IN THE CLASSROOM IS DIFFICULT TO MANAGE
SOLUTION: REQUEST HELP FROM COMMUNITY MEMBERS TO PROVIDE SUPPORT DURING LESSON.

1. **Introduction (5 minutes):**
- Ask a pupil to explain her response.
- Present the approach on the board to explain the process of taking away to ensure all pupils understand and present the response in the form of “There are 14 fishes remaining for the family.”

2. **Practice (10 minutes):**
- Present 5 practice problems for pupils to solve in their groups allowing them sufficient time to solve:
  - 50 - 12 = 38
  - 44 - 37 = 7
  - 32 - 9 = 23
  - 16 - 8 = 8
  - 47 - 18 = 29

3. **Reinforcement (15 minutes):**
- Present 5 practice problems for pupils to solve in their groups allowing them sufficient time to solve:
  - 50 - 12 = 38
  - 44 - 37 = 7
  - 32 - 9 = 23
  - 16 - 8 = 8
  - 47 - 18 = 29

4. **Reflection (5 minutes):**
- Reiterate the concept that in subtraction with carry: “when you take 1 from the tens column, it represents 10 ones in the ones column.”

**ROLE PLAY (20 MINUTES)**

- In a group, practice the above activity. One teacher can play the role of the maths teacher and all the others can pretend to be pupils.

**TURN AND TALK (5 MINUTES)**

- After trying the activity, turn and talk to the person to your right about the experience. Some questions to reflect on:
  - Do you think this activity is suitable for your classroom?
  - Will you practice it in your class?
  - What challenges do you think you will encounter in trying it in the class?
SAY TO TEACHERS:

“Now we will read the core concept. We will take turns reading the text aloud. After the first teacher finishes the paragraph, he/she can call out another teacher’s name so that they read the next paragraph. While we are reading, you should mark any key information. Put an exclamation point (!) Next to anything you think is important. Put a question mark (?) Next to anything that confuses you or that you disagree with. Finally circle (o) any new words.”

READ ALOUD (5 MINUTES)

1. One teacher should start reading out loud. After he/she finishes the first paragraph, he/she can call out another teacher’s name so that they read the next paragraph.

2. While reading:
   - Put an exclamation point (!) next to anything that you find important
   - Put a question mark (?) next to anything you don’t understand or don’t agree with
   - Circle (o) any words that are new to you

Children develop mastery through practice and repetition.

Repeated practice and repetition is important when learning new concepts because it helps children commit to memory basic facts that allow them to calculate quickly and with precision. It also helps develop their self-confidence about their mathematical ability. Furthermore, it frees up working memory space in the pupils’ brain so that they can learn new concepts. Mastery of counting and operations can be achieved if teachers introduce weekly counting activities in which every pupil in the class counts and records the number of objects. When the quantity is large (two- or three-digit numbers), pupils can group objects into groups and then count the groups. Later on, a weekly addition or subtraction activity where every pupil works out exercises and solves problems develops mastery of basic arithmetic. Also, when children are given the opportunity to memorise number facts by looking for patterns and repeating it frequently with accuracy, it helps them to build fluency in mathematics and gain confidence. When they make mistakes while repeating, it is important to correct them and make them repeat again. However, you must correct them using a kind and nurturing approach and tone of voice while appreciating their effort in learning. This develops pupils’ ability to persevere through challenges while maintaining self-confidence.

Teaching aids such as the 1 to 100 Number Chart, Multiples of 10 up to 1000 Number Chart and the Number Line support counting forwards and backwards; skip counting by twos, fives and tens; comparing numbers; addition and subtraction; and multiplication and division. They are useful when singing counting songs or playing counting games or explaining new concepts as the teacher can point at the charts or the number line and make reference to them to emphasise the different concepts.

The 1 to 100 Number Chart is a 10 x 10 table of numbers from 1 to 100 written clearly on a large piece of paper or cardboard that is mounted on the classroom wall.

```
1  2  3  4  5  6  7  8  9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50
51 52 53 54 55 56 57 58 59 60
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The Multiples of 10 up to 1000 Number Chart is a 10 x 10 table of numbers from 1 to 1000 written clearly on a large piece of paper or cardboard that is mounted on the classroom wall.

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<tr>
<th>10</th>
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The Number Line is a picture of a straight line on which every equally spaced bar corresponds to a number and every number to a bar. It is like a ruler. It can be drawn on a large piece of paper and mounted on the wall.

These teaching aids should be mounted on the wall so that children are continuously seeing and visualising the numbers. It supports the concept of creating a print rich environment discussed during the literacy INSET training. You can improvise other number charts for your classroom, as you need them for your lessons. Examples include the multiplication table for Standard 3 and tables for multiples of 2 or multiples of 5.

GROUP DISCUSSION (10 MINUTES)

1. What were some of the new or important ideas that you marked with an exclamation (!) point?
2. What were some of the unclear ideas that you marked with an exclamation (?)?
3. What were new concepts that you circled?
SAY TO TEACHERS:

“Now you will do an activity with your group. We will draw the number charts and number to mount in the classroom wall.”

MAKE SURE THAT YOU HAVE ENOUGH FLIP CHART PAPER OR CARDBOARD PAPER, MARKERS AND MASKING TAPE TO MOUNT THE TEACHING AIDS.

ACTIVITY – 1 to 100 NUMBER CHART, MULTIPLES OF 10 UP TO 1000 NUMBER CHART AND NUMBER LINE

MAKE WITH HANDS (20 MINUTES)

- Read the instructions below and make a 1 to 100 Number Chart, Multiples of 10 up to 1000 Number Chart and a Number Line to mount on the wall of the classrooms.
- Divide the teachers so that each one can draw one of the charts

### 1 to 100 Number Chart

1. Take a large piece of flipchart paper about 90cm x 120cm.
2. Using markers and a ruler, make the following diagram. Ensure that the rows and columns are evenly spaced and the numbers are large enough for children to see the chart from a distance.
3. Using masking tape, mount the chart at your height level on one of the walls of the classroom.

### Multiples of 10 up to 1000 Number Chart

1. Take a large piece of flipchart paper about 90cm x 120cm.
2. Using markers and a ruler, make the following diagram. Ensure that the rows and columns are evenly spaced and the numbers are large enough for children to see the chart from a distance.
3. Using masking tape, mount the chart at your height level on one of the walls of the classroom.
3. Using masking tape, mount the chart at your height level on one of the walls of the classroom.

**Number Line**

1. Take a long piece of flipchart paper; tape together pieces to make it at least 150cm x 45cm.
2. Using markers and a ruler, make the following diagram. Ensure that the numbers are marked with equal distance between each and the numbers are large enough for children to see the chart from a distance. Draw the line with numbers at least up to 30.

3. Using masking tape, mount the paper at your height level on one of the walls of the classroom.

**THINK – PAIR – SHARE (15 MINUTES)**

- Think about different ways that each Number Chart and the Number Line can be used to teach counting.
- Turn to the person next to you and exchange ideas of how to incorporate these tools in your teaching practice.
- Share ideas with the group.

**CORE CONCEPT – CHILDREN NEED SUPPORT IN USING MATHS VOCABULARY CORRECTLY**

**SAY TO TEACHERS:**

“Now we will read the core concept. We will take turns reading the text aloud. After the first teacher finishes the paragraph, he/she can call out another teacher’s name so that they read the next paragraph. While we are reading, you should mark any key information. Put an exclamation point (!) Next to anything you think is important. Put a question mark (?) Next to anything that confuses you or that you disagree with. Finally circle (o) any new words.”

**READ ALOUD (5 MINUTES)**

1. One teacher should start reading out loud. After he/she finishes the first paragraph, he/she can call out another teacher’s name so that they read the next paragraph.
2. While reading:
   - Put an exclamation point (!) next to anything that you find important
   - Put a question mark (?) next to anything you don’t understand or don’t agree with
   - Circle (o) any words that are new to you.

Children need support in using maths vocabulary correctly.

Knowledge of maths vocabulary is an essential component of learning mathematics. There are numerous reasons why it is important to develop children’s maths vocabulary. If they know and can use appropriate mathematical terminology, pupils will be able to:

- Build understanding as they process ideas through language
- Communicate their mathematical thinking clearly and coherently to the teacher and to each other
- Address their doubts and questions clearly to the teacher and to each other
- Improve their performance in maths
- Improve their literacy levels, and
- Increase their understanding of maths concepts as they learn how to explain their problem solving methods to the teacher or to each other.

For teachers, it allows them to accurately monitor pupils’ progress through regular knowledge checks. If we want pupils to use the language of mathematics precisely it is important that teachers model appropriate language in context, both verbally and visually. Some key strategies for emphasizing correct use of maths vocabulary are to:

- Pre-teach maths vocabulary
- Model correct use of vocabulary when teaching new concepts
- Use appropriate labels clearly and consistently, and
- Integrate vocabulary knowledge in assessments.

You can use the **Vocabulary Cards** in several ways during your lessons. Below are two examples:

1. **Word wall**
   Each week, as you introduce new vocabulary words, write the word on the board, emphasise its proper usage, show the vocabulary card to the class and mount it on a wall with scotch tape. Over the course of the school year, more words will be added to the list creating the word wall. When pupils misuse a term or are struggling to explain them, point to the word wall and ask which of those terms can help them to explain themselves.

2. **Word of the day**
   When introducing a new concept, select the word of the day that will be emphasised during the lesson. Mount the vocabulary card that is the word of the day on the board. Make reference to the word throughout the lesson.
“Now you will do an activity with your group. We will make vocabulary cards to add to the Maths Teaching Aid Box.”

MAKE SURE THAT YOU HAVE ENOUGH FLIP CHART PAPER OR CARDBOARD PAPER AND MARKERS FOR THIS ACTIVITY.

## ACTIVITY – VOCABULARY CARDS

### SAY TO TEACHERS:

- Read the instructions below and make the **vocabulary cards**
- Divide the math words amongst the participants so that each person is making a card for a different word

### MAKE WITH HANDS (15 MINUTES)

1. Draw rectangles of dimensions 12 cm by 18 cm.
2. Write the following words in large clear letters.
3. Neatly cut out the rectangles with a pair of scissors to make a pack of math vocabulary cards.

Examples of vocabulary words for Standards 1 and 2 are: greater than, less than, equal to, increasing, decreasing, most, least, greatest, smallest, as much as, as many as, increase, add, addition, added to, decrease, subtract, minus, subtraction, subtracted from, equals, half, quarter, one-third, two-thirds, fraction, equal parts, length, distance, long, short, longer, shorter, near, far, nearer, further, tall, short, taller than, shorter than, sides, length, width, rectangle, square, circle, triangle, sphere, cub
"To improve pupils' learning, it is very important that teachers are able to practice the teaching techniques they learn from INSET in their classrooms. For this, it would be beneficial to develop the lesson plans together as a group instead of individually. When we support each other through this process of lesson planning, we will be able to design better quality lessons. So let us dedicate at least 2 hours to lesson plan together. Let us decide now when we will meet next to complete this component of the INSET for this module."

JOINTLY DETERMINE WHEN THE TEACHERS WILL MEET AGAIN TO COMPLETE THE LESSON PLANNING SECTION OF THIS MODULE. WHEN YOU MEET AGAIN TO WORK ON THIS SECTION, WALK AROUND AND SEE IF TEACHERS NEED HELP WITH THE PLANNING.

LESSON PLANNING

Also write cards for the numerals one to one hundred and the corresponding word.

one 1
twenty five 25
eighty two 82
one hundred 100

THINK – PAIR – SHARE (10 MINUTES)

• Write down at least three reasons why it is important to actively develop pupils’ use of correct math vocabulary.
• Turn to the person next to you and share your three reasons.
• Share ideas with the group.

LESSON PLANNING

SAY TEACHERS:

To improve pupils’ learning, it is very important that teachers are able to practice the teaching techniques they learn from INSET in their classrooms. Therefore, it is important to set aside at least 2 hours to lesson plan together with other teachers.

• Set a time to meet in order to complete this activity before continuing on to the conclusion of today’s session.
• When you meet for the lesson planning, first review the core concepts covered in this module.
• Then as a group, plan two different lessons that incorporate at least one of the teaching techniques or core concepts covered in this module.
• As a group, determine the appropriate learning objectives for your lessons based on the concepts covered in this module.
• Complete the two lesson plans using your lesson plan template.
• You are expected to implement the lesson plan in your classroom with your pupils.
CONCLUSION

SAY TO TEACHERS:

“We have come to the end of the module. Please take minute to reflect on the session. Fill in the form to record your appraisal of today’s module. After you are finished, rip the page out and give it to me. Please be honest with your answers because your feedback will help to improve school based INSET in the future.”

COLLECT THE TEACHERS’ APPRAISAL FORMS AND BRING THEM TO THE NEXT WARD CLUSTER MEETING. WHILE THE TEACHERS ARE FILLING OUT THE APPRAISAL FORM, REFLECT ON THE OVERALL SUCCESSES AND CHALLENGES OF TODAY’S SESSION AND COMPLETE THE FORM BELOW.

WRITE INDIVIDUALLY (15 MINUTES)

Please fill in the following form to record your appraisal of today’s module. After you are finished, rip this page out and give it to your INSET Coordinator. Please be honest with your answers because your feedback will help to improve school based INSET in the future.

Marking Scheme for the INSET Appraisal:

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
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<tbody>
<tr>
<td>0</td>
<td>I completely disagree with the statement</td>
</tr>
<tr>
<td>1</td>
<td>I partially disagree with the statement</td>
</tr>
<tr>
<td>2</td>
<td>I partially agree with the statement</td>
</tr>
<tr>
<td>3</td>
<td>I completely agree with the statement</td>
</tr>
</tbody>
</table>

INSET Appraisal Form:

Overall successes from this session:  

Overall challenges from this session:  

School: ______________________    District: _________________________  
Region:_____________________  
Appraisal for Module # ________     Topic of Module:  
Number of teachers who participated: ________         Did the Head Teacher participate:   Yes/No  
Was the INSET Coordinator present to facilitate: Yes/No  

Read the statements below and tick the box that indicates whether your answer:

1. The Core Concepts of today’s module was very clear. I feel like I have a very good understanding of the topics.  
2. This module had many useful and relevant strategies that I will try in my class.  
3. The amount of time it took to complete this module was appropriate. It did not feel too long.  

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<tr>
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<td>Appraisal for Module # ________</td>
<td>Topic of Module: ____________________________</td>
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<tr>
<td>Was the INSET Coordinator present to facilitate: Yes/No</td>
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</table>

4. This module prompted a lot of interesting discussion and reflection.

5. The INSET Coordinator was prepared for the session – he/she has clearly read the module and had all the materials ready.

6. The INSET coordinator effectively facilitated discussion – he/she knows how to get people talking and how to help with answers.

7. The INSET coordinator knows how to maintain a good group dynamic – he/she makes sure that teachers are supportive, collegial and energised.

8. The INSET coordinator knows how to keep teachers motivated – he/she follows up with teachers who are absent/late and reminds us of why INSET is important.

- Close the session by setting the meeting time and date for the Lesson Planning session for this module and the meeting time and date for the new module.