ESSENTIAL
Mathematics
Kindergarten 2

Teacher's Guide

Adwoa Nkrumah

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Introduction

RATIONALE

The rationale for the Kindergarten Curriculum is to provide through play and use of creative learning and teaching approaches, positive learning experiences to learners at this level so as that they are ready for school. The first eight years in a child's life are the formative and the most critical years and require that the learning to which they are exposed are appropriate in enhancing their curiosity, creativity and critical thinking. The kind of physical and psychological environments that are created, the interactions and the experiences adults have with learners influence and have lasting effects on them. At this stage the child requires basic needs like nutrition, warmth, health, security, interaction and stimulation for social, emotional psychological, physical and cognitive development. It is during this stage that the child establishes learning patterns, attitudes, personality and a sense of being. Learners generally learn by practice and this is done naturally and best through play. They are very active, curious, and explorative and enjoy listening to stories. This natural tendency should be the basis for designing teaching and learning programmes for young learners.

Since learners learn better in a positive learning environment, where they feel emotionally and physically safe to enjoy learning (play-based learning). This curriculum has at its heart practices essential for motivating learners to attend, stay in school and perform better socially and academically. An integrated, inquiry and discovery approach to teaching and learning will foster caring, supportive and committed relationships between teachers and learners, as well as between learners and their peers. Teachers become more confident in their practice, feel trusted by learners, and can develop better classroom management and positive discipline practices. Play-based learning further helps to develop the inherent potential of learners as well as their critical thinking and imagination skills.

PHILOSOPHY

The Kindergarten learning curriculum is informed by three main philosophical ideas namely Brain research, Developmental theory and Social Constructivism. Firstly, the learner's brain from birth to ages eight undergoes maximum development. During this developmental period, the young child's brain is extraordinarily active, developing very fast, and this is the optimal time for learning and development for life. Early years are critical and very important because the experiences a child encounters at that period have a decisive impact on the development of connections in the brain. During this critical and "sensitive period" of the early years, the child develops language and literacy skills, physical, psycho motor, cognitive, emotional control and interpersonal social skills. It is important for every growing child to be exposed to learning experiences that are positive, appropriate and holistic instead of fragmented and compartmentalised.

LEARNING PHILOSOPHY

Developmental theories affirm that learners go through distinct and unique stages in their development as they move through their early years. Every child is very unique and develops

at their own pace. In language and cognitive skills development, learners go through different stages that are unique. This curriculum identifies the individual differences and variability in a child's development and affirms that the differences would not be seen as deficits or weaknesses, but rather rich and appropriate developmental experiences to help them bridge home and school experiences. This curriculum ensures that classroom experiences are made rich and activities are developmentally appropriate to cater for the different and unique stages.

Further, the current curriculum relies on social constructivist philosophical notions which emphasise that learners learn better when they are actively involved in their own learning: Learning is a social and interactive process. Learners learn better when they interact and share ideas with adults and other knowledgeable peers around them. The typical characteristics of the learners at the early years is that they are active, explorers, builders, also extremely curious and thus learn best when they are involved actively in their own learning process. For such learners, learning and play are inextricably linked and as learners play and interact with their friends, they learn better.

Finally, to promote high quality learning, that is functional, meaningful, and authentic, the growing child needs a safe, warm, nurturing, and welcoming physical, social, emotional and psychological environment. This is vital because research affirms that the type of environment created for the child is key to their successful development and a brighter future.

LEARNING OUTCOMES

Learning outcomes are grade specific. They describe, in observable and measurable terms, what learners must be able to demonstrate, with respect to each of the content standards, to meet grade level expectations.

The learning outcomes for each content standard become progressively more complex as learners move up the grade levels. This is done to ensure that learners become increasingly more proficient in their understandings and their use of these understandings as they move through the grade levels.

It should be noted that learning outcomes define what learners should understand and be able to do. They do not define teaching methods. Teachers are free to select the instructional strategies they feel are most appropriate for ensuring that learners can meet the learning outcomes.

It should be noted that in early primary, learner's learning is focused around a limited number of content standards. By Basic 3, however, learners are expected to be developing understandings with respect to all five standards.

Use of subheadings within content standards

Learning outcomes for a given content standard have sometimes been grouped together under subheadings. For example, the learning outcomes for Standard 1 Number and Number Sense have been grouped under three subheadings:
- Counting
- Representing number quantities in different ways
- Describing relationships between number quantities.

Example of "clustered" learning outcomes, P1

1. Learners will demonstrate a conceptual understanding of addition and subtraction by:
   - Acting out a given story problem presented orally.
   - Indicating if the scenario in a story problem represents an addition or a subtraction and justifying the answer.
   - Creating a story problem for subtraction or addition or for a given number sentence (+ and – within 20).

This has been done to enable teachers to quickly identify the important components of the standards in question.

Use of clustered learning outcomes

To help teachers make connections across learning outcomes within a given standard, this method can be used. In many cases, related learning outcomes have been "clustered", i.e. grouped together under a key idea. The use of clustered learning outcomes allows teachers to quickly recognise the different related understandings or skills learners need to develop in order to achieve full understanding of a key idea.

Order of learning outcomes within a content standard

The content standards themselves, and the learning outcomes for a given content standard, are not necessarily organised sequentially. For example, just because learning outcome A comes before learning outcome B does not mean that learning outcome A should be addressed before learning outcome B. Teachers might want to address learning outcome B before learning outcome A, or address the two learning outcomes at the same time.

The illustrative term and weekly schemes of work provided in this guide serve as examples of how teachers might organise learning for a given grade level.

PERFORMANCE STANDARDS

Although all the learning outcomes for a grade level are important and learners are expected to be able to demonstrate their ability to meet the learning outcomes for their grade level, it is not always feasible to assess and report on learner's progress with respect to each individual learning outcome. At the same time, district officials, head teachers, teachers and parents need to be assured that learners are developing the minimal levels of competency required to be successful in subsequent grade levels. To meet this need, the standards based curriculum defines a series of end of year performance standards for each grade level. Performance standards identify the key learning's that learners must be able to demonstrate, by the end of the school year, if they are to be successful in subsequent grade levels.

The number of performance standards varies by grade level. At some grade levels performance standards have been identified for all five content standards. At other grade levels, in addition to the end of year performance standards intermediary term-specific performance standards have been established. This is done to provide all stakeholders with a clear indication of the pace of learning required to meet end of year performance standards.

Content standards define the five essential learnings for primary mathematics. They describe the overall goals that learners are working towards.

Learning outcomes describe the specific understandings or skills learners must be able to demonstrate, at each grade level, with respect to each of the content standards.

Performance standards are the key measures that stakeholders can use to determine whether learners at a given grade level are progressing as expected.

ASSESSMENT TASKS

Assessment tasks are simple problems or tasks that district staff, head teachers or classroom teachers can use to measure whether learners have met the standards described in the performance standards. Each task has a simple-to-interpret scale to allow teachers to determine whether a given learner is performing at, below or above expectations for their grade levels. Assessment tasks are included for the end of year performance standards.

WHAT'S IMPORTANT IN KG2

Young children are naturally curious and develop a variety of mathematical ideas before they enter Kindergarten. Children make sense of their environment through observations and interactions at home, in daycares, in preschools, and in the community. Mathematics learning is embedded in everyday activities, such as playing, reading, beading, baking, storytelling and helping around the home.

Activities can contribute to the development of number and spatial sense in children. Curiosity about mathematics is fostered when children are engaged in, and talk about such activities as comparing quantities, searching for patterns, sorting objects, ordering objects, creating designs and building with blocks.

Positive early experiences in Mathematics are as critical to child development as are early literacy experiences.

In KG2, teaching time focuses on two critical areas:

1. Representing, relating and operating on whole numbers (to 10), initially with objects and eventually with symbols.

    Learners use numbers, and eventually written numerals, to represent quantities and to solve problems involving counting objects (counting out a given number of objects, comparing groups of objects, comparing numerals, joining groups of objects together and counting how many altogether, removing objects from a group and counting how many are remaining.) Although learners may see the teacher write an equivalent addition or subtraction equation for actions of joining or separating groups of objects. Learners in KG2 do not write equations.

    In KG2, learners solve problems daily that involve counting and producing groups of given size, counting the number of objects in combined groups, or counting the number of objects that remain after some have been taken away, and explain how they went about solving the problem.

2. Describing shapes and their position in space.
    Learners describe their physical world using geometric ideas and vocabulary. They name and describe three-dimensional shapes,

such as cubes, cones, cylinders and spheres, and two-dimensional shapes such as squares, circles, triangles and rectangles. They recognise two-dimensional shapes presented in a variety of ways (different sizes and orientations).

[More time in KG2 should be devoted to number than to other content standards. Number and number operations should be the focus of 70 to 80 percent of the teaching time.]

EXPECTATIONS OF KG2 MATHEMATICS LEARNERS

If teachers focus on the two critical areas of the KG2 curriculum, and if they implement the types of learning activities described in the revised syllabus, KG2 mathematics learners will have strong conceptual and procedural understandings of foundations of math and be able to meet the specified standards in the curriculum enlisted below:

CONTENT STANDARD (CS1) NUMBER AND NUMBER SENSE
- Solve problems involving counting or comparing groups of up to 5 objects
- Read and write numerals to 5
- Represent quantities up to 5 in multiple ways
- Identify number that are 1 more than or less than numbers up to 5

CONTENT STANDARD (CS2) NUMBER OPERATIONS
- Use counters to solve addition and subtraction problems.

CONTENT STANDARD (CS3) PATTERNS AND RELATIONSHIPS
- Sort small collections of objects into groups by a single feature (size, colour, shape)

- Identify the sorting rule used to sort a small collection of common objects

CONTENT STANDARD (CS4) SHAPE, SPACE AND MEASUREMENT
- Use everyday language to describe common 3D shapes.
- Use direct comparison to compare the length, mass, or capacity of common objects; order a collection of objects by their length, mass or capacity.
- Describe the position of objects using simple language like "beside, next to, under, on top of, etc."

TEN EXPECTATIONS OF KG2 TEACHERS

If learners are to meet the expectations of the KG2 syllabus, teachers will need to:

1. Use concrete objects effectively and accurately (accurate physical models) in the classroom so their learners develop strong conceptual understandings of counting up to 10, and of basic addition and subtraction, and be able to connect their understandings of procedures for basic operations.

2. Have all learners use concrete objects to explore math concepts or solve math problems each day, (as opposed to watching the teacher use them). This means ensuring that each child comes to class with a collection of counters to use for counting or for solving problems.

3. Manage concrete objects effortlessly. Teachers need to put in place classroom management strategies to ensure the learners stay focused on learning when using concrete objects.

4. Develop learners' mental math skills by devoting 5 minutes at the beginning of each class to the development of mental math games and activities linked to the learning outcomes of the curriculum; for example:
    • Counting quickly from 1 to 10.
    • Quickly naming a numeral from 1 to 10 when they see it.
    • Quickly identifying the number of objects in a group of 1-5 objects without counting them.

5. Encourage inquiry and mathematical reasoning by:
    • Providing learners with rich tasks or problems to explore
    • Encouraging them to represent their understandings in different ways.

6. Encourage math talk in the classroom by having learners share their thinking or how they got solutions, inviting them to comment on the thinking of others and having learners work in pairs to explore math ideas or solve problems.

7. Talk and do less than the learners. Teachers need to listen more. Spend more of the time in the classroom having the child explain or do (as opposed to teacher explaining or doing), or having them work with a partner to figure things out.

8. Have learners use math textbooks and notebooks every day. Teachers need to ensure that their learners have a dedicated notebook for Mathematics and give them problems or questions to do in their notebook each day (either from the textbook or the board or with the support of a partner, if necessary) that require them to apply or practice understandings. Teachers also need to walk around and check what learners write in their notebooks.

9. Pace learning appropriately, both during class time and in monthly, weekly and term plans by following the proposed term and weekly schemes of work.

10. Create a classroom learning environment that
    • Communicates to learners that their teacher likes mathematics;
    • Communicates to learners that they have the ability to be successful math learners
    • Fosters risk taking by not punishing or demeaning learners who makes mistakes,
    • Fosters an enjoyment of mathematics by:
        * Encouraging all learners, regardless of their abilities.
        * Providing opportunities each week for strong learners to work with and support struggling learners, and reward them for doing so.
        * Providing opportunities each week for strong learners to work together, while teacher/facilitator works with struggling learners.

CORE COMPETENCIES
Core competencies describe a body of skills that teachers at all levels should seek to develop in their learners. The competencies presented here describe a connected body of core

skills that are acquired throughout the processes of teaching and learning. Core competencies include the following:

Critical thinking and Problem solving (CP)

Developing in learners' cognitive and reasoning abilities to enable them to analyse and solve problems. Learners will be able to analyse and find solutions to problems using their own experiences. This will allow learners to embrace the problem and take responsibility for their own learning.

Creativity and Innovation (CI)

This competency will help learners to develop entrepreneurial skills that require imagination, (ingenuity of ideas, arts, technology and creativity. Learners will be able to think independently and create solutions to address problems.

Communication and Collaboration (CC)

Learners will be able to use languages, symbols and texts to exchange information about themselves and their experiences. Learners will actively participate in sharing ideas and engage in dialogues. This will be able to boost their listening and speaking skills. They will also learn to listen, respect, value other people's views and be able to work together with their peers.

Cultural identity and Global Citizenship (CG)

This competency grooms learners to put country and service first by making them understand what it means to be active citizens, inculcating in them a strong sense of environmental, social, and economic awareness, with emphasis on protecting the environment. Learners make use of the knowledge, skills, attitudes acquired to contribute effectively towards the socioeconomic development of the country and on the global stage. Build skills to critically analyse cultural trends, identify and contribute to the global world.

Personal Development and Leadership (PL)

Improving self-awareness, health, building self-esteem; identifying and developing talents, skills, of self and dreams and aspirations. It involves recognising the importance of values such as honesty and empathy; seeking the well-being of others; distinguishing between right and wrong; fostering perseverance, resilience, and self-confidence; exploring leadership, self-regulation and responsibility, and developing love for lifelong learning.

Digital Literacy (DL)

Developing learners to discover, acquire and communicate through ICT to support their learning and make use of digital media responsibly.

SUGGESTED TIME ALLOCATION

On an average two to three hours per sitting, depending on the age and level of learners, each period consisting of thirty minutes, is allocated to the teaching relevant physical play-based activities with equal participation, co-ordination of each learner to develop their cognitive skills at the preschool level.

Rhymes and songs

I'm counting one
I'm counting one, what is one? one is one alone, alone it shall be.
I'm counting two, what is two? two pair, two pair, Come pair, let us pair, one is one alone, alone it shall be.

I'm counting three, what is three, **"three is turn around",** two pair, two pair come pair, let us pair, one is one alone, alone it shall be.

I'm counting four, what is four, **"four is follow me",** three is turn around, two pair two pair come pair let us pair, one is one alone, alone it shall be.

I'm counting five what is five, **"five is fire",** four is follow me, three is turn around, two pair, two pair come pair let us pair, one is one alone, alone it shall be.

I'm counting six, what is six, **"six is sister",** five is fire, four is follow me, three is turn around, two pair, two pair come pair let us pair, one is one alone, alone it shall be.

I'm counting seven, what is seven, **"seven is savior",** six is sister, five is fire, four is follow me, three is turn around, two pair, two pair come pair, let us pair, one is one alone, alone is shall be.

I'm counting eight, what is eight, **"eight is "eat more fruits",** seven is savior, six is sister, five is fire, four is follow me, three is turn around, two pair, two pair come pair, let's us pair, one is one alone, alone it shall be.

I'm counting nine, what is nine, **"nine is Nana Yaw",** eight is eat more fruits, seven is savior, six is sister, five is fire, four is follow me, three is turn around, two pair, two pair come pair lets us pair, one is one alone, alone it shall be.

I'm counting ten, what is ten, ten is **"thank your God."**…

A circle is a shape
A circle is a shape 2x
It has no corner 2x
But it can roll roll.
A square is a shape 2 x
It has four corners 2x
But it cannot roll.
A square is a shape 2x
It has four corners 2x
But it cannot roll.
A triangle is a shape 2x
It has three corners 2x
But it cannot roll.
A rectangle is a shape 2x
It has four corners 2x
But it can not roll.

Can you count 123?
Can you count 123?
Can you count 234?
Can you count345?
Yes I can count 2x

I have two eyes
I have two eyes. They are the same, same, same.
I have two ears. They are the same, same, same.
I have two buttocks. They are the same, same, same.
I have to legs. They are the same, same, same.
I have two hands. They are the same same, same.
I have two breasts. They are the same, same, same.

TERM ONE

1

Strand:

Number

Strand 1: Number

Sub-strand 1: Whole number: counting, representation and cardinality

WB: *pages 2-3*

LESSON 1: Counting to find out how many

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to:
1. Count objects to find how many.
2. Write numeral for the objects counted up to 20.

Essential for learning
Learners can count objects up to 10 and write numerals from 1 – 10.

New words
Count, how many, objects

Resources
Bottle caps, straws

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners recite the rhyme below
 I have two eyes; they are the same same same.
 I have two ears; they are the same same same.
 I have two hands; they are the same same same.
 I have two legs; they are the same same same.
 I have two buttocks; they are the same same same.

Main activities

Activity 1
• Call out a girl/boy to the front of the class. Have them identify the parts of their body. E.g. eyes, ears, nose, hands and mouth. Have learners tell you the number of eyes, ears, nose and hands the girl/boy has on their body.

Activity 2
• Now let learners work in pairs. They face each other and identify the body parts.
• Let them repeat the rhyme "I have two eyes; they are the same same".

Activity 3
• Have learners form a semi-circle. Let them play this game. "show me" Show me your nose, and everybody touch his/her nose.

- Hold any part which is two. Hold any part, which is one.
- Show me the part which is two.
- When learners hold any of their part mentioned, they sing and dance with "I have one nose, I have two hands".

Review exercise
Slow learners
Have learners work in pairs to identify the parts of their bodies which are one.

Fast learners
Working in pairs, have learners identify the body parts which are in pairs and those that are one.

Assessment for learning
Refer learners to Practice 1 and 2 on pages 2-3 of their Workbook for exercises.

Suggested homework
Ask learners to identify and count the number of body parts of their siblings at home.

Answers to workbook
Practice 1
1) 2
2) 2
3) 1
4) 2
5) 2

Practice 2
1) 2
2) 1
3) 2
4) 2
5) 1

LESSON 2: Counting to find "how many" (1 – 10)

2 fingers, 4 fingers, 1 finger

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to count objects to find how many and write a number for it.

Essential for learning
Learners can write numerals from 1 – 10.

New words
Circled, count, number.

Resources
Straws, bottle caps, numeral cards 1 – 10, crayons.

Core competencies
Learners develop Problem Solving Skills: Critical Thinking: Collaborative learning.

Warming up
Play:" Fingers up".
Show a number of fingers up and learners call out the number.

Activity 1
• Put learners into groups of four. Give each group sufficient bottle caps and straws. Call out a number and learners count objects to represent that number. E.g. 1) 8   2) 5   3) 7 4) 6

Activity 2
• In their various groups, let them select a leader. The leader calls out a number and the rest count objects to represent the number.

Activity 3
• Show a number of objects to learners. E.g. books.
• Count with learners and let them tell you the number of books they counted.
• Make learners aware that when counting, the last number name said, tells the number of objects counted.
• Repeat this activity several times with different numbers with learners.

Activity 4
• Ask learners to pick 9 straws. Guide them to arrange the objects diagonally and horizontally. Let them count them.
• Let them understand that the number of objects is the same regardless of their arrangement or the order in which they are counted.

9 (0 0 0 0 0 0 0 0 0)

0 0
0 0
0 0
0 0
0

0 0
0 0
0 0
0 0
0

9   9

Review exercise
Slow learners
Have learners work in pairs. Give them 5 objects. One calls out a number and the other count objects to represent it.

Fast learners
Have learners work in pairs. Give them 10 bottle caps. Randomly, one picks a number of bottle caps and the other one counts and calls out the number.

Assessment for learning
Refer learners to practice 1 – 4 on pages 4-7 of their workbook for exercise.

Suggested homework
Draw objects for these numbers
6
8
9

Answers to workbook
Practice 1
a) Learners to circle 4
b) Learners to circle 1
c) Learners to circle 7
d) Learners to circle 6
e) Learners to circle 5

Practice 2
a) 5
b) 10
c) 9
d) 8
e) 7
Number track --- 3, 4, 5, 6, 7, 8, 9.

Practice 3
a) Learners to circle 6 chairs
b) Learners to circle circle 8 squares
c) Learners to circle 9 triangles.
d) Learners to circle 7 balls
e) Learners to circle 5 stars.

Practice 4
Learners to match correctly.

9
4
10
2
8
6
1
5
7
3
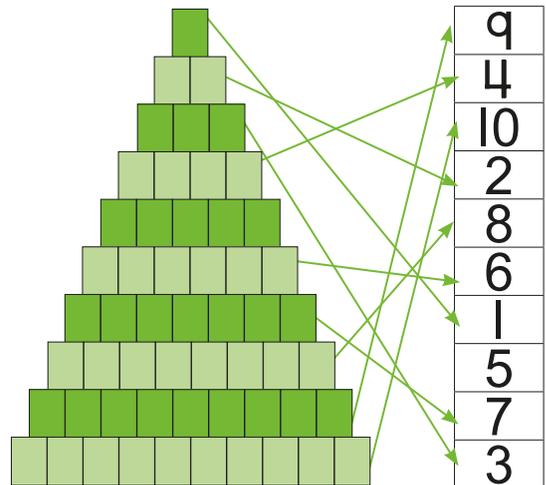
LESSON 3: Counting forwards by 1s (1 – 10)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to count forwards by 1s from 1 to 10.

Essential for learning
Learners can count objects up to 10 and write numerals for it.

New words
Forwards, count, number

Resources
Straws, bottle caps, numeral cards (1 – 10)

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Play: "Fingers up".
Show a number of fingers , learners call out the number shown.

Main activities

Activity 1
• Call 3 boys and 2 girls to the front of the class. Let them line up and the rest count them, one, two, three, four, five … Repeat this activity with another set. This time three girls and three boys.
• Give them numeral cards:
 1 2 3 4 5 6
 Have learners count the numeral cards and read the numerals as well.

Activity 2
• Put learners into groups of three. Give out numeral cards 1 – 10 to each group. Have them arrange the number in order from 1 up to 10 and count them. Make sure everyone in the group takes part.
• 1 2 3 4 5 6 7 8 9 10

Activity 3
• Now have learners work in pairs. Give each pair numeral cards from 1 to 10. Ask them to count forwards by 1s starting from 2, 4, 6 and 7.

Review exercise
Slow learners
In pairs learners count forward from 1 – 5. Ask them to count forwards by 1s starting from any number.

Fast learners
Have learners work in pairs.
Give them numeral cards from 1 – 10.
Ask them to count forwards by 1s starting from any number.

Assessment for learners
Refer learners to practice 1 and 2 on pages 8-9 of their workbook for exercises.

Suggested homework
Fill in the missing numbers.

1)   1, __ 3, __ , 5, __ , 7, __, 9,10

2)   3, __, __, 6, 7, __, 9, __

Answers to workbook
Practice 1
1) 2
2) 3
3) 4
4) 5

Practice 2
Missing number --- 1, 4 5, 7, 8, 10.

LESSON 4: Counting backwards by 1s (1 – 10)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2. 1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to count backwards from (10 – 1)

Essential for learning
Learners can count forwards by 1s up to 10.

New words
Backwards, count, objects

Resources
Bottle caps, straws, numeral cards (1 – 10)

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Play "fingers up and down."
Show 2 fingers up. Ask learners to tell you how many fingers up => 2
How many fingers down => 3

Main Activities

Activity 1
• Put learners into groups of four. Give each group numeral cards from (1 - 10). Call 6 learners to the front of the class. Give them the numeral cards in the order that they will come.
 1 2 3 4 5 6

• Ask the last person to call out his/ her number. (6) followed by the next learner (5) and so on. So, the counting will be 6, 5, 4, 3, 2, 1

Activity 2
• Hang numeral cards on the wall.
• Ask learners to count backwards from 10 – 1. They can also start on any number and count backwards.

Activity 3
• Have learners work in pairs. Give each pair numeral cards from (1 – 10). Have them count backwards starting from any number.

Review exercise
Slow learners
Give them numeral cards from 1 – 5. Working in pairs, let them count backwards from (5 - 1)

Fast learners
Working in pairs, give them numeral cards from (1 – 10). Let them count backwards by 1s starting from any number up to 1.

Assessment for learning
Refer learners to practice 1 and 2 on pages 10-11 of their workbook for exercises.

Answers to workbook
Practice 1
1) Missing numbers --- 8, 7, 5, 3, 2.
2) Missing numbers --- 7, 5, 4, 2
3) Missing numbers --- 9, 8, 6, 5, 3, 2.

Practice 2
10, 8, 6, 6, 5, 3, 1

LESSON 5: Counting to find "how many" (11 – 20)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2. 1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to count objects to find out how many up to 20 and write a numeral for them.

Essential for learning
Learners can count objects up to 10 and write numeral for them.

New words
Count, objects ringed, arrange order

Resources
Bottle caps, seeds, stick, numeral cards

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Clap your hands a number of times and learners call out that number. E.g. clap, clap, clap. Learners say three.

Main Activities

Activity 1
- Put learners into groups of three. Give out sufficient straws and bottle caps to learners. Call out a number and learners. Count objects to represent the number called.

E.g. 1) 12 => I I I I I I I I I I I I

2) => 0 0 0 0 0 0
        0 0 0 0 0 0

- Repeat this activity several times with learners using different numbers.

Activity 2
- Now have learners work in pairs. One takes a number of objects and the other person counts them and call out the number. Learners have to take turns.

Activity 3
- Have learners understand that the number of objects is the same regardless of their arrangements or the order in which they are counted.
- Ask learners to count 18 objects, let them arrange them diagonally and horizontally.

Activity 4
- Have learners count the number of objects in their school bags and tell their partner. Have them exchange the bags, count the number of objects again and compare the number to what they told you earlier on.

Activity 5

- Give out numeral cards to learners. Working in groups of two, one picks a numeral card, the other person counts objects to that number and they match the numeral cards to it.

e.g.

0 0 0 0 0 0 0 0
0 0 0 0 0
0 0

15
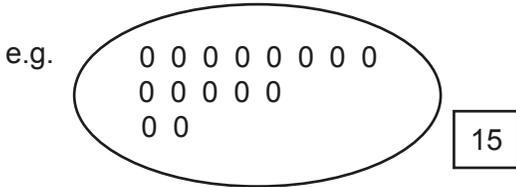
Review Exercise

Slow learners

Have learners work in pairs.
Give them objects (10) and numeral cards (1 – 10). One picks a numeral card and the other learner counts objects to represent it.

Fast learners

Give out numeral cards (1 – 20) and 20 straws to them. Have learners work in pairs. One picks a number of straws and the other learner counts objects to represent that and match the numeral card to it.

Assessment for Learning

Refer learners to practice 1 – 4 on pages 12-15 of their workbook for exercises.

Suggested Home Work

Count the number of spoons and kitchen knives you have in your home and write the number down. Learners compare their result with their partners the next day.

Answers to workbook
Practice 1

a) Learners to circle 14 toffees.
b) Learners to circle 15 oranges.
c) Learners to circle 12 balls.
d) Learners to circle 13 triangles.
e) Learners to circle 18 eggs.

Practice 2

a) 11
b) 12
c) 14
d) 15
e) 20
f) 18

Practice 3

1) Five pots ⟶ 5
2) Six Bibles ⟶ 6
3) Ten spoons⟶ 10
4) Nine balls ⟶ 9

Practice 4

1) Twenty tea cups ⟶ 20
2) Fourteen calabashes ⟶ 14
3) Fifteen buttons ⟶ 15
4) Twelve cowries ⟶ 12

LESSON 6: Counting forwards by 1s (11 – 20)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning Outcome
Learners will be able to count forwards by 1s (11-20)

Essential for Learning
Learners can count forwards and backwards by 1s from (1-10) and (10-1) respectively.

New Words
Number, forwards, missing, count

Resource
Numeral cards (1-20), bottles tops, number chart (1-20)

Core competencies: Learners develop Problem Solving Skills: Critical Thinking: Collaborative learning.

Warming up
Have learners recite the rhyme "One two buckle my shoe

Main Activities

Activity 1
• Call 15 learners to the front of the class. Let them line up. Give them numeral cards from 1-15. Let the class count from 1-15. Learners in front show up the numeral when the class call the number

1	2	3	4	5	6	7	8

9	10	11	12	13	14	15

Activity 2
• Let learners form a big circle. They count forward by 1s from 1-20.
• If the class is more than twenty, when they get to 20 then restart from 1.

Activity 3
• Write the numeral cards (10-20) on the board. Have learners count forward by 1s from (1-20). Have them start from different numbers as well e.g.
a. 12, 13, 14, 15, 16, 17, 18, 19, 20
b. 15, 16, 17, 18, 19, 20

Activity 4
• Have learners work in groups of three. Give them the number chart to count from any number

> 10, 11, 12, 13, 14
> 15, 16 17, 18, 19, 20

Review Exercise
Slow Learners
Have learners work in pairs. Give them numeral cards. They start from any member and count forwards by 1s starting from any number.

Fast Learners
Give out the number chart to learners in groups of four. They count forward by 1s starting from any number.

Assessment for Learning
Refer learners to practice 1 and 2 on pages 16-17 of their workbook for exercise.

Suggested homework
Fill in the missing numbers

1. 10, 11, __, __, 14,15, __, __ 18, __,20

2. 14, __, 16, 17, __, __, 20

Answers to workbook
Practice 1
1) Missing numbers -- 13, 15, 18, 19
2) Missing numbers -- 13, 14, 17, 19, 20.

Practice 2
Missing Numbers --- 13, 16, 18, 19.

LESSON 7: Counting backwards by 1s from (20 – 10)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.1: Use number names, counting sequences and how to count to find out "how many?" up to 20.

Learning outcome
Learners will be able to count backwards by 1s from (20-10)

Essential for learning
Learners can count forwards by 1s from 1 up to 10.

New words
backwards count, missing number

Resources
Numeral cards, number chart (1-20)

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners recite the rhyme One-two buckle my shoe

Main Activities

Activity 1
• Put learners into groups of four. Give each group numeral cards from 10 up to 20. Direct them to line them up as shown below.

| 20 | 19 | 18 | 17 | 16 | 15 |

| 14 | 13 | 12 | 11 | 10 |
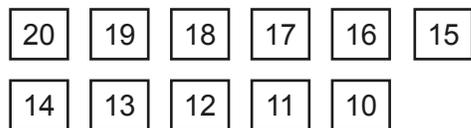
• Have learners count by 1s starting from 20 down to 10. Have learners select their own leader, to guide them to count by colours and individually.

Activity 2
• Have learners form a big circle outside the classroom. They count by 1s from 20 to 10. When they count and reach 10, they restart the counting from 20. They could also start counting backwards from any number. E.g. 18, 16 and 19.

Activity 3
• Write the numeral 10-20 on the board. Have learners count backwards by 1s from any of the numbers. In groups let them count starting from different numbers.

Activity 4
• Give out number chart to learners in pairs. They count backwards starting from any number.

1, 2, 3, 4, 5, 6,
7, 8, 9, 10, 11, 12
13, 14, 15, 16, 17, 18,

Review Exercise
Slow Learners
Have learners work in pairs. Give out numeral card to learners. They count backwards from 20, 19, 18, 17, and 16.

Fast Learners
Have learners work in pairs to fill in the missing gaps
1) 20,____ 18,____16,____14 ____,__11, 10

Assessment for learning
Refer learners to practice 1 and 2 on pages 18-19 of their work book for exercises.

Suggested homework
Fill in the missing numbers
1) 17,_____, 15, 14,_____, _____, 11,____

2) 15, 14_____, _____, _____, _____

Answers to workbook
Practice 1
1) Missing numbers -- 17, 16, 13, 12.
2) Missing numbers -- 15, 14, 12, 9, 7, 5, 4.

Practice 2
1)
a) Missing numbers --- 19, 18, 16, 14, 13, 12..
b) Missing numbers --- 17, 16, 14, 13, 11, 10, 9.

2) Missing numbers --- 17, 15, 13, 12.

LESSON 8: Representing number quantities in different and equivalent ways

Content standard
KG2.1.1.2: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.2.1: Represent number quantities (0 to 20) in different and equivalent ways.

Learning outcome
Learners will be able to represent number quantities (1-9) in different and equivalent ways using objects, fingers and drawings.

Essential for learning
Learners can count the number of objects in group and write numeral for it.

New words
represent, quantity, different, number

Resources
bottle caps, straws, numeral cards up to 20, seeds, number names cards.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Clap a certain number of times using objects, fingers and drawing and learners call out that number

Main activity

Activity 1
- Put learners into groups of three. Give them bottle caps, straws and seeds. Have learners play 'number game'. Show a numeral card (1-20). Learners in their groups count objects up to that number. Again call out a number and learners count objects to represent that number.

Activity 2
- Ask learners with the same colour of bags to put them together. They count them and find a number card to represent the number of bags.
- Repeat this activity with the number of pencils and erasers that they have. Make sure the total does not exceed 20.

Activity 3
- Working in pairs, give out number name cards to learners. Call out a number. Ask learners to count objects to represent that number. Let them pick a number name card to represent it.

E.g.

thirteen
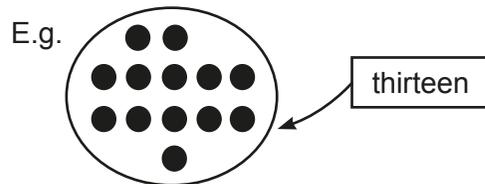
Repeat this activity by calling different numbers.

Review exercise
Slow learners
Work in pairs. Give them numeral cards 1 up to 10. One calls out a number and the other person counts objects to represent that number and match it with appropriate numeral card. Make sure they take turns.

Fast learners
Let them work in pairs. Give them numeral cards (1-20); one picks a numeral card and the other counts object to represent the number picked.

Assessment for learning
Refer learners to practice 1-11 on pages 20-30 of their workbook for exercises.

Suggested homework
Draw objects to represent these numbers.

1) 8

2) 15
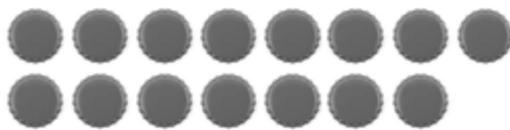
3) 12

Answers to workbook
Practice 1
Learners to colour.
1) 6
2) 12

Practice 2
Learners to colour.
1) 9
2) 5

Practice 3
Learners to colour.
1) 15
2) 10

Practice 4
1) 2 ⟶ two tables
2) 3 ⟶ three children
3) 8 ⟶ eight knives
4) 6 ⟶ six books
5) 4 ⟶ four chairs

Practice 5
1) 15 ⟶ fifteen bells
2) 10 ⟶ ten plastic kettles
3) 14 ⟶ fourteen eggs
4) 9 ⟶ nine Bibles

Practice 6
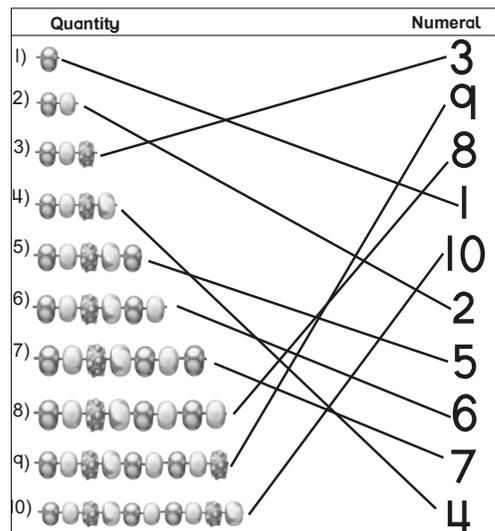
Practice 7

	Number name		Quantity
1)	Eighteen		
2)	Nineteen		
3)	Sixteen		
4)	Seventeen		
5)	Twelve		
6)	Twenty		
7)	Fourteen		
8)	Eleven		
9)	Fifteen		
10)	Thirteen		

Practice 8

1) twelve ⟶ 12
2) thirteen ⟶ 13
3) fourteen ⟶ 14
4) fifteen ⟶ 15
5) sixteen ⟶ 16
6) seventeen ⟶ 17
7) eighteen ⟶ 18
8) nineteen ⟶ 19
9) twenty ⟶ 20

Practice 9

1) ten fingers ⟶ 10
2) eight fingers ⟶ 8
3) nine fingers ⟶ 9
4) fifteen fingers ⟶ 15

Practice 10

1) 9 ⟶ nine bags
2) 20 ⟶ twenty birds
3) 13 ⟶ thirteen crayons
4) 6 ⟶ six sneakers

Practice 11

1) 10 ⟶ ten cups
2) 6 ⟶ six tables
3) 12 ⟶ twelve toffees
4) 15 ⟶ fifteen keys
5) 16 ⟶ sixteen cowries

Strand:

Algebra

2

Strand 2: Algebra

Sub-strand 1: Non-numerical patterns and relationships

LESSON 1: Non-numerical patterns

Content standard
KG2.2.1.1: Recognise, sort, classify, describe and extend non-numerical patterns.

Indicator
KG2.2.1.1.1: Recognise and describe some simple repeating non-numerical patterns.

Learning outcome
Learners will be able to:
• Recognise and describe some simple non-numerical patterns.
• Copy and continue patterns started for them.

Essentials for learning
Learners can identify the 2D shapes, and draw them.

New words
patterns, continue

Resources
Cut out shapes of 2Ds, straws, bottle caps

Core competencies: Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Play: 1 clap 1, 1 clap 2, 1 clap 3.

Main Activities

Activity 1
• Let learners form a big circle and repeat this pattern. One squat 1, one squat 2. Make sure the number does not exceed 20.

Activity 2
• Put learners into groups of four. Give them more 2D shapes. Arrange some shapes on the board and let learners copy same on their tables.

1. △□, △□, △□

2. □△□, □△□

Activity 3
• Working in pairs, have learners create their own patterns with the 2D shapes. Go round and inspect what they are doing. Add straws to the 2D shapes and make them create patterns with the 2D shapes and the straws.

Review exercise
Give out the 2D shapes to learners in pairs. Let them create their own patterns in pairs.

Assessment for learners

Refer learners to practice 1-5 on pages 32-36 of their workbook for exercises.

Suggested homework

Use triangles and circles to create two patterns. △ ○

Answers to workbook
Practice 1

1) [red] [yellow]

2) A B

3) [yellow◁▷blue]

4) ☆○

Practice 2

1) ||| ≡

2) ★ ★ (red, yellow)

3) ⟩⟩⟨

4) ✕✕○

Practice 3

1) ○□△

2) △○□

3) ◇○□

4) ▭⌓○

5) ⊙▪△
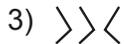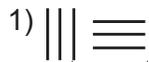
Practice 4

Learners to colour squares red and triangles yellow.

Practice 5

Learners to copy same patterns.

TERM TWO

Strand:

Number

Strand 1: Number

Sub-strand 1: **Whole numbers: Counting, representation and cardinality.**

LESSON 1: Comparing quantities

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.5: Use comparative language to describe the relationship between quantities/numbers up to 20.

Learning outcome
Learners will be able to describe relationship between quantities and numbers.

Essential for learning
Learners can compare two objects and determine the one which is heavier or lighter.

New words
compare, more than, less than, same as.

Resources
pictures of families, bottle caps, pebbles

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Have learners sing "I'm counting one".

Main activities

Activity 1
- Show pictures of two families to learners. Paste them on the board. Allow learners to talk about the two pictures. The number of children and adults. Let them count the total number of people in the pictures and tell which family is more or less.
  Picture A _____Picture B _____

Activity 2
- Put learners into groups of five. Ask them to count 6 bottle caps and 10 pebbles. Let them line them up and determine which group is more

10 pebbles (10) 6 bottle caps

- *Comparing the two lines, the pebbles are more than the bottle caps.*

Activity 3

- Call two learners to the front of the class. Let them tell you the members of their nuclear families. Ask the class to tell you which of the two families have more or less members.

Activity 4

- Let learners work in pairs to determine the number of members in their family and compare to determine who has more / less.

Review activity

Have learners work in groups of four. Each learner tells the number of families they have and they compare to determine who has more or less. Let them compare only two families at at a time.

Assessment for learning

Refer learners to practices 1, 2 and 3 on pages 38-41 of their workbook for exercises.

Suggested homework

Let learners count the number of their extended family members and report to the class the second day.
Let them draw their nuclear families.

Answers to workbook
Practice 1

1) Learners to tick family of four
2) Learners to tick family of five

Practice 2
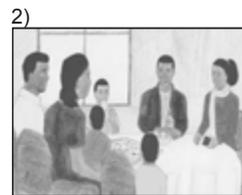
Practice 3

Learners to colour 6 people.
6 people

Practice 4

Learners to colour second picture.

LESSON 2: Comparing quantities (2)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.5: Use comparative language to describe the relationship between quantities/numbers up to 20.

Learning outcome
Learners wil be able to compare two objects and determine which group has more/less object.

Essential for learning
Learners can compare two families and determine which family has more or less members.

New words
more than, less than, same as.

Resources
Pebbles, straws, bottle caps, numeral cards.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
"Play: How many fingers up?"
Hold up fingers 1 – 10. Ask the class to tell you the number they see.

Main Activities

Activity 1
- Have learners work in groups of three. Give them six bottle caps and eight pebbles. Direct them to line the two objects and compare the two using the expressions more than/ less than.

6 bottle caps and 8 pebbles lined up

The caps are less than the pebbles. The pebbles are more than the bottle caps.

Activity 2
- Call the whole class to the front of the class. Ask the girls to line up and the boys also line up side by side to the girls. Let them compare and say who is more or less.

Activity 3
- Now have learners work in pairs. Give them a number of straws and sticks. Let them line them side by side and determine which one is more or less. Make sure they use the expression more than, and less than.

Activity 4
- Have learners count 10 bottle caps and 10 pebbles. Let them line them up and compare the two and come out with what they see.
- The pebbles are the same as the bottle caps. Direct them to make equal groupings of different objects.

Review exercise
Have learners work in pairs. Make sure you pair slow learners to fast learners. Give out more materials to make equal groupings and different grouping and compare using the expression learnt.

Assessment for learning
Refer learners to pictures 6,7 and 8 on pages 42-44 of their workbook for exercises.

Suggested Homework
Learners count the number of cups and spoons in their homes and compare the two.

Learners count the numbers of boys and girls in their family.

Answers to workbook
Practice 1
1) Learners to tick the four knives, cross the three wooden grinders
2) Learners to tick the five calabashes, cross the two earthenware grinding bowls
3) Learners to tick the four saucepans, cross the three ladles

Practice 2
1) Learners to tick the six mosques
2) Learners to tick the eight smocks
3) Learners to tick the fifteen potatoes

Practice 3
1) bottles $\longrightarrow$ bottle caps
2) tables $\longrightarrow$ chairs
3) crayons $\longrightarrow$ pencils

Strand:

2

Algebra

LESSON 1: Patterns with shapes

WB: *pages 46-48*

Content standard
KG2.2.1.1: Recognise, sort, classify, describe and extend non-numerical patterns.

Indicator
KG2.2.1.1.2: Create, simple patterns using shapes, colour, size, sound and movement.

Learning outcome
Learners will be able to create simple patterns with shapes.

Essential for learning
Learners can draw and identify names of 2D shapes as triangle, square, rectangle and circle.

New words
continue, patterns, shapes, create

Resources
cut out shapes of 2Ds, different colours of bottle caps.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking and observation:
Collaborative learning.

Warming up
Play: clap my number and say it. Call out a number and learners clap that number and say it.

Main Activities

Activity 1
- Have learners form a big circle in the class. They play one clap one, one clap two. When they get to ten they restart.

Activity 2
- Give out bottle caps to each group. Ask them to create patterns with three terms.
- (R)(B)　　(R)(b)　　(r)(b)
- Let them use different bottle caps to create another pattern of 3 terms.

    (G)(R)　(G)　(R)　(G)　(R)

Activity 3
- Give out 2D shapes to learners.
- △ □ □ ○ Ask them to use the circle and the square to create patterns on their own. Let them work in pairs, and create a pattern. e.g.

    ○□ ○□ ○□

Activity 4

- Call out five boys and 5 girls to the front of the class. Call one learner to create a pattern with the boys and girls.
- BG, BG, BG, BG.

Review exercise

Ask learners to work in pairs. Give them cut-out shapes of 2D, to create patterns on their own.

Assessment for learning

Refer learners to practices 1, 2 and 3 on pages 46-48 of their workbook for exercises.

Suggested homework

Draw 2D shapes to create 3 different patterns.

Answers to workbook
Practice 1

1)

2)

3)

4)

Practice 2

1)

2)

3)

4)

5)

Practice 3

1)

2)

3)

LESSON 2: Patterns with colour

Content standard
KG2.2.1.1: Recognise, sort, classify, describe and extend non-numerical patterns.

Indicator
KG2.2.1.1.2: Create, simple patterns using shapes, colour, size, sound and movement.

Learning outcome
Learners will be able to create patterns with defferent colours.

Essential for learning
Learners can create patterns with shapes.

New words
colours, create, patterns.

Resources
2D shapes with different colours, leaves with different colours, bottle caps.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking and observation:
Collaborative learning.

Warming up
Play: clap my number and say it. Call out a number and learners clap that number and say it.

Main activities

Activity 1
- Call out learners to the front. Let them form a big circle. Guide them to perform this circle activity: clap, tap, clap tap, clap tap. They clap and tap feet in a pattern. Let them do it in turns. The one who makes a mistake is asked to go and sit down.

Activity 2
- Have learners work in groups of four. Give the coloured 2D shapes. Ask them to pick red and green to make their own patterns
- G (R) G (R) G (R)
- Now ask learners to go round and look at the patterns other groups have created.

Activity 3
- Give out all the 2D shapes and the coloured bottle caps to the groups. Ask them to create pattern on their own.
- R(G)Y   R(G)Y   R(G)Y

Activity 4
- Give them the different leaves to create their own patterns.

Review exercise
Let learners work in pairs. They create their own patterns with the coloured 2D shapes. Let learners move round to appreciate what others have done.

Assessment for learning
Refer learners to pictures 1 and 2 on pages 49-50 of their workbook for exercises.

Suggested homework

Learners create their own patterns with 2D shape on a sheet of paper. Let them write their names under. Display their work on the walls for others to appreciate.

Answers to workbook
Practice 1

1)

2)

3)

4)

Practice 2

1)

2)
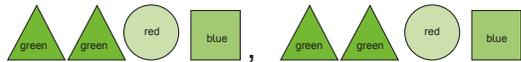
3)

LESSON 3: **Patterns with size**

Content standard
KG2.2.1.1: Recognise, sort, classify, describe and extend non-numerical patterns.

Indicator
KG2.2.1.1.2: Create, simple patterns using shapes, colour, size, sound and movement.

Learning outcome
Learners will be able to create patterns with different types of objects.

Essential for learning
Learners can create patterns with shapes, and using different colours.

New words
size, create, patterns, continue.

Resources
Different objects with different sizes e.g. balls, bowls, caps, 2D shapes, pebbles, etc.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking and observation:
Collaborative learning.

Warming up
Play: clap my number and say it. Call out a number and learners clap that number and say it.

Main Actitivities

Activity 1
•   Call six learners to the front of the class. (three tall and three short). Call a learner (a girl) to come and create a pattern with them. E.g. tall short, tall short, tall short.

Activity 2
•   Put cups of different sizes on your table, call a learner to come and arrange them to form a pattern (big cap, small cap, big cap, small cap)

Activity 3
•   Have learners work in pairs now. Give them different objects with different sizes. Ask them to create patterns with them. Learners move round to appreciate what others have done.

Activity 4
•   Write the letters of the alphabet on the board up to J. Ask learners to use any of the letters to create patterns using the capital and the small letters.
•   Aa Aa   Aa   Aa
•   eE eE   eE   eE

Review exercise
Play a game "clap clap, tap tap"
Learners form a big circle. They clap three times and tap two times while shaking their bodies.

Assessment for learning

Refer learners to practices 1 to 3 on pages 51-53 of their workbook for exercises.

Suggested homework

Create two patterns with
1. Small circle and a big circle.
2. Big square, small square.

Answers to workbook
Practice 1

1)

2)

3)

4)

Practice 2

1)

2)

3)

4)

5)

Practice 3

1)

2)

3) **tT**

4) **Aɑ**

5) **dD**

Strand:

3

Geometry and measurement

Sub-strand 1: Lines and shapes

LESSON 1: 2D shapes

Content standard
KG2.3.1.1: Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.

Indicator
KG2.3.1.1: Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.

Learning outcome
Learners will be able to identify and match names to shapes.

Essential for learning
Learners can identify the names of 2D shapes and can draw them.

New words
describe, trace, match, square, triangle, circle, rectangle.

Resources
Different sizes of 2D shapes, different colours of 2D shapes, empty boxes and cans, coins, choco milo

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up

Play: show fingers up. Call out a number and learners hold up their fingers to represent that number.

Main activities

Activity 1
• Give out milk tins and empty boxes to learners to play with them in their groups. Allow them to roll and open them.

Activity 2
• Give them shapes to trace around them to get circles, rectangles, triangles and squares. (Note: teach one shape at a time) Introduce the names as you introduce the shapes.

triangle   circle   rectangles   square
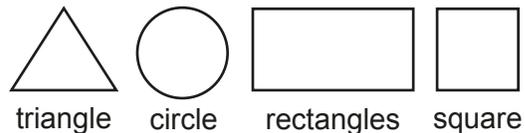
Activity 3
• Give out suffcent 2D shapes to learners in groups of two. Mention a name of a shape and learners quickly look through the shapes and pick it. E.g. 'pick square', 'pick circle'.

Review exercise
Have learners work in pairs. One calls out a name of a 2D shape and the other looks through and picks it.

Assessment for learning

Refer learners to practices 1 and 2 on pages 56-57 of their workbook for exercises.

Suggested homework

Have learners trace different objects to get circle, rectangle or square.

Answers to workbook
Practice 1

Learners to trace and colour the shapes.

Practice 2

1)

2)

3)

4)

rectangle

square

triangle

circle
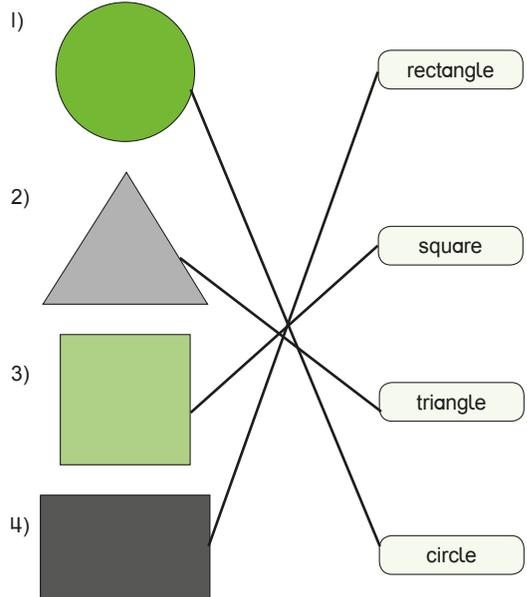
LESSON 2: Corners and sides of 2D shapes

Content standard
KG2.3.1.1: Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.

Indicator
KG2.3.1.1.2: Identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably.

Learning Outcome
Learners will be able to identify the number of corners and sides of 2D shapes.

Essential for learning
Learners can trace around a shape and can identify the names of 2D shapes

New words
sides, corners, circle, triangle, rectangle, square.

Resources
cut-out shapes of 2Ds

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners sing the song "A circle is a shape"

Main activities

Activity 1
• Put learners into groups of four. Give out 2Ds shapes to learners. Let them identify the shapes. One picks a shape and the rest mention its name. e.g. one picks ◯ and the rest call out 'circle'. Another learner also calls out the name of a shape and the rest look through the shapes and pick it.

Activity 2
• Introduce the word 'corners' to learners by asking them to look at the corners of the classroom. There are four corners. Call out a boy to point to the corners of teachers table. Call a girl also to come and point to another corner of your table. Direct learners to go round and point to corners of objects in the classroom.

Activity 3
• Draw a big triangle on the board. Mark the corners.
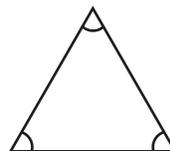
• Let learners tell you the number of corners you have marked (3). A triangle has 3 corners. Direct each learner to pick a triangle and mark the three corners. Ask them to tell you the number of corners i.e. 3. Introduce the name "corner" to them.

Activity 4
- Draw a rectangle on the board. Call a learner to mark the sides, count and write the number.

- Number of sides of a rectangle is 4. Repeat the same activity for a square.
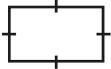
A square has 4 sides.

Activit y 5
- Draw a circle on the board. Invite learners to come and mark the corners and sides. Learners will realise that a circle has no corners and no sides.

Assessment for learning

Answers to workbook
Practice 1
1) 4 corners
2) 4 corners
3) No corners

Practice 2
1) No sides
2) 3 sides
3) 4 sides

LESSON 3: Sorting 2D shapes

Content standard
KG2.3.1.1: Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.

Indicator
KG2.3.1.1.2: Identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably.

Learning outcome
Learners will be able to sort 2D shapes and write the number for each shape.

Essential for learning
Learners can identify the number of corners and sides of 2D shapes.

New words
sort, rectangle, triangle, square, circle.

Resources
cut out shapes of 2Ds, pencils, crayons

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Have learners sing "A circle is a shape"

Main activity

Activity 1
• Put learners into groups of four. Give them enough 2D shapes with different colours and sizes. Direct learners to sort them according to a given criteria.
• Have learners sort them according to colours and.
• Have learners count and write the number of each shape.
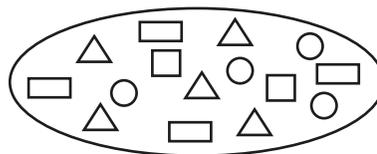
• Example. triangle = 5, reactangle = 4, circle = 4, square = 2

Activity 2
• Now have learners work in pairs. Give them the 2D shapes. Ask them to sort them:
•   According to colours.
•   According to shapes.
• Have learners write the number for each shape.

Review exercise
Put learners into groups of three. Give out more 2D shapes for them to sort based on shapes.

Assessment for learning
Refer learners to practice 1, 2 and 3 on pages 60-62 of their work book for exercises.

Suggested homework

Learners draw each of the 2D shapes and colour them.

Answers to workbook
Practice 1
1) Circles = 5
2) Squares = 4
3) Triangles = 3

Practice 2
1) Learners to trace and colour.
2)
a) 3
b) 2
c) 1
d) 3

Practice 3
1 Learners to trace and colour.

2)
a) squares = 3
b) triangles = 2
c) rectangles = 5
d) circles = 3

LESSON 4: 3D objects

Content standard
KG2.3.1.1: Analyse attributes of two-dimensional shapes and three-dimensional objects to develop general concept about their properties.

Indicator
KG2.3.1.1.1: Identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles.

Learning outcome
Learners will be able to identify 3D objects.

Essential for learning
Learners have been playing with 3D objects e.g. balls.

New words
objects, can roll, cannot roll, flat, round.

Resources
A variety of empty boxes, tins, oranges, balls etc.

**Core competencies:** Learners develop Problem Solving Skills: Critical Thinking: Collaborative learning.

Warming up
Have learners sing "A circle is a shape"

Main activities

Activity 1
Put learners into groups of two. Give out a variety of 3D objects for learners to play with them. Let them touch and feel them.
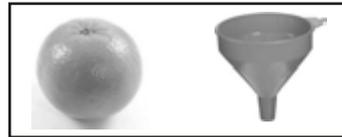

Activity 2
- Guide learners to describe the objects using words like round, flat. Have learners group the objects into two categories. Round and flat faces.

Flact faces	Round faces
Match box	Orange
Books	Balls
erasers	Milk tin
	pencil

Activity 3
- Give more objects to learners. Let them sort them according to sizes
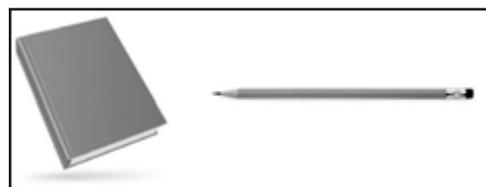
- A pencil is smaller than a book.
- Let them compare different objects and use expressions like bigger than, smaller than.

Review Exercise

Put learners into groups of two. Give them objects to classify them into objects that can roll and those that cannot roll.

Assessment for learning

Refer learners to practices 1-6 on pages 63-68 of their workbook for exercises.

Suggested homework

Let learners draw one object that can roll and another object that cannot roll.

Answers to workbook
Practice 1
Learners to colour.

Practice 2
Objects that can roll --- 3, 4, 7, 8.

Practice 3
Objects which can not roll --- 2, 3, 5, 6

Practice 4

Learners to draw
1) An object that can roll
2) An object that cannot roll

Practice 5

1) Learners to colour cube red, match box, blue.
2) Learners to colour cabbage red, onion blue.
3) Learners to colour cup red, funnel blue.

Practice 6

Sub-strand 2: Time

LESSON 1: Showing the time on clock

Content standard
KG2.3.2.1: Develop general concept about time.

Indicator
KG2.3.2.1: Show the time of the day using clock faces.

Learning outcome
Learners will be able to tell the time by the hour.

Essential for learning
Learners know that we greet in the morning as 'Good Morning' and in the Afternoon as 'Good Afternoon'

New words
Time, o'clock, good morning, good afternoon, good evening

Resources
Wooden clock faces for every learner. Numeral cards 1-12

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning, Attend to precision.

Warming up
Play "Mr Wolf what is the time? Answer: 1 o'clock "Mr Wolf what is the time"? 2 o'clock --------12 o'clock

Main Activities

Activity 1
•   Introduce the hour hand and the minute hand to learners. The minute (long) hand moves faster. When it moves to 12, then there is an o'clock.
•   The number on which the short (hour) hand is on tells the time. E.g.
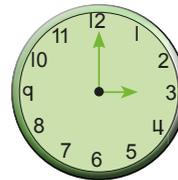
The long hand is on 12 and the short hand is on 3. So the time is 3 o'clock.

Activity 2
•   Give the clock faces to learners to work in pairs. Display your big clock face at a place that every learner can see.
•   Ask learners to call a time, say 7 o'clock. Demonstrate by using your clock face. E.g. To show 7 o'clock

Move the long hand to 12 and the short hand to 7.

Activity 3
- Invite learners to the board to show these times:
  4 o'clock
  6 o'clock
  11 o'clock.

Activity 4
- Let learners tell you the various greetings we have and the time for these greetings.
  Good morning: is from after midnight up to 12 o'clock or 12noon.
  Good afternoon: it is after noon up to 6 o'clock.
  Good evening: It is from 6 o'clock up to midnight.

Review exercise
Have learners work in pairs. Give them the wooden clock faces. One calls a time and the other manipulates the clock to read it. They should take turns.

Assessment for learning
Refer learners to practices 1 and 2 on pages 69-70 of their workbooks for exercises.

Suggested home work
Draw the hour and the minute for the following times:

1)

3 o'clock

2)

6 o'clock

3)
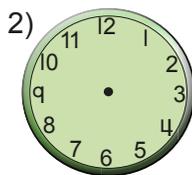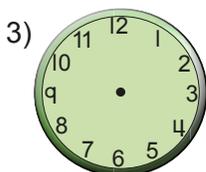
11 o'clock

Answers to workbook
Practice 1
1) 10 o'clock.
2) 3 o'clock
3) 12 o'clock
4) 5 o'clock
5) 8 o'clock
6) 9 o'clock

Practice 2
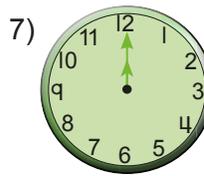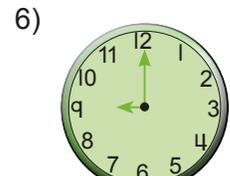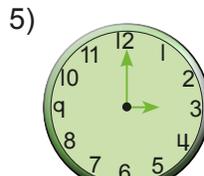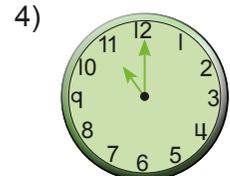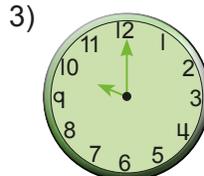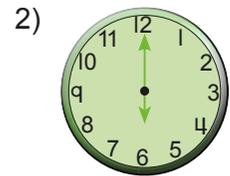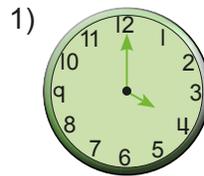
1)

2)

3)

4)

5)

6)

7)

Strand:

1

Number

Strand 1: Number

LESSON 1: Addition (sum up to 10)

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.1: Understand addition as combing and finding how many altogether and subtraction as separating and finding how many left; numbers 0 to 10.

Learning outcome
Learners will be able to act out subtraction problems within 10 and use counters to solve them.

Essential for learning
Learners can solve addition problems with sum up to 10.

New words
separate, take away

Resources
bottle caps, straws, numeral cards

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Play: clap my number. Call out a number and learners clap that number of times.

Main activities

Activity 1
• Put learners into groups of three. Give simple subtraction sentence for learners to act out that scenario. E.g. Adwoa has 5 toffees she gave one to Musa. How many does she have now? Let two learners act out the situation. Repeat this activity several times with learners.

Activity 2
• Call 5 learners (2 boys and 3 girls) to the front of the class.
• Let learners count them. Now ask the boys to come and sit down. Ask how many learners were there? How many came to sit down? How many are left now?

Activity 3
• Still in their groups, give simple problem like Edem has 8 pencils, he lost 2. How many has he now? Have learners use their counters to represent the scenario. Let them remove the number which he lost and learners count the remaining counters to find the answer.
• Ask key questions like:
• How many pencils had he?
• How many did he loose?
• How many are left?

Activity 4
- Repeat activity 3 several times until learners can use counters to represent and solve subtraction sentences on their own.

Review exercises
Slow learners
Give them 5 straws, let them act out this situation and solve it with their counters. Have them work in pairs.
There are 5 eggs in a bwol, 2 got broken how many are left?

Fast learners
Give them 10 bottle caps. Have them work in pairs. They use their counters to solve this problem.
Fatau has 8 exercise books. He gave 3 to his friend. How many has he now?

Assessment for learning
Refer learners to practice 1 and 2 on pages 72-76 of their workbook for exercises.

Suggested home work
Use your counters to solve these subtraction sentences.
Dela has 6 erasors, he lost 2. How many are left?

Teacher Asante has 10 mangoes, 5 got rotten. How many good ones has he?

Answers to workbook
Practice 1

1) [2] and [4] make [6]

2) [3] and [2] make [5]

Practice 2

1) [4] and [3] make [7]

2) [3] and [5] make [8]

3) [3] and [1] make [4]

Practice 3

1) [4] and [4] make [8]

2) [5] and [4] make [9]

3) [1] and [3] make [4]

Practice 4

1) [3] and [2] make [5]

2) [2] and [2] make [4]

3) [3] and [2] make [5]

Practice 5

1) 3 and [1] make 4

2) 2 and [2] make 4

3) 4 and [6] make 10

4) 3 and [5] make 8

LESSON 2: Subtraction within 10

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.1: Understand addition as combing and finding how many altogether and subtraction as separating and finding how many left; numbers 0 to 10.

Learning outcome
Learners will be able to do subtraction within 10.

Essential for learning
Learners can do subtraction within 5

New words
subtract, take away, remove.

Resources
straws bottle caps.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Have learners count backward by 1s from 10 to 1.

Main activities

Activity 1
- Call six learners, two boys four girls to the front of the class. Let them line up and let the class count them. 1,2,3,4,5,6. Now ask them how many girls (4), how many boys? (2). Ask the girls to go and sit down. Now ask the class:
1. How many learners were there?
2. How many went to sit down?
3. How many are left?

Activity 2
- Put ten books on your table. Count with the class. (10). Call a boy to come and remove 5.
- Ask the class to tell you how many books are left. (10 books take away 5 books, 5 books will be left).

Activity 3
- Put learners into groups of four. Give each group ten straws. Ask them to count 8 straws.
- Tell them to take 6 away and count how many are left. (4).
- Repeat activity 3 several times with the class.

Activity 4
- Let learners select a leader. They count a number of objects (within 10) and play: "how many are left"?
- The leader will say take away 2, how many are left?

Review exercise
Slow learners
Have learners work in pairs.
Solve these:
1. 6 bottle caps take away 3. How many are left?
2. 5 bottle caps take away 4. How many are left?

Fast learners
Give them 10 bottle caps. Let them solve these:
1. 9 bottle caps take away 6. How many are left?
2. 10 bottle caps take away 8. How many are left?

Assessment for learning
Refer learners to practices 1 to 3 on pages 77-78 of their workbook for exercises.

Answers to workbook
Practice 1
1) 3
2) 1
3) 4
4) 5

Practice 2
1) 2
2) 1
3 3
4) 4

LESSON 3: Addition (sum up to 20)

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.1: Understand addition as combing and finding how many altogether and subtraction as separating and finding how many left; numbers 0 to 10.

Learning outcome
Learners will be able to solve addition problems with sum up to 20.

Essential for learning
Learners can solve addition and subtraction problems within 10.

New words
altogether, add, act out

Resources
bottle caps, straws, numeral cards

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Play: "clap my number". Call out a number and learners clap that number of times.

Main activities

Activity 1
• Call out 3 girls and 5 boys to the front of the class. Have them stand separately. Let the class count them separately. Now put them together. 3 girls and 5 boys is 8 learners.

Activity 2
• Have learners work in pairs and act out this scenario. Aku has 12 books her father added 4 more. How many has she now?
• Learners use counters to solve this problem. Repeat this activity several times with learners with different numbers.

Activity 3
• Have learners work in groups of five. Give them straws up to 20. Give out the following situations for learners to use counters to solve them:
• I have 10 mangoes Kwesi gave me 4 more. How many do I have now?
• Bortey has 12 pencils. His father gave him 3 more. How many pencils has Bortey now?

Review exercises
Slow learners
Have learners work in pairs. Give each pair 10 counters. Let them use their counters to solve this problem:
Borko has 6 toffees, Ameley gave her 2 more, how many toffees has she now?

Fast learners
Have learners work in pairs. Give them 20 bottle caps. They use the counters to solve this problem:

Adjetey plucked 12 mangoes. His father gave him 3 more. How many mangoes has he now?

Assessment for learning
Refer learners to practices 1 to 6 on pages 79-83 of their work book for exercises.

Suggested homework
Use your counters to solve these:
1. Musa has 6 erasers, Kinaba added 3 more. How many erasers has Musa now?
2. There are 12 chocolates in my bag. Mamle gave me 8 more, how many chocolate do I have now?

Answers to workbook
Practice 1
1) 10 and 10 make 20
2) 6 and 6 make 12
3) 12 and 7 make 19

Practice 2
1) 9
2) 5
3) 10

Practice 3
1)   2)

  8   8

3)   4)

  6   6

Practice 4
1)   2)

  11   13

3)   4)

  17   11

Practice 5
1)   2)

  16   14

3)   4)
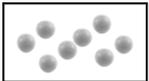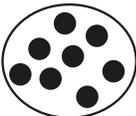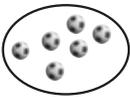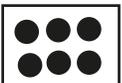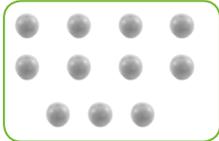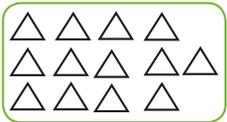
  12   19

LESSON 4: Subtraction within 20

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.1: Understand addition as combining and finding how many altogether and subtraction as separating and finding how many is left; numbers 0 to 10.

Learning outcome
Learners will be able to act or use counters to solve subtraction problems withen 20.

Essential for learning
Learners can solve subtraction sentences within 10.

New words
separate, take away, remove

Resources
bottle caps, straws

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up:
Have learners count backwards from 5 to 1 whiles clapping simultaneously.

Main activities

Activity 1
- Call 12 learners to the front of the class. Have learners count them. Now ask 7 of them to go and sit down. Ask key questions to get the answer.
     1. How many learners were standing in front?
     2. How many are left standing?
- Repeat this activity several times with different learners.

Activity 2
- Let learners work in groups of two. Give the scenario for learners to use counters to solve:
- There are 18 bulbs in a box. 7 got broken. How many are left?
- Mummy bought 16 ice creams. We ate 6. How many are left?

Activity 3
- Have learners work in pairs. Give them 20 straws. They create their own problems and solve them.

Review exercises
Slow learners
Have learners work in pairs. Give them 10 bottle caps. Let them use their counters to act out and solve this problem:
Maamle was given 7 toffees.
She ate 3. How many are left.

Fast learners
Have learners work in pairs. Give them 20 straws to act out the problem and solve it:
Musah has 18 pencils, he lost 6. How many has he now?

Assessment for learning
Refer learners to practices 1 and 2
on pages 84-85 of their workbook for
exercises.

Suggested homework
Use counters to solve these:
1. Mammy has 10 christmass hat, she
   lost 4 of them. How many are left.
2. There are 19 bottles on the table 7
   fell down. How many are on the table
   now?

Answers to workbook
Practice 1
1) 10
2) 8
3) 10
4) 10

Practice 2
1) 9
2) 10

LESSON 5: Decomposing numbers

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.2: Compose and decompose numbers up to 10 using concrete materials.

Learning outcome
Learners will be able to decompose numbers up to 10.

Essential for learning
Learners can do addition with sum up to 20

New words
decompose, separate, to make

Reasurces
Numeral cards (1-10) bottle caps, straw

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Clap my number. Call out a number and learners clap that number of times.

Main activities

Activity 1
• Write the number 5 on the board. Ask learners what they can say about number 5. Give them bottle caps (5). Let them group the caps in different ways as follows:
• 5 is: 4 and 1, 3 and 2, 1 and 4.

Activity 2
• Put learners into groups of six. Ask them to break 10 into 3 different ways using their fingers or counters. 10 is: 7 and 3, 8 and 2, 5 and 5, 6 and 4.
• Repeat this activity several times with learners.

Activity 3
• Have learners work in pairs to decompose 8 in different ways.

a.

and

b.

and

c

and
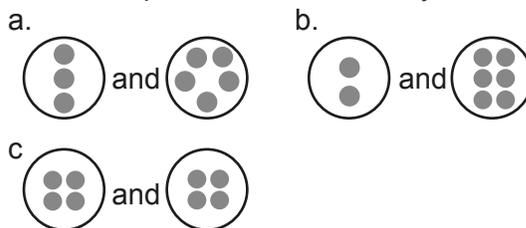
Review exercises
Slow learners
Have learners work in pairs. Give them 6 counter to decompose it in 3 different ways.

Fast learners
Have them work in pairs. Give them 15 counters to decompose in 4 different ways.

Assessment for learning
Refer learners to practice 1 to 4 on pages 86-89 of their workbook for exercises.

Suggested homework
Decompose these numbers in 3 different ways:
1) 8   2) 11   3) 13

Answers to workbook
Practice 1

1)   2)

3)   4)

5)

Practice 2

1)   2)

3)   4)
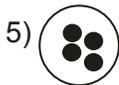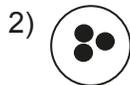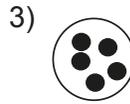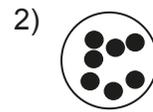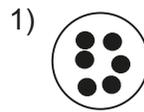
Practice 3
Makes 10 -- 2, 3.

Practice 4
Makes 10 --- 2, 3, 5.

Sub-strand 4: Money

LESSON 1: Identifying Ghanaian coins by name

Content standard
KG2.1.4.1: Identify coins in order to recognise the need for monetary transactions.

Indicator
KG2.1.4.1.1: Identify Ghanaian coins by name, including one pesewa, five pesewas, ten pesewas, twenty pesewas, fifty pesewas, one cedi and two cedis.

Learning outcome
Learners will be able to identify Ghanaian coins in use.

Essential for learning
Learners have been buying food items with coins.

New words
one pesewa, two pesewas, 10 pesewas.

Resources
All Ghanaian coins in circulation.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Sing the song I am counting one!

Main activities

Activty 1
• Put learners into groups of two. Give them the various coins. Have learners touch and feel and say the features of each coin. They should describe what they see on both sides of the coin.

Activity 2
• Pick the coins one after the other and introduce the names to them one after the other. Starting from one pesewa to fifty pesewas.

Activity 3
• Display the coins on learners' tables. Guide them to identify the coin with the higher value, e.g.

Review exercise
Have learners work in groups of two. Give each group all the coins. One learner picks a coin and the rest call out its name. Another learner calls out the name of a coin and the rest search through and pick it up.

Assessment for learning

Refer learners to practices 1 to 3 on pages 90-92 of their workbooks for exercises.

Suggested homework

Ask your parents to give you all the coins they have. Count the number for each and write it. Report to the class the next day.

Answers to workbook
Practice 1

Learners to trace the words.

Practice 2
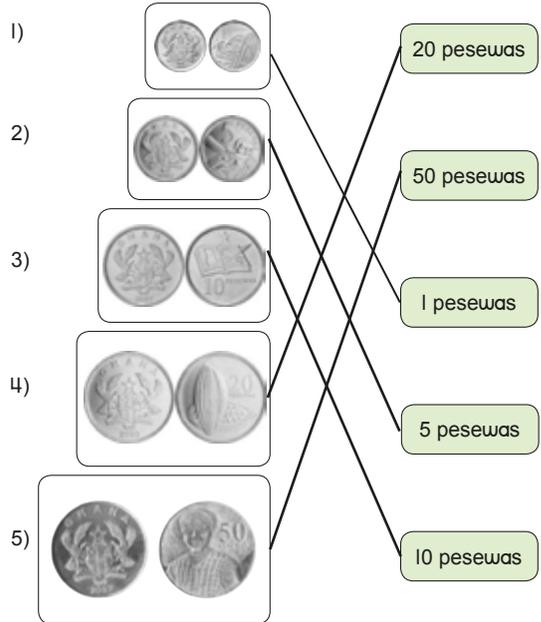
Practice 3
1) 10 pesewas
2) 50 pesewas
3) 20 pesewas
4) 10 pesewas
5) 5 pesewas

TERM THREE

Strand:

Number

Strand 1: Number

Sub-strand 2: Whole Numbers: Operations relationship between numbers

LESSON 1: Composing and decomposing numbers (up to 20)

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.1: Compose and decompose numbers up to 10 using concrete materials.

Learning outcome
Learners will be able to use concrete materials to compose and decompose numbers up to 20.

Essential for learning
Learners can count objects up to 20 and write numerals from 1 up to 20.

New words
Compose, decompose, break down

Resources
Bottle caps, straws, numeral cards up to 20.

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Play "fingers up and down"
Show a number of fingers up and down. Learners tell the number of fingers up and the number of fingers down.
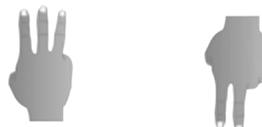
Main Activities

Activity 1
- Call one boy and two girls to the front of the class. Give the boy 8 books. Ask him to share them between the girls.
- He should collect them and share them differently whiles you write the different sharings on the board.

e.g. 1) 4 and 4   2) 3 and 5
       3) 2 and 6   4) 1 and 7

Activity 2
- Put learners into groups of three. Give them sufficient bottle caps, straws and numeral cards. Write the numeral 10 on the board. Ask learners to count 10 objects.
- Ask them to break it into two as 5 and 5
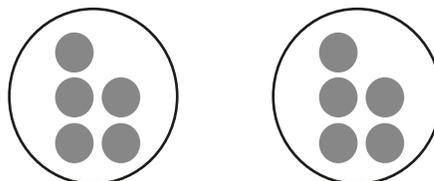
Ask them to break them into different groupings as shown below:

1)

2)

3)
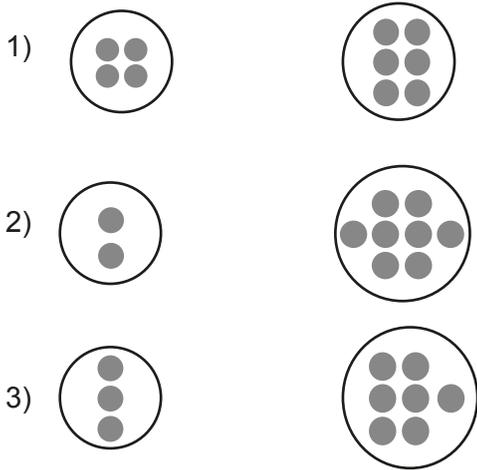
Activity3
- Give 12 straws to the various groups. Ask them to decompose them in 4 different ways.

Activity 4
- Now, have learners work in pairs. Give them numeral cards and bottle caps. Have them decompose these numbers in different and equivalent ways.
- 1) 9   2) 13   3) 15

Suggested Home Work
Decompose   1) 11 and   2) 18 in four different ways.

Answers to workbook
Practice 1
1) 5 pencils
2) 5 balls
3) 3 tops

Practice 2
1) 6 squares
2) 7 bottle caps
3) 13 jerseys
4) 10 balls

LESSON 2: Composing and decomposing numbers (up to 20)

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.2: Compose and decompose numbers up to 10 using concrete materials.

Learning outcome
Learners will be able to find two numbers which will add up to a given number.

Essential for learning
Learners can decompose a given number in several ways.

New words
Before, after, decompose

Resources
Bottle caps, straws, numeral cards

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners sing "I have 2 eyes"

Main activities

Activity 1
- Put learners into groups of four. Ask learners to pick the numeral card 9 and 9 straws. Have them decompose the number in these different ways.

1)   6 and 3

2)   7 and 2

3)   5 and 4
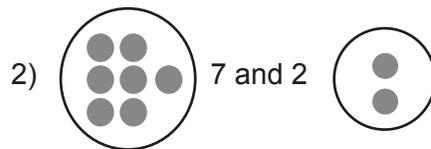
Activity 2
- Write the numeral 12 on the board. Decompose and write one number for the group to find the other number.

○—— |2 ——(8)
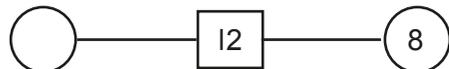
- Have learners brainstorm in their groups to find the next decomposed number.
- Let them use the counters to help them.

(4)—— |2 ——(8)
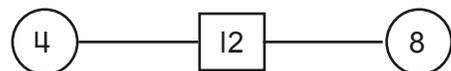
Activity 3

- Now have learners work in pairs. Write these on the board for learners to find the other decomposed numbers.

1)
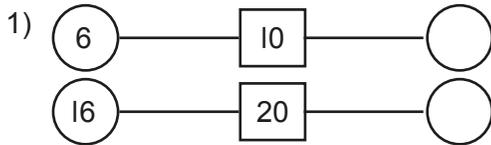
Activity 4

- Still working in pairs have learners decompose the two numbers 10 and 20 in different but equivalent ways.
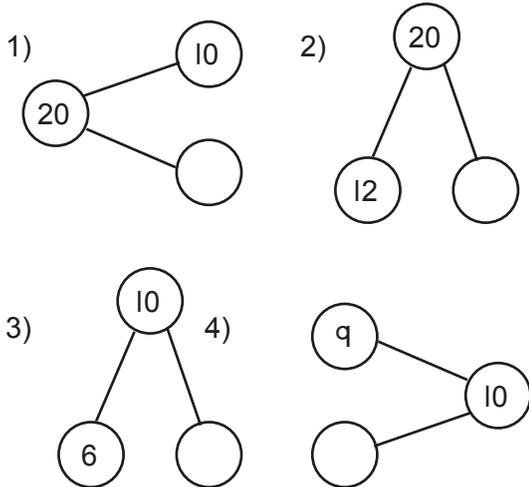
Slow learners
Have learners work in pairs to decompose these numbers in two different ways.
1) 8   2) 12

Fast learners
Working in pairs have learners decompose these numbers in four different ways.
1) 15   2) 19   3) 18

Assessment for learners
Refer learners to practices 1 – 6 on pages 96-101 of their workbook for exercises.

Suggested homework
Decompose these numbers in three different ways.
1) 5   2) 9   3) 17   4) 20

Answers to workbook

Practice 1	Practice 2
1) 1	1) 6
2) 4	2) 7
3) 2	3) 4
4) 2	4) 5
5) 1	5) 2
6) 4	6) 4
7) 1	7) 3

Practice 3	Practice 4
1) 3	1) 4
2) 8	2) 7
3) 7	3) 6
4) 6	4) 9
5) 5	5) 5

Practice 5	Practice 6
1) 5	1) 10
2) 7	2) 5
3) 5	3) 3
4) 5	4) 3
	5) 4

LESSON 3: Positions of objects

Content standard
KG2.3.2.1: Describe the position of objects in space.

Indicators
KG2.3.21.1: Tell the position and motion of objects in space using such words as above, below, to the right, etc.

Learning outcome
Learners will be able to tell the position of objects using expressions like above, below, to the right, to the left.

Essential for learners
Learners can:
Put numbers from 1 – 20 orderly, determine numbers that come before and after a given number.

New words
above, below, beside, left, right, third, next

Resources
Numeral cards, tables, balls, bowls, coloured 2D shapes

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Justification of ideas..

Warming up
Have learners count backwards by 2.

Main Activities

Activity 1
- Have learners sit properly at their places. Let them mention the names of the person sitting
- 1) beside   2) right 3) left
  4) behind   5) in front of him/her.
  Repeat this activity with learners.

Activity 2
- Call three learners in front of the class. Two girls and one boy. Let the class mention their names. Now let the boy stand in between the two girls.
- Let the class call out the names of the girls standing on the left and right of the boy.

Activity 3
- Put your table in front of the class.
- Put a chair on top of it and a bag under it. Now have learners work in groups of four to describe the positions of the chair and the bag.
- The bag is under the table.
- The chair is on the table.

Activity 4
- Refer learners to practice 1 on page 102 of their workbook to describe the positions of
- 1) the book   2) the ball   3) the bowl

Review exercise
Draw a tree on the board, draw a bird on top of it and a cat in front of it. Have llearners describe the positions of the bird and the cat.

Assessment for learning
Refer learners to practices 1 and 2 of pages 102-103 of their workbook for exercises.

Suggested homework
Describe the positions of the triangle.
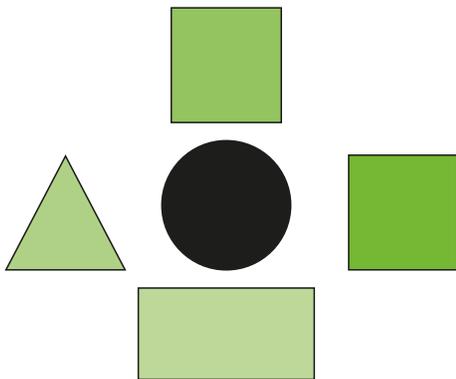
A**nswers to workbook**
Practice 1
1) top
2) under
3) beside

Practice 2
1) between
2) below
3) right
4) left
5) above

LESSON 4: Position of Numbers (1)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.2: Identify numbers in different positions around a given number (0-20).

Learning outcome
Learners will be able:
To describe the position of given numbers using the expressions above, right, behind, left, below, etc.

Essential for Learning
Learners can describe the positions of an object.

New words
Number, above, below, left, right

Resources
Numeral cards 1 - 20, straws, bottle caps, number charts 1 – 20

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners sing "I'm counting one"

Main Activities

Activity 1
• Put learners in groups of two. Give them the numeral cards 1 – 20. Let them arrange (1 – 10) in order as done below.

1	2	3	4	5
6	(7)	8	9	10
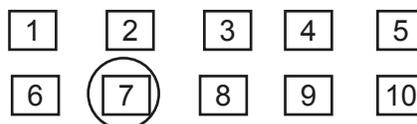
• Circle a number and let learners tell you the number on the right and left of it.

6	(7)	8

Draw a circle around 7 and let learners tell you the numbers which are on the left and right of it.

Activity 2
• Have learners select a leader. He or she picks a numeral card, put it back and learners call out the numbers which are left and right of it.

Activity 3
• Paste this number chart on the board. Have learners describe the positions of the circled number. E.g. 6

9	7	2
2	**(6)**	10
5	1	3

• The number left to it is 2.
• The number right to it is 10.
• The number above it is 7.
• The number below it is 1.

Activity 4
- Now, have learners work in pairs. Give them number chart 1 – 10. Let them circle a number and describe it themselves.

Review Exercise
Slow learners
Give them numeral cards 1 – 20. Have them work in pairs. They arrange the numbers in order. One points to a number and the other identifies the numbers to the left and right of it respectively.

Fast learners
Give them number chart 1 – 20. They describe the numbers to the left , right, below and above the circled number.

5	1	6
1	**(10)**	12
2	20	7

Assessment for learners
Refer learners to practices 1 and 2 on pages 104-105 of their workbook for exercises.

Suggested Home Work
I am 10 describe me.

12	15	18
6	10	11
20	3	1

What number is below me?
What number is above me?
What number is on my left?
What number is on right?

Answers to workbook
Practice 1
1) 19
2) 10
3) 1
4) 18

Practice 2
1) 9, 14
2) 18, 19
3) 1
4) 15

LESSON 5: Position of Numbers (2)

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.2: Identify numbers in different positions around a given number (0-20).

Learning outcome
Learners will be able to determine numbers which come before and after a given number.

Essential for learning
Learners can describe the position of a given number.

New words
number, to the left, to the right, before, after, below, above.

Resources
Numeral cards, (1 – 20), number chart (1 – 20), bottle caps

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners sing the song "I'm counting one"

Main Activities

Activity 1
• Put learners into groups of five.
• Give each group numeral cards (1 -20). Ask them to arrange the numbers 1 – 10 in order.

1	2	3	4	5
(6)	7	8	9	10
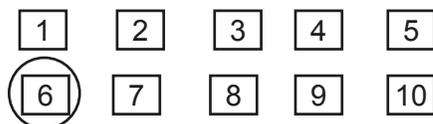
• Give them chalk to circle the numeral 6. Let them tell you the number that comes before or after it. The numbers are 5 and 7 respectively.
• In their groups let them continue this activity with different numbers.

Activity 2
• Let them arrange the numbers from 1 – 20. Have them identify the numeral 9. Have them identify the numbers that come before and after 9. The answer is 8 and 10 respectively.

Activity 3
• Repeat activity 2 with learners with different numbers. E.g. 17 and 14.
• Now let them work in pairs. Give them numeral cards 10 – 20. Let them play number a game. When one picks a numeral card, the other calls out numbers that come before and after it.

Review Exercise
Slow learners
Give out numeral cards. One selects a number and the other person calls out the numbers which come before and after it.

Fast learners
Give each pair numeral cards from 1 – 20. One calls/picks a numeral card and the other calls out the numbers that come before and after.

Assessment for learners
Refer learners to practice 1 and 2 on pages 106-107 of their workbook for exercises.

Suggested homework
Fill in the missing numbers. Write the numbers that come before and after the middle numbers

1) ◯ —— [6] —— ⑦

2) ◯ —— (17) —— ◯

3) ◯ —— (19) —— ◯
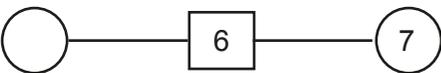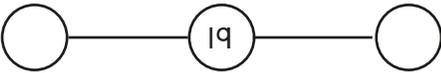
Answers to workbook
Practice 1

	Before	After
1)	7	9
2)	10	12
3)	8	10
4)	14	16
5)	3	5
6)	18	20
7)	5	7

Practice 2
1) 16
2) 16, 18
3) 11
4) 10, 11
5) 17, 19
6) 9

LESSON 6: Word problem involving addition

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.3: Solve word problems using objects and drawings to find sums up to 10 and differences within 10.

Learning outcome
Learners will be able to develop conceptual understanding of addition as combining and finding how many altogether.

Essential for learning
Learners can decompose a number into different and equivalent ways.

New words
add, combine, altogether

Resources
bottle caps, straw, numeral cards.

Warming up
Play fingers up. Show a number of fingers and learners call out the number.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Have learners play the doubles game.

Main activities

Activity 1
• Call a girl and a boy to the front of the class. Give out 6 books to each learner. Now ask the girl to give 2 of hers to the boy. Let the class tell you how many the boy has now. i.e. 6 and 2 is 8. Now the boy has 8 books.

Activity 2
• Put learners into groups of four. Give them bottle caps to act similar scenarios as activity one. Make sure the sum does not exceed 10.

Activity 3
• Call two boys to the front of the class. Ask the class to tell you the number of ears one has. Now let them tell you the total number of ears. They have 4 ears.

2 ears and another 2 ears make 4 ears

Activity 4
• Have learners work in threes. Give them 10 straws. Let them act their own stories by sharing. E.g. I have 6 straws Amina has 3. I am giving 2 to Amina so, Amina has 5 now.

Review exercise
Slow learners
Have learners work in pairs. Solve this: Akos has 6 mangoes, Ama gave her 2 more. How many mangoes has Akos now?

Fast learners
Give them 10 bottle caps. Have them work in pairs. They act their own scenario for addition.

Assessment for learning
Refer learners to practices 1 and 2 on pages 108-109 of their workbook for exercises.

Suggested home work
Mummy gave Fusani and Abiba 3 toffees each, Abiba gave 2 to Fuseni. How many toffees has Abiba now?

Answers to workbook
Practice 1
1) 8
2) 6
3) 10

Practice 2
1) 9
2) 6
3) 10

LESSON 7: Word problem involving subtraction

Content standard
KG2.1.2.1: Develop conceptual understanding of addition and subtraction.

Indicator
KG2.1.2.1.3: Solve word problems using objects and drawings to find sums up to 10 and differences within 10.

Learning outcome
Learners will be able to develop conceptual understanding of subtraction as separating and finding how many are left (1-10).

Essential for learning
Learners can do addition by putting two objects together.

New words
subtraction, left, left over, take away.

Resources
straws, bottle caps.

Core competencies
Learners develop
Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning.

Warming up
Play fingers up. Show a number of fingers up and learners call out that number.

Main activities

Activity 1
• Call a girl and a boy to the front of the class. Give the girl 6 books. Let the class count together. Now ask her to give 3 to the boy. Let the class count how many are left for the girl. 6 take away 3 is 3.

Activity 2
• Put learners into groups of 4. Give each group sufficient materials. Have them act different scenarios. Example, the leader picks 5 straws and the rest count together. Ask him/her to give 2 straws to one person. They count how many are left for the leader. 5 take away 2 is 3.

Activity 3
• Have learners work in pairs. Give 9 objects to each pair. Allow them to do subtraction on their own by acting different scenarios.

Activity 4
• Whole class activity: Ask learners to form a big circle. One person stands in the middle, picks a number of objects (make sure the number does not exceed 10) and give some to a friend. The class come out with what is left in the hands. Have different learners perform this activity.

Review exercise
Slow learners
Have learners work in pairs. Give them 5 straws. Ask them to do their own subtraction by acting different scenarios.

Fast learners: Give them 10 straws. Let them work in groups of three. They should form their own stories by subtracting
4 from 10
6 from 8
7 from 10

Assessment for learning
Refer learners to practices 1 and 2 on pages 110-111 of their workbook for exercises.

Suggested homework
Solve these:
6 bulbs, 2 broken
5 toffees, 3 eaten
10 trees 4 fallen

Answers to workbook
Practice 1
1) 6
2) 4
3) 2

Practice 2
1) 4
2) 6
3) 5

Strand:

3

Geometry and measurement

Strand 3: Geometry and and measurement

Sub-strand 2: Measurement: Length, mass and capacity

LESSON 1: Comparing lengths/heights of objects

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.3: Use number names and non-standard units for measuring (lengths and volumes) and to count to find out "how long or much?"…up to 20.

Learning outcome
Learners will be able to compare two objects and determine the one which is longer or shorter.

Essential for learning
Learners have been comparing their heights. They can also compare two objects and determine the one which is bigger or smaller.

New words
taller, longer, shorter, compare

Resources
straws, plastic bottles, sticks

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning, Attend to precision.

Warming up
Have learners recite the rhyme "can you count 1,2,3" or any other related rhyme.

Main activities

Activity 1
• Call two learners to the front of the class. Make sure one is taller than the other. Let them compare their height by putting their backs together. The class calls out the name of the person who is shorter/taller e.g. Dede is shorter than Edem and Edem is taller than Dede.

Activity 2
• Put learners into groups of four. Give them sticks of different length, straws, pencils.
• Have them take two sticks and compare the length. Make sure they put the two on the same base.

Activity 3
• Have them compare two different objects e.g. plastic bottles of different heights.
• Let them move round the classroom and compare any two objects that they see. E.g. pencils, markers etc. make sure they use the expression shorter/longer than.

A

B

- A is shorter than B
- B is longer than A

Activity 4
- Have learners take 2 straws of the same lengths. Let them compare their lengths. They have the same lengths. Look out for learners with the same object. Let them come out for learners to compare their heights.

Review exercises
Take your metre rule. Put it side by you. Let them determine who is taller / shorter. Put the metre rule side by side of your table and let them compare and determine which is taller/shorter.

Assessment for learning
Refer learners to practices 1, 2 and 3 on pages 114-116 of their workbook for exercises.

Suggested homework
Ask learners to go home and compare the heights of their parents or siblings. They report the following day of their findings to their group members.

Answers to workbook
Practice 1
1) B
2) A
3) A
4) B

Practice 2
1) Learners to circle a
2) Learners to circle a
3) Learners to circle a
4) Learners to circle b

Practice 3
1) g is as long as a
2) e is as long as f
3) b is as short as h
4) c is as short as d

LESSON 2: Comparing capacities of containers

Content standard
KG2.1.1.1: Describe numbers and the relationship between numbers 0 to 20.

Indicator
KG2.1.1.1.3: Use number names and non-standard units for measuring (lengths and volumes) to count to find out "how long or much?" … up to 20.

Learning outcome
Learners will be able to compare two containers and determine the one which holds more or less liquids.

Essential for learning
Learners can compare two objects and determine the one which is taller or shorter than the other.

New words
holds more, holds less, compare

Resources
bowls of different capacities, plastic bottles and milk tins.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Justification of ideas:
Collaborative learning, Attend to precision.

Warming up
Have learners recite the rhyme "can you count 1,2,3" .

Main activities

Activity 1
• Demonstrate to learners by filling two different containers. E.g. 1 litre bottle, and 500 mls bottle with water.
• Fill the smaller bottle up to the brim and pour it into the 1 litre bottle. Have learners tell you what they observed.
• There is still space in the bigger one which means the bigger bottle holds more water than the smaller one.
• The smaller container holds less water than the bigger bottle.

Activity 2
• Put learners into groups of four.
• Give them two different plastic cups.
• Let them fill one and pour it into the other one and compare which cup holds more or less water.
• *Note:* This activity should be done outside the classroom.

Activity 3
• Give different containers to learners.
• They select any two containers on their own, fill one with water and pour it into another one.
• They use the expressions learnt to describe what they saw.

Review exercises
Have learners work in pairs. Give them milo tins and milk tins. Ask them to fill the milo tin with water up to the brim and pour it into the milk tin and compare. They should use the expression "holds more than / holds less than"

Assessment for learning

Refer learners to practices 1 and 2 on pages 117-118 of their workbook for more exercises.

Suggested homework

Ask learners to compare the capacity of two containers at home and report the next day.

Answers to workbook
Practice 1
1) b
2) a
3) a

Practice 2
1) a
2) b
3) b
4) a
5) b

LESSON 3: Comparing weights of objects

Content standard
KG2.3.3.1: Describe relationships between objects that have measurable attributes and sort a small collection of such objects according to given attributes.

Indicator
KG2.3.3.1.1: Develop an understanding of length, mass and capacity by sorting items into given measurable attributes e.g. small, long, thing, big, heavy, etc.

Learning outcome
Learners will be able to compare two different weights of objects and determine the one which is heavy or light.

Essential for learning
Learners can compare the capacity of two containers and determine the one which holds more or less.

New words
Compare, heavy, light, heavier, lighter.

Resources
leaves, stones, bottle caps, books, etc.

Core competencies: Learners develop Problem Solving Skills: Critical Thinking: Justification of ideas: Collaborative learning, Attend to precision.

Warming up
Have learners sing the song "I'm counting one"

Main activities

Activity 1
•   Call a boy to the front of the class. Ask him to lift you up. Ask the class why he couldn't lift you? Say " I am heavy". Lift him up and ask the class to tell you why you were able to lift him up. Let them use the expression heavier or lighter than.

Activity 2
•   Call a girl to the front of the class. Tell her to lift your table. Ask whether she was able to lift the table.
•   She couldn't because the table is heavier.

Activity 3
•   Put learners into groups of two. Give them different materials, e.g. books, stones, leaves, paper etc.
•   Direct them to pick, e.g. a big stone and a leaf. Ask them to tell you the one which is heavier/lighter.

Review exercise
Direct learners to go round the classroom to take two objects and compare their weights, e.g. their chair and teachers table, eraser and textbook.

Assessment for learning
Refer learners to practices 1 and 2 on pages 119-120 of their workbook for exercises.

Suggested homework
Compare two objects in your house and report to the class the next day.

Answers to workbook
Practice 1
1) Learners to tick the bottle of water.
2) Learners to tick the tennis ball.
3) Learners to tick the stone.
4) Learners to tick the can.
5) Learners to tick the banana.

Practice 2
1) Learners to colour the plate.
2) Learners to colour the cup.
3) Learners to colour the pen.

Strand: **4**

Handling data

Strand 4: Handling data

LESSON 1: Classification of objects

Content standard
KG2.4.1.1: Collect and present data using objects.

Indicator
KG2.4.1.1.1: Classify objects and count the number of objects in each category.

Learning outcome
Learners will be able to sort shapes and objects into a given criteria.

New words
sort, group, count, objects, shapes.

Resources
fruits, 2D shapes, bottle caps, numeral cards.

Core competencies
Learners develop Problem Solving Skills:
Critical Thinking:
Collaborative learning.

Warming up
Have learners sing the song on shapes. "A circle is a shape"

Main activities

Activity 1
- Call 6 boys and 5 girls to the front of the class. Let them line up and ask the class to count the number.
- Ask one of them to record it on the board. Girls 5, boys 6.

Activity 2
- Put learners into groups of three.
- Give them different objects, e.g bottle caps of different colours, straws, sticks, 2D shapes.
- Ask them to sort the bottle caps according to colour and write the number for each. E.g.
  Red - 6
  Blue - 4
  White - 2
- Now let them sort the straws also into the different colours.
  Note make sure they do not sort more than three different objects.

Activity 3
- Display the fruits on your table: banana, apple and orange.
- Count with the class and call one learner to write the number on the board.
- Let them line them up first before counting.
  Banana – 6
  Orange – 8
  Apple – 2
- Ask questions like: How many oranges are there? Which fruit is more? Which fruit is less?

Have learners work in groups of three. They group erasers, pencils and crayons on their table and write down the number for each item. Erasers ____, Pencils ____, Crayons ____

Assessment for learning
Refer learners to practices 1 to 5 on pages 122-126 of their workbook for exercises.

Suggested homework
Ask learners to count the spoons, cups and knives in their homes. They record and report the next day to the class.

Answers to workbook
Practice 1
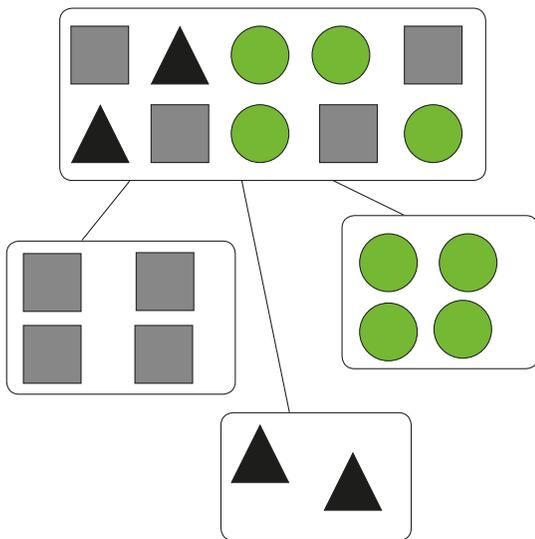
Practice 2
Banana = 5
Pineapple = 4
Watermelon = 3

Practice 3
Carrot = 8
Tomatoes = 8
Cucumber = 5

Practice 4
1)
circle = 7
triangle = 5
square = 8

2)
a) square
b) 20
c) triangle
d) 7

Practice 5
1) car $\longrightarrow$ 3
2) boat $\longrightarrow$ 2
3) bicycle $\longrightarrow$ 4

GLOSSARY

A
2-D shapes a flat plane figure or a shape that has two dimensions.

above at a higher level or to a place that is higher.

add put together or sum or join.

after following (something or someone) in order or in a series.

altogether with everything added together.

arrange put (things) in a required order

B
backwards in the direction of or toward the back

backwards count to count in the direction of or toward the back

before in front of (someone or something).

below at a lower level or to a place that is lower.

bottle caps the cover of bottles. usually used in counting.

break down the process or result of separating a substance into simpler parts.

C
circle to form a circle around (something).

compare estimate, measure, or note the similarity or dissimilarity between two or more things.

compose to form or make something.

continue to keep doing something in the same way as before.

corners the point or area where two lines, edges, or sides of something meet.

count to recite numbers.

create to cause (something new) to exist.

D
decompose express (a number or function) as a combination of simpler components.

describe to say what something or someone is like.

different not of the same kind : partly or totally unlike.

F
flat having a smooth, level, or even surface.

forwards in the direction that one is facing or towards the front.

fruits a usually sweet food (such as a blueberry, orange, or apple) that grows on a tree or bush.

H
heavier having greater weight.

heavy having great weight.

L
left not used.

left over the remains of something.

less smaller in amount or number

light not heavy.

lighter less heavy.

longer of greater length.

M

match to make or see a connection or relationship between (two people or things).

missing unable to be found.

more than of greater number or value compared with.

N

number an arithmetical value, expressed by a word, symbol, or figure, representing a particular quantity and used in counting and making calculations.

numeral cards a learning material with number inscriptions.

O

objects things that you can see and touch and that are not alive.

order place in a certain arrangement.

P

patterns a repeated decorative design.

Q

quantity an amount or number of something.

R

rectangle a four-sided shape that is made up of two pairs of parallel lines and that has four right angles.

remove to move or take (something) away from a place.

represent to be an example of (someone or something).

ringed to draw a circle around.

round having a circular shape.

S

separate to cause (two or more people or things) to stop being together, joined, or connected.

sides a line that forms part of a geometric shape.

size how large or small someone or something is.

sort to separate and put (people or things) in a particular order.

square a four-sided shape that is made up of four straight sides that are the same length and that has four right angles.

subtraction the act of taking something away from a group or number of things.

T

trace to draw the outline of (something).

triangle a shape that is made up of three lines and three angles.

ESSENTIAL

Mathematics

Kindergarten 2

Teacher' Guide

NNF
BOOKS