MATHEMATICS TEACHERS GUIDE

1. **Overview of the guide**

Mathematics is one of the compulsory learning areas/subjects taught in basic education including non-formal schools in Kenya. The acquisition of Mathematical skills is necessary for learners to function effectively and meaningfully in the modern society. This teachers guide aims at equipping the teacher with the necessary contents and strategies to use while teaching. Critical units have been covered. This includes numbers concepts, basic arithmetic operations, and measurement. It is envisaged that these units will equip the teacher with the necessary strategies and techniques that they will apply in their practice to prepare learners 'catch up' with others for further training and for daily life.

2. **Aims of the guideline**

The guideline should help the teacher to:

   a) Develop strategies and techniques to effectively facilitate the learning of mathematical skills for mixed ability group of learners.
   b) Assist learners to develop knowledge and skills in Mathematics that will prepare them for further learning and training.
   c) Guide learners in developing competencies in Mathematics that can be applied in economic activities and daily life.

3. **General Learning Outcomes**

By the end of the unit the learner should be able to:

   a) Recognize, read and write numbers clearly
   b) Interpret numbers correctly
   c) Perform correctly the four basic arithmetic operations
   d) Identify and apply the correct arithmetic operations in everyday life situations
   e) Use correct units and solve arithmetic problems based on measures, money and time related to their daily activities.

UNIT 1: NUMBER CONCEPT

1.1 Introduction

Number concept is the foundation of acquisition of Mathematical skills by the learners. Understanding of numbers enables the learners to have a clear understanding and logical thoughts of acquiring knowledge and skills in numeracy for their day to day life. This involves areas such as sorting, counting, representation and number recognition, magnitude and comparisons. It is important that learners are able to accurately and quickly identify numbers, write numbers (representation), determine which of two numbers is greater or smaller (comparisons), and are able to place numbers in a sequence based on their size (magnitude).

1.2 Specific Learning Outcome

By the end of the session the learner should be able to:

1. Read and write whole numbers in symbols and words up to 1000
2. Identify and recognize even and odd numbers.
3. Recognize and identify place value.

Preparation

Have the learning materials such as Sticks, Counters, Manila papers, felt pens and number cards in advance.

Concept 1: Sorting and grouping

Sorting is the most basic and earliest skill learners should develop in numeracy. Sorting means looking for the common characteristics in objects and putting similar ones in the same group. Sorting may be done by considering colour, size, shape or texture. Various objects should be provided for this activity for better understanding of the concept and sorting should be done considering one characteristic at a time.

Activity 1: Sorting and grouping by colour
   i.   Provide learners with materials of different colour
   ii.   In pairs ask them to sort materials of the same colour together
   iii.   Move around to check how the pairs are doing.
   iv.   Give feedback
   v.   Provide more materials for practice and let them sort the items according to other attributes e.g. shapes, texture and size
   vi.   Extended work: Ask children to sort and group items while at home

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Concept 2: Number value/recognition

The first step in Mathematics is learning what the 10 numerals (0 through 9) look like. This requires strong visual discrimination skills since many numerals (such as 6 and 9, or 1 and 7) look

very similar. Once a child is able to recognize the 10 numerals and know each numeral's name, he can develop an understanding of the amount each numeral represents.

Activity 1: How Many?

Provide learners with a chart and guide them to match numbers with the correct number of objects in the chart

Number	Objects
1	● ●
4	●
8	● ● ● ● ●
0	● ● ● ● ● ● ● ●
2	● ● ●
6	● ● ● ● ●
5	● ● ● ●
3	

This activity is appropriate for learners who have competencies in number recognition. It is used to build the concept of number value. It also promotes proper coordination as learners match the objects with the correct number

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Concept 3: Number Counting

Counting is used by learners to demonstrate knowledge of the number names and number system. Skills such as the ability to perceive subgroups, need to be developed alongside counting in order to provide a firm foundation for number sense

Activity 1. Counting backwards and forward

i.   Ask learners to count numbers 1-50

ii.   Ask learners to count forward in groups of twos, fives, and tens starting at any point.e. g 5,10,15,20,25,30,35,40,45 etc. *This can be done as a class, in small groups or by individual learner.*

iii.   Guide learners to count backwards in groups of twos, fives and tens. e.g. 100,90, 80,70,60,50,40,30,20,10.

iv.   Give formative feedback as learners count.

v.   Ask the learners to count the following numbers

vi.   100,102,104,106,108,110,112,114,116

vii. 500,502,504,506,508,510,514,516

viii. Give more numbers for practice

Concept 4: Number reading

Activity 1: Read numbers

i.   Display a chart with numbers 1-100 and ask learners to read them

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
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

ii.   Ask individual learner to read aloud and give feedback

iii.   Encourage learners to practice reading numbers on their own

iv.   Once the learners have mastered 1-100 chart ,provide a chart with 100- 1000 and let them practice.

Concept 5: Number writing

Activity 1: Missing numbers

   i.   Provide a chart with missing numbers and ask learners to fill in the missing numbers in the chart

1	2					7			10
		13			16			19	
21			24				28		
			34						
	42			45					

   ii.   Provide more complex numbers for those who have developed competencies in the above

| 110		130	140		160	170	180		200
210	220	230	240	250	260	270		290	
310		330		350		370	380		400
410	420		440		460		480	490	
510	520								
610	620		640	650	660	670		690	700
710		730			760	770	780		800
810	820		840	850		870		890	900
910		930		950	960	970	980	990	1000

Concept 6: **Place Value**

The concept of place value is the value of a single digit depending on its position in a number. For example: a three-digit number represents the amount of hundreds, tens and ones. Involve learners in various activities that will equip them with knowledge of the concept of place value, Guide learners to brainstorm on real life application of place value.

> **Activity 1: Concept of place value.**
> i)   Organise Learners in groups and give them 23 sticks
> ii)   Ask them to put the sticks into bundles. Ask each group to share and explain how they have arranged the bundles. Model the activity if learners cannot group the sticks together.
> iii)   Give formative feedback
> iv)   Give children more sticks and repeat the exercise.
> v)   Introduce the concept of ones and tens.

Illustration 1.
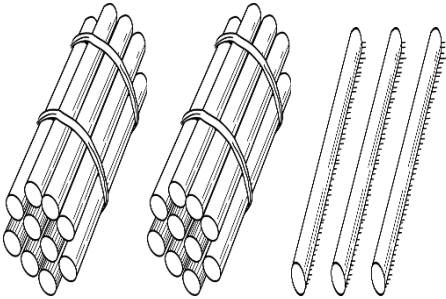
Activity 3: Ones and Tens

- Take beans and place a pile on a table.
- First make groups of tens then count the ten-groups and the individual beans separately.
- Continue in a similar way. Take a different amount of beans. Group them into groups of tens. Count the ten-groups and the ones separately.
- As you do that introduce the words twenty, thirty, forty……etc

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Activity 2: Place Value chart

i. Guide learners to represent the activity 1 above in a table chart.

Tens	ones
2	3

   23 is **2** tens and **3** ones

ii. Do the same for 45,22,34……etc
iii. Give more exercise for practice
   How many **tens** and **ones**?
   a) 44 is **4**   tens and 4 ones
   b) 32 is ---- tens and -------ones
   c) 56 is -----tens and-------ones
   d) 61 is -----tens and-------ones
   e) 40 is …… tens and………ones
iv. Provide formative feedback

Activity 4: Hundreds, tens and ones

    i.   Introduce the hundreds in the place value

    ii.   Guide learners to complete the statements below.

310 pens   = **3** hundreds **1** tens **0** ones

111 bananas= 1 hundreds 1 tens_____ ones

159 cups   = 1 hundreds _____ tens 9 ones

900 books = 9 hundred_____tens____ones

236 balls   = 2 hundred 3 tens_____ones

    iii.   Give formative feedback

Activity 5: Use of Abacus

i) Give each group of participant an abacus.

ii) Provide them with counters of three different colours such that each colour represents either ones, tens or hundreds. Assign each group a different three - digit number.

iii) Ask each group to put the counters in the abacus to represent the assigned number.

iv) Ask the groups to go round, read, and discuss from the abacus the assigned numbers.

v) Give different numbers to each group or individual learners for practice.

vi) Move around the class and give feedback.

- Group 1: 362
- Group 2: 190
- Group 3: 703
- Group 4 :271
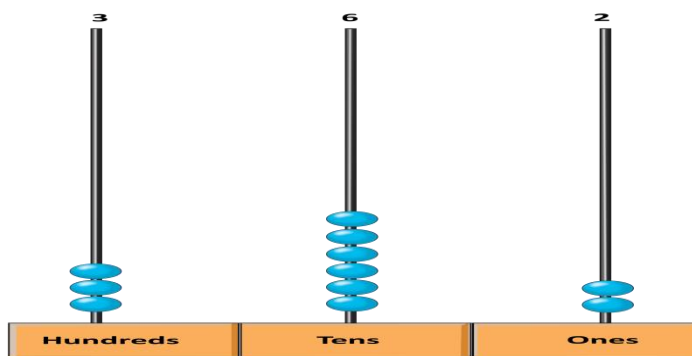
Illustration

Activity 5: Number clues/story

Create a number story:

There are **7** tens, **1** one and **9** hundred. Let learners write their answers.

Ask the learners to create own number stories as the others record the numbers in their exercise books

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Activity 6: Number Hunt/Gallery walk

  i.   Take a walk with the learners around the class area. Look for one-, two-, three-, digit numbers and have the learner read them out loud
 ii.   Ask the learner to record out the numbers they see.
iii.   Discuss each number with the learner and ask how many ones, tens, hundreds are in the number?
 iv.   What is the largest number you can find?
  v.   What is the smallest number you can find?

Activity 7: Hat trick/Fishing game

   i.   Write the numbers 0 to 9 on separate papers and place them in a hat.
  ii.   Have the learner draw one, two or three cards out of the hat.
 iii.   Ask the learner to make different numbers like:
 iv.   If the learner pulls 3, 6, 9 the learner can make 3,6,9,36,39,396,693. Challenge the learners to make as many numbers as possible.
  v.   Ask which is the smallest number you can make?
 vi.   Ask which is the largest number?
vii.   Assist learners to compare numbers by looking at the largest place values.

Concept 7: Number Patterns:

The concept of pattern will help learners learn basic number patterns, observe relationships and find continuous connections to deduce generalizations and predictions. The learner should be guided   to recognize a pattern and expand it.

Activity 1: Pattern Identification

    i.   Collect cards

    ii.   Write number patterns in different cards

    iii.   Arrange the cards to form patterns

    iv.   Read the number patterns

          a) 4   44   444

          b) 1   11   111

          c) 6   66   666

          d) 8   88   888

          e) 7   77   777

Activity 2: Write the missing number

    i.   Write number patterns on the board :30,40,50,60……………………..

    ii.   Ask learners whether the numbers are increasing or decreasing and by how many.

    iii.   Guide learners to identify the pattern and fill the remaining numbers up to 100

    iv.   Give more examples and in pairs, ask learners to identify the missing number in a sequence of numbers given.

    v.   Learners to give feedback in plenary

    vi.   Give formative feedback

Examples

a) 20,25, _____35____45,50

b) 35, 41, 47,53, _

c) 29, 38, 47,56, _

d) 550,500,450_____, _____

e) 1000,900,800, ____, _____

f) 900,890,880,870, _____,____

Concept 8: Fractions

A fraction tells the learner how many parts of a whole they have. Guide the learners to recognise, read and write fractions ½, ¼, 1/8 ,1/10 and 1/12 as part of whole.

Activity 1: Identification of fractions
i.   Provide the learners with a rectangular plain paper
ii.   Ask them to fold the paper into two equal parts
iii.   Introduce the concept of half
iv.   Ask the learners to fold the paper again into to equal parts to make ¼
v.   Guide children to identify the differences in sizes between the two folds.
vi.   Give more materials for practice e.g. an orange, a banana, paper cut outs of different shapes etc.
Example:
a) **A whole orange**
b). Two halves
b) **Four quarters**
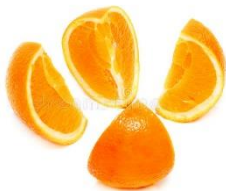
Activity 2

    i.   Use circular objects to draw circles.

    ii.   Colour the circles

    iii.   Draw a line to show equal parts

    iv.   Colour each part with a different colour

    v.   Ask the learners to fold/colour different shapes to learn on fractions

   vi.   Guide the learners on halves and quarters teaching fractions on to higher levels
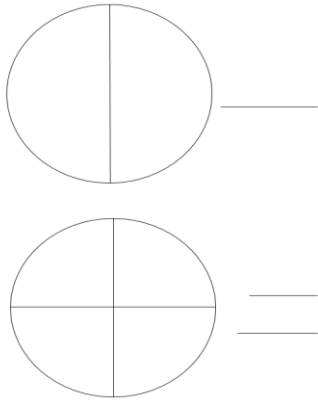
    v.   Draw the above and ask learners to say the fractions


Activity 2: Representation of fractions

    i.   Provide learners with flash cards with pictures with different fractions

    ii.   In small groups, ask children to discuss the pictures

    iii.   Ask learners to present their observation to the rest of the class

    iv.   Write their feedback on the chalkboard e.g ½,1/4,1/8 etc

    v.   Give formative feedback.

    vi.   Give the following for practice.

a) Write the fraction represented by the colours

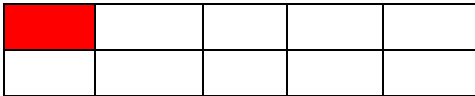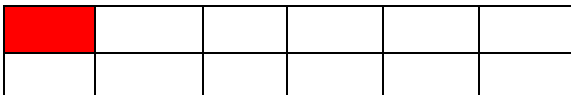|			

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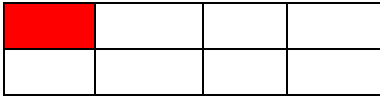
b)

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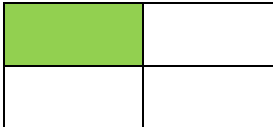
c)

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d)

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e)

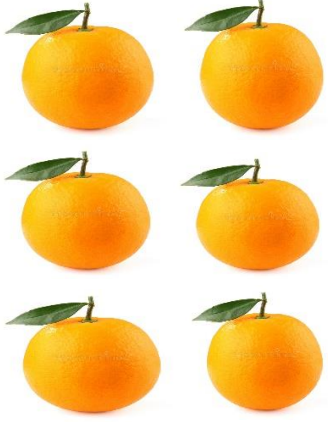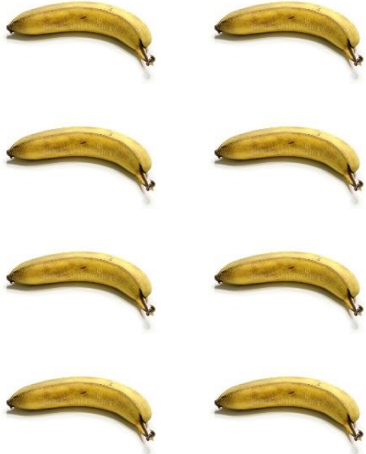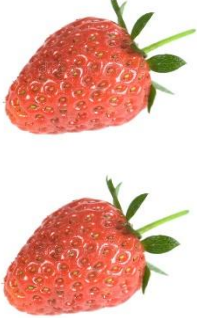|				

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Activity 3: Matching with its half.

    i.   Ask learners to collect different items in class; Expected items would be books, pens, pencils, rulers

    ii.   Guide learners to count the total number of items they have collected

    iii.   Ask the learners to put the items into two equal groups

    iv.   Tell them to count each item in each group to see whether they are equal

    v.   Guide them to understand the concept of half of the whole group

    vi.   Give the exercise below for practice

a). **Match the pictures below with its half**

	4
	1
	2
	3

Concept 9: Addition

Addition is one of the basic operation in mathematics. For the beginners, introduce addition as putting together. Once the learners have good mastery of sorting and grouping, number value and counting, acquisition of competencies in addition becomes easier. Learners need to understand basic addition to be able to handle more difficult concepts in Maths.

Specific Learning Outcomes

i. Add a 2- digit number to a 1-digit number without and with regrouping with sum not exceeding 100,

ii. Add a 2-digit number to a 2-digit number without and with regrouping, with sum not exceeding one hundred

iii. Add 3-single digit numbers up to a sum of 1000 with and without regrouping

Activity 1: Putting together

i. Ask learners to collect different items in class

ii. Let them group same objects e.g. exercise books together, pencils together, rubber together etc.

iii. Ask learners to mix the groups of items and count the total number of objects

iv. Give formative feedback

Activity 2: Counting on

i. Guide learners to understand that addition means counting on

ii. Write a sum on the chalkboard e.g. 23+5

iii. Guide the learners to count 5 steps from 23.
24,25,26,27,28

iv. Give more exercise for practice.

v. Give feedback

Activity 3: Use of a number line

This activity should be used to build on the activity 2 above

i. Draw a number line on the chalkboard or on the floor if visible

ii. Write the starting number and guide learners to count on the number of steps given

iii. Example. 51+5

	51	52	53	54	55	56	57

iv. The starting point is 51, guide learners to move 5 steps forward. The destination will be 56.51+5 therefore will be 56

v. Give more sums for practice and ask learners to practice in pairs

vi. Give formative feedback

Activity 4: Regrouping

Regrouping basically means carrying and borrowing using groups of tens

i. Write 17+4 on the chalk board

ii. Guide learners to identify ones and tens in 17 and in 4

iii. Draw bundle of 10 and 7 individual ones on the board

iv. Draw 4 individual ones

v. Ask learners to group all the ones together to form one group of 10s and 1 ones

vi. Guide them to identify that there are two groups of tens and 1 ones and therefore the answer is 21.

vii. Ask one learner to demonstrate how we can work 16+7 using regrouping method

Give more work for practice and give formative feedback


Teacher's Notes 1:

- Make it hands on: Learners should be actively engaged in the activity by letting them do the activities on their own
- Use visuals and concrete objects to enhance better understanding of the concept of fractions.
- Pay attention to individual abilities of the learners and give more attention to those lagging behind.
- Ask students to explain their ideas to check their understanding

**Activity 5 : Addition of numbers using spike abacus**

i) Organise participant in groups. Provide each group with spike abacus and a number card written 735 + 59.

ii) Ask the group to represent 9 as rings in the Ones spikes and 5 rings in the Tens spike as shown below.
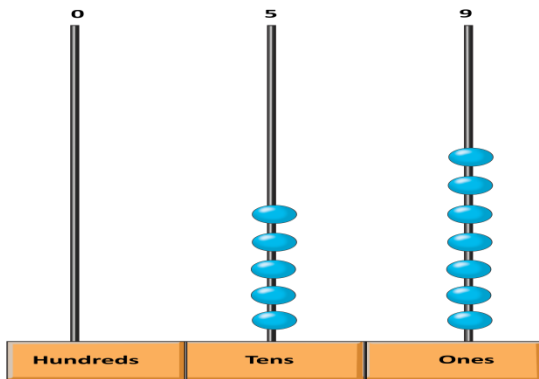
iii) Ask the participant to represent 735 as 5 rings in the Ones spike, 3 rings in the Tens spike and 7 rings in the Hundreds as shown below.
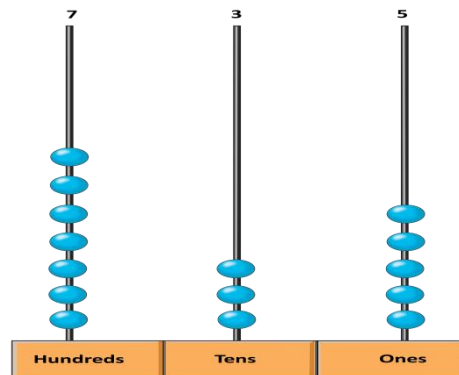
iv) Ask the participant to add 9 rings in the Ones spike to get 14 rings and add 5 rings to 3 rings in the Tens spike to get 8 rings
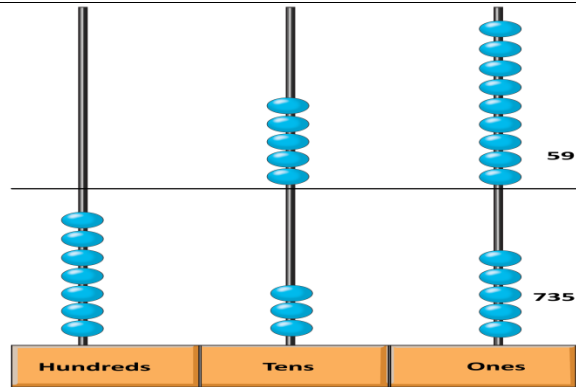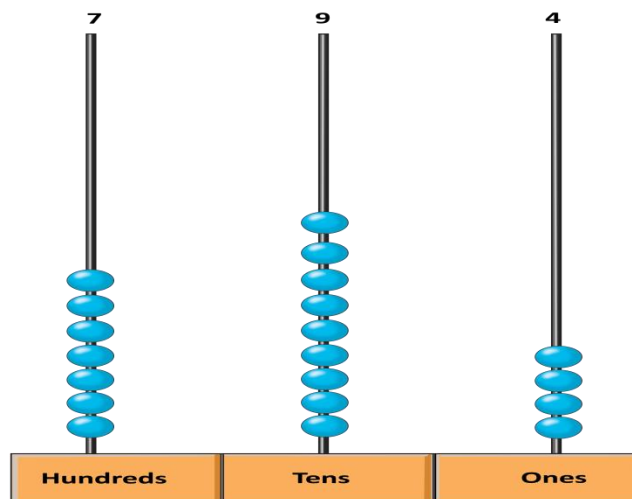
v) Ask them to regroup the 14 rings in the Ones spike as 1 Ten and 4 Ones
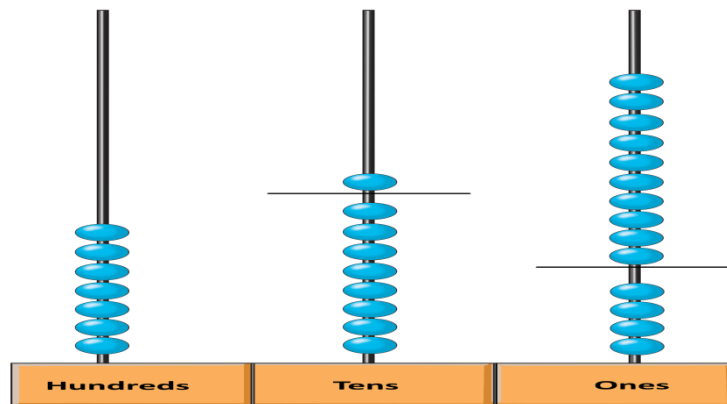
vi) Ask them to remove 10 rings from Ones spike to remain with 4 rings.
vii) Ask them to add 1 ring in the Tens spikes to get 9 rings to remain with 7 rings in Hundreds spike, 9 rings in the Tens spike and 4 rings in the Ones spike as shown below.
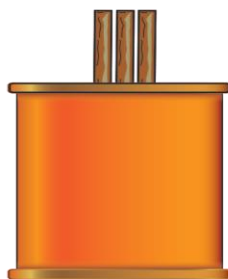
Activity 6: Using Place Value Tins

i) Organise participants in groups and provide each group with 2 set tins, counters and a number card written 538 + 325

ii) Ask them to represent 538 as 8 sticks in Ones tin, 3 sticks in Ten tin and 5 sticks in hundred tin

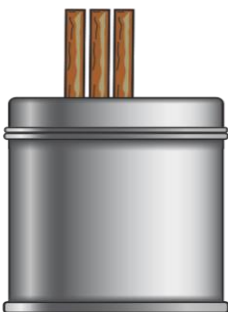Hundreds   Tens   Ones

iii) Ask them to represent 325 as 5 sticks in Ones tin, 2 sticks in Ten tin and 3 sticks in Hundred tin
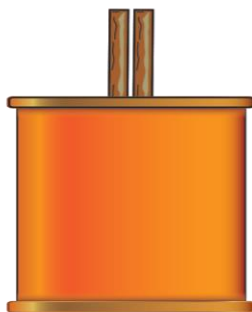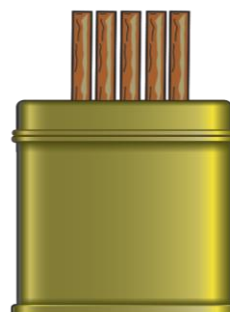
Hundreds   Tens   Ones

iv) Ask them to combine the sticks in the respective Ones, Tens and Hundreds tins
v) Ask them to count the sticks to get, 13 sticks in the ones tin, 5 sticks in the ten tin and 8 sticks in the hundreds tin
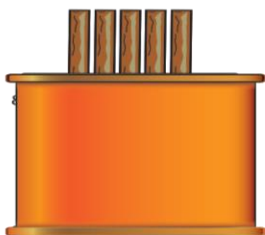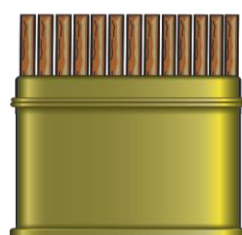
Hundreds   Tens   Ones

vi) Ask them to regroup 13 sticks in ones tin into 10 and 3 ones and replace the bundle of ten sticks with 1 and add it to the tens tin

Hundreds   Tens   Ones

vii) Ask them to represent the answer as 3 sticks in Ones tin, 6 sticks in Tens tin and 8 sticks in Hundreds tin as shown below.

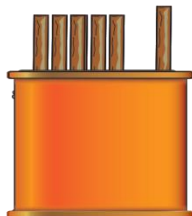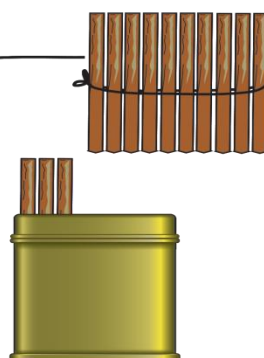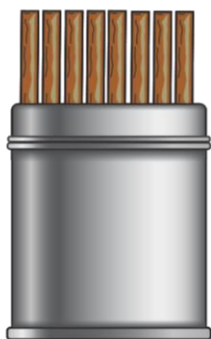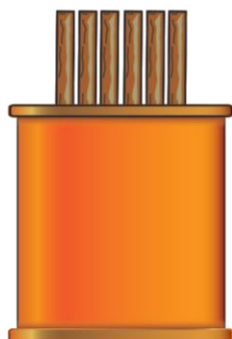Hundreds   Tens   Ones

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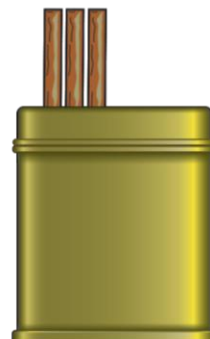
Activity 7: Breaking apart numbers

The prerequisite skills to use this strategy include the understanding that it is easy for learners to work with a ten. For learners to be successful with this activity, they need to know fact families of numbers from 1-10. In some instances, the knowledge of the fact that a number take away itself is zero is also very important.

i. Guide learners to see that working in 10s is easier.
ii. Give the following sum,16+9
iii. Ask learners to read the sum aloud
iv. Underline the number in the ones place (6) Break the number 9 into a number that when added to 6 will give a ten 16+4+5=
v. Work with pupils to repeat the process with 18+7=18+2+5

vi. Pupils to Practice breaking apart numbers using the following
 12+7
vii. Give formative feedback

Concept 10: Subtraction

Learners with a strong base of addition would not confuse addition and subtraction. Begin subtraction by introducing story problems and vocabulary. Learners need to know that you are ending with a smaller number. The question, "What is left?" should be continuously emphasized.

Specific Learning Outcomes

a) Subtract up to 2- digit numbers without regrouping,
b) Use the relationship between addition and subtraction in working out problems,
c) Work out missing numbers in subtraction of up to 2- digit numbers from a three-digit number.

Activity 1: Take away
i. Ask learners to collect different items
ii. Let them group similar objects
iii. Ask them to mix the groups and count the objects
iv. Guide them to take away objects of one group from the mix
v. Let them count the remaining number of objects in the mix

Activity 2: Counting backwards

    i.   Guide learners to understand that subtraction means counting backwards
   ii.   Write a sum on the chalkboard e.g. 17-6
  iii.   Guide the learners to count 6 steps backwards from 17
          e.g 16,15,14,13,12,11,
  iv.   Give more exercise for practice.
   v.   Give feedback

Activity 3: Use of a number line
Task 1.
This activity should be used to build on the activity 2 above
    i.   Draw a number line on the chalkboard or on the floor if visible
   ii.   Write the starting number and guide learners to count backwards the number of steps given
  iii.   Example. 56-4

        52   53   54   55   56   57
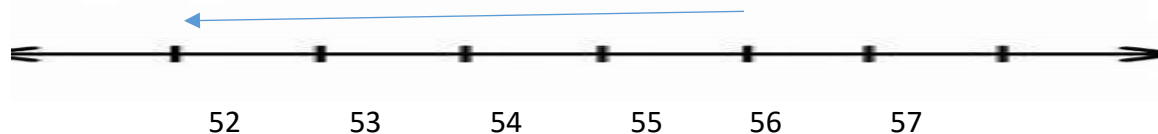
Task 2: Finding the difference
Example 9-4
Tell learners that they should start by locating the starting point in the number line 4
Guide the learners to locate number 9 in the number line which will be their final destination

Guide them to count the distance between the two points: "5, 6, 7, 8, 9."

The distance is five. Therefore, 9-4=5.

Activity 3: Introduce the concept of fact families

A fact family is a set of facts, or mathematical problems, that use the same numbers. There are three numbers in each fact family. These three numbers can be added or subtracted in different ways. For example, 10, 3, and 7 form a fact family. You can use these three numbers to create two addition number sentences and two subtraction number sentences:

10-3=7

10-7=3

7+3=10

3+7=10

Activity 4: Breaking apart numbers

The problems in this exercise should not involve borrowing.

   i.   Write the sentence on the board e.g **22-9**

   ii. Underline the number in the ones place in the big number that you are taking away from (this gives you a clue on how to break apart the next number)2**2**-9

   iii. Take away the same number (underlined) from the big number-this should give you a ten e.g 22-2

   iv. Take away the remaining number after breaking apart from the whole number that was created after subtraction. 20-7

   v.   Write the answer in the correct place.

Example: 22-7

First break down 9 into 2 and 7

Subtract 2 from 22which equals to 20

Take away 7 from 20 which equals 13

22-2-7=20-7=13

   vi. Learners to practice breaking apart in pairs

   vii. Ask one learner to model the concept of breaking apart on the board

   viii. Give formative feedback and more work for practice

Activity 5: Subtraction of 2 digit numbers from 3 digit numbers without borrowing
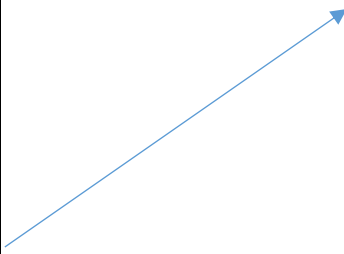
   i.   Write the sum on the board e.g 638-34

   ii. Guide learners to realise that 638 can be written horizontally as   638

                                                  -34

                                                _____

                                                _____

iii. Model to the learners to start subtracting from the ones, then tens and finally hundreds

iv. Give a sum for learners to work on in pairs e.g 777-74,546-21,628-21

v. Let them give feedback in plenary

vi. Give more exercise for practice and give feedback

Activity 6: Match the subtraction

i. Guide learners to match the subtractions below with the right answer

ii. Model the activity as below

iii. Let the learners workout the sum on a separate paper

iv. Give formative feedback

976-41=		201
628-21=		525
223-22=		935
546-21=		607
638-34=		604

v. **Extended work:** Give learners assignment for more practice

Suggested strategies for teaching for subtractions and additions

Use of Abacus   use of fact families

➢ Use of regrouping method

➢ Use of the place value tins

➢ Repeated additions

➢ Use of number line

Concept 11: Multiplication

Guide learners to see the relationship between addition and multiplication. Introduce multiplication as repeated addition.

Specific Learning Outcomes

By the end of the session, the learner should be able to: -

a) Represent multiplication as repeated addition.

b) Write repeated addition sentences as multiplication, using 'x' sign,

c) Multiply upto 3 digit numbers by 1, 2, 3, 4, 5 and 10.

Activity 1: Learning tables using the ladder method

      i.   Have a multiplication Chart

| X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

    ii.   Place the finger on the multiplication table and read it loudly and clearly.

    iii.   Ask 2-3 learners to read.

    iv.   Divide the class into groups and each group to read aloud as they point to the multiplication chart.

    v.   Ask learners to sit in small groups and practise with a small chart

Activity 2. Repeated counting/addition in groups

1. Ask the learners to count in groups of two, three etc

   Example 1.
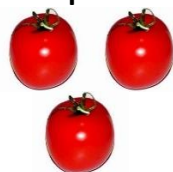
2. Have 3 tomatoes in 3 different groups
3. Ask learners to count the total number of tomatoes and say how many they are.
4. Draw three pencils in the four circles and say how many they are all together.
5. Use different counters for practice.
6. Help learners to see the relationship between 3x3=9 and the grouping and counting in the above.

Activity 3: Extended work

Fill in the missing numbers

X	1	2	3	4	5
1	1		3	4	
2		4			10
3	3		9	12	
4		8			20
5	5		15	20	

Task 3: Multiplication statements

Model to the learners how to write multiplication of numbers from statements

    a) 2 mangoes 4 times is = **2x4**

    b) 3 bottle tops 4 times is =

    c) 1 school bag times 8 is =

Activity 2: Multiplication of 2 digit numbers by 1-digit number

i)   Provide the learners with sticks/counters

ii) Demonstration of how to use counters or sticks to show repeated addition

iii) Ask them to use the sticks to work out the following multiplication questions:

    • 13 x 3 =

    • 21 x 7 =

    • 62 x 11=

iv) Ask the participant to explain their working steps in plenary.

Illustration 1:

Use bundles of sticks to show how to work out 13 x 3 = as follows:
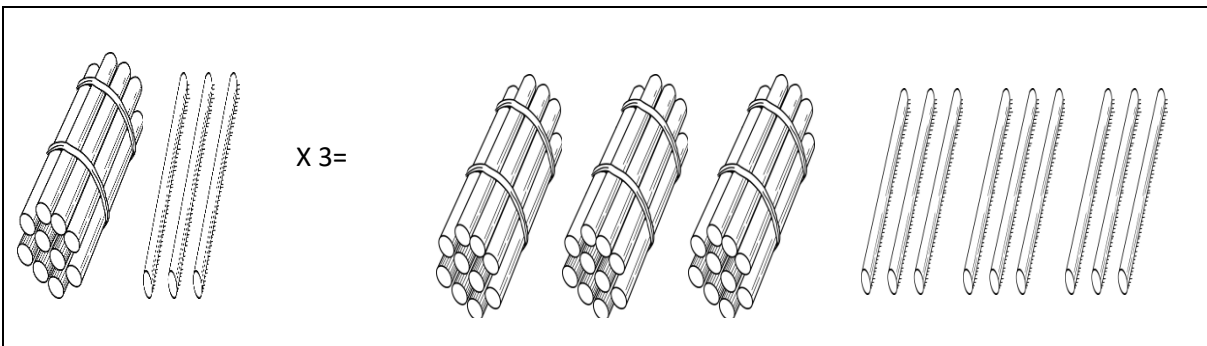
Concept 12: Division

Division should be introduced to learners as the idea of sharing equally. Division helps learners to conceptualize it by explaining how a number of items can be shared equally between groups. Guide learners to view division as taking away repeatedly and sharing equally with a given number.

Activity 1: Division of 2-digit number by a 1-digit number

i) Organize the learners in three groups and provide them with 36, 48 and 57 counters respectively.

ii) Ask them to arrange counters to show the following divisions as putting counters in groups or repeated subtraction:

- $36 \div 6 =$
- $48 \div 8 =$
- $57 \div 3 =$

iii) Ask each group to share with plenary how they have carried out their activity.

iv) Use $18 \div 3 =$ to show division as repeated subtraction.

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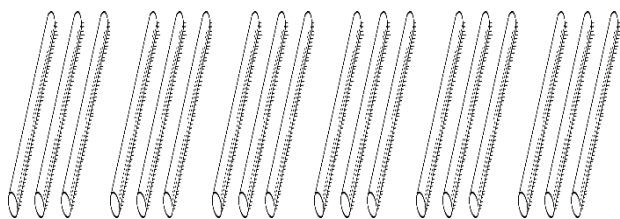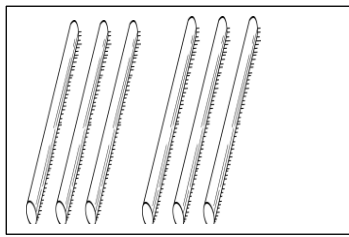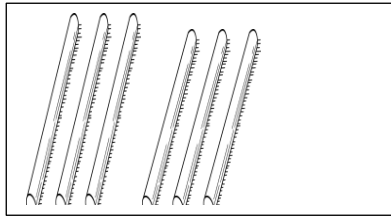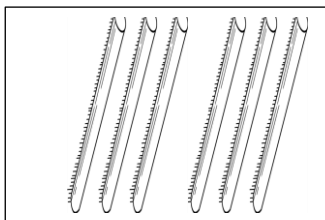
Activity 3: Story

i. Narrate a story to learners which involve division.

Example

Mother gave me 2 shillings. I bought 2 chocolates. I met 2 friends in school. I gave 2 chocolates to my 2 friends.

ii. Ask the learners how many chocolates did each friend get.

Activity 4: Word problems
    i.   Guide the learners to deduce information from word problems
    For Example
        1. A teacher has 20 pencils. He intends to share them equally among 5 pupils. How many pencils will each pupil get?
        2. A father bought 8 oranges for his 2 children. How many oranges did each child get?
    ii.   Guide learners to understand that the above word problem can be written as:20÷5 and 8÷2
    iii. Let learners do repeated subtraction until they get 0 at the end
    iv.   Ask them to count the number of 5 they have subtracted in the first statement e.g 20-**5**=15-**5**=10-**5** =5-**5**=0
    v.   learners can circle the 5s for easy identification
          20÷5=4

Activity 5: Equal sharing

   i.   Give a fixed number of beads to the learners

  ii.   Tell them to divide them equally among themselves a number of times until they are left with none.

 iii.   Ask them to count the number of beads each of them received.

 iv.   Each learner to say the number of beads a loud

Notes to the Teacher

1. Relate multiplication to addition which is termed as repeated addition.
2. Start with the multiples of zero example a classroom that has 25 chairs with zero learners sitting on each means that there are no learners in the classroom. Also 0 x 1 million= zero
3. Multiply by one. Emphasize to the learners that a number multiplied by one is equals to itself. For instance, one group of eight desks is eight desks.
4. Cover the multiplication table starting with the easy numbers i.e. teach the learners on how to use the chart and find products by following and matching the position of numbers using the vertical and horizontal axes. Example 12 x 12 chart, or 10 x 10 chart
5. Guide learners to realise that the order of factors doesn't change the answer. Example 8 x 2= 16 and 2 x 8 = 16

Suggested Teaching and Learning Methods
- working in groups
- working pairs
- Manipulating numbers and counters
- Demonstration of operations

Suggested Assessments Methods
- Assignments
- Question and answer
- Sample assessment rubrics

Learning Resources
- NFE syllabus

- NFE Teacher's Guides
- NFE Learner's Books
- Counters
- Manilla papers and felt pens.

UNIT 3: MEASUREMENT

Children should be exposed to the concept of measurement as it is important in their day to day life experience. In addition, it is always important to understand the units that are used for measuring items**.**

Specific Learning outcomes

By the end of the unit the learner should be able to:

a) Identify and use correctly units of measuring weight
b) Measure length of objects using metres and centimetres
c) Measure mass of objects using a beam balance
d) Measure different capacity of different liquids.

Concept 13: Money

Concept of money is very important. The teacher should encourage children to save money and what it means to save up for something. Learning about money also helps children to understand other mathematical concepts such as fractions and decimals in later grades.

Specific learning outcomes

By the end of the session, the learner should be able to;

1. Identify the various denominations of money
2. Apply the concept of money in their day to day life experiences
3. Solve problems involving money while buying and selling

Activity 1. Identification of money with different denomination

Task 1: Identification of coins and notes
i. Provide children with different coins. ii. Discuss with the children what they can see in the coins. iii. Guide them to identify names of the coins and their value iv. Ask children to sort and group the same coins together e.g. ksh.1, ksh. 5.ksh 10.ksh,20 and ksh. 40 separately.

> v. Guide children to order coins from the smallest to the biggest and from the biggest to the smallest.
> vi. Guide children to represent same amount of money in different denominations
> **Repeat the same for notes**

Task 2: Representing same amount of money in different denominations

i. Provide learners with different coins and different notes e.g. 5 coins of sh. 1

ii. Ask the learners to count the number of coins provided

iii. Guide the children to understand that 5 sh. 1 coins can be represented by 1 sh. 5 coins

iv. Repeat the above using different other coins for example 3 sh. 10 coins and 1 sh. 20 coin to represent 1 sh. 50 note.

Activity 2: Use of Money in trading

Task 1: Role play
i. Provide children with 20 shillings' coin
ii. Let one child to be a buyer and another one a seller
iii. Ask the 'buyer' to buy a book from the 'seller' which cost ten shillings
iv. Ask the buyer to tell you the amount of money he/she should give back to the buyer

This activity should be done progressively depending on the level of the learner

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This activity focuses on helping the learners as they use money on their day to day life experiences. Through this experiences, children will learn the money vocabulary in a natural way

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Task 2: Dialogue
i. Ask children to practice the dialogue below
Peter: Excuse me, how much are you selling the vegetables.
Jane: At fifty shillings each.

Peter: Please, may I buy them at thirty shillings.

Jane: Am sorry customer, the best price I can offer is at forty shillings.

Peter: kindly, give me your last price.

Jane: Take them at thirty-five shillings.

Peter: Thank you.

      ii.   Ask the children what they have learnt from the drama

      iii.   Guide them to understand what discount means

This activity should be done progressively depending on the level of the learners

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Task 3: Relating Money to goods and service

      i.   Provide learners with the following price list and ask them to read.

Items	Price in Ksh.	Items	Price in Ksh.
A dress	80	Pencil	20
A pair of shoes	100	A sweet	2
A bag	60	A packet of milk	50
A watch	50	A book	20

      ii.   Ask the learners to mention the total cost of certain items e.g. a rubber and a book

      iii.   Guide learners to list the items they should buy first

      iv.   Ask the learners to list the items they can do without and those they cannot do without

      v.   Discuss with the learners the reasons for the answer of the above question

      vi.   Emphasize on the need to prioritize and save money

Concept 14: Calendars.

In order to teach learners, the value of time they must also know about the passing of days. Calendars help everyone stay on track. They also allow one to look ahead on anticipated events and plan for them.

Activity 1: Calendar reading

Task 1: Discussion
i.   Discuss with the learners the public holidays in Kenya.
ii.   Ask learners to say the days of the week
iii.   Discuss how many days make a week
iv.   Guide the learners on writing the days of the week on the chalkboard
v.   Ask the learners to mention how many months make a year.
vi.   Discuss with the learners the months that have less days and more days.
vii.   Discuss on memorable events in their lives and indicate the dates
viii.   Guide the learners on creating a diary to keep track of their days.

Concept 15: weeks

Task 1: Discussion
• Create a short story on the days of the week.
Story
One **Monday** morning I went to the city to visit my father. The following day on **Tuesday** we went to the animal park. On **Wednesday** afternoon, we went to the market to buy vegetables. Then came on **Thursday**, he took me to a television station. **Friday** morning, I bought a newspaper and saw my picture on the paper. I was very happy. On **Saturday**, I washed the dishes and cleaned the house. On **Sunday** afternoon I went to my village.
• Guide the learners to mention the days of the week
• Write on the board the days of the week.
• Provide the learners with a chart with missing days of the week and ask them to fill in.

Concept 16: Months

| |
|---|
| • Discuss with the learners on activities they do during the year (this can be done in pairs or groups or a whole class discussion) |
| • Expected feedback would be: Ploughing, opening of the schools in the year, Planting, Weeding, closing of the schools in first, second and third term, Labour, Madaraka day, Harvesting, Beginning of short and long rains e.t.c |

- Ask the learners to fill in the blanks of the missing months.
- Guide the learners to rhyme of the months that have 30 days, 31days and the month that has an exception e.g leap year

Concept 17: Time

This session is to equip learners with knowledge on time, as it is an important aspect on our day to day lives. This helps one organize their activities well. This is essential to help in understanding on time zones and international times as well.

Task 1: Reading Time
i)   Organize the learners in pairs
ii) Display clocks with different time readings
iii) Ask them to discuss what time it is in different clocks and discuss the different hands of the clock.
iv) Ask participants to discuss AM and PM time of day using 12-hour clock
v)   Ask participants to discuss AM and PM time of day using 24-hour clock
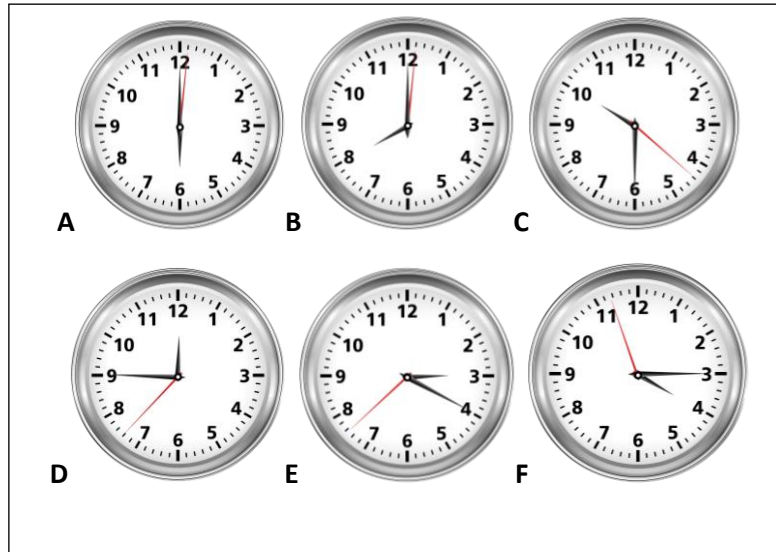
Facilitators Notes
Time is ongoing sequence of events taking place past, present and future.
A clock has three hands the second, minute, and the hour hand. The long and thin hand is the second hand, the long and thick is the minute hand while the short is the hour hand.

In the clocks above:

Clock	A reads	6:00 o'clock
	B reads	8:00 o'clock
	C reads	10:30 o'clock
	D reads	11:45 o'clock
	E reads	3:20 o'clock
	F reads	4:15 o'clock

Concept 18: Length

Length is an important area in mathematics because it helps the learners in development of comparative language which is revealed through understanding of the attributes of length. Its mandatory to teach the concept of length because learners need to develop appropriate language to describe what they see.

Task 1: Measuring length

i) Organize learners in small groups

ii) Provide each group with a string

iii) Let each group use the string provided to measure the length of a book, table and blackboard.

iv) Allow every group to give the comparison of the three lengths

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Task 1: Measurement of length

i) Model to the learners how to measure using blackboard ruler.

ii) In small groups guide learners to measure the length of their classroom, their desk, themselves etc. using the blackboard ruler and record the measurement in centimetres.

iii) Ask learners to give the measurement of the length of blackboard in terms of number of times they move the ruler.

iv) Learners can draw a table to record the measurements

Facilitators notes

Length is the most extended dimension of an object. It is distance from one end to the other end of an object. Length has two systems for measurement;

Suggested teaching and learning methods

Working in groups

Use of dialogue

Discussion

Group work

Suggested assessment methods

Observation

Question and answer

Learning resoures

Books

Stones

Pieces of wood

Beam balance

Item equivalent to 1 kg to use with the beam balance.

Items of same mass, beam balance