# Teachers' Guide for Numeracy Competence



#### Title: Teachers' Guide for Numeracy Competence

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#### Dear teachers,

We would like to thank you for implementing these new materials and teaching in Zambia. We appreciate your effort. The following four points are very important concepts for mathematics teaching and learning:

#### • To pay attention to children's understanding

We tend to judge if answers in mathematics are correct or not. On the other hand, children's thinking has a variety. Some have correct answers but they sometimes do not understand the concept we want to teach well. Others have incorrect answers but they have a very right way to do. Thus, we want value the process of children's thinking and operations in class. We value a lot of ideas from pupils from different angles.

#### • To expect children to grasp place values

We expect pupils to fully understand <u>place value system</u> using the material we developed. Before the place value, therefore, we would like them to understand <u>ones and tens</u> with concrete materials and after that we can reach the stage of understanding and operating numerals.

#### • To move from counting all to systematic ways of counting and calculating

We strongly value children's counting behaviours but not up to Grade 4. Young children gradually understand numbers by counting in nature and they do enjoy the counting activities. But let us strategically move from counting to see the systematic identification of numbers in teaching. Counting at the later stage, such as Grade 3 and 4 (even upper than them) may hinder children from calculating mentally or systematically. Let us expect children to explain HOW and WHY they move bottle tops and find the efficient way to calculate fast in mind in an economical way. The structured calculation will help children grow mathematically at the later stage of learning mathematics.

## • To respect Zambian culture, e.g. local languages, local available materials such as bottle tops, and YOUR creative mind

We strongly recommend that you could respect your Zambian culture and modify the teaching materials given, according to your classroom setting. Let us try something creative if you think it is suitable for this concept and context.

We hope that you and your children will be enjoying the activities!

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#### 1. Counting objects one by one, by groups, count forward and backward

#### **Objectives:**

The pupil is expected to:

- i. Count bottle tops
- ii. Say numbers upward from 1
- iii. Say numbers downward from 20

#### Materials used:

20 bottle tops



#### -1 Pupils' workbook p.1

1-1
<ol> <li>Ika tu pendelo tuli 20 munjila iliyonse pa desk. Tupenda kamozi kamozi.</li> </ol>
🗆 Na ichita!
<ol> <li>Ika tu pendelo tuli 20 munjila iliyonse pa desk. Tupenda tubili tubili na five five.</li> </ol>
🗆 Na ichita!
1

#### Guide for teachers:

Teacher places 20 bottle tops randomly and ask pupils, 'Count and tell me the number'. When s/he counts one by one correctly, ask 'Count in 2s' and 'Count in 5s'.

e.g.) 'Count one by one and tell me the number.'



### 2 Pupils' workbook p.2

}_∃ 1. Penda kufika pa 20. □ Na ichita!
2. Penda muma 2 kufika pa 20.
3. Penda muma 5 kufika pa 20.
2

#### Guide for teachers:

Teacher asks pupils 'count up to 20'. If it is too hard for them without concrete things, the teacher can tell 'You may use bottle tops for counting'. For those pupils who can tell numbers upward correctly without using any tools, teacher can ask 'count 2s and 5s up to 20'. (<u>Teacher may ask pupils</u> to do the activities in pairs)

#### -3 Pupils' workbook p.3

1



#### Guide for teachers:

Ask 'count down from 20'. If it is too hard for them without concrete things, the teacher can tell 'You may use bottle tops for counting'. For those pupils who can tell numbers upward correctly without using any tools, teacher can ask 'count 2s and 5s from 20 downward'. (<u>Teacher may ask pupils to do the activities in pairs.</u>)

	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 1-1	S/he makes a mistake in counting, 1, 2, 3, 4, or 5.	S/he can count correctly up to 5.	S/he can count one by one up to 20 s	S/he can count up to 20 in 2s or 5s	S/he can count up to 20 both in 2s and 5s
Activity 1-2	S/he cannot count numbers up to 10.	S/he tries to count numbers but failed to count up to 20	S/he can count numbers upward one by one.	S/he can count numbers upward up to 20 in 2s or 5s.	S/he can count numbers upward up to 20 both in 2s or 5s.
Activity 1-3	S/he cannot count numbers downward to 10.	S/he tries to count numbers downward but failed to count to 1.	S/he can count numbers downward one by one.	S/he can count numbers one by one downward to 1 says 2s or 5s.	S/he can count numbers one by one downward to 1 both 2s and 5s.

#### 2. Recognizing patterns and structure of numbers

Objectives

The pupil is expected to:

- i. Make original patterns on their own
- ii. See and identify the number of bottle tops in a structured way, e.g. 10+4, or 20-6
- iii. Imagine the frame of 10 in mind and place the bottle tops in such an order.

#### Materials used

- 20 white bottle tops and 20 red bottle tops
- Two 10-frames

#### Tasks:

2-1 Pupils' workbook p.4

2-1	
Konza	tupendelo tuli 10 twa white na twa red tuli 10 pa desk yako.
1. Pan	ga ka mu line ka nkhale na ka pattern kalikonse ka tupendelo twa red na twa
whi	te.
(Chi	sanzo)
•	$) \bullet \bigcirc \bullet $
2. Uzo	a banzako pattern yamene wapanga.
	4

#### Guide for teachers:

Teacher explains the patterns with bottle tops that we follow certain rule to make a line. Teacher can show a pattern using red and white bottle tops as below.



Teacher ask what kind of patterns there are in a line. After that, ask pupils to create any line with patterns. (Ask pupils to do the activities in pairs or groups of 4 or 5 pupils.)

Teacher should pick up some good and creative patterns of the line and show them to the class. Value different ideas in class.



Ko 1.	nza ka frame of 10 na tupendelo. Ika tupendelo tuli 7 pa ka frame of 10 uyambile ku left pa mwamba.
	Penaa tu penaelo <u>muma guu ya 5.</u> ≋Peza njila yopendelamo bwino na mwamusanga elo uza banzanko mwamene wapendek □ Na ichital
2.	Ika tupendelo tuli 9 pa ka frame of 10 uyambile ku left pa mwamba. Penda tu pendelo <u>muma gulu ya 5.</u>
	*Peza njila yopendelamo bwino na mwamusanga elo uza banzanko mwamene wapendek           Ima ichital
3.	Ika tupendelo tuli 8 pa ka frame of 10 uyambile ku left pa mwamba. Penda tu pendelo <u>muma qulu ya 5</u> .
	#Peza njila yopendelamo bwino na mwamusanga elo uza banzanko mwamene wapendek           Ima ichital
4.	Ika tupendelo tuli 6 pa ka frame of 10 uyambile ku left pa mwamba. Penda tu pendelo <u>muma gulu ya 5</u> .
	%Peza njila yopendelamo bwino na mwamusanga elo uza banzanko mwamene wapendek           Image: Na ichital         Image: Na ich
5.	Ika tupendelo tuli 10 pa ka frame of 10 uyambile ku left pa mwamba. Penda tu pendelo <u>muma qulu ya 5</u> .
	#Peza njila yopendelamo bwino na mwamusanga elo uza banzanko mwamene wapendek           Image:
	5

#### Guide for teachers:

Pupils places 7 bottle tops neatly, start from the left on top, on the 10-frame. (Teach children to place bottle tops at the upper left.)

Then, teacher tell 'Let's count the bottle tops using group of 5.' (Encourage pupils to find the better way to count fast and let pupils to tell their own way to friends.)

X Teacher should encourage children to explain their ways verbally to recognise the total number of bottle tops.

e.g.) There are group of 5, so 6 and 7.





#### Guide for teachers:

Pupils places 18 bottle tops neatly, start from the left on top, on the two 10frames. Then, teacher tells 'Let's count the bottle tops using group of 10.' (Encourage pupils to find the better ways to count fast and correctly, and let pupils to tell their own way to friends.)

## X Teacher should encourage children to explain their ways verbally to recognise the total number of bottle tops.

e.g.) There are one group of 10 and 8 more, so 18.

There are two groups of 10 so it is 20, 2 less is 18.



#### 2-4 Pupils' workbook p.7

1.	Kanas tu pendela huli 20. Tatalia tu pendela huli 20. 2012a benzanko motufakila.
2.	Konza tu pendelo tuli 14. Tantika tu pendelo mwamene uganizila tunga rikhalile pa ma frame of 10. @Uza banzanko motufakila. □ Na ichital
3.	Konza tu pendelo tuli 18. Tantika tu pendelo mwamene uganizila tunga nkhalile pa ma frame of 10. ⊕Uze banzanko matufakila. □ Na ichitel
4.	Konzo tu pendelo tuli 16. Tantika tu pendelo mwanene uganizila tunga nkhalile pa ma frame of 10. ⊕Uza banzanko matufakila.
5.	Ganiza tuma frame of 10 tubili. Pasala ma spaces yangati, ngati pali tu pandelo tuli 13' 19Uza banzanko motufakila.
6.	Goniza tuma frame of 10 tubili. Pasala ma spaces yangati, ngati pali tu pendelo tuli 17? @Uza banzanko motufakila. 7 Na ichital

#### Guide for teachers:

Students prepares 20 bottle tops. The teacher tells pupils 'Suppose there is a 10-frame and arrange the bottle tops in the imaginary 10-frames.' Let pupils practice different numbers, for example 14, 18, 16 etc. **%Let pupils tell how they arranged the number to friends.** 

After that, teacher ask pupils 'Imagine two 10-frames in your head. How many blank spaces are there?' Let pupils practice different numbers, for example 11, 13, 17, 18 etc. Let pupils tell how they arranged the number to friends.)

%Let pupils tell how they arranged the number to friends.

	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
	S/he cannot make	S/he makes a lines	S/he can make a	S/he can make a line with	Besides level 4, S/he can
Activity 2 1	any patterns.	without any pattern.	line with one by one	original patterns.	explain it
Activity 2-1			patterns or 1red and		
			white line.		
	S/he tries to	S/he makes a mistake	S/he can identify	S/he can identify the	Besides level 4, s/he can
Activity 2-2	count, but cannot	in counting.	the number by	number using any groups	explain by words.
2-3	do it completely		counting one by	or counting on from a	
	in some reasons		one.	certain number.	
	S/he cannot	S/he can place the	S/he can place the	S/he can place 20 bottle	Besides level 4, s/he can
A attivity 2 1	arrange the bottle	bottle tops but they are	bottle tops	tops correctly considering	explain verbally what s/he
Activity 2-4	tops	not placed structurally	structurally but not	frame of 10 (5×2).	has done.
		(place randomly)	$5 \times 2$		

#### 3. Composing and decomposing numbers

#### Objectives

The pupil is expected to:

i. Calculate by identifying the less than 10 bottle tops in a structured way and write the operation in the mathematical sentence.

#### Materials used

- 40 bottle tops
- Four 10-frames
- Paper (If it is needed)

#### Tasks

3-1 Pupils' workbook p. 8.

#### Guide for teachers:

3-1
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tutatu, ku side kwinangu ik tu pendelo tuli 9.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10.
Lemba ansa:
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tuli 4, ku side kwinangu ika tu pendelo tuli 7.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10.
Lemba ansa: Na ichital
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tuli 5, ku side kwinangu ika tu pendelo tuli 8.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10.
Lemba ansa:
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tuli 7, ku side kwinangu ika tu pendelo tuli 6.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10. 🗌 Na ichital
Lemba ansa:
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tuli 8, ku side kwinangu ika tu pendelo tuli 7.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10. 🗌 Na ichital
Lemba ansa:
<ol> <li>Konza tuma frame of 10 tubili. Ku side ku mozi ika tu pendelo tuli 6, ku side kwinangu ika tu pendelo tuli 9.</li> </ol>
Ganiza ngati tuli tungati tu pendelo pamozi muma gulu ya 10. □ Na ichital
Lemba ansa:
8

3-2 Pupils' workbook p. 9.

Pupils prepares two 10-frams. On one side, place 3 bottle tops and on the other side, place 9 bottle tops. Teacher asks pupils 'How many bottle tops are there altogether?', 'Choose the best and quickest way and tell me the answer.' and 'You may move the bottle tops and write something on the paper if you like to'. For fast learner, teacher also ask, 'Can you express what you did using number and mathematical sentence?'



%Teacher should encourage children to explain how they did verbally.

#### Guide for teachers:

Pupils prepare four 10-frams shown below. On one side, place 13 bottle tops and on the other side, place 19 bottle tops. Teacher asks 'How many bottle tops are there altogether?', 'Choose the best and quickest way and tell me the answer.' and 'You may move the bottle tops and write something on the paper if you like to'.



%Teacher should encourage children to explain how they did verbally.

3-3 Pupils' workbook p. 10.



#### Guide for teachers:

Pupils prepare two 10-frames shown below, and place 12. Teacher asks pupils 'How many bottles do you need to fill up to 20? and please explain the reason.'



%Teacher should encourage children to explain how they did verbally.

### 3-4 Pupils' workbook p. 11

3-4	
<ol> <li>Konza tuma frame of 10 tuli 4. Ika tu pende Ganiza ngati ufunika tu pendelo tungati kuti</li> </ol>	elo tuli 27. i tu kwane 40 muma gulu ya 10.
Lemba ansa:	🗆 Na ichital
<ol> <li>Konza tuma frame of 10 tuli 4. Ika tu pende Ganiza ngati ufunika tu pendelo tungati kuti</li> </ol>	elo tuli 24. i tu kwane 40 muma gulu ya 10.
Lemba ansa:	🗆 Na ichital
<ol> <li>Konza tuma frame of 10 tuli 4. Ika tu pende Ganiza ngati ufunika tu pendelo tungati kuti</li> </ol>	elo tuli 28. i tu kwane 40 muma gulu ya 10.
Lemba ansa:	🗆 Na ichita!
<ol> <li>Konza tuma frame of 10 tuli 4. Ika tu pende Ganiza ngati ufunika tu pendelo tungati kuti</li> </ol>	elo tuli 18. i tu kwane 40 muma gulu ya 10.
Lemba ansa:	🗆 Na ichita!
5. Konza tuma frame of 10 tuli 4. Ika tu pende Ganiza ngati ufunika tu pendelo tungati kuti	elo tuli 13. i tu kwane 40 muma gulu ya 10.
Lemba ansa:	🗆 Na ichita!
6. Nkhalani babili babili. Panga funso ili monga yapamwaba yo funsa n	nunzako.
	je j
1	11

#### Guide for teachers:

Prepare four 10-frams. Place 27. Ask 'How many bottles do you need to fill up to 40? and explain the reason.'

%Teacher should encourage children to explain how they did verbally.



	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
	S/he tells a wrong	S/he tells the	S/he can find an	S/he can find an answer	Besides level 4, s/he also
	answer that is	incorrect answers	answer by counting	by moving bottle tops	can explain with
Activity 3-1	beyond our	which are closed to	mentally or physically	or by using any groups.	mathematical expressions.
	expectations	the right answer	one by one from 1.		
	S/he tells a	S/he tells the	S/he can find an answer	S/he can find an answer	Besides level 4, s/he also
	wrong answer	incorrect answers	(32) by counting	by moving bottle tops	can explain with any
Activity 3-2	that is beyond our	which are closed to	mentally or physically	or by using any groups.	mathematical expressions.
	expectations	the right answer.	one by one from 1.		
	S/he tells a wrong	S/he tells incorrect	S/he can find the answer	S/he can find an answer	Besides level 4, s/he also
Activity 2.2	answer that is	answers which are	by counting mentally or	by counting on or by	can explain with
Activity 5-5	beyond our	close to numbers.	physically one by one	using any groups.	mathematical expressions.
	expectations		from 1.		
	S/he tells a wrong	S/he tells incorrect	S/he can find an answer	S/he can find an answer	Besides level 4, s/he also
Activity 2 1	answer that is	answers which are	by counting mentally or	by counting on or by	can explain with
Activity 5-4	beyond our	close to numbers such	physically one by one	using base 10.	mathematical expressions
	expectations	as 11, 12 or 14.	from 1.	-	by using base 10.

#### 4. Seeing numbers in terms of unit and relative size of numbers

#### Objectives

The pupil is expected to:

i. Identify the number of bottle tops by seeing the groups of 10 .

#### Materials used

- Five frames of 10
- 50 bottle tops
- Paper (If it is needed)

#### Tasks

4-1 Pupils' workbook p. 12

₩ Uza banzanko mu class mwamene wa ganizila.	🗆 Na ichita!
. Konza tuma frame of 10 tuli 5. Ika tu pendelo kuti tu Penda tu pendelo mu njila yamusanga musanga.	kwane 38.
$\ensuremath{\mathbbmm}$ Uza banzanko mu class mwamene wa ganizila.	🗆 Na ichita!
8. Konza tuma frame of 10 tuli 5. Ika tu pendelo kuti tu Penda tu pendelo mu njila yamusanga musanga.	kwane 26.
$\ensuremath{\ensuremath{\mathbb{K}}}$ Uza banzanko mu class mwamene wa ganizila.	🗆 Na ichita!

#### Guide for teachers:

Prepare five 10-frames. Fill 49 bottle tops and teacher asks 'Count the number of bottle tops as fast and correct as possible. You may write something if you want.' For those students who finished the activity, teacher asks 'Write the numeral of the number you got'.

\*Teacher let pupils share their own idea with friends.



	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 4-1	S/he tells a wrong answer that is beyond our expectations	S/he tells incorrect answers such as 48 or 50 which is near 49 by counting.	S/he can tell 49 by counting one by one from 1.	S/he can tell 49 quickly by using base 10 or counting on from a certain number or using groups.	Besides level 4 s/he can explain verbally using base 10.

Extra Activity 1

#### Objectives

The pupil is expected to:

i. count the objects using group of 10.

#### Materials used

- Any concrete material
- Students workbook

Tasks Pupils' workbook p. 13



#### Guide for teachers:

Teacher ask pupils 'Think about how to count these dots correctly as fast as possible. Let pupils notice that group of 10 is useful to count many things.

Also, teacher ask students to solve the exercise in the workbook.

#### %Let students notice the group of 10 is useful to count many things.



#### 5. Understanding the base ten numeration system

#### Objectives

The pupil is expected to:

- ii. see the numbers considering group of 10.
- iii. understand the position of a number on a number line.

#### Materials used

- Dot diagram
- Number line sheets

Tasks (Use pupils' workbook)

5-1 Pupils' work book p. 14



#### Guide for teachers:

Pupils tell the number of  $\bullet$  looking at the following diagrams. Teacher asks how pupils identify the number.



#### \*Teacher should encourage children to focus on groups of 10.

e.g.) The examples of pupils' responses are as follows:

'10+6=16', '10+5+1=16, 5+5+5+1=16, 20-4=16' Pupils do not necessarily use mathematical sentences, but they also can express the same thing verbally. Value the multiple answers from children.



#### Guide for teachers:

Pupils point out the number on the number line. Teacher asks how they identify the number and appreciates many ways of thinking.



e.g.) Let pupils point out "12" on the number line. The examples of pupils' responses are as follow: '10+2=12, 5+5+2=12, 15-3=12'.

Pupils do not necessarily use mathematical sentences, but they also can express the same thing verbally. Value the multiple answers from children. 5-2b Pupils' workbook p. 16



#### Guide for teachers:

Pupils surround the given total numbers of the dots on the sheet by focusing on the group of 10. Teacher asks pupils that how they identify the number and appreciate many ways of thinking.

#### \*Teacher should encourage children to focus on groups of 10.

e.g.) Let pupils surround total of "11". The examples of pupils' responses are as follows: '10+1=11, 5+5+1=11, 20-9=11, 20-5-4=11'.

Pupils do not necessarily use mathematical sentences but they also can express the same thing verbally. Value the multiple answers from children.



5-3a Pupils' workbook p. 17



#### Guide for teachers:

Pupils point out the number on the number line as below. Teacher distributes the sheet of number line for pupils and let them aware and utilize the numbers of benchmarks such as 5's and 10's in order to identify the number on number line.

e.g.) Locate the position of 77 on number line and let pupils explain their thinking.



#### 5-3b Pupils' worksheet pp. 18-19



5-3c Pupils' worksheet p.20

5-3c	
Circling'a aya ma number yama dots. Uza bar	nzako mwamene waganizila.
Chisanzo: 76	
(1) 54	(2) 80
	••••
(3) 98	(4) 79
	*****

#### Guide for teachers:

Pupils point out the number on the number line as below. Teacher distributes the sheet of number line for pupils and let them aware and utilize the numbers of benchmarks such as 0, 50, 100 in order to identify the number on number line.

e.g.) Locate the position of 58 on number line and let pupils explain their thinking.



#### Guide for teachers:

Pupils surround the given total numbers of dots on the sheet. Let pupils explain their thinking in the class. Different ways of thinking are appreciated, in order to develop the different way of grouping by using group of 5 and group of 10. All examples represent 76. There will be more different ideas.

X Teacher should encourage children not to count one by one and to explain their ideas in many different ways as shown in the example.

#### e.g.1)

Surrounding 76 in one-time



e.g.2)

76 as  $3 \times (5 \times 5) + 1$ 



5-3d Pupils' workbook p. 21



#### Guide for teachers:

Pupils surround a given total numbers of dots on the sheet. Let pupils explain their thinking in the class. Different ways of thinking are appreciated, in order to develop the different way of grouping by using group of 5 and group of 10. All examples represent 55. There will be more different ideas.

\* Teacher should encourage children not to count one by one and to explain their ideas in many different ways as shown in the example.

e.g.) Surrounding 55 in one-time



e.g.) 55 as 50+5.



	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 5-1	S/he tells a wrong answer that is beyond our expectations	S/he count the number one by one, however, miscounted in the middle of counting.	S/he can count the number one by one from 1.	S/he can find an answer by counting on from a certain number or using groups.	Besides level 4 s/he can explain by words.
Activity 5-2a	S/he tells a wrong answer that is beyond our expectations	S/he cannot indicate correctly, however the answer is close to 13.	S/he can indicate the number 13 by counting one by one from 1.	S/he can indicate the number 13 at glance or counting on from a certain number.	Besides level 4 s/he can explain by words.
Activity 5-2b	S/he tells a wrong answer that is beyond our expectations	S/he cannot count and surround the total of 13 dots, however the answer is close to 13.	S/he can surround the total of 13 dots by counting one by one from 1.	S/he can surround the amount of 13 dots by counting on from a certain number or using groups.	Besides level 4 s/he can explain by words.
Activity 5-3a	S/he tells a wrong answer that is beyond our expectations	S/he cannot indicate correctly, however the answer is close to 76.	S/he can indicate the number 76 by counting one by one from 70.	S/he can indicate the number 76 at glance or counting from 75	Besides level4, s/he can explain by words.
Activity 5-3b	S/he tells a wrong answer that is beyond our expectations	S/he cannot indicate correctly, however the answer is close to 76.	S/he can indicate the number 76 by counting one by one from 50.	S/he can indicate the number 76 at glance or counting from 50	Besides level4, s/he can explain by words.
Activity 5-3c	S/he tells a wrong answer that is beyond our expectations	S/he cannot count and surround the amount of 76 dots, however the answer is close to 76.	S/he can surround the amount of 76 dots by counting one by one from 1.	S/he can surround the total of 76 dots by counting on from a certain number or using groups.	Besides level 4 s/he can explain by words.
Activity 5-3d	S/he can count from 1 by corresponding to the bottle tops, however s/he cannot answer correctly.	S/he cannot count and surround the amount of 76 dots, however the answer is close to 76.	S/he can surround the amount of 76 dots by counting one by one from 1.	S/he can surround the total of 76 marbles by counting on from a certain number or using groups.	Besides level 4 s/he can explain by words.

#### (Number bond with dots) Extra Activity 2

#### Objectives

The pupil is expected to:

i. decompose numbers 2 to 10.



#### Tasks (Use pupils' workbook)

#### Pupils' workbook pp.22-24



#### Guide for teachers:

Teacher asks pupils to draw the dots to break down the number into 10-frame and pupils explain how it is broken down. Teacher may ask pupils that how to break down numbers which are not seen in the workbook such as 4, 8 and 9.

Avoid the blank one (which means 0). It is okay to write the combinations of e.g. 3 and 4, 4 and 3.



6 dots are broken down into 3 and 3.

6 dots are broken down into 4 and 2.

|--|

#### Objectives

The pupil is expected to:

ii. decompose numbers 2 to 10.

#### Tasks (Use pupils' workbook)

#### Pupils' workbook p. 25



#### Guide for teachers:

Materials used

- Workbook for students

Teacher asks pupils to break down the number on top and pupils explain how it is broken down. Teacher may ask pupils that how to break down numbers which are not seen in the workbook such as 8, and 9.

Avoid 0. It is okay to write the combinations of e.g. 3 and 4, 4 and 3.

e.g.)



10 is broken down into 1 and 9.

10 is broken down into 2 and 8.

10

10 is broken down into 3 and 7.

10

#### 6. Performing the four basic arithmetical operations

6.a Addition

#### Objectives

The pupil is expected to:

- i. 1-digit+ 1-digit
- ii. Addition of 2-digt number
- Materials used
- 20 bottle tops

#### Tasks



#### Guide for teachers:

Teacher shows 7 +4 and ask pupils to represent it <u>by using bottle tops</u>. Pupils explain the procedure and tell the sum. Teacher asks pupils to make 10 in the process of calculation. 4 bottle tops are broken down into 3 and 1. Then, 3 bottle tops move next to the 7 bottle tops to make 10. So, 10 and 1 is 11 bottle tops.



- e.g.1) Teacher shows 4 + 7 and ask students to represent it by bottle tops, explain the procedure and tell the sum.
- e.g.2) Teacher shows 9 + 3 and ask students to represent it by bottle tops, and explain the procedure and tell the sum.

After finishing above activities, ask pupils to do Pupils' work book p.26-27





#### Guide for teachers:

Teacher shows 7 + 4 and ask pupils to represent it <u>by using bottle tops</u>. Pupils write and explain the procedure and tell the sum. Teacher asks pupils to make 10 in the process of calculation.

- (1) 4 bottle tops are broken down into 3 and 1.
- (2) 3 bottle tops move next to the 7 bottle tops to make 10. So, 10 and 1 is 11 bottle tops.
- (3) Write the answer 11 in the mathematical sentence.



After finishing above activities, ask pupils to do Pupils' work book p.28-29

Teacher should encourage them not to count but to think for the calculation. So do not just let them write the answer but see the process of the calculations important.

Peza masamu aya, ugabanis	e namba imozi kuti ipange 10.		
$1 \frac{4}{13} + 7 = 11$	2) 6 + 7 =	3) 7 + 9 =	
4) 9 + 7 =	<sub>5)</sub> 9 + 8 =	6) <b>4</b> + 8 =	
7) 8 + 9 =	8) 7 + 8 =	<sup>9)</sup> 6 + 5 =	
10) 7 + 5 =	11) <b>6</b> + <b>9</b> =	12) 7 + 6 =	
13) 5 + 6 =	14) 9 + 6 =	15) 3 + 8 =	
Unga sanke illanse number yosenbenzesa mu ma sun.			
	51		

First, pupils decide which number should be divided to make ten. Next, they do the same steps as previous exercises.

\*Teacher asks pupils to draw the process of calculation according to the example.

\*Teacher should encourage them not to count but to think for the calculation. So do not just let them write the answer but see the process of the calculations important.

Rubric for a	assessment
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	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 6-a1	S/he cannot place bottle tops correctly.	S/he can place 7 and 8 bottle tops correctly but cannot answer correctly.	S/he can place 7 and 8 bottle tops and tell the sum by counting all.	S/he can place 7 and 8 bottle tops and tell the sum by manipulating bottle tops considering the groups.	Besides level 4, s/he can explain using base 10 by words.
Activity 6-a2	S/he used bottle tops, however could not answer correctly.	S/he can place 11 and 13 bottle tops correctly but S/he cannot answer correctly.	S/he can place 11 and 13 bottle tops and tell the sum by counting all bottle tops.	S/he can place 11 and 13 bottle tops and tell the sum by manipulating bottle tops considering the groups.	Besides level 4, s/he can explain using base 10 by words.

6-a,C Pupils' workbook pp. 30-31

2) 9 + 6 =

s) 9 + 5 =

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s) 9 + 8 =

11) 9 + 7 =

6 + 9 =

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3) 8+8 =

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6) 7 + 7 =

» 4 + 9 =

6 + 5 =

d0

(5) 7 + 9 =

18) 9 + 4 =

QQ

Q0

00

6-a, C

(5+6=11)

51

• 9 + 2 =

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#### Guide for teachers:

Teacher shows mathematical expression and asks pupils to think how to break down the number into two numbers in order to make 10. Pupils write the numbers in the given circles and explain the procedure for telling the sum.

(1) 6 is divided 1 and 5 to make 10. Write 1 and 5 in the circles.

- (2) 9 + 1 = 10
- (3) 10 + 5 = 15

(4) Write the answer 15 in the mathematical sentence.

6 = 15

6.s Subtraction

#### Objectives

The pupil is expected to:

- i. 1- digit 1-digt
- ii. Subtraction with 2-digt number

#### Materials used

20 bottle tops





6-s,A Pupils' workbook pp.32-33

#### Guide for teachers:

Teacher shows 13-4 and ask pupils to do following steps.

- (1) Prepare 13 bottle tops.
- (2) Think about how break down subtrahend in order to make 10 (3 and 1)
- (3) Take away 3
- (4) Take away 1
- (5) Write the answer 9 in the mathematical sentence.



After doing various exercises using bottle tops, ask pupils to do Pupils' work book p.32-33

#### 6-s,B Pupils' workbook p.34

6 - s, B			
Chisanzo: 12 - 3 = 8 2 - 1 12 - 2 = 10 10 - 1 = 9	Steps: D 3 niyogabanisina muma number yabili, imazi niyolembena yoyambilia( number 2), ela yasala(number 1). W Ku 12 ta chasaka 2 ku peza 10, ku 10 tachasaka 1 ku peza 9.		
Peza ma sum aya, ku lemb	a ma number mu malo mwamene mulib	oe.	
1) $13 - 4 =$ 3 - 3 = 10 10 - 1 = 9	2) $15 - 6 =$	3) $14 - 5 =$	
4) $12 - 4 =$	5) 11 - 3 =	6) $16 - 7 =$	
n 17 - 8 =	8) <b>11 - 2 =</b>	9) <b>12</b> - <b>3</b> =	
10) $11 - 4 =$	11) $14 - 6 =$	12) 13 - 6 =	

#### Guide for teachers:

Teacher asks pupils to calculate in the following steps.

- (1) 4 is divided 3 and 1 to make 10. Write 3 and 1 in the circles.
- (2) 13-3=10
- $(3) \quad 10-1 = 9$
- (4) Write the answer 9 in the mathematical sentence.



\*Teacher should encourage them not to count but to think for the calculation. So do not just let them write the answer but see the process of the calculations important.

#### 6-s,C Pupils' workbook p.35

6-s, C		
Peza masamu aya yochosela, na k	(ulembe mwamene wayipezela we	ka
1) $16 - 9 = 7$ 6 3 16 - 6 = 10 10 - 3 = 7	2) 15 - 8 =	<sub>3)</sub> 15 - 9 =
4) 14 - 9 =	<sub>5)</sub> 15 - 6 =	6) 14 – 8 =
7) 18 - 9 =	8) <b>13</b> – 8 =	<sub>9)</sub> 17 – 9 =
13) 15 - 7 =	14) 14 - 7 =	15) 13 - 8 =
16) <b>17</b> – 9 =	17) 18 - 9 =	18) 16 - 8 =
19) 12 - 4 =	20) 11 - 3 =	21) 16 - 7 =
	35	

#### Guide for teachers:

Teacher ask pupils to do by using same steps of 6-s,B.





After doing various exercises using bottle tops, ask pupils to do Pupils' work book p.36-37

\*Teacher should encourage them not to count but to think for the calculation. So do not just let them write the answer but see the process of the calculations important.





#### Guide for teachers:

Teacher shows 13-5 and ask pupils to do following steps.

(1) 13 is divided into 10 and 3. Write 10 and 3 in the circles.

(2) 10-5=5

- (3) 5 +3=8
- (4) Write the answer 8 in the mathematical sentence.



6-s,F	Pupils'	workbook	p.39
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6-s, F				
Peza masamu aya yochosela, na kulemba mwamene wayipezela weka.				
<sup>1)</sup> 14 - 6 =	<sub>2)</sub> 14 - 8 =	<sub>3)</sub> 14 - 5 =		
. 15 - 7 -	» 13 – 6 –	· 15 - 8 -		
4) 15 7 -	5) 15 0 -	6) 15 0 -		
× 12 - 5 -	» 15 — 9 —	11 − 9 −		
1) 12 5 -	8) 15 7 =	9) 11 9 -		
18 - 9 =	13 - 7 =	12 - 7 =		
10) 10 9 -	11) 10	12) 12		
13) 14 - 9 =	11 - 7 =	15) 13 - 8 =		
		10/ 20 O -		
	39			

#### Guide for teachers:

Teacher ask pupils to do by using same steps of 6-s,E



\*Teacher should encourage them not to count but to think for the calculation. So do not just let them write the answer but see the process of the calculations important.

	1. No at all	2. Partly implicit	<ol><li>Implicit</li></ol>	4. Structural	5. Advanced
Activity 6-s1	S/he used bottle tops, however could not answer correctly.	S/he can place the necessary number of bottle tops but S/he cannot answer correctly. Wrong answer/counting all.	S/he can place 15 bottle tops and remove 8 from them and counting all bottle tops, (Counting all)	S/he can place 15 bottle tops and remove 8 from them, tell the answer verbally by considering the groups.	Besides level 4, s/he can explain using base 10 by words.
Activity 6-s2	S/he used bottle tops, however could not answer correctly.	S/he can place the necessary number of bottle tops but S/he cannot answer correctly.	S/he can place 25 bottle tops and remove 12 from them and counting all bottle tops.	S/he can place 25 bottle tops and remove 12 from them, tell the answer verbally by considering the groups and place value.	Besides level 4, s/he can explain using base 10 by words.

6.m Multiplication

#### Objectives

The pupil is expected to:

- i. Multiply to see the numbers by group. Represent by numbers. Be able to calculate.
- ii. 2-digt  $\times$  1-digit, Emphasis on place value.

#### Materials used

– 20 bottle tops

6-m1 Pupils' workbook p.40



#### Guide for teachers:

Teacher shows  $2 \times 3$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.



XAsk students to consider not by counting all but by using groups. Teacher should not allow children to circle the dots vertically in this particular case, otherwise the order of multiplication will be changed which makes me more complicated in teaching.

(e.g.1) Teacher shows  $4 \times 2$  and ask students to represent it by bottle tops.

Explain the procedure and tell the answer.

(e.g. 2) Teacher shows  $3 \times 6$  and ask students to represent it by bottle tops.

Explain the procedure and tell the answer.

After finishing above activities, ask pupils to do Pupils' work book p.40

#### 6-m2 Pupils' workbook p.41



#### Guide for teachers:

Teacher shows 12  $\times$  3 and ask students to represent it by bottle tops, explain the procedure and tell the answer.

\* Ask pupils to calculate considering place value.  $3 \times 2$  is equal to 6' and  $3 \times 10$  is equal to 30'. Therefore, the answer is 36. Teacher should not allow children to circle the dots vertically in this particular case, otherwise the order of multiplication will be changed which makes me more complicated in teaching.



 $3 \times 2 = 6$ 

(e.g.1) Teacher shows  $13 \times 3$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.

(e.g. 2) Teacher shows  $14 \times 2$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.

After finishing above activities, ask pupils to do Pupils' work book p.41

	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 6-m1	S/he used bottle tops, however could not answer correctly.	S/he can place 6 bottle tops in groups but S/he cannot answer correctly.	S/he can place 6 bottle tops in groups and tell the answer verbally by counting. (Counting all)	S/he can place 6 bottle tops in groups, and tell the answer verbally the groups.	Besides level 4, s/he can explain using base 10 by words.
Activity 6-m2	S/he used bottle tops, however could not answer correctly.	S/he can place 12 bottle tops in 3 rows, but S/he cannot answer correctly.	S/he can place 36 bottle tops and tell the answer verbally by counting.	S/he can place 36 bottle tops in groups, and tell the answer verbally the groups and place value.	Besides level 4, s/he can explain using base 10 by words.

#### 6.d Division

Objectives

The pupil is expected to:

- i. see the numbers by group, represent by numbers, and be able to calculate'.
- ii. 2-digt  $\div$  1-digit, Emphasis on place value'.

#### Materials used

20 bottle tops

#### Tasks

6-d1 Pupils' workbook p. 42

6-d1				
Chienze:	Mochitila/Vokonka: (i) Lemba masamu (2) Ma dot yali 12 niyogabanisiwa muma gulu yabili elo group imozi ili na ma dot yali 6. Mwaicho, 12 + 2=6			
Lemba masamu.				
(1)	(2)			
	000000000			
$10 \div 2 = 5$	÷=			
(3)	(4)			
0000000000000	00000000			
÷=	÷=			
(5)	(6)			
00000000	00000000000			
÷=	÷=			
Drawinga tupendelo kulangiza masamu aya.				
(1)	(2)			
8 ÷ 2 =	$10 \div 5 =$			
	42			

#### Guide for teachers:

Teacher shows  $8 \div 2$  and ask students to represent it <u>by bottle tops</u>, explain the procedure and tell the answer.



- e.g.) Teacher shows  $6 \div 3$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.
- e.g.) Teacher shows  $9 \div 3$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.

After finishing above activities, ask pupils to do Pupils' work book p.42





#### Guide for teachers:

Teacher shows  $36 \div 3$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.

\* Ask students to calculate considering place value. ' $30 \div 3$  is equal to 10' and ' $6 \div 3$  is equal to 2'. Therefore, the answer is 12.



- e.g.) Teacher shows  $24 \div 2$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.
- e.g.) Teacher shows  $48 \div 4$  and ask students to represent it by bottle tops, explain the procedure and tell the answer.

After finishing above activities, ask pupils to do Pupils' work book p.43

	1. No at all	2. Partly implicit	3. Implicit	4. Structural	5. Advanced
Activity 6-d1	S/he used bottle tops, however could not answer correctly.	S/he can place 8 bottle tops, however could not answer correctly.	S/he can place 8 bottle tops and find the answer by dividing one by one. S/he can say the answer instantly but failed to express it with bottle tops.	S/he can place 8 bottle tops 2 by 4 in order, and tell the answer verbally.	Besides level 4, s/he can explain using base 10 by words.
Activity 6-d2	S/he used bottle tops, however could not answer correctly.	S/he can place 30 bottle tops, however could not answer.	S/he can find the answer by dividing one by one. S/he can say the answer instantly but failed to express it with bottle tops.	S/he can divide the 30 bottle tops by using group of 5 or 10.	Besides level 4, s/he can explain by words.