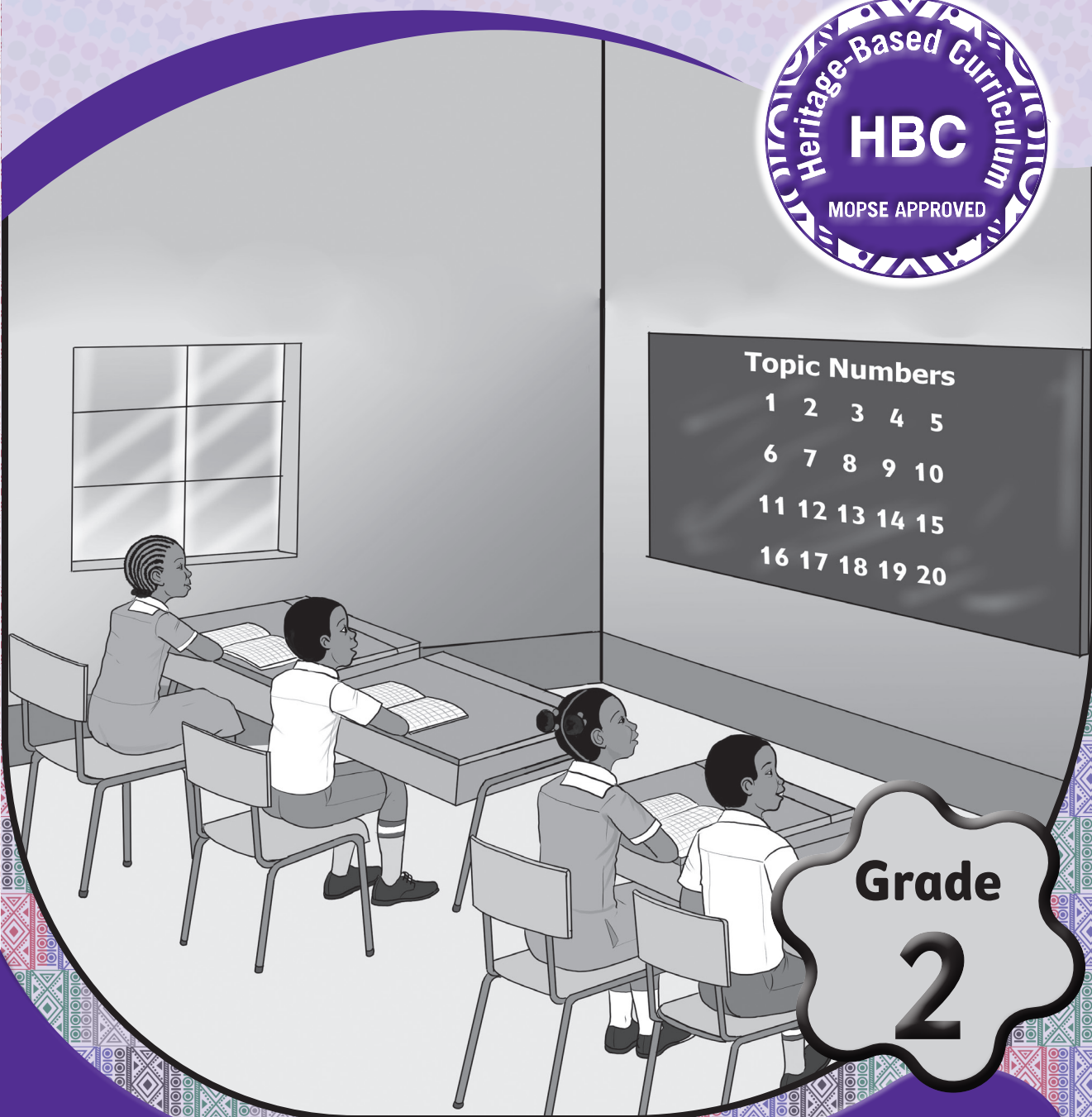


PlusOne

Mathematics



Grade
2

Boniface N. Nyamai

Teacher's Guide

PlusOne

Mathematics

Teacher's Guide



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Introduction

PlusOne Mathematics forms an integral part of our everyday lives since Mathematical concepts are central to most facets of everyday life and enterprise skills. Mathematics is vital to the country's future development.

This teacher's guide aims to develop individuals to become mathematically literate, good problem-solvers, can think creatively and have both the confidence and competence to participate fully in society as responsible local and global citizens.

To provide quality Mathematics education, teachers must facilitate learning in the Mathematics classroom. This will provide the foundations for discovering and understanding the world around us and provide the basics for further studies in this field. This PlusOne Mathematics Grade 2 Teacher's Guide will help you to guide learners to understand how Mathematics can be used to explain what is occurring, predict how things will behave and analyse causes and origins of things in our environment. It considers the desired outcomes of education for learners at the basic level, in terms of the competency-based curriculum.

To ensure that the learners are mathematically literate. Mathematics ought to be taught using hands-on and minds-on approaches that learners will find fun and will remember for the rest of their lives.

Topics

- 1 Number
- 2 Operations
- 3 Measures
- 4 Relationships

Philosophy of teaching Mathematics

The teaching and learning of Mathematics emphasises that:

- 1 An effective Mathematics education should be inquiry-based.
- 2 It must provide learners with opportunities to expand, change, enhance and modify the ways in which they view the world.
- 3 It should be pivoted on learner-centred Mathematics teaching and learning approaches that engage learners physically and cognitively in the knowledge-acquiring process in a rich and rigorous inquiry-driven environment.
- 4 Mathematics learning is an active contextualised process of constructing knowledge based on learners' experiences rather than acquiring it.
- 5 Learners are information constructors who operate as researchers.
- 6 Facilitators serve by providing the enabling environment that promotes the construction of learners' own knowledge, based on their previous experiences.
- 7 This makes learning more relevant to the learner and leads to the development of critical thinkers and problem-solvers.

Philosophy of learning Mathematics

The learners will specifically acquire the following through the learning of Mathematics:

- 1** Critical thinking and problem-solving skills to be able to compare, analyse, evaluate and apply Mathematical skills with little or no supervision.
- 2** Creative thinking skills to be able to reconstruct important information confidently.
- 3** Digital literacy skills to be able to use IT tools and resources efficiently for investigations and
- 4** Effective communication skills to be able to share information at various levels of interaction.
- 5** Values to live as global citizens capable of applying Mathematical skills in any of their given situation.

The Heritage Based Mathematics curriculum aims at producing a numerically upright Zimbabwean, who is responsible and capable of maintaining a calculative approach to solving life problems.

Subject specific aims

The Infant School Mathematics syllabus aims to help learners to:

- develop, in learners, a positive attitude towards Mathematics.
- foster into learners mathematical problem-solving skills.
- use/sign and communicate mathematical information to develop critical thinking.
- acquire mathematical concepts and skills for use as tools in life.
- develop psycho-social skills such as self-control and free expression of emotions which contribute to the holistic development of the learner.

Instructional expectations

This teacher's guide provides opportunity for facilitators to:

- guide and facilitate learning by encouraging discussions among learners and challenging them to accept and share responsibility for their own learning.
- select Mathematics content, adapt and plan lessons to meet the interests, knowledge, understanding, abilities and experiences of your class.
- work together with colleagues within and across disciplines and grade levels to develop communities of Mathematics learners who exhibit the skills of mathematical inquiry and the attitudes and social values conducive to Mathematics learning.
- use multiple methods and systematically gather data about learners' understanding and ability to guide Mathematics teaching and learning.
- arrange to provide feedback to both learners and parents.
- design and manage learning environments that provide learners with the time, space and resources needed for learning Mathematics.

Methodology and time allocation

It is recommended that Mathematics be allocated at least 6 periods of 30 minutes per week for Grade 2.

Teaching and learning methods which help learners build interest and confidence in solving problems are recommended. Learner centred and multisensory approaches as well as principles of individualisation, concreteness, totality and stimulation should be employed to enhance the suggested teaching/learning methods. The teaching and learning process must be inclusive, gender sensitive and encourage collaboration. This will promote self-confidence, mathematical ethics, *unhu/ubuntu* / *vumunhu* children's rights and responsibilities among others. The use of technological implements such as smartphones is recommended in problem-solving.

The following are suggested teaching and learning methods:

- Discovery
- Experimentation
- Group work
- Projects
- Song and dance
- Poems and rhymes
- Questioning and answer
- Educational tours
- Imitation
- Discussion
- Investigation
- Dramatisation/role-play

Pedagogical approaches

These include the approaches, methods, strategies, appropriate relevant teaching, and learning resources for ensuring that every learner benefits from the teaching and learning process. The teacher should:

- create learning-centred classrooms using creative approaches.
- position inclusion and equity at the centre of quality teaching and learning.
- use differentiation and scaffolding as teaching and learning strategies.
- use Information and Communications Technology (ICT) as a pedagogical tool.
- identify subject specific instructional expectations to make the subject relevant.
- integrate all assessment strategies.
- use questioning techniques that promote deep learning.

This teacher's guide provides teaching methodology for each lesson and concept to ensure that the correct pedagogical approach is used. However, this may need to change based on the skills levels of your class in any year, so use your own experience and discretion to adapt these methodologies accordingly.

Learning-centred pedagogy

A learning-centred classroom creates the opportunity for learners to engage in meaningful hands-on activities that relate what they are learning to the real world. It is a place for learners to discuss ideas,

become actively engaged in looking for answers, working in groups to solve problems. They also research, analyse and evaluate information. The aim of the learning-centred pedagogy is to enable learners to take ownership of their learning.

Inclusion

Inclusion is ensuring access and learning for all learners especially those disadvantaged. Each lesson in this teacher's guide contains advice on how to teach that concept to large classes, and to learners with special needs.

Differentiation and scaffolding

Differentiation is a process by which differences (learning styles, interest and readiness to learn) between learners are accommodated so that all learners in a group have the best possible chance of learning. Differentiation could be by content, tasks, questions, outcome, groupings and support.

Class management

Most facilitators in Zimbabwe teach large classes. The facilitators, based on their professional experience over the years have developed skills in classroom methodology. Here are a few reminders about whole class, group, pair and individual work that could be helpful with large classes.

Whole class teaching

Much of your teaching, especially when your class is large, will involve you standing in front of the class explaining and listening to your learners. You can set out facts and concepts which learners can understand. However, your class has a variety of abilities. More able learners should be given additional tasks to stretch their capabilities while those who find understanding more difficult should be given the time and attention they need.

When you introduce a topic make sure you use learners' existing knowledge and build upon it. The basic information for your lesson is in the text. If you are going to ask learners to read for themselves (at home or in class or to read out loud), work out during your lesson planning which words will be difficult for them to understand and explain these first. Make sure that all your learners have understood your explanation. Give time to those having difficulties. Talking and listening activities can be very valuable during whole-class teaching.

Group work

Many of the activities, especially those related to listening and speaking are done in groups. Group work needs to be carefully planned and used thoughtfully. For group work to be successful, the whole class must be well behaved. Therefore, it is important for you to set very definite ground rules. For example:

- Learners must listen to each other.
- They must give all group members the opportunity to share their ideas.
- They must be polite and courteous.

- Tell learners exactly how loudly they are expected to talk.
- Inform them as to whether they are allowed to get up out of their seats or not.
- Make them aware of the consequences if they do not adhere to the ground rules.
- It is usually best to remove them from the group and for them to complete the activity on their own.

Have signals that will tell your learners that the activity is coming to an end, or the noise level is getting too loud, for example, flicker the lights on and off or ring a bell. It is best not to use your voice as you will end up shouting to be heard above the group discussions.

Circulate and supervise. You need to listen to discussions, check if groups have understood the instructions and conduct informal assessments.

Vary the groups sizes each time you have group work. Three to five members per group is ideal. If groups are too large, you will usually find someone not participating.

Pair work

Learners are often instructed to work in pairs – either with their desk mate, or with a partner. This is an ideal opportunity for learners to assist each other, and for them to assess each other.

Working with a desk mate offers the least classroom disturbance. The learners are already seated side-by-side. They ask and answer questions during picture talk, and they discuss the readings before they write comprehension answers individually.

Working with a partner that you have allocated to the learner means that you can pair a slower learner with a faster learner, so that they can help one another. You may also choose to pair learners of similar abilities together, so that they can proceed more quickly with the work, while you assist the slower pairs.

Individual work

Individual work usually follows a group discussion, or a reading by you, the facilitator. The learner will by this stage be familiar with the vocabulary required for the individual work and will usually have been involved in a discussion about the text. This means that he or she is now ready to work alone and answer comprehensive questions while learners are working individually, walk around the classroom, checking what they are doing, and offering help where it is needed.

Learner self-study

There will be times when you want the class to work as individuals to allow them to become familiar with material you have given them. This allows you to work with learners of different abilities.

It is worth bearing in mind that while there is a need for learners to learn how to read and study on their own; there are also dangers in this approach. It is essential that the material they read is understandable to them; your attention should still be focused on the class to ensure that all learners are using the time to read and not misbehave. Use additional material at different levels to ensure that some learners do not finish more quickly than others.

Teaching tips

One of the most important skills in classroom management is the ability to ensure your learners are occupied for the whole lesson. If a group has finished its task and has nothing else to do, it is likely to become disruptive. Break up your lesson and make sure it has several different parts.

- Full class work
- Individual work
- Practical activities

Information and Communication Technology (ICT)

ICT has been integrated into the Mathematics curriculum as part of the core of education, alongside reading, writing and numeracy. Facilitators are encouraged to use ICT as a teaching and learning tool to enhance deep and independent learning. If your school has internet access these functions can be done online. Alternatively, download the clips or games to use offline in the classroom.

Examples of ICT in the Mathematics classroom:

- 1 Use calculators to solve problems.
- 2 Use cameras to record results and steps in a problem-solving process.
- 3 Use multimedia to support the teaching and learning process.
- 4 Show YouTube videos to explain certain concepts visually.
- 5 Search for grade-appropriate online Mathematics and Science games for each concept.
- 6 Encourage learners to play the game online in groups, pairs or individually.
- 7 Learners research data online to bring to school when required.
- 8 Start teaching the basic skills of MS Office, using basic word processing skills, spreadsheets, and PowerPoint presentations.

The use of ICT as a teaching and learning tool is to provide learners with access to large quantities of information online and offline. It also provides the framework for analysing data to investigate patterns and relationships. Once learners have made their findings, ICT can help them organise, edit and print the information in many different ways.

The exposure that learners are given at the primary school level to use ICT in exploiting learning will build their confidence and will increase their level of motivation to apply ICT use in later years, both within and outside of education. ICT use for teaching and learning is expected to enhance the quality and competence level of learners.

Diagnostic assessment

a Assessment as learning

Assessment as learning relates to engaging learners to reflect on the expectations of their learning. Information that learners provide the facilitator forms the basis for refining teaching-learning strategies. Learners are assisted to play their roles and to take responsibility of their own learning to improve performance. Learners are assisted to set their own goals and monitor their progress.

b Assessment for learning

It is an approach used to monitor learner's progress and achievement. This occurs throughout the learning process. The teacher employs assessment for learning to seek and interpret evidence which serves as timely feedback to refine their teaching strategies and improve learners' performance. Learners become actively involved in the learning process and gain confidence in what they are expected to learn.

c Assessment of learning

This is summative assessment. It describes the level learners have attained in the learning, what they know and can do over a period of time. The emphasis is to evaluate the learner's cumulative progress and achievement.

Reinforcement and revision

Sometimes you will need to revise parts of the topic with the whole class. You will certainly need to start the next lesson by asking learners what they remember of the last one. Children need reinforcement. A few revision notes on the board to cover earlier work will be a very valuable start to every lesson.

Marking work

When you have a large class the marking of learners' work can become a burden. If it is postponed the burden can become unbearable. Learners need to have their work marked and returned promptly with constructive criticism and as much encouragement as you can give them.

Teaching tips

Some marking of work can be done by learners themselves, swapping papers so that there is a check. You can mark work in class while you are going round supervising and encouraging the learners as they work. This has the advantage of offering instant praise and correction.

- Do not let your marking pile up from one day or one week to another.
- It is important to create an atmosphere of trust in which learners feel confident enough to ask you questions without feeling embarrassed.
- Learners should never be allowed to make fun of a learner who asks a question to which other learners already know the answer. Make it clear that such a response is not acceptable.

Using resources effectively

To help learners gain the most draw on as many resources as possible. This section contains some suggestions on how best to use the resources in the Learner's Book and how to make use of other resources that may be available. The factual material in the Learner's Book is useful but it should be used alongside other information that the learners find out for themselves. It is important that learners learn techniques for finding out additional information.

The learner's book

Within each topic and unit of the Learner's Book, there are different types of text, illustrations and activities. These are designed to be used in a variety of ways to make lessons interesting, to increase learners' knowledge and motivation and to encourage them to be inquisitive, skilled, confident and mutually supportive.

Other resources

You can use a variety of resources in your lessons. Below are some of them.

- **Equipment:** weather stations, gardening tools, craft tools, and computers
- **Buildings:** laboratories, churches, workshops, shops, houses, memorials
- **Sound resources:** radio, audio tape, musical instruments
- **Living resources:** plants, seedlings, animals, local people
- **Personal treasures:** photos, diaries, possessions, memories
- **Print resources:** magazines and newspapers, books, atlas, workbooks
- **Pictures:** photographs, maps, drawings, diagrams, cartoons, illustrations

Using the local environment

The study of Mathematics is about the whole of your learners' physical, social and cultural surroundings. Your resources lie all around you. Do not just rely on the written word or pictures; use your own knowledge and that of your learners. Go outside and look with new eyes at your surroundings. Take the learners out into their environment (farms, rivers, lakes, offices, workshops, factories) and encourage them to do the same. Bring people from the Mathematics fields into the school to talk about their roles in the community; make the most of local examples.

Topic 1

Number

Unit 1: Counting

Unit objective

By the end of this unit, learners should be able to:

- a** count objects from 0-100 sequentially.

Teaching notes

Lesson organisation

- Count objects in a group.
- How many objects in each group.
- Write numbers in numerals and words up to 100.
- Identify the missing numbers.
- Identify the number before, after and between.

Lesson development

Counting

Background information: Objects can be placed in order for counting and also to find their place value.

Suggested activities

- Count the objects and read the numerals and words from 0-100.
- Missing numbers are put respectively.
- Identify missing numbers before, after and between.
- Making sets of 2s not exceeding 20.
- Making sets of 5s not exceeding 20.
- Learners write exercises.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner’s Book.
- Mathematics Infant Syllabus
- Counters
- Tape measure
- Rulers
- Crayons
- Books

Activity

Learners to count given objects and write the number in the box.

Exercise 1.1

- 1

100
- 2

from the steps
- 3

100
- 4

80
- 5

24

Exercise 1.2

- 1

Rewrite numbers from 1 to 100.
- 2

96, 43, 67, 13, 84, 22, 54, 76, 5, 49
- 3

forty-three, fifty-nine, seventy-six, ninety-four, eighteen
- 4

Circle the numbers in the learners book 12, 19, 98, 100, 39.

Exercise 1.3

Learners write the numbers that come before and after.

1

Groups of 5	Groups of 10
8	4
12	6
16	8

- 2

10 5

Exercise 1.4

- 1

Draw five circles with 5 stars each inside.
- 2

3
- 3

(a)

15

(b)

10

(c)

7

- ④ 2
⑤ 20, 25, 35

Unit exercise

- ① 47, 50
② (a) thirty-three
(b) fifty-seven
(c) eighty
③ 6
④ 97
⑤ 20, 30, 50, 70, 80, 90

Unit 2 : Numerical order

Unit objectives

By the end of this unit, learners should be able to:

- ① order objects to their respective positions.
② position numbers in a number line sequentially.
③ arrange in ascending and descending order.

Teaching notes

Lesson organisation

- Arrange in ascending order.
- Arrange in descending order.
- Missing numbers

Lesson development

Suggested activities

- Arrange numbers from the smallest to the biggest.
- Count numbers and arrange from biggest to smallest.
- Count and identify numbers from the number line.
- Identify the missing numbers.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus

- Pencils
- Rulers
- Books
- Dolls
- Toy cars
- Crayons
- Chairs

Activity 1

Exercise 2.1

- | | |
|-----------------|------------------|
| ① 1 3 6 7 9 | ④ 10 20 30 40 60 |
| ② 0 2 5 6 8 | ⑤ 69 79 89 99 |
| ③ 2 14 24 26 54 | |

Exercise 2.2

- | | |
|------------------|------------------|
| ① 75 19 17 9 0 | ④ 98 80 48 10 8 |
| ② 48 24 13 10 2 | ⑤ 99 98 90 70 55 |
| ③ 77 66 55 33 22 | |

Exercise 2.3

- | | |
|-----------------------------------|---------------------------------------|
| ① Ascending order 8 12 19 30 45 | ④ 79 |
| ② Descending order 89 67 50 34 23 | ⑤ Ascending order 9 12 40 54 60 80 99 |
| ③ Missing number 16 18 | |

Exercise 2.4

- | | |
|-----------------------------------|--|
| ① Ascending order 1 3 7 10 15 | ⑤ 20 40 |
| ② Descending order 12 35 58 76 92 | ⑥ Arrange children as : 40cm 49cm 55cm |
| ③ Circle 12 | 70cm 100cm |
| ④ Underline 64 | |

Unit exercise

- | | |
|----------------------------------|-------------|
| ① Ascending order 7 12 33 50 91 | ④ 42 |
| ② Descending order 88 77 56 14 3 | ⑤ Circle 64 |
| ③ 15 25 | |

Unit 3: Construction

Unit objectives

By the end of the unit, learners should be able to:

- a** arrange the pieces of the jigsaw puzzle in a sequential order using numbers.
- b** identify the missing numbers on the puzzle and fit the missing numbers.
- c** arrange materials in a numerical order.
- d** sorting from biggest to smallest / smallest to biggest.

Lesson organisation

- Counting from 0-100.
- Number identification.
- Fill in the missing numbers.
- Arrange numbers from smallest to biggest.
- Complete the puzzles using numbers.

Lesson development

Background information: Putting puzzles together helps learners learn more about numbers and also identifying missing numbers.

Suggested activities

- Rearrange the numbers.
- Fix the jigsaw puzzle sequentially.
- Fill in the missing numbers.
- Sort numbers from smallest to biggest / biggest to smallest.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Jigsaw puzzle
- Number line
- Number cards
- Counters

Exercise 3.1

- | | |
|--|-----------------|
| 1 Ascending order 8 12 19 25 34 | 4 (a) 45 |
| 2 Descending order 89 67 50 43 23 | (b) 85 |
| 3 16 18 | 5 59 |

Exercise 3.2

① 12

② 50

Exercise 3.3

① 4 8

② 15 25

③ 3 7 14 18 21

④ 49

⑤ 34 37

Exercise 3.4

① Learners to draw their shapes.

② 2 reds 2 blues

③ 6

④ 3 7 9 11 15

Exercise 3.5

① Ascending order 8 14 19 22 35

② Descending order 89 67 50 23 12

③ Missing number 12 14

④ 43

⑤ 12

Exercise 3.6

① Stick in the book.

② Circle 67.

③ 80

④ 100

⑤ Underline 88.

Unit exercise

① 7 12 33 40 91

② 88 77 56 14 3

③ 15 25

④ 64

⑤ 15

Unit 4: Ordinal numbers

Unit objective

By the end of this unit, learners should be able to:

a tell the position of objects in a line.

Lesson organisation

- Match number to ordinal number.
- Identify the positions of the given objects.

Lesson development

Background information: ordinal numbers help us to know where exactly an object is positioned.

Suggested activities

- Position identification.
- Write the numeral to the ordinal number.
- Match the ordinal numbers.

Suggested teaching and learning activities

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Number line
- Ordinal number cards
- Pictures of objects
- Learners

Exercise 4.1

- | | |
|----------|----------|
| ① Third | ④ Second |
| ② Fifth | ⑤ First |
| ③ Fourth | |

Exercise 4.2

- ① Circle 4th.
- ② Circle 7th position.
- ③ (a) First
(b) Fifth
(c) Tenth
- ④ fourth, sixth
- ⑤ Match

Exercise 4.3

- | | |
|--------------------------------------|--|
| ① Circle the 4 th star. | ④ Match: Books - 1 st , Cap - 2 nd , Bag - 3 rd ,
Pencil - 4 th |
| ② Circle the 3 rd pencil. | ⑤ 2 nd , 4 th , 7 th |
| ③ 5 th | |

Unit exercise

- 1 (a) first
(b) fourth
(c) ninth
- 2 Circle 7th.
- 3 1st, 2nd, 3rd, 4th
- 4 Emily
- 5 10th, 12th

Unit 5 : Fractions

Unit objectives

By the end of the unit, learners should be able to:

- a identify a denominator and a numerator in a fraction.
- b know that a fraction is a part of a whole.

Lesson organisation

- Colour given fractions of a whole.
- Identify shaded parts.

Lesson development

Background information: Learners already know how to identify the shaded part from a whole.

Suggested activities

- Colour shaded part.
- Identify the denominator and the numerator.
- Write exercises.

Suggested activities and materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Fruits
- Pencils
- Books

Exercise 5.1

- | | |
|--------------------------------|-----------------|
| ① Colour half of the circle. | ④ $\frac{1}{2}$ |
| ② Shade half of the rectangle. | ⑤ 2 |
| ③ 2 | |

Exercise 5.2

- ① Shade $\frac{1}{2}$ circle, rectangle, triangle, square and circle.

Exercise 5.3

- | | |
|------------------------------|--------------------------|
| ① Colour half of the square. | ③ Circle $\frac{1}{4}$. |
| ② 4 quarters. | ④ $\frac{1}{2}$ |

Exercise 5.4

- ① Colour $\frac{1}{4}$ of a square, triangle, circle, rectangle and diamond.

Exercise 5.5

- | | |
|----------------------------------|-------------------------------|
| ① $\frac{1}{2}$ | ④ $\frac{2}{4}$ |
| ② Shade $\frac{1}{4}$ rectangle. | ⑤ $\frac{1}{2}$ $\frac{1}{4}$ |
| ③ Circle the shaded square. | |

Exercise 5.6

- | | |
|-----|-----|
| ① < | ④ < |
| ② = | ⑤ = |
| ③ = | |

Exercise 5.7

- | | |
|--|--|
| ① < | |
| ② (a) < | |
| (b) = | |
| ③ < | |
| ④ Match by drawing the lines from 1 to $\frac{2}{2}$ and $\frac{4}{4}$. | |
| ⑤ < | |

Unit exercise

- | | |
|--------------------------------------|----------------------------------|
| ① Shade half of the square. | ④ $\frac{2}{4}$ or $\frac{1}{2}$ |
| ② Shade $\frac{1}{4}$ of the circle. | ⑤ Circle $\frac{1}{2}$ |
| ③ > | |

Unit 6: Approximation and estimation

Unit objective

By the end of the unit, learners should be able to:

- a make approximations of numbers near 10.

Lesson organisations

- Numbers 0-100
- Number line
- Number cards

Lesson development

Background information: numbers can be estimated to the nearest 10.

Suggested activities

- Use the number line to estimate.
- Use a number wheel for estimations.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Number line
- Number wheel

Exercise 6.1

- 1 20
- 2 70
- 3 40

- 4 90
- 5 50

Exercise 6.2

- 1 40
- 2 80
- 3 30

- 4 60
- 5 80
- 6 90

Exercise 6.3

- ① 70
- ② 20
- ③ 10
- ④ 90

- ⑤ 60
- ⑥ 50
- ⑦ 60
- ⑧ 90

Exercise 6.4

- ① 20
- ② 40
- ③ 30

- ④ 80
- ⑤ 40

Unit exercise

- ① (a) 30
(b) 80
- ② 30
- ③ 60
- ④ 90
- ⑤ (a) 20
(b) 50

Unit 7 : Comparisons

Unit objectives

By the end of this unit, learners should be able to:

- a compare two groups of items.
- b compare two numbers using greater than, less than or equal to.

Lesson organisation

- Organise objects from smallest to biggest.
- Organise objects from biggest to smallest.

Lesson development

Background information: Compare the given objects using signs $<$, $>$ and $=$.

Suggested activities

- Learners compare objects.
- Learners compare given numbers.
- Learners compare which group holds more or less.
- Use greater than, less than or equal to for comparing.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Number cards
- Number line
- Pencils
- Objects
- Charts

Exercise 7.1

- | | | | |
|---|------------------|---|-------------------|
| ① | Circle basket B. | ④ | Longer |
| ② | First stick. | ⑤ | Group B has more. |
| ③ | First books. | | |

Exercise 7.2

- | | | | |
|---|---|---|---|
| ① | > | ⑤ | > |
| ② | < | ⑥ | < |
| ③ | < | ⑦ | = |
| ④ | > | ⑧ | < |

Exercise 7.3

- | | | | |
|---|----|---|----|
| ① | < | ④ | 19 |
| ② | 72 | ⑤ | = |
| ③ | < | ⑥ | = |

Exercise 7.4

- | | | | | |
|---|-----|---|---|-------|
| ① | (a) | > | ④ | 59 |
| | (b) | < | ⑤ | (a) > |
| | (c) | = | | (b) < |
| ② | 14 | | | (c) = |
| ③ | > | | | |

Exercise 7.5

- 1 (a) $>$
(b) Left

2 $>$

- 3 $>$
4 $<$
5 48

Unit exercise

1 $<$

2 1 ruler longer 3 rulers shorter

- 3 $>$
4 $>$

Topic revision exercise

- 1 (a) eighteen (b) thirty-five
(c) seventy-two

2 (a) 47 49 (b) 92 94

3 10

4 3

5 4

6 (a) 8 (b) 4

7 Joe

8 (a) 8th (b) 9th

9 (a) 7th (b) 9th

10 (a) $<$ (b) $>$ (c) $=$

11 (a) 87 (b) 42

12 15

13 10 18 22 30 45

14 92 85 81 77 69

15 10

16 Colour half of each shape.

17 $\frac{3}{4}$

18 Circle (b).

19 (a) 50 (b) 80 (c) 30

20 (a) 91

21 est 60

22 10 20

23 10 20 30 40 50 60

24 14 28

Topic 2

Operations

Unit 8 : Addition of whole numbers up to 100

Unit objectives

By the end of the unit, learners should be able to:

- a** understand different words that mean add whole numbers.
- b** demonstrate addition using signs and addition terms.
- c** add whole numbers using calculators.

Lesson organisation

- Simple addition: Count on, add, plus, altogether, sum of.
- Adding: Plus
- Adding: Count on and write the answer. Learners use pictures to add, learners count the objects put together.
- Learners read the words sum of, combine, altogether, add and total. Learners use the + sign.

Lesson development

Lesson topic: Addition

Background information: Learners can now add, put together, find the totals, count on. Learners can add a variety of objects which they use every day in real life situations.

Suggested activities

- Learners count up to 10, teacher introduces the words, add, plus, put together and the + sign. Learners use counters to make sets, children look at number statement and count, learners write and put answers.
- Learners also add big numbers using a calculator.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Counters
- Books
- Tins
- Pencils
- Number cards
- Number line
- Calculator

Exercise 8.1

- | | | | |
|---|-------------------------|---|---------------|
| ① | numbers 1-100 | ③ | 368 |
| ② | Read the numbers aloud. | ④ | As per count. |

Exercise 8.2

- | | | | |
|---|----------------|---|----------------|
| ① | $16 + 38 = 54$ | ④ | $24 + 44 = 68$ |
| ② | $24 + 38 = 62$ | ⑤ | $24 + 33 = 57$ |
| ③ | $32 + 44 = 76$ | | |

Exercise 8.3

- | | | | |
|---|----|---|----|
| ① | 23 | ⑤ | 27 |
| ② | 40 | ⑥ | 61 |
| ③ | 35 | ⑦ | 55 |
| ④ | 23 | ⑧ | 25 |

Exercise 8.4

- | | | | |
|---|----|---|----|
| ① | 68 | ④ | 79 |
| ② | 94 | ⑤ | 57 |
| ③ | 99 | | |

Exercise 8.5

- | | | | |
|---|----|---|----------|
| ① | 45 | ③ | 82 bags |
| ② | 28 | ④ | 14 drums |

Exercise 8.6

- | | | | |
|---|----|---|-----|
| ① | 19 | ④ | 60 |
| ② | 40 | ⑤ | 100 |
| ③ | 34 | | |

Unit exercise

- 1 $11 + 7 = 18$
 $9 + 5 = 14$
 $16 + 11 = 27$
- 2 55
- 3 42
- 4 86
- 5 (a) 91
(b) 100

Unit 9 : Subtraction of whole numbers

Unit objectives

By the end of this unit, learners should be able to:

- a subtract whole numbers within the range.
- b using concrete objects to subtract.
- c demonstrate subtraction of whole numbers.

Teaching notes

Lesson organisation

- Subtraction of whole numbers.
- Count back.
- Crossing out subtraction.
- Subtraction within 0-100.
- Subtraction within 0-100.
- Subtraction using a calculator.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Pencils
- Counters
- Tape measure
- Ruler

Lesson development

Background information : Learners already understand the subtraction of whole numbers. Subtraction is reducing the number of the things you already have.

Suggested activities

- Crossing out given objects and count the remainder.
- Count back from the given number and write the answer.
- Count objects in each set, write the number and find the difference.

Exercise 9.1

① $40 - 20 = 20$
② $66 - 25 = 41$
③ $48 - 20 = 28$

④ $56 - 20 = 36$
⑤ $28 - 16 = 12$

Exercise 9.2

① 17
② 14
③ 14

④ 21
⑤ 30

Exercise 9.3

① 10
② 6
③ 8

④ 10
⑤ 25

Exercise 9.4

① 15
② 10
③ 10

④ 16
⑤ 85

Exercise 9.5

① 10
② 6
③ 25

④ 8
⑤ 10

Exercise 9.6

① 27
② 53

③ 29
④ 35

Unit exercise

- 1 (a) 26
(b) 16
(c) 3
- 2 (a) 25
(b) 15
(c) 42
(d) 42
(e) 25
- 4 30
- 5 29
- 6 25

Unit 10 : Multiplication

Unit objectives

By the end of this unit, learners should be able to:

- a multiply using repeated addition.
- b count objects in sets.
- c skip counting on a number line.

Lesson organisation

- Count given objects to find the product of given sets.
- Group given objects into sets.

Lesson development

Back ground information: Grouping sets in 2s and 5s is also known as multiplication using repeated addition.

Suggested activities

- Counting objects to find the product of given numbers using repeated addition.
- Group sets of objects into sets.
- Learners to write exercises.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner’s Book.
- Mathematics Infant Syllabus
- Counters
- Boxes
- Seeds

Exercise 10.1

- 1 3
- 2 9
- 3 6
- 4 (i) 6
(ii) 10
- 5 6
- 6 Circle 8.

Exercise 10 .2

- 1 6 3(2)
- 2 10 2(5)
- 3 20 4(5)
- 4 (a) 12
(b) 10
- 4 10

Exercise 10.3

- 1 15 and 16
 - 2 6
- 3 Match

Exercise 10.4

- 1 6
 - 2 4
 - 3 10
- 4 20
 - 5 12

Exercise 10.5

- 1 2
 - 2 4
 - 3 6
 - 4 9
 - 5 8
- 6 10
 - 7 15
 - 8 20
 - 9 10
 - 10 20

Exercise 10.6

- ① $2 + 2 + 2 + 2$
- ② Draw 3 sets of 3 apples.
- ③ 10
- ④ (a) 8
(b) 15
- ⑤ 6

Unit exercise

- ① 5 10 15 20
- ② $4(2)$
- ③ 12
- ④ (a) 6
(b) 20
- ⑤ $2 + 2 + 2 + 2 = 4 \text{ sets } 2$
 $= 4(2)$
 $= 8$

 $5 + 5 = 2 \text{ sets of } 5$
 $= 2(5)$
 $= 10$

Unit 11 : Division

Unit objectives

By the end of this unit, learners should be able to:

- a share given objects equally without leaving a remainder.
- b share not exceeding 20.

Lesson organisation

- Sharing equally.

Lesson development

Back ground information: Learners already have an understanding of numbers and sharing amongst themselves.

Suggested activities

- Share given objects equally.
- Learners to write exercises.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Stones
- Counters
- Objects

Suggested answers

Exercise 11.1

- 1 4
- 2 4
- 3 6

- 4 3
- 5 3

Exercise 11.2

- 1 6
- 2 7

- 3 Each group gets 5 cars.

Exercise 11.3

- 1 5
- 2 6

- 3 5
- 4 3

Unit exercise

- 1 7
- 2 3
- 3 4
- 4 2

- 5 2
- 6 4
- 7 4

Topic revision exercise

- 1 (a) 70
(b) 83
(c) 86
- 2 (a) 43
(b) 63

- 3 $5 + 7 = 12$
- 4 (a) 43 (b) 15 (c) 68
- 5 (a) 33 (b) 42
- 6 (a) 36 (b) 25
- 7 32
- 8 67
- 9 53
- 10 (a) $<$ (b) $>$ (c) $=$
- 11 (a) $=$ (b) $<$
- 12 8 10 12 16 18
- 13 (a) 9 (b) 20
- 14 (a) 8 (b) 12 (c) 3
- 15 16
- 16 15

- 17 12
- 18 (a) 3 (b) 2
- 19 (a) 5 (b) 5 (c) 4
- 20 12 sweets shared among 3 friends
- 21 4
- 22 4
- 23 7
- 24 12
- 25 $4(2) = 8$
- 26 (a) \$15 (b) \$5
- 27 8
- 28 6
- 29 8
- 30 20

Topic

3

Measures

Unit 12 : Money

Unit objectives

By the end of this unit, learners should be able to:

- a** know the value of each coin.
- b** calculate change.
- c** calculating money up to \$1.

Lesson organisation

- Add coins.
- Find the value of given coins.

Lesson development

Background information: The learners already know how to buy using money and also know how to add coins.

Suggested activities

- Add given coins.
- Learners do write their exercises.
- Learners to calculate change up to \$1.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Coins
- Money chart
- Paper money

Exercise 12.1

- | | |
|---------------|------------|
| ① Circle 50c. | ③ 35c |
| ② 10c 50c | ④ A and B. |

Exercise 12.2

- ① 20c 20c 10c
- ② 50c 20c 5c
- ③ (a) 20c
(b) 5c
- ④ $20c + 20c + 20c$
- ⑤ C

Exercise 12.3

- | | |
|-------|-------|
| ① 5c | ③ 15c |
| ② 70c | |

Unit exercise

- | | |
|------------------------|------------------------|
| ① Circle the \$1 coin. | ④ 20c 20c 20c 5c 5c 5c |
| ② 50c | ⑤ A |
| ③ 20c | |

Unit 13 : Time

Unit objectives

By the end of this unit, learners should be able to:

- a name the days of the week in the correct order.
- b tell the difference of today, tomorrow and yesterday.

Lesson organisation

- Organise the days of the week.
- Answer all questions.
- Organise the months of the year.
- Ordinal positions – days of the week and months of the year.
- What time of the day it is.

Lesson development

Back ground information: The learners already know how many days they go to school. Also they know their birthdays. The learners know how to read the time on a clock.

Suggested activities

- Organise days of the week in a rhyme.
- Let the learners read the calendar.
- Let the learners write the days of the week.
- Let the learners tell the months they were born.
- Let the learners tell the season of the year using months.
- Let the learners write the shown time.
- Learners to tell the time using o'clock, half past.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Days of the week cards
- Months of the year cards
- Charts with days of the week
- Clock face
- Calendars
- Pencils
- Books
- Time table

Exercise 13.1

- 1 Thursday
- 2 Thursday
- 3 As per day.
- 4 (a) As per day.
(b) As per day.
- 5 Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

Exercise 13.2

- | | |
|------------------|---|
| 1 June | 4 January |
| 2 July | 5 February, April, July, November, December |
| 3 Birthday month | |

Exercise 13.3

- 1 Insert clock 3 o'clock.
- 2 6 o'clock.
- 3 C
- 4 (a) hour
(b) 6
- 5 Matching page 146.

Unit exercise

- 1 Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
- 2 Wednesday
- 3 Half past 3 Half past 12
- 4 Insert a clock 7 o'clock.
- 5 Draw a clock half past 9.
- 6 2 August 2025

Unit 14 : Mass

Unit objectives

By the end of this unit, learners should be able to:

- a compare the mass of given objects using words heavier and lighter.
- b measure weight using a balancing scale.

Lesson organisation

- Comparing objects.
- Weighing objects.

Lesson development

Background information: different objects have different mass. Learners can compare mass of objects using a balancing scale.

Suggested activities

- Let the learners lift different objects to compare the weight.
- Learners to write exercises.
- Weigh different objects and write down their mass.
- Weigh objects and compare then using heavier and lighter.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infants Syllabus
- Counters
- Stones
- Fruits
- Boxes

Exercise 14.1

- stone
 - books
- book
 - feather
- False
 - False
- Draw heavier and lighter objects.
- heavier
 - heavier

Exercise 14.2

- School bag
- Mangoe
- brick
 - school shoe
- Draw a seesaw.
- book

Unit exercise

- Watermelon
- Heavier
- Draw heavier and lighter objects.
- False
- Matching page 156

Unit 15 : Length

Unit objectives

By the end of this unit, learners should be able to:

- a** use non-standard units to compare measurements.
- b** measure length, height, area and perimeter.

Teaching notes

Lesson organisation

- Compare length of given objects.
- Short / longer
- Measure length
- Measure in centimetres.
- Taller / shorter

Lesson development

Background information: Length of objects can be measured using standard measures. Length of objects can be calculated.

Suggested activities

- Learners to compare length of different objects.
- Learners to measure using rulers, spans, strings.
- Learners to compare height of objects.
- Learners to write exercises.

Suggested teaching and learning materials

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Ruler
- Crayons
- Pencils
- Learners

Suggested answers

Exercise 15.1

- | | |
|---------------------------------------|-------------------------------------|
| 1 Ruler | 3 False |
| 2 (a) As per desk. (b) As per height. | 4 Draw a longer and shorter object. |

Exercise 15.2

- | | |
|----------------|----------------------------|
| 1 As per desk. | 4 As per the drawn square. |
| 2 As per desk. | 5 House bigger |
| 3 True | Book smaller |

Exercise 15.3

- | | |
|--------------------------------|------------------------------------|
| 1 (a) 8 squares (b) 16 squares | 3 False |
| 2 12 squares | 4 Draw a rectangle with 6 squares. |

Unit exercise

- | | |
|----------------|----------------------------|
| 1 As per book. | 4 (a) As per water bottle. |
| 2 As per desk. | (b) As per mat. |
| 3 4 | 5 True |

Unit 16 : Rate

Unit objectives

By the end of this unit, learners should be able to:

- a compare rate of given objects which one is faster, fastest.
- b slow and slowest.

Lesson organisation

- Fast and slow

Lesson development

Background information: Rate is a measure of movements of objects as well as performance of tasks.

Suggested activities

- Compare which one is faster and slower from the given objects.
- Learners to write exercises.

Suggested teaching and learning material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Moving objects
- Toys
- Learners

Suggested answers

Exercise 16.1

- | | |
|-------------------------|--------------------------------------|
| ① Circle running. | ④ Draw 2 people running and walking. |
| ② (a) faster (b) slower | ⑤ Me |
| ③ False | |

Exercise 16.2

- | | |
|-------------------------|---|
| ① Reading one sentence. | ③ False |
| ② (a) faster | ④ Match page 171. |
| (b) faster | ⑤ Draw a picture showing faster and slower. |

Unit exercise

- | | |
|--------------|--|
| ① Running | ③ True |
| ② (a) faster | ④ Draw 2 people running faster and slower. |
| (b) less | ⑤ Match 172. |

Unit 17 : Volume and capacity

Unit objectives

By the end of this unit, learners should be able:

- ① compare capacity of containers using non-standard units.

Teaching notes

Lesson organisation

- Volume containers.
- Compare using bigger / smaller.
- Compare using less / more.
- Write exercises.

Lesson development

Background information: volume containers differ in size and shape. Some containers have a larger volume whilst others have a smaller volume. Learners use liquids, gas and solids to compare the capacity.

Suggested activities

- Let the learners compare different volumes from different containers.
- Learners use more or less to compare the volume.
- Learners answer questions.

Suggested activities

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Plastic containers
- Tins
- Sacks stones
- Feathers
- Water

Exercise 17.1

- 1 (a) Circle the cup.
(b) plate
- 2 (a) more
(b) more
- 3 True
- 4 Draw 2 containers more / less.
- 5 Bottle

Exercise 17.2

- 1 jug
- 2 (a) more
(b) less
- 3 trolley
- 4 Draw a bigger container and a smaller container.

Unit exercise

- 1 jug
- 2 (a) less
(b) less
- 3 false
- 4 Draw a jug and a cup.
- 5 more

Topic revision

- | | | |
|----------------------------|-----------------|------------|
| 1 Draw the coins you know. | 14 (a) taller | (b) longer |
| 2 (a) one dollar | 15 first one | |
| (b) five cents | 16 8 | |
| (c) twenty cents | 17 14 <i>cm</i> | |
| 3 40c | 18 20 <i>m</i> | |
| 4 30c | 19 car | |
| 5 30c | 20 (a) slower | (b) slower |
| 6 20c | 21 Tendai | |
| 7 (a) Tuesday | 22 (a) cup | (b) bucket |
| (b) Sunday | 23 (a) more | (b) more |
| 8 Wednesday / March | 24 (a) 5 | (b) 10 |
| 9 3 o'clock | 25 60c | |
| 10 Half past 7 | 26 4 chairs | |
| 11 Tick a stone. | 27 15 | |
| 12 (a) heavier | | |
| (b) heavier | | |
| 13 (a) As per pencil. | | |
| (b) As per book. | | |

Topic 4

Relationships

Unit 18 : Data collection and presentation

Unit objectives

By the end of this unit, learners should be able to:

- a** represent data using concrete objects, counters, shapes.
- b** they should also be able to use the tallying method to represent data.

Teaching notes

Lesson organisation

- Objects / pictures
- Graphs
- Tallying

Lesson development

Background information: learners read and identify objects as well as sort them on a graph.

Suggested activities

- Let the learners identify objects.
- Represent data using counters.
- Ask learners to sort objects and identify which graph has more or less.

Suggested learning and teaching material

- PlusOne Mathematics Grade 2 Learner's Book.
- Mathematics Infant Syllabus
- Blocks
- Counters

Exercise 18.1

- 1 11 tallied sticks
- 2 1 1

- 3 Banana has the most.
Pear has the least.

Exercise 18.2

- 1 Represent on a graph.
 - (a) 6 books
 - (b) 4 bags
 - (c) 5 pencils
- 2 Table
Tally 6 books.
Tally 5 books.
Tally 7 pencils.
- 3 (a) books
(b) bags
- 4 Insert a graph.

Exercise 18.3

- 1 Apples
- 2 More
- 3 True
- 4 Draw a pictograph.

Unit exercise

- 1 Red 3
Green 2
Blue 4
 - (a) Draw the bar graph.
 - (b) Blue is popular.
Green is least.
- 2 True

End of term test

- 1 (a) Data collection.
(b) Graph and tallying method.
- 2 Calling them out.
- 3 Category 1 - 3
Category 2 - 12
- 4 (a) bird (b) cat
- 5 (a) Pictures on a graph.
(b) Counters on a table.
(c) Numerical representation on a graph.
- 6 apples
- 7 (a) 25 27
(b) 91 93
- 8 8
- 9 blazer
- 10 (a) 9th
(b) 3rd
- 11 (a) 76
(b) 62
- 12 (a) 53
(b) 23
- 13 (a) 50
(b) 4
- 14 (a) 8, 10, 12
(b) 15, 25
- 15 12, 23, 34, 54, 89
- 16 92, 83, 67, 51, 45
- 17 35
- 18 Tuesday
- 19 (a) March
(b) Saturday
- 20 stone
- 21 heavier
- 22 (a) As per pencil.
(b) As per ruler.
- 23 train
- 24 Tendai
- 25 10
- 26 \$6
- 27 25
- 28 20
- 29 25
- 30 60
- 31 (a) 8, 10, 12
(b) 30, 35, 40
- 32 12
- 33 85 75 60 45 30
- 34 (a) fifty-six
(b) ninety-eight
(c) twenty-seven
- 35 (a) 73
(b) 49
(c) 82
- 36 (a) 82
(b) 48
- 37 (a) 45
(b) 45
- 38 38
- 39 (a) 8 (b) 10
(c) 5 (d) 5
- 40 24
- 41 shade $\frac{1}{2}$
- 42 $\frac{1}{2}$
- 43 (a) > (b) =
- 44 $\frac{1}{2}$
- 45 (a) 4 (b) 25
- 46 15c
- 47 September
- 48 heavier
- 49 maize
- 50 (a) orange (b) 4 oranges