

PlusOne

Mathematics



Grade
3

PlusOne

Mathematics

Teacher's Guide



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Introduction

The PlusOne Mathematics Teacher's Guide is a detailed book that complements the teaching of Mathematics in Zimbabwean primary schools. This book offers valuable guidelines on how to deliver effective lessons using the HBC PlusOne Mathematics Grade 3 Learner's Book.

The subject, Mathematics, aims at producing a morally upright Zimbabwean, who is responsible and capable of maintaining a socially sound lifestyle. It seeks to explore social, cultural, geographical and technological space to develop the cognitive, affective and psychomotor domains of the learner. As a foundational tool for logic and arrangement, Mathematics assists in the teaching and learning of other learning areas across the curriculum. Broadly, the syllabus aims to produce learners who can:

- apply Mathematical concepts and skills in relevant life situations.
- solve problems using a variety of Mathematical strategies.
- communicate Mathematical ideas clearly and confidently.
- utilise ICT tools in Mathematical investigations and operations.
- demonstrate an understanding of Zimbabwean heritage through ethno-Mathematics.
- develop mental agility and logical reasoning skills.
- apply measurement, estimation, and data handling skills in daily activities.
- demonstrate accuracy and efficiency in number operations.
- appreciate the beauty and utility of Mathematics in the environment.
- comment meaningfully on data to develop skills such as critical thinking, problem solving, team building and tolerance.
- use appropriate Mathematical language in line with our cultural values.

Topics/Skills

The learning and teaching of Mathematics will focus on the following topics:

- Number
- Operations
- Measures
- Relationships

The objective of this Grade 3 Teacher's Guide is to make teaching and learning more interactive, practical and useful and to bring out the ingenuity of teacher professionalism in the teacher to produce well-equipped learners for national development.

Philosophy of teaching Mathematics

Mathematics provides opportunity for teachers to adopt cross-cutting and creative pedagogic approaches such as talk for learning, project-based learning, games, modelling, questioning, songs, storytelling and role-play necessary for achieving a conducive learning environment and developing learners into creative, honest and responsible citizens. The Mathematics classrooms

should be learning-centred where the teacher, acting as a facilitator, introduces the topics for the day and assists learners to describe and analyse issues raised.

In addition, the teacher helps learners to interact and share ideas among themselves based on their knowledge of Zimbabwe and the world. The class will be encouraged to explore topics through enquiry-based questions. The teacher should emphasise these important areas in day-to-day learning as they are aimed at promoting higher order thinking among learners.

Philosophy of learning Mathematics

Through the learning of Mathematics, learners will specifically acquire:

- critical thinking and problem-solving skills to be able to compare, analyse, evaluate and apply Mathematical knowledge with little or no supervision.
- creative thinking skills to be able to reconstruct important information confidently.
- digital literacy skills to be able to use IT tools and resources (such as calculators and software) efficiently for investigations and project works.
- effective communication skills to be able to share Mathematical information at various levels of interaction.
- values to live as global citizens capable of learning about other peoples and cultures of the world.
- leadership skills to be able to effectively build a team and influence others to accomplish a common task.

Subject specific aims

The syllabus should enable learners to:

- develop a positive attitude towards Mathematics.
- foster problem-solving skills into learners.
- communicate Mathematical information to develop critical thinking and logical reasoning.
- develop Mathematical concepts and skills for use in entrepreneurship and other facets of life.
- develop psycho-social skills such as self-control and free expression of emotions which contribute to the development of the learner.
- develop an awareness of national heritage in the learning of Mathematics.
- promote an awareness of IKS in the teaching and learning of Mathematics.

Instructional expectations

Mathematics provides opportunity for teachers to:

- adopt thematic and creative pedagogic approaches such as the concrete-pictorial-abstract approach, project-based learning, games and modelling.
- nurture and develop learners into creative, honest and responsible citizens.

- adopt collaborative approaches to lesson preparation within and across disciplines and grade levels to develop communities of Mathematics learners.
- use multiple methods to systematically gather data about learners' understanding and ability to guide the teaching and learning of Mathematics.
- put necessary arrangements in place to provide feedback to both learners and parents.

Interpretation of key words in the syllabus

Topics are the broad areas of the Mathematics curriculum. Units are larger groups of related objectives. Content objectives indicate what all learners should know, understand and be able to do. Objectives are clear statements of specific things learners should know and be able to do within each unit.

Class management

Most teachers in Zimbabwe teach large classes. The teachers, based on their professional experience over the years, have developed skills in classroom methodology. Here are a few reminders about the 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 at the front of the class explaining and listening to your learners. You can set out facts and concepts which everyone can understand. However, your class will vary in ability. 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. work out during your lesson planning which concepts will be difficult for them to understand and explain these first. Make sure that all your learners have understood your explanation and give time to those having difficulty.

1. Group work

Class teaching is large group work but sometimes there are advantages in working in pairs or groups of four to six learners. Some children make more progress when working in a group of the same ability. On other occasions, more able learners can help those who are not quite so quick at understanding.

There are many advantages in allowing several children to consider a Mathematical problem, work jointly and bring their findings back to the whole class: each group will think in a slightly different way and have different experiences to share. Individual groups can study a diagram together, solve a complex operation, or discuss a topic like budgeting in their community.

2. 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 deskmate offers the least classroom disturbance. They ask and answer questions during "shape talk" and they discuss the steps of a calculation before they solve individual exercises.

3. 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 and to allow you to work with learners of different abilities. It is essential that the material they use is understandable to them. Use additional material at different levels to ensure that some learners do not finish more quickly than others.

Teaching tip

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 (measuring, drawing, weighing).

The syllabus emphasises the:

- creation of learning-centred classrooms using creative approaches to ensure learner empowerment.
- positioning of inclusion and equity at the centre of quality teaching.
- use of Information and Communications Technology (ICT) as a pedagogical tool.
- integration of assessment as learning, for learning and of learning.

Learning-centred pedagogy

The learner is at the centre of learning. At the heart of the national curriculum for change and sustainable development is the learning progression and improvement of learning outcomes for Zimbabwe's young people. It is expected that at each curriculum phase, learners would be offered the essential learning experiences to progress seamlessly to the next phase. Where there are indications that a learner is not sufficiently ready for the next phase, a compensatory provision through differentiation should be provided to ensure that such a learner is ready to progress with his/her cohort.

The syllabus encourages the creation of a learning centred classroom with the opportunity for learners to engage in meaningful "hands-on" activities that bring home to the learner what they are learning in school and what they know from outside of school. The learning centred classroom is a place for the learners to discuss ideas through the inspiration of the teacher.

The learners then become actively engaged in looking for answers, working in groups to solve problems. They also research information, analyse and evaluate information. The aim of the learning-centred classroom is to enable learners to take ownership of their learning. It provides the opportunity for deep and profound learning to take place.

The teacher as a facilitator needs to create a learning environment that:

- makes learners feel safe and accepted.
- helps learners to interact with varied sources of information in a variety of ways.
- helps learners to identify a problem suitable for investigation through project work.
- connects the problem with the context of the learners' world so that it presents realistic opportunities for learning.
- organises the subject matter around the problem, not the subject.
- gives learners responsibility for defining their learning experience and planning to solve the problem.
- encourages learners to collaborate in learning.
- expects all learners to demonstrate the results of their learning through a product or performance.

It is more productive for learners to find answers to their own questions rather than teachers providing the answers and their opinions in a learning-centred classroom. The content with reference to learner's activities in class and outside classroom focusses on learner-centred pedagogy, which emphasises active participation in class activities, making teaching and learning more practical and toward achieving positive learning outcomes that largely benefit the learner.

Pedagogical approaches

Effective teaching and learning in Mathematics depend upon the use of actively participatory methods including the following:

- Demonstration
- Mathematical Games
- Individual and group presentations
- Modelling (making 3D shapes)
- Educational tours/Excursions (visiting a bank or market)
- E-Learning
- Case studies (financial literacy)
- Problem-based learning
- Scences/Models/Resource persons (for example, inviting an engineer or accountant)

Inclusion

Inclusion is ensuring access and learning for all learners especially those disadvantaged. Planning, delivery and reflection on daily learning experiences should take these differences into consideration, ensuring learners with visual or learning impairments are supported with appropriate media (for example, Braille or tactile models).

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 task, support and outcome. Differentiation as a way of ensuring each learner benefits adequately from the delivery of the curriculum can be achieved in the classroom through:

- task,
- one-on-one support,
- learning outcomes.

Differentiation by task: Setting different Mathematical problems for learners of different abilities.

Differentiation by support: Giving one-on-one help to learners struggling with specific operations.

Differentiation by outcome: Allowing learners to respond at different levels of complexity.

Scaffolding in education refers to the use of variety of instructional techniques aimed at moving learners progressively towards stronger understanding and ultimately greater independence in the learning process. It involves breaking up a complex Mathematical task into smaller steps. Common strategies include:

- giving learners a simplified version of a problem.
- illustrating a concept (like fractions) in multiple ways (diagrams, physical objects).
- giving learners a model of an assignment they will be asked to complete.

Learner activities

The types of activities used to ensure multi-ability learning include:

- practical measuring and weighing
- geometric drawing
- role-play (buying and selling)
- Mathematical songs and games
- crosswords and number puzzles
- matching activities (shapes to names)
- case studies and interviews

Core competencies

Activities in the text serve to:

- break up the lesson to aid concentration.
- extend the knowledge gained from the text.
- develop academic skills such as calculation, data interpretation, and spatial awareness.
- develop communication skills: discussing strategies and reporting findings.

In later primary years the activities should also help learners to look beyond the material easily available to them by encouraging them to ask other adults, visit libraries (if there are any) and use the internet if it is available.

The Learner's Book aims to use a variety of approaches to offer as many ways of learning as possible. No one way suits every learner. As an example, there are many ways to teach reading. The best teachers use every method they know to suit everyone in their class.

Some people learn quickly by reading with understanding. Others need to learn through practical experience. You will have all types of learners in your class.

You will need additional activities to broaden the learning experience, some tailored to the needs of able learners and others to add variety and depth to various topics.

Practical activities

In Mathematics, these cover all activities which include a practical skill. The obvious ones are drawing and measuring, but equally valuable is making a model of a house or using local market scenarios to understand profit and loss. Learning needs to be made enjoyable to encourage lifelong interest.

Practising skills

Acquisition of study skills and knowledge has, by and large, been through practical lessons. Oral lessons cannot necessarily and abundantly give the learner the required skills and knowledge.

Learners need to practise:

- **Calculation:** Developing speed and accuracy in operations.
- **Measurement:** Using SI units correctly in real-world contexts.
- **Logical reasoning:** Practising concentration and step-by-step thinking.
- **Research skills:** Looking for Mathematical patterns in the environment. Research skills are important too. You can encourage learners to go beyond the Learner's Book in these later years of their primary schooling to look for additional materials and to store only those facts which will be of long-term use and lifelong learning.

Use of ICT

Some schools in urban areas have access to computers in school or in libraries. Rural areas will become linked in the future. You should learn how to use a computer as soon as you are able. They open the world as your resource. The internet can provide as much additional material as you will ever need.

Once your learners have the chance to use a computer, they too will have access to a world of information. Effective use of ICT in Mathematics includes:

- Calculators
- Laptops/Tablets for graphing or coding (Scratch Jr).
- Projectors for visualising geometric transformations.
- Spreadsheets (Microsoft Excel) for data handling.

The teacher should try as much as possible use whatever technological resources available such as any of those stated above to assist in teaching and learning. The use of ICTs in teaching and learning activities promotes a paradigm shift to learner-centred environment. Here are some useful ideas on how to go about this:

- Integrate ICT's in the learning process, as a key competence and contributing to the acquisition of skills and knowledge;
- Use ICT's in the classroom to work on information processing, authentic communication, and on the learner autonomy, as the builder of his or her own learning process;
- Give ICT's a role to help young people be able to arrange, evaluate, synthesise, analyse and decide on the information that comes to them;
- Learners with different types of supports and formats and, therefore, a great variety of activities in which they pass from receivers to makers;
- Attend to the diversity or learning needs of learners, using the copious offer of interactive exercises available on the web.

Making sure that learners have absorbed the lessons taught and not just had fun through the entire lesson is equally important. There are assessments at the end of each lesson in the Learner's Book that are useful tools for reinforcement of lessons taught.

You can also adopt other forms of assessment during the lessons to ensure learners are on the same level of understanding. Some of these assessments include the following:

Diagnostic assessment

Examining prior knowledge to establish links to new lessons. This examines learners' prior knowledge and is used to establish links to the new lesson. Test learners' prior knowledge by asking them to respond to key words, names and dates related to the next topic. Ask learners to define key words and terms.

Formative assessment

Formative assessment is the methods that teachers use to evaluate and assess a learner's ability to understand and apply what they have learnt during a lesson.

Topic 1

Number

Unit 1: Whole numbers

Unit objectives

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

- a** read numbers in numerals.
- b** write numbers in numerals.
- c** read numbers in words.
- d** write given numbers in words.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 1–3.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 1.1

- 1** **a** Four ____ 4 **b** Seven _____ 7
- 2** Learners read and write the numbers up to 1000 in numerals and words.
- 3** **a** 6 – Six
- b** 7 – Seven
- c** 8 – Eight
- d** Nine – Nine
- e** 155 – One hundred and fifty-five
- f** 205 – Two hundred and five
- g** 500 – Five hundred
- h** 617 – Six hundred and seventeen
- i** 999 – Nine hundred and ninety-nine

Exercise 1.1

- 1
 - a three → 3
 - b five → 5
 - c seven → 7
 - d eighteen → 18
 - e twenty-one → 21
- 2 119
- 3 32
- 4 Two hundred and seventeen
- 5 Sixteen
- 6 Five hundred and fifty-six
- 7 920

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 B | 4 C |
| 2 B | 5 B |
| 3 A | |

Structured questions answers

- 6
 - a Twenty-one → 21
 - b Sixty → 60
 - c Nine hundred and twenty → 920
- 7
 - a 32 → Thirty-two
 - b 105 → One hundred and five
 - c 500 → Five hundred
- 8 250
- 9 14
- 10
 - a 617 → Six hundred and seventeen
 - b 155 → One hundred and fifty-five
 - c 205 → Two hundred and five

Unit 2: Place value of digits

Unit objectives

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

- a identify the place value of each digit in two- or three-digit numbers.
- b compare the place value of digits in different places within a number or on different numbers.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 4–7.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 2.1

Number	Hundreds (H)	Tens (T)	Units (U)
254	2	5	4
302	3	0	2
235	2	3	5
954	9	5	4

Exercise 2.1

- 1
- a 3 tens 4 units = 34
 - b 6 tens 3 units = 63
 - c 7 tens 9 units = 79
 - d 4 tens 3 units = 43
 - e 2 hundreds 0 units = 200

2

Number	Digit to look at	Place value
a. 25	2	Tens
b. 325	2	Tens
c. 3258	5	Hundreds
d. 324	3	Hundreds

Unit revision exercises

Multiple choice answers

- 1 B
- 2 C
- 3 B
- 4 C
- 5 B

Structured questions answers

- 1
- a

3 tens and 4 units = 34
- b

6 tens and 3 units = 63
- c

7 tens and 9 units = 79
- d

4 tens and 3 units = 43
- e

2 hundreds and 0 units = 200
- 2
- a

25 (if 2 is bold) → Tens
- b

325 (if 2 is bold) → Tens
- c

3258 (if 3 is bold) → Thousands
- d

324 (if 3 is bold) → Hundreds

3

Number	Hundreds (H)	Tens (T)	Units (U)
254	2	5	4
302	3	0	2
235	2	3	5
954	9	5	4

- 4
- a

Place value — The value of a digit depending on its position in a number.
- b

Units (ones) — The last digit showing single items.
- c

Tens — The second digit from the right showing groups of ten.
- d

Hundreds — The third digit from the right showing groups of a hundred.

Unit 3: Number notation

Unit objective

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

- a
- expand numbers.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner’s Book pages 8–10.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 3.1

- 1

23 = 20 + 3
- 2

35 = 30 + 5
- 3

123 = 100 + 20 + 3
- 4

248 = 200 + 40 + 8
- 5

352 = 300 + 50 + 2
- 6

364 = 300 + 60 + 4
- 7

485 = 400 + 80 + 5
- 8

324 = 300 + 20 + 4

Exercise 3.2

1 $15 = (1 \times 10) + (5 \times 1)$

2 $25 = (2 \times 10) + (5 \times 1)$

3 $45 = (4 \times 10) + (5 \times 1)$

4 $125 = (1 \times 100) + (2 \times 10) + (5 \times 1)$

5 $321 = (3 \times 100) + (2 \times 10) + (1 \times 1)$

6 $324 = (3 \times 100) + (2 \times 10) + (4 \times 1)$

7 $423 = (4 \times 100) + (2 \times 10) + (3 \times 1)$

8 $564 = (5 \times 100) + (6 \times 10) + (4 \times 1)$

9 $623 = (6 \times 100) + (2 \times 10) + (3 \times 1)$

10 $725 = (7 \times 100) + (2 \times 10) + (5 \times 1)$

Unit revision exercises

Multiple choice answers

1 B

2 B

3 C

4 C

5 A

Structured questions answers

1 a $23 = 20 + 3$

b $35 = 30 + 5$

c $123 = 100 + 20 + 3$

d $248 = 200 + 40 + 8$

e $352 = 300 + 50 + 2$

f $364 = 300 + 60 + 4$

g $485 = 400 + 80 + 5$

h $324 = 300 + 20 + 4$

2 a $15 = (1 \times 10) + (5 \times 1)$

b $25 = (2 \times 10) + (5 \times 1)$

c $45 = (4 \times 10) + (5 \times 1)$

d $125 = (1 \times 100) + (2 \times 10) + (5 \times 1)$

e $321 = (3 \times 100) + (2 \times 10) + (1 \times 1)$

f $324 = (3 \times 100) + (2 \times 10) + (4 \times 1)$

g $423 = (4 \times 100) + (2 \times 10) + (3 \times 1)$

h $564 = (5 \times 100) + (6 \times 10) + (4 \times 1)$

i $623 = (6 \times 100) + (2 \times 10) + (3 \times 1)$

j $725 = (7 \times 100) + (2 \times 10) + (5 \times 1)$

3

Term	Meaning
a. Expand numbers	Writing a number to show the value of each digit (for example, $234 = 200 + 30 + 4$).
b. Place value	The position of a digit in a number that determines its value.

Unit 4: Ordinal numbers from first to thirtieth

Unit objectives

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

- a write ordinal numbers up to 30.
- b use ordinal numbers in ranking and positioning.
- c write ordinal numbers in words and numerals.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 11–18.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 4.1

Learners read and write the given ordinal numbers up to 30.

Exercise 4.1

- 1
 - a First, second, third, fourth, fifth, sixth.
 - b Eleventh, twelfth, thirteenth, fourteenth, fifteenth.
- 2 (Eleventh) 11th
- 3 In a race, the person who runs the fastest and reaches the finish line before everyone else is the winner. The fastest runner takes the **first** position (or **1st**).
- 4

Ordinal word	Numeral
a. Thirteenth	13 th
b. Fourteenth	14 th
c. Sixteenth	16 th
d. Fifteenth	15 th
e. Twenty-fifth	25 th
f. Twenty-ninth	29 th
g. Thirtieth	30 th

Activity 4.2

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Exercise 4.2

- 1 True (2 can be split into 1 and 1).
- 2 False (3 is an odd number).
- 3 True (4 can be split into 2 and 2).
- 4 False (7 is an odd number).
- 5 True (8 can be split into 4 and 4).
- 6 Any number ending in 0 is even. Here are eight: 10, 20, 30, 40, 50, 60, 70, 80
- 7 10, 12, 14, 16, 18, 20

Activity 4.3

Odd numbers always end in **1, 3, 5, 7, or 9**. They always have one left over when you try to pair them up. From the given list, the odd numbers are: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.

Exercise 4.3

- | | |
|----------------------------------|------------------|
| 1 15, 5, 11, 17 → None are even. | 13 9, 19, 17, 3 |
| 2 12, 2, 18 | 14 3 |
| 3 2, 12, 18 | 15 15, 7 |
| 4 10 | 16 1 |
| 5 2, 20, 8 | 17 3, 1 |
| 6 14, 4 | 18 15 |
| 7 6, 8, 16 | 19 3, 19 |
| 8 4, 6, 14 | 20 19, 9, 13 |
| 9 18, 10, 6 | 21 17, 9 |
| 10 14, 18 | 22 no odd number |
| 11 18, 16 | 23 5 |
| 12 20, 10 | 24 7, 3 |

Exercise 4.4

- 1 Ordinal odd positions from left to right:
 - a First (1st): Red
 - b Third (3rd): White
 - c Fifth (5th): Black
 - d Seventh (7th): Purple
- 2 Ordinal positions from right to left:
 - a First (1st): Purple
 - b Second (2nd): Green
 - c Third (3rd): Black
 - d Fourth (4th): Yellow

- e Fifth (5th): White
- f Sixth (6th): Brown
- g Seventh (7th): Red

Exercise 4.5

- 1
 - a 2nd: Peter
 - b 4th: Chipso
 - c 6th: Nomatter
- 2
 - a 1st: A
 - b 3rd: C
 - c 5th: E
 - d 7th: G
 - e 9th: I
 - f 11th: K
- 3
 - a 2nd: B
 - b 4th: D
 - c 6th: F
 - d 8th: H
 - e 10th: J
 - f 12th: L
- 4
 - a 14th: N
 - b 16th: P
 - c 18th: R
 - d 20th: T
 - e 22nd: V
 - f 24th: X
 - g 26th: Z
- 5
 - a Sunday: 1st
 - b Monday: 2nd
 - c Tuesday: 3rd
 - d Wednesday: 4th
 - e Thursday: 5th
 - f Friday: 6th
 - g Saturday: 7th

Month	Ordinal position	Month	Ordinal position
January	1 st	July	7 th
February	2 nd	August	8 th
March	3 rd	September	9 th
April	4 th	October	10 th
May	5 th	November	11 th
June	6 th	December	12 th

Unit revision exercises

Multiple choice answers

- 1 B
- 2 A
- 3 C
- 4 A
- 5 C

Structured questions answers

- 1 Patterns:
 - a First, second, third, fourth, fifth, sixth.
 - b Eleventh, twelfth, thirteenth, fourteenth, fifteenth.
- 2 Ordinal for 11 is eleventh (11th).
- 3 The fastest runner takes 1st (First) position.
- 4 Ordinals as numerals:
 - a 13th
 - b 14th
 - c 16th
 - d 15th
 - e 25th
 - f 29th
 - g 30th
- 5 Even numbers (1–20): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.
- 6 Odd numbers (1–20): 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.
- 7 True
- 8 False
- 9 True
- 10 False
- 11 True
- 12 Eight even numbers ending in 0: 10, 20, 30, 40, 50, 60, 70, 80.
- 13 Six even numbers between 10 and 20: 10, 12, 14, 16, 18, 20.

- 14** Odd positions (left to right): (1st, 3rd, 5th, 7th): 1st: Red, 3rd: White, 5th: Black, 7th: Purple.
- 15** Positions (right to left): 1st: Purple, 2nd: Green, 3rd: Black, 4th: Yellow, 5th: White, 6th: Brown, 7th: Red.
- 16** Two odd-numbered positions: 1st, 3rd (or any like 5th, 7th, 9th).
- a** 1st — A
 - b** 2nd — B
 - c** 3rd — C
 - d** 4th — D
 - e** 5th — E
 - f** 6th — F
 - g** 7th — G
 - h** 8th — H
 - i** 9th — I
 - j** 10th — J
 - k** 11th — K
 - l** 12th — L
- 17** (A–L): A (1st), C (3rd), E (5th), G (7th), I (9th), K (11th).
- 18** (A–L): B (2nd), D (4th), F (6th), H (8th), J (10th), L (12th).
- 19** N (14th), P (16th), R (18th), T (20th), V (22nd), X (24th), Z (26th).

Unit 5: Comparison of numbers

Unit objectives

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

- a** arrange sets of numbers in ascending and descending order.
- b** compare any two numbers using: $>$, $<$ or $=$.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 19–23.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 5.1

- 1** 23, 49, 58, 68, 7 8
- 2** 36, 46, 75, 77, 80
- 3** 20, 25, 48, 50

- 4 200, 250, 350, 400
- 5 thirteen, fourteen, seventeen, twenty-one
- 6 Susan (18), Chipo (21), John (30), Nomsa (40)
- 7 20 kg, 30 kg, 58 kg, 65 kg, 75 kg
- 8 200 litres, 250 litres, 300 litres, 350 litres, 400 litres
- 9 Ben (20), Timothy (25), Tim (80), Biggy (85), Susan (90)

Exercise 5.2

- 1 10, 9, 8, 7, 5, 4, 3, 2, 1
- 2
 - a 9, 8, 7, 6, 5, 4, 3, 2
 - b 14, 13, 11, 9, 8, 7, 3
 - c 21, 15, 13, 9, 8, 8, 7, 3
 - d 11, 9, 7, 6, 5, 4, 3
 - e 14, 13, 12, 9, 8, 7
- 3
 - a 8, 7, 6, 5, 3
 - b 8, 7, 5, 4, 3
 - c 8, 7, 6, 5, 4
 - d 7, 6, 5, 4, 3
 - e 7, 5, 4, 3, 1
 - f 9, 8, 7, 6, 4

Activity 5.1

- 1
 - a $5 > 4$
 - b $4 > 3$
 - c $12 < 13$
 - d $2 < 25$
- 2 Chipo is right $21 > 14$.

Exercise 5.3

- 1 $5 < 8$
- 2 $5 < 9$
- 3 $7 > 3$
- 4 $9 > 6$
- 5 $12 > 9$

Unit revision exercises

Multiple choice answers

- 1 C
- 2 B
- 3 B
- 4 B
- 5 C

Structured questions answers

- 1
 - a 23, 49, 58, 68, 78
 - b 20, 25, 48, 50
 - c 200, 250, 350, 400
- 2
 - a 10, 9, 8, 7, 5, 4, 3, 2, 1
 - b 14, 13, 12, 9, 8, 7
 - c 8, 7, 6, 5, 3
 - d 9, 8, 7, 6, 4
- 3 Thirteen, Fourteen, Seventeen, Twenty-one.
- 4 Susan (18), Chipso (21), John (30), Nomsa (40).
- 5 20 kg, 30 kg, 58 kg, 65 kg, 75 kg.
- 6 200 litres, 250 litres, 300 litres, 350 litres, 400 litres.
- 7 Ben (20), Timothy (25), Tim (80), Biggy (85), Susan (90).
- 8 $5 < 8$
- 9 $5 < 9$
- 10 $7 < 3$.
- 11 $9 > 6$
- 12 $12 > 9$
- 13 $21 > 11$
- 14 $13 < 15$
- 15 $12 = 12$
- 16 Ascending order - From smallest to largest.
- 17 Descending order - From largest to smallest.
- 18 Greater than ($>$) - The first number is bigger than the second.
- 19 Less than ($<$) - The first number is smaller than the second.
- 20 Equal to ($=$) - Two numbers are the same.

Unit 6: Number sequence

Unit objectives

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

- a establish patterns of various number sequences.
- b complete given number sequences.
- c create their own number sequences.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 24–28.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 6.1

- | | |
|------|------|
| 1 6 | 4 15 |
| 2 9 | 5 30 |
| 3 12 | |

Exercise 6.1

- | | |
|----------|----------|
| 1 21; 24 | 4 17; 19 |
| 2 14; 16 | 5 20; 23 |
| 3 9; 10 | 6 22; 25 |

Activity 6.2

- | | |
|------------------------------|-----------------------------|
| 1 24, 26, 28, 30, 32, 34, 36 | 4 5, 10, 15, 20, 25, 30 |
| 2 3, 6, 9, 12, 15, 18 | 5 6, 12, 18, 24, 30 |
| 3 4, 8, 12, 16, 20, 24 | 6 7, 14, 21, 28, 35, 42, 49 |

Activity 6.3

- | | |
|------------------------|-------------------------|
| 1 26 | 4 30, 25, 20, 15, 10, 5 |
| 2 18, 15, 12, 9, 6, 3 | 5 36, 30, 24, 18, 12, 6 |
| 3 24, 20, 16, 12, 8, 4 | |

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 B | 4 B |
| 2 B | 5 B |
| 3 C | |

Structured questions answers

- | | |
|----------|-------------------------------|
| 1 6 | 7 14; 16 |
| 2 9 | 8 9; 10 |
| 3 12 | 9 17; 19 |
| 4 15 | 10 20; 23 |
| 5 30 | 11 22; 25 |
| 6 21; 24 | 12 24, 26, 28, 30, 32, 34, 36 |

13 3, 6, 9, 12, 15, 18

14 4, 8, 12, 16, 20, 24

15 5, 10, 15, 20, 25, 30

16 6, 12, 18, 24, 30

17 7, 14, 21, 28, 35, 42, 49

18 30, 28, 26, 24, 22, 20, 18

19 18, 15, 12, 9, 6, 3

20 24, 20, 16, 12, 8, 4

21 30, 25, 20, 15, 10, 5

22 36, 30, 24, 18, 12, 6

23 Example: 4, 8, 12, 16, 20

24 Example: 20, 17, 14, 11, 8

25 Example answer: "I add 4 each time."

Unit 7: Approximation

Unit objective

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

- a round off numbers to the nearest 10 and 100.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 29–34.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 7.1

a $59 \rightarrow 60$

b $33 \rightarrow 30$

c $108 \rightarrow 110$

d $210 \rightarrow 210$

e $413 \rightarrow 410$

Exercise 7.1

1 $25 \rightarrow 30$

2 $36 \rightarrow 40$

3 $8 \rightarrow 10$

4 $858 \rightarrow 860$

5 $654 \rightarrow 650$

Activity 7.2

a $603 \rightarrow 600$

b $742 \rightarrow 700$

c $654 \rightarrow 700$

d $539 \rightarrow 500$

e $675 \rightarrow 700$

Exercise 7.2

Transport	Passengers	Nearest hundred
Car	235	200
Bus	548	500
Bicycle	254	300
Train	854	900
Motorcycle	702	700

Activity 7.3

Note: Answers vary depending on school.

- 1
- Number of learners at the school: about 600
- 2
- Number of boys: about 300
- 3
- Number of girls: about 300
- 4
- Number of female teachers: about 18
- 5
- Number of male teachers: about 12
- 6
- Number of houses (buildings) at the school: about 20

Exercise 7.3

Note: Answers vary depending on school.

- 1
- Number of books of one classmate: about 10
- 2
- Number of chalks with the teacher: about 25
- 3
- Number of chairs in the class: about 40
- 4
- Number of desks in the class: about 20
- 5
- Number of boys in the class: about 18
- 6
- Number of girls in the class: about 22

Unit revision exercises

Multiple choice answers

- 1
- B
- 2
- B
- 3
- D
- 4
- A
- 5
- B

Structured questions answers

- 1
- 60
- 2
- 30
- 3
- 110
- 4
- 210
- 5
- 410
- 6
- 30
- 7
- 40
- 8
- 10
- 9
- 860
- 10
- 650

11 600

12 700

15 700

a 240

b 550

c 250

d 850

e 700

13 700

14 500

(Questions 16–27: Answers vary – accept reasonable estimates.)

Unit 8: Numeration system

Unit objective

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

- a convert Roman numerals to Arabic and vice versa in the range I to X.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner’s Book pages 35–38.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 8.1

English	Arabic	Roman
Zero	0	–
One	1	I
Two	2	II
Three	3	III
Four	4	IV
Five	5	V
Six	6	VI
Seven	7	VII
Eight	8	VIII
Nine	9	IX
Ten	10	X

Exercise 8.1

1 Arabic to Roman

- a 4 - IV b 7 - VII c 3 - III d 10 - X e 6 - VI f 9 - XIX g 5 - V

2 Roman to Arabic

- a II - 2 b IV - 4 c V - 5 d VI - 6 e VIII - 8 f IX - 9 g X - 10

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 A | 4 B |
| 2 B | 5 C |
| 3 C | |

Structured questions answers

- | | |
|--------|---------|
| 6 IV | 16 6 |
| 7 VI | 17 8 |
| 8 VII | 18 9 |
| 9 IX | 19 10 |
| 10 III | 20 7 |
| 11 V | 21 VIII |
| 12 X | 22 9 |
| 13 2 | 23 VIII |
| 14 4 | 24 VIII |
| 15 5 | |

Test 1

Paper 1: Multiple choice answers

- | | | | |
|------|------|------|------|
| 1 C | 11 B | 21 C | 31 C |
| 2 B | 12 D | 22 B | 32 C |
| 3 B | 13 C | 23 C | 33 A |
| 4 C | 14 D | 24 D | 34 B |
| 5 B | 15 C | 25 C | 35 B |
| 6 C | 16 B | 26 A | 36 A |
| 7 B | 17 A | 27 A | 37 B |
| 8 B | 18 B | 28 D | 38 B |
| 9 B | 19 A | 29 A | 39 C |
| 10 C | 20 B | 30 A | 40 B |

Paper 2: Structured questions answers

- 1
 - a 223 – Two hundred and twenty-three
 - b 332 – Three hundred and thirty-two
 - c 442 – Four hundred and forty-two
 - d 888 – Eight hundred and eighty-eight
- 2 12
- 3 524 rounded to the nearest hundred: 500
- 4 IX
- 5 3 tens
- 6 thirteenth
- 7 Second, Fourth, Sixth, Seventh, Eighth, Twelfth
- 8 5th, 6th
- 9 Sunday
- 10 10th
- 11 2, 3, 4, 5, 6, 7, 8, 9, 10
- 12 16, 15, 14, 13, 12, 11, 10
- 13 $12 < 15$
- 14 Estimated price of \$19: \$20
- 15 Estimated age of 12 years: 10 years

Unit 9: Proper fractions

Unit objectives

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

- a write fractions in numerals.
- b name fractions shown in diagrams.
- c compare fractions with the same denominators.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 43–52.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 9.1

- 1
 - a $\frac{2}{3}$
 - d $\frac{5}{6}$
 - f $\frac{7}{8}$

2 a $\frac{1}{2} \rightarrow 1$

b $\frac{2}{3} \rightarrow 2$

c $\frac{3}{4} \rightarrow 3$

d $\frac{5}{6} \rightarrow 5$

e $\frac{6}{8} \rightarrow 6$

3 a $\frac{1}{3} \rightarrow 3$

b $\frac{2}{4} \rightarrow 4$

c $\frac{3}{5} \rightarrow 5$

d $\frac{5}{6} \rightarrow 6$

e $\frac{6}{7} \rightarrow 7$

f $\frac{9}{10} \rightarrow 10$

Activity 9.1

In groups, learners fill in the table with .

$\frac{2}{4}; \frac{2}{4},$

$\frac{3}{6}; \frac{3}{6},$

$\frac{6}{9}; \frac{3}{9}$

$\frac{6}{10}; \frac{4}{10}$

$\frac{9}{12}; \frac{3}{12}$

Exercise 9.2

a $\frac{2}{3}$

d $\frac{3}{8}$

b $\frac{3}{6}$

e $\frac{4}{8}$

c $\frac{2}{5}$

Exercise 9.3

1 a $\frac{3}{7}$

b $\frac{2}{5}$

c $\frac{7}{10}$

d $\frac{1}{5}$

e $\frac{5}{13}$

f $\frac{8}{17}$

2 $\frac{3}{5}$

3 a 8 balls

b $\frac{5}{8}$

c $\frac{3}{8}$

4 Learners draw sets to show these fractions.

(Use circles or dots; shade the required number.)

- a $\frac{2}{4}$ ● ● ○ ○
- b $\frac{3}{4}$ ● ● ● ○
- c $\frac{5}{6}$ ● ● ● ● ● ○
- d $\frac{7}{8}$ ● ● ● ● ● ● ● ○
- e $\frac{4}{6}$ ● ● ● ● ○ ○

Activity 9.2

- 1 Examples:
 - $\frac{1}{2} = \frac{2}{4}$
 - $\frac{1}{3} = \frac{2}{6}$
 - $\frac{1}{4} = \frac{2}{8}$
- 2 $\frac{2}{5}, \frac{4}{6}$
- 3

- a $\frac{2}{4}$ and $\frac{4}{8} \rightarrow$ **Yes**
 - b $\frac{1}{3}$ and $\frac{2}{6} \rightarrow$ **Yes**
 - c $\frac{3}{4}$ and $\frac{2}{8} \rightarrow$ **No**

- d $\frac{1}{4}$ and $\frac{5}{20} \rightarrow$ **Yes**
 - e $\frac{3}{4}$ and $\frac{1}{12} \rightarrow$ **No**

Exercise 9.4

Fraction	Equivalent fraction
$\frac{1}{2}$	$\frac{3}{6}$
$\frac{1}{3}$	$\frac{2}{6}$
$\frac{2}{3}$	$\frac{4}{6}$
$\frac{3}{4}$	$\frac{6}{8}$
$\frac{1}{5}$	$\frac{2}{10}$
$\frac{2}{5}$	$\frac{4}{10}$

Activity 9.3

- a $\frac{2}{3} > \frac{1}{3}$
 - b $\frac{2}{5} < \frac{3}{5}$
 - c $\frac{2}{6} < \frac{3}{6}$
 - d $\frac{4}{5} > \frac{3}{5}$

- e $\frac{6}{8} > \frac{5}{8}$
 - f $\frac{1}{3} < \frac{2}{3}$
 - g $\frac{2}{4} < \frac{3}{4}$
 - h $\frac{3}{5} > \frac{2}{5}$

Exercise 9.5

- 1 so Sam got the greater share.
- 2 so John was awarded the greater prize.
- 3 $\frac{5}{6}$
- 4 $\frac{7}{10}$
- 5 $\frac{3}{6}$

Activity 9.4

- | | |
|--|--|
| a $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}$ | c $\frac{3}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}$ |
| b $\frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}$ | d $\frac{2}{9}, \frac{3}{9}, \frac{4}{9}, \frac{6}{9}$ |

Exercise 9.6

- 1 $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}$
- 2 $\frac{4}{10}, \frac{5}{10}, \frac{7}{10}, \frac{8}{10}$

Activity 9.5

- | | |
|--|--|
| 1 $\frac{4}{5}, \frac{3}{5}, \frac{2}{5}, \frac{1}{5}$ | 3 $\frac{5}{7}, \frac{4}{7}, \frac{3}{7}, \frac{2}{7}$ |
| 2 $\frac{5}{7}, \frac{4}{6}, \frac{3}{6}, \frac{2}{6}$ | 4 $\frac{7}{8}, \frac{6}{8}, \frac{5}{8}, \frac{4}{8}$ |

Exercise 9.7

- | | |
|--|--|
| 1 $\frac{6}{7}, \frac{5}{7}, \frac{4}{7}, \frac{3}{7}$ | 4 $\frac{8}{10}, \frac{7}{10}, \frac{6}{10}, \frac{5}{10}$ |
| 2 $\frac{5}{6}, \frac{4}{6}, \frac{3}{6}, \frac{2}{6}$ | 5 $\frac{8}{9}, \frac{7}{9}, \frac{6}{9}, \frac{5}{9}$ |
| 3 $\frac{6}{8}, \frac{5}{8}, \frac{4}{8}, \frac{3}{8}$ | |

Unit revision exercises

Multiple choice answers

- | | |
|----------------------|----------------------|
| 1 C - $\frac{2}{3}$ | 4 C - $\frac{2}{3}$ |
| 2 D - $\frac{2}{3}$ | 5 A - $\frac{2}{10}$ |
| 3 D - $\frac{8}{10}$ | |

Structured questions answers

- 6 $\frac{2}{5}, \frac{3}{5}, \frac{4}{5}$
- 7 $\frac{3}{4}, \frac{2}{4}, \frac{1}{4}$
- 8 a $\frac{1}{5} = \frac{2}{10}$
b $\frac{4}{6} = \frac{2}{3}$
c $\frac{1}{4} = \frac{2}{8}$

Topic 2

Operations

Unit 10: Addition of whole numbers

Unit objectives

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

- a add whole numbers without carrying.
- b add numbers which require carrying once.
- c demonstrate the commutative law in addition.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 53–64.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 10.1

- | | |
|-----|------|
| 1 7 | 4 9 |
| 2 8 | 5 10 |
| 3 8 | |

Exercise 10.1

- 1 Total ages = 7 years
- 2 Total amount = 7 cents
- 3 Total length = 11 cm
- 4 Total cost = \$3
- 5 Total mass = 9 g

Activity 10.2

- | | |
|------|------|
| a 58 | d 98 |
| b 41 | e 77 |
| c 55 | f 39 |

Exercise 10.2

- | | |
|------|------|
| ① 23 | ④ 29 |
| ② 29 | ⑤ 28 |
| ③ 29 | |

Activity 10.3

- | | |
|-------|-------|
| ① 359 | ④ 577 |
| ② 575 | ⑤ 836 |
| ③ 532 | |

Exercise 10.3

- ① 564
- ② Total number of bags = 486
- ③ Total number of passengers = 577
- ④ Total number of cattle = 585
- ⑤ Total number of patients = 447

Activity 10.4

- | | |
|------|------|
| ① 52 | ④ 81 |
| ② 81 | ⑤ 81 |
| ③ 81 | ⑥ 90 |

Exercise 10.4

- ① Total number of animals = 41
- ② Total number of learners = 30
- ③ Total number of bags = 41
- ④ Total number of people = 72
- ⑤ Total number of trees = 30
- ⑥ Total number of books = 71

Activity 10.5

- | | |
|-------|-------|
| ① 282 | ④ 851 |
| ② 471 | ⑤ 672 |
| ③ 581 | ⑥ 980 |

Exercise 10.5

- ① Total tonnes of maize produced = 591 tonnes
- ② Total number of learners = 604
- ③ Total number of voters = 791

- 4 Total number of animals = 601
- 5 Total number of people who attended the match = 784

Activity 10.6

- | | |
|-------|-------|
| a 101 | d 122 |
| b 101 | e 121 |
| c 120 | f 111 |

Exercise 10.6

- 1 Total number of homesteads = 121
- 2 Total learners who support handball = 121
- 3 Total number of workers = 115
- 4 131

Exercise 10.7

- 1 5
- 2 7
- 3 9
- 4 11
- 5 13
- 6 15
- 7 17
- 8 19

Activity 10.7

- | | |
|---------|--------------|
| a \$864 | e 264 km |
| b \$734 | f 533 ml |
| c \$877 | g 477 hr |
| d \$797 | h 547 tonnes |

Exercise 10.8

- 1 Total cost = \$377
- 2 Total money = \$387
- 3 Total time = 366 minutes
- 4 Total time = 495 minutes
- 5 Total travelling time = 577 minutes
- 6 Total mass = 358 kg
- 7 Total water drunk = 45 litres
- 8 Total fuel = 347 litres

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 A | 3 C |
| 2 B | 4 C |

Structured questions answers

- | | |
|--------------|--------------|
| 5 93 metres | 8 480 kg |
| 6 599 litres | 9 450 metres |
| 7 445 cents | |

Unit 11: Subtraction of whole numbers

Unit objectives

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

- a subtract numbers.
- b subtract numbers with one equal addition.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 65–73.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 11.1

- | | |
|---------------------------------------|------------------------------------|
| 1 2 | 4 There are 4 oranges left. |
| 2 1 | 5 She had 12 books left. |
| 3 Mr Bonzo had 10 cattle left. | |

Activity 11.1

- | | |
|------|------|
| a 13 | c 31 |
| b 32 | d 40 |

Exercise 11.2

- 1 She had 22 tomatoes left.
- 2 22 learners are absent.
- 3 12 chickens were left.
- 4 20 cars were left.
- 5 30 sweets left.

Activity 11.2

- | | | | |
|---|-----|---|-----|
| a | 121 | d | 222 |
| b | 201 | e | 204 |
| c | 322 | | |

Exercise 11.3

- 1 He had 122 bags of maize left.
- 2 He had 221 cents left.
- 3 210 books were in good condition.
- 4 Nomsa contributed 302 cents.
- 5 404 kilometres were left to reach Nyanga.

Activity 11.3

- | | | | |
|---|----|---|----|
| a | 18 | d | 18 |
| b | 29 | e | 9 |
| c | 29 | | |

Exercise 11.4

- 1 19 mm more rain fell on Tuesday.
- 2 The difference is 19 minutes.
- 3 The difference in their times is 19 seconds.
- 4 19 seeds had germinated.
- 5 He was present for 17 days.

Activity 11.4

- | | | | |
|---|-----|---|-----|
| a | 217 | d | 192 |
| b | 75 | e | 319 |
| c | 129 | | |

Exercise 11.5

- 1 119 learners joined School A.
- 2 117 learners joined School B.
- 3 336 learners joined both schools.
- 4 118 learners joined School E.

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 C | 4 A |
| 2 B | 5 C |
| 3 D | |

Structured questions answers

- 6 Clara has 271 books.
- 7 She needs 158 more sweets.
- 8 123 cups are left.
- 9 The difference is 39 cm.
- 10 The distance left is 50 metres.
- 11 The other number is 42.
- 12 515

Unit 12: Addition of proper fractions

Unit objective

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

- a add two proper fractions with the same denominators.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 74–80.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 12.1

- a $\frac{2}{4}$
- b $\frac{4}{5}$
- c $\frac{3}{4}$
- d $\frac{7}{10}$
- e $\frac{3}{5}$

Exercise 12.1

- 1 He ate $\frac{5}{10}$ of the sweets. (This is also the same as $\frac{1}{2}$.)
- 2
 - a Fraction of tomatoes: $\frac{4}{6}$
 - b Fraction of lemons: $\frac{2}{6}$
- 3
 - a Fraction of large pieces: $\frac{6}{10}$
 - b Fraction of small pieces: $\frac{4}{10}$
- 4
 - a Fraction of green balls: $\frac{2}{9}$
 - b Fraction of yellow balls: $\frac{4}{9}$
 - c Fraction of white balls: $\frac{3}{9}$

Activity 12.2

- 1
 - a $\frac{2}{2}$ (which is also 1 whole)
 - b $\frac{3}{4}$
 - c $\frac{4}{5}$
 - d $\frac{4}{4}$ (which is also 1 whole)
 - e $\frac{5}{10}$
- 2 Shaded diagrams. To show these, draw a shape, divide it into equal parts and shade the parts.
 - a $\frac{2}{3}$
 - b $\frac{3}{4}$
 - c $\frac{3}{5}$
 - d $\frac{3}{6}$
 - e $\frac{5}{6}$
 - f $\frac{4}{4}$ (or 1)

Exercise 12.2

- 1 $\frac{3}{4}$
- 2 $\frac{4}{5}$
- 3 $\frac{4}{5}$
- 4 $\frac{3}{5}$
- 5 $\frac{7}{10}$

Exercise 12.3

- 1 $\frac{3}{5}$
- 2 $\frac{8}{10}$
- 3 $\frac{4}{5}$
- 4 $\frac{3}{4}$
- 5 $\frac{7}{8}$
- 6 $\frac{3}{6}$ (which is also $\frac{1}{2}$)

Activity 12.3

- | | |
|-----------------|-----------------|
| 1 $\frac{4}{7}$ | 4 $\frac{2}{5}$ |
| 2 $\frac{3}{7}$ | 5 $\frac{2}{5}$ |
| 3 $\frac{3}{5}$ | 6 $\frac{3}{5}$ |

Exercise 12.4

- 1 $\frac{3}{5}$ of the circle is shaded.
- 2 He ate $\frac{7}{10}$ of the chocolate sweet.
- 3
 - a Netball players: $\frac{3}{5}$
 - b Volleyball players: $\frac{2}{5}$
- 4
 - a Mango trees: $\frac{7}{10}$
 - b Guava trees: $\frac{3}{10}$

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 C | 4 A |
| 2 D | 5 A |
| 3 C | |

Structured questions answers

- 6 10
- 7
 - a Black books: $\frac{3}{4}$
 - b Red books: $\frac{1}{4}$
- 8 $\frac{8}{10}$
- 9 $\frac{8}{10}$
- 10 $\frac{7}{10}$

Test 2

Multiple choice answers

- | | | | |
|------|------|------|------|
| 1 C | 11 A | 21 C | 31 B |
| 2 B | 12 B | 22 D | 32 A |
| 3 C | 13 D | 23 C | 33 C |
| 4 B | 14 B | 24 C | 34 C |
| 5 C | 15 B | 25 C | 35 B |
| 6 C | 16 B | 26 B | 36 C |
| 7 D | 17 A | 27 C | 37 B |
| 8 B | 18 B | 28 A | 38 C |
| 9 D | 19 A | 29 B | 39 B |
| 10 B | 20 B | 30 C | 40 C |

Paper 2

Structured questions answers

- Twenty-three.
 - 28.
 - $10 + 20 = 30$ animals.
- $\frac{3}{10}$ is greater.
 - $\frac{8}{10}$
 - $\frac{2}{4}$
- 204.
 - 24 cattle.
- $\frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{3}{5}$.
 - 10, 12, 14, 16, 18, 20.
 - Kumbi (20), Dorothy (15), Chipi (10).
- 8 balls.
 - $\frac{5}{8}$
 - $\frac{3}{8}$
- 400.
 - 422 bags.
 - 213 books.
- $\frac{3}{5} > \frac{3}{10}$
 - $256 < 265$

- 8 a 11th
 b Sipho
 c Tsitsi
- 9 a Odd numbers: 5, 7, 9, 11
 b Even numbers: 2, 10, 16
 c Multiples of 2: 2, 10, 16
- 10 a Roman Numerals: 3 = III, 5 = V, 7 = VII, 10 = X
 b ☐ 3, 6, 9, 12, **15**, 18 (Counting in 3s).
☐ 5, 10, 15, 20, **25**, 30 (Counting in 5s).

Unit 13: Subtraction of proper fractions

Unit objective

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

- a subtract proper fractions with the same denominators.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 86–91.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 13.1

- | | |
|-----------------|------------------|
| a $\frac{1}{3}$ | f $\frac{2}{8}$ |
| b $\frac{1}{4}$ | g $\frac{2}{8}$ |
| c $\frac{1}{5}$ | h $\frac{4}{8}$ |
| d $\frac{2}{6}$ | i $\frac{1}{9}$ |
| e $\frac{2}{7}$ | j $\frac{3}{10}$ |

Exercise 13.1

- 1 $\frac{2}{4}$ (or $\frac{1}{2}$) of the distance is left for walking.
- 2 $\frac{2}{5}$ of the mangoes are left for her daughter.
- 3 $\frac{3}{10}$ of the land is left for cultivation.
- 4 $\frac{2}{5}$ of the cloth is left for her blouse.
- 5 $\frac{2}{5}$ of the teachers are female.

Activity 13.2

1 $\frac{1}{2}$

2 $\frac{1}{4}$

3 $\frac{1}{5}$

4 $\frac{1}{5}$

5 $\frac{2}{10}$

Exercise 13.2

a $\frac{1}{5}$

b $\frac{1}{5}$

c $\frac{1}{6}$

d $\frac{2}{7}$

m $\frac{1}{8}$

f $\frac{4}{9}$

g $\frac{3}{10}$

h $\frac{5}{10}$

i $\frac{1}{4}$

j $\frac{3}{6}$

k $\frac{1}{7}$

l $\frac{2}{8}$

m $\frac{1}{10}$

n $\frac{2}{6}$

o $\frac{2}{7}$

Exercise 13.3

1 $\frac{2}{8}$

2 $\frac{3}{6}$

3 $\frac{1}{3}$

4 $\frac{1}{5}$

Activity 13.3

1 $\frac{2}{4}$ sec (which is also $\frac{1}{2}$ sec)

2 $\frac{1}{6}$ hr

3 $\frac{3}{10}$ g

4 $\frac{1}{4}$ kg

5 $\frac{2}{6}$ m (which is also $\frac{1}{3}$ m)

6 $\frac{2}{10}$ km (which is also $\frac{1}{5}$ km)

7 $\frac{1}{4}$ ml

Exercise 13.4

1 $\frac{1}{9}$ min

2 $\frac{1}{4}$ hour is left.

3 $\frac{2}{10}$ kg (also written as $\frac{1}{5}$ kg)

- 4 $\frac{4}{10}$ kg of meat was left.
- 5 $\frac{1}{5}$ metres of rope was left.
- 6 $\frac{1}{3}$ metres is left.
- 7 $\frac{3}{10}$ litres of water are left.
- 8 $\frac{1}{5}$ ml of medicine is left.

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 B | 3 B |
| 2 C | 4 B |

Structured questions answers

- 5 $\frac{1}{3}$
- 6 a Thandi's fraction: $\frac{4}{10}$
b Thoko's fraction: $\frac{6}{10}$
- 7 $\frac{6}{10}$ kg
- 8 $\frac{2}{8}$ (This is also the same as $\frac{1}{4}$).
- 9 $\frac{2}{5}$

Unit 14: Multiplication of whole numbers

Unit objectives

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

- a demonstrate that multiplication is repeated addition.
- b multiply whole numbers by one-digit multiplier without carrying.
- c identify factors of numbers within the range 0 to 100.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 92–101.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 14.1

- | | |
|-------------|-------------|
| a 6 | f 20 |
| b 8 | g 18 |
| c 12 | h 24 |
| d 18 | i 30 |
| e 15 | j 21 |

Exercise 14.1

- | | |
|--------------|--------------|
| 1 150 | 6 24 |
| 2 18 | 7 36 |
| 3 21 | 8 63 |
| 4 40 | 9 72 |
| 5 36 | 10 63 |

Activity 14.2

To find the answer, we add the first number as many times as the second number tells us.

- | | |
|-------------|-------------|
| a 4 | f 18 |
| b 6 | g 20 |
| c 12 | h 30 |
| d 15 | i 45 |
| e 20 | |

Exercise 14.2

- | | |
|-------------|-------------|
| a 12 | f 30 |
| b 9 | g 54 |
| c 16 | h 35 |
| d 35 | i 32 |
| e 12 | j 27 |

Activity 14.3

- | | |
|----------|-------------|
| 1 | a 6 |
| | b 12 |
| | c 20 |
| | d 10 |
| | e 20 |

- 2 a $2 + 2 + 2 = 3 \times 2 = 6$
 b $3 + 3 + 3 + 3 + 3 = 5 \times 3 = 15$
 c $5 + 5 + 5 + 5 + 5 = 5 \times 5 = 25$
 d $6 + 6 + 6 + 6 + 6 + 6 = 6 \times 6 = 36$
 e $10 + 10 + 10 + 10 = 4 \times 10 = 40$

Exercise 14.3

- 1 12 apples
 2 8
 3 40 eggs
 4 20 oranges
 5 35 coins
 6 30 points

Activity 14.4

- 1 a 6
 b 8
 c 15
 d 20

Exercise 14.4

- | | |
|------|------|
| 1 2 | 4 15 |
| 2 12 | 5 10 |
| 3 16 | |

Exercise 14.5

- | | |
|------|------|
| 1 15 | 4 24 |
| 2 20 | 5 24 |
| 3 30 | |

Exercise 14.6

- | | |
|-------|-------|
| 1 846 | 5 88 |
| 2 99 | 6 39 |
| 3 684 | 7 369 |
| 4 999 | |

Activity 14.5

- | | |
|-----------------|---------------------------------------|
| ① 5: 1, 5 | ④ 8: 1, 2, 4, 8 12: 1, 2, 3, 4, 6, 12 |
| ② 6: 1, 2, 3, 6 | ⑤ 15: 1, 3, 5, 15 |
| ③ 7: 1, 7 | |

Exercise 14.7

- ① 1, 2, 4, 5, 10, 20.
- ② 1, 2, 3, 5, 6, 10, 15, 30.
- ③ 1, 2, 3, 6, 9, 18.
- ④ 1 (1 is the smallest factor for every whole number).
- ⑤ 1, 2, 3, 4, 6, 9, 12, 18, 36.

Activity 14.6

- | | |
|------|------|
| ① 6 | ⑦ 3 |
| ② 10 | ⑧ 4 |
| ③ 20 | ⑨ 9 |
| ④ 15 | ⑩ 10 |
| ⑤ 18 | ⑪ 4 |
| ⑥ 15 | ⑫ 10 |

Exercise 14.8

- | | |
|-------|---------|
| ① 345 | ⑤ 666 |
| ② 75 | ⑥ 1,105 |
| ③ 448 | ⑦ 36 |
| ④ 486 | ⑧ 924 |

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| ① D | ④ B |
| ② B | ⑤ B |
| ③ D | |

Structured questions answers

- ⑥ 9
- ⑦ 369
- ⑧ 66

Unit 15: Division of whole numbers

Unit objectives

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

- a share equally with or without a remainder.
- b divide by one-digit divisors using repeated subtraction.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 102–108.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 15.1

- | | |
|-----|-----|
| a 2 | d 5 |
| b 2 | e 2 |
| c 2 | f 2 |

Exercise 15.1

- | | |
|-----|-----|
| 1 4 | 4 2 |
| 2 1 | 5 5 |
| 3 2 | 6 3 |

Activity 15.2

- | | |
|-----------|---------------------|
| 1 5 | 4 2 balls |
| 2 2 | 5 1 and a half pens |
| 3 2 forks | |

Exercise 15.2

- | | |
|-----|--------------|
| 1 5 | 4 2 |
| 2 3 | 5 8 tractors |
| 3 4 | |

Activity 15.3

- | | |
|-----|-----|
| a 2 | d 3 |
| b 2 | e 5 |
| c 2 | |

Exercise 15.3

- 1 1 mango
- 2 2 pencils
- 3 4 books
- 4 20 sweets
- 5 4 cattle

Activity 15.4

- a 4 r 2
- b 2 r 1
- c 3 r 2
- d 3 r 3
- e 6 r 2

Exercise 15.4

- 1 3 each, 1 left over
- 2 3 boxes, 3 cupcakes left over
- 3 2 groups, 3 counters left over
- 4 3 pencils each, 2 left over
- 5 3 r 1

Exercise 15.5

- 1 2 metres
- 2 12 kg
- 3 5 sweets
- 4 8 litres
- 5 10 litres
- 6 8 litres

Unit revision exercises

Multiple choice answers

- 1 B
- 2 C
- 3 D
- 4 C
- 5 C

Structured questions answers

- 6 19
- 7 7
- 8 \$6
- 9 \$4
- 10 3 nurses
- 11 4 cars
- 12 3 learners

Unit 16: Multiplication of whole numbers by fractions

Unit objective

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

- a multiply a whole number by a proper fraction.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 109–114.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 16.1

- a 1
- b 2
- c $\frac{4}{5}$
- d $\frac{3}{5}$
- e $\frac{2}{5}$

Activity 16.1

Repeated addition means adding the fraction as many times as the whole number says.

- a $1\frac{1}{2}$
- b $2\frac{1}{2}$
- c $\frac{1}{2}$
- d $1\frac{1}{2}$
- e $\frac{2}{15}$
- f 1

Exercise 16.2

- 1 $3\frac{3}{4}$
- 2 2
- 3 $\frac{3}{10}$
- 4 Completing the table

Whole number	Fraction	Answer
$2 \times$	$\frac{2}{4}$	$\frac{4}{4} = 1$
$3 \times$	$\frac{1}{4}$	$\frac{3}{4}$
$4 \times$	$\frac{1}{4}$	$\frac{4}{4} = 1$
$5 \times$	$\frac{3}{10}$	$\frac{15}{10} = 1\frac{1}{2}$

Activity 16.2

To find a fraction of a number, divide the number by the denominator (bottom) and then multiply by the numerator (top).

- a 3
- b 8
- c 4

- d 2
- e 8

Exercise 16.3

- 1 3
- 2 50
- 3 2

- 4 40
- 5 5
- 6 15

Activity 16.3

- a 10 litres
- b 8 kg
- c \$10
- d 8 km
- e 12 grammes

- f 4 litres
- g 16 kg
- h \$50
- i $7\frac{1}{2}$
- j 10 grammes

Exercise 16.4

- 1 10 litres
- 2 25 kg
- 3 30 minutes

- 4 1 litre
- 5 8 kg
- 6 10 metres

Unit revision exercises

Multiple choice answers

- 1 A
- 2 B
- 3 D

- 4 C
- 5 C

Structured questions answers

- 6 $1\frac{1}{5}$
- 7 10
- 8 4
- 9 2
- 10 4

Topic 3

Measures

Unit 17: Money

Unit objectives

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

- a identify currency up to \$10.00.
- b describe features on coins and notes.
- c calculate composition of amounts in terms of smaller notes and coins.
- d convert cents to dollars and vice versa.
- e calculate change in buying and selling.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 115–124.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 17.1

Coins: ZiG 1, ZiG 2, and ZiG 5.

Notes: ZiG 10, ZiG 20, ZiG 50, ZiG 100, ZiG 200

Key heritage features:

- The iconic Big Five animals of Zimbabwe: lion, elephant, buffalo, leopard and rhinoceros.
- The Zimbabwe bird on a star as a registration device and gold bars.
- Balancing rocks.

Exercise 17.1

- 1 \$1, \$2, \$5, \$10, 10c, 20c, 50c
- 2 Zimbabwe bird, buffalo (or Great Zimbabwe monument)
- 3 Value (\$2), Great Zimbabwe Monument
- 4 National monument, value (\$10)

Activity 17.2

- 1 $\$1 = 100c$
- 2 $\$2 = 200c$
- 3 $\$3 = 300c$
- 4 $\$10 = 1000c$
- 5 $\$20 = 2000c$

Exercise 17.2

- 1 100c
- 2 300c
- 3 200c
- 4 300c
- 5 500c
- 6 1 300c
- 7 1 800c

Activity 17.3

- | | |
|--------------|----------------|
| 1 100c = \$1 | 4 800c = \$8 |
| 2 200c = \$2 | 5 500c = \$5 |
| 3 300c = \$3 | 6 1000c = \$10 |

Exercise 17.3

- | | |
|-------|-------|
| 1 \$3 | 4 \$6 |
| 2 \$5 | 5 \$6 |
| 3 \$5 | |

Activity 17.4

Learners correctly read ready reckoners showing:

- $\$1 = 100c$
- relationship between dollars and cents.

Exercise 17.4

- | | |
|-------------------|------------------------|
| 1 100 cents | 5 $\$4.50 = 450$ cents |
| 2 10 coins of 10c | 6 $600c = \$6$ |
| 3 20 cents | 7 $\$5.50 = 550$ cents |
| 4 100 cents | |

Activity 17.5

- a

$\$1 = 2 \times 50c$
- b

$\$2 = 2 \times \1
- c

$\$5 = \$2 + \$2 + \1
- d

$\$10 = \$5 + \$5$

Exercise 17.5

- 1

\$1
- 2

\$10
- 3

\$5
- 4

\$4.50
- 5

\$7

Activity 17.6

Item	Cost	Money paid	Change
Soap	75c	\$1	25c
Sweet	50c	80c	30c
Book	\$1.50	\$2.00	50c
Pencil	30c	80c	50c
Banana	60c	75c	15c

Exercise 17.6

- 1

50c
- 2

\$3
- 3

\$5
- 4

75c
- 5

50c
- 6

50c
- 7

\$1.50
- 8

50c

Unit revision exercises

Multiple choice answers

- 1

D
- 2

C
- 3

C
- 4

B
- 5

B

Structured questions answers

- 6

\$4
- 7

$10c + 5c$
- 8

Zimbabwe Bird, Great Zimbabwe
- 9

Watermark, security thread
- 10

Value, country name
- 11

30c
- 12

\$5
- 13

\$1
- 14

20c

Unit 18: Time

Unit objectives

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

- a tell time up to the hour, half hour and quarter hour.
- b identify days of the week, seasons and months of the year.
- c identify seasons of the year.
- d write seasons of the year.
- e convert hours to days.
- f convert days to hours.
- g convert days to weeks.
- h convert weeks to days.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 125–145.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 18.1

Learners draw clocks showing the following times:

- a **12 o'clock.** Both the short hand and long hand point straight up at the **12**. It looks like one single line!
- b **1 o'clock**
 - Short hour hand: Points at the **1**.
 - Long minute hand: Points at the **12**.
- c **7 o'clock**
 - Short hour hand: Points down and to the left at the **7**.
 - Long minute hand: Points at the **12**.
- d **9 o'clock**
 - Short hour hand: Points straight to the left at the **9**.
 - Long minute hand: Points at the **12**.
- e **10 o'clock**
 - Short hour hand: Points up and to the left at the **10**.
 - Long minute hand: Points at the **12**.
- f **11 o'clock**
 - Short hour hand: Points up and to the left at the **11**.
 - Long minute hand: Points at the **12**.

Exercise 18.1

Since the **minute hand points at 12**, all the times are **o'clock**.

The minute hand points at	Hour hand	Time
12	1	1 o'clock
12	2	2 o'clock
12	4	4 o'clock
12	5	5 o'clock
12	9	9 o'clock
12	10	10 o'clock
12	11	11 o'clock

Activity 18.2

- a

Half past 7
- b

Half past 2
- c

Half past 8
- d

Half past 2
- e

Half past 1
- f

Half past 5

Exercise 18.2

- a

5 o'clock
- b

Quarter past 5
- c

Quarter past 11
- d

Two o'clock
- e

Quarter past 11
- f

Quarter past 2

Activity 18.3

- a

Quarter to 4
- b

Quarter to 1
- c

Quarter to 8
- d

Quarter to 5
- e

Quarter to 10
- f

Quarter to 12

Exercise 18.3

- 1

Quarter to two
- 2

Quarter to three
- 3

Quarter to four
- 4

Quarter to five
- 5

Quarter to eleven
- 6

Quarter to twelve
- 7

Quarter to one

Exercise 18.4

- 1

Half past one in the afternoon
- 2

Quarter past ten at night
- 3

Quarter to one in the afternoon
- 4

Quarter to four in the afternoon
- 5

Half past one in the morning
- 6

Quarter past eleven in the morning

Activity 18.4

- | | |
|------------|--------------|
| ① 366 days | ④ 10 decades |
| ② 5 years | ⑤ 10 decades |
| ③ 7 days | |

Exercise 18.5

- | | |
|-------------|----------------|
| ① 10 years | ④ 20 years |
| ② 1 year | ⑤ 2 fortnights |
| ③ 1 century | ⑥ 10 decades |

Exercise 18.6

- ① Monday
- ② Wednesday
- ③ Third day
- ④ Fifth day
- ⑤ Sunday
- ⑥ 7 days
- ⑦ Monday, Tuesday, Wednesday

Exercise 18.7

- | | |
|------------|-------------|
| ① January | ④ December |
| ② December | ⑤ 12 months |
| ③ June | |

Exercise 18.8

- ① December
- ② April
- ③ Africa Day
- ④ New Year's Day
- ⑤ Heroes Day and Defence Forces Day
- ⑥ 22 December

Activity 18.5

- a January
- b Monday, Tuesday, Wednesday, Thursday, Friday
- c 12
- d April, June, September, November
- e Guide discussion on provincial cultural days.

Exercise 18.9

- | | |
|----------------|--------------|
| 1 10 years | 6 January |
| 2 1 year | 7 30 days |
| 3 1 century | 8 Friday |
| 4 2 fortnights | 9 Africa Day |
| 5 May | 10 April |

Exercise 18.10

- | | |
|-------------|-------------|
| 1 48 hours | 5 144 hours |
| 2 72 hours | 6 168 hours |
| 3 96 hours | 7 192 hours |
| 4 120 hours | 8 240 hours |

Exercise 18.11

- | | |
|----------|----------|
| 1 1 day | 5 5 days |
| 2 2 days | 6 6 days |
| 3 3 days | 7 7 days |
| 4 4 days | |

Exercise 18.12

- | | |
|-----------|-----------|
| 1 1 week | 5 6 weeks |
| 2 3 weeks | 6 7 weeks |
| 3 4 weeks | 7 8 weeks |
| 4 5 weeks | 8 9 weeks |

Exercise 18.13

- | | |
|-----------|------------|
| 1 7 days | 6 49 days |
| 2 21 days | 7 56 days |
| 3 28 days | 8 63 days |
| 4 35 days | 9 70 days |
| 5 42 days | 10 77 days |

Exercise 18.14

- | | |
|------------|-------------|
| 1 72 hours | 6 28 days |
| 2 28 days | 7 3 days |
| 3 2 days | 8 504 hours |
| 4 4 days | 9 35 days |
| 5 21 days | |

Unit revision exercises

Multiple choice answers

- 1 C
- 2 B
- 3 D
- 4 B
- 5 C

Structured questions answers

- 6 5 days
- 7 8:30 am
- 8 25 December
- 9
 - a Quarter past 3.
 - b Quarter past 4.
 - c Quarter past 11.
 - d Quarter to 5.

Unit 19: Mass

Unit objectives

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

- a find the mass of objects by using weights.
- b compare the mass of different objects using weights.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 146–154.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 19.1

Learners take turns reading the mass of a stone, pen, duster, ruler, chalk, cellphone, tin, matches, pencil, rubber, shoe and a coin using a scale. They write down their findings.

Exercise 19.1

- | | |
|----------------|----------------|
| 1 1500 grammes | 4 3500 grammes |
| 2 2500 grammes | 5 300 grammes |
| 3 1700 grammes | 6 250 grammes |

Activity 19.2

- 1 200 g
- 2 1 000 g (1 kg)
- 3 1 000 g (1 kg)
- 4 3 kg
- 5 400 g

Exercise 19.2

- 1 1 000 g (1 kg)
- 2 1 000 g (1 kg)
- 3 1 000 g (1 kg)
- 4 600 g
- 5 5 boxes

Activity 19.3

- 1 1 300 grammes
- 2 1 100 grammes
- 3 1 050 grammes
- 4 1 kg
- 5 1 kg

Activity 19.4

- Jug: 200 grammes
- Pen: 2 grammes
- Book: 600 grammes
- Ruler: 1 gramme
- Water glass: 150 grammes
- Chalkboard duster: 180 grammes

Exercise 19.3

- 1 True
- 2 False
- 3 True
- 4 False
- 5 True

Unit revision exercises

Multiple choice answers

- 1 C
- 2 A
- 3 B
- 4 B
- 5 D

Structured questions answers

- 6 1 kg
- 7 1000 g (1 kg)
- 8
 - a 1 000
 - b 1 000
- 9 A lorry.
- 10 150 g

Test 3

Paper 1

Multiple choice answers

- | | |
|------|------|
| 1 D | 21 D |
| 2 C | 22 B |
| 3 C | 23 C |
| 4 C | 24 C |
| 5 B | 25 B |
| 6 C | 26 B |
| 7 D | 27 C |
| 8 B | 28 A |
| 9 D | 29 A |
| 10 C | 30 C |
| 11 A | 31 B |
| 12 D | 32 A |
| 13 C | 33 C |
| 14 B | 34 C |
| 15 A | 35 B |
| 16 D | 36 C |
| 17 A | 37 B |
| 18 A | 38 C |
| 19 C | 39 B |
| 20 D | 40 C |

Paper 2

Structured questions answers

- 1
- a $\frac{2}{10}$
 - b 80 cm
 - c $\frac{1}{3}$
- 2
- a 140
 - b 60 cattle
 - c 100 sweets
- 3
- a 24
 - b 5 small boxes
 - c 6 sweets each

- 4 a 48 hours
b \$32
- 5 a Independence Day is 18 April
b 72 hours
c Half past 7 (7:30)
 - Minute hand on 6
 - Hour hand between 7 and 8
- 6 a 1 000 g (1 kg)
b 100 g
c 1 200 g
- 7 a
 - Value (1 ZiG, 2 ZiG)
 - Zimbabwe bird
 - National emblem
b \$18
c \$10
- 8 a 6 hours
b 240 minutes
c 36 months
- 9 a 2 pages
b $\frac{3}{5}$
c $\frac{2}{5}$
- 10 a 7.30
b Morning
c 10 years

Unit 20: Length

Unit objectives

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

- a measure the length of objects accurately.
b measure the length of lines accurately.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 160–168.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 20.1

- 1 2 cm = 20 mm
- 2 4 cm = 40 mm
- 3 5 cm = 50 mm
- 4 6 cm = 60 mm
- 5 7 cm = 70 mm

- 6 8 cm = 80 mm
- 7 9 cm = 90 mm
- 8 10 cm = 100 mm
- 9 12 cm = 120 mm
- 10 15 cm = 150 mm

Exercise 20.2

- 1 200 cm = 2 m
- 2 300 cm = 3 m
- 3 400 cm = 4 m
- 4 500 cm = 5 m

- 5 600 cm = 6 m
- 6 700 cm = 7 m
- 7 800 cm = 8 m
- 8 900 cm = 9 m

Exercise 20.3

- 1 2 m = 200 cm
- 2 3 m = 300 cm
- 3 4 m = 400 cm
- 4 5 m = 500 cm
- 5 6 m = 600 cm

- 6 7 m = 700 cm
- 7 8 m = 800 cm
- 8 9 m = 900 cm
- 9 10 m = 1 000 cm

Exercise 20.4

- 1 800 mm = 0.8 m
- 2 3 000 mm = 3 m
- 3 60 mm = 0,06 m

- 4 1 250 mm = 1,25 m
- 5 450 mm = 0,45 m

Activity 20.1

Learners measure small things around the school and express their length in millimetres.
Sample answers (accept any reasonable measurements):

- Pencil: 180 mm
- Eraser: 45 mm
- Chalk: 75 mm
- Crayon: 90 mm
- Matchbox: 50 mm

Emphasise correct use of a ruler and correct unit (mm).

Activity 20.2

Learners measure classroom or school objects using a string, stick, tape measure or ruler and record results.

Sample answers:

- Desk length: 120 cm
- Table width: 60 cm
- Door height: 2 m
- Blackboard length: 3 m
- Window width: 1 m

Accept different correct measurements.

Exercise 20.5

(Answers depend on the actual printed lines.)

- Measure each line using a ruler.
- Answers must be in mm or cm.
- Accept correct measurements based on learners' books.

Activity 20.3

Learners measure items around the school and give answers in metres.

Sample answers:

- Length of classroom: 8 m
- Playground width: 15 m
- School corridor: 20 m
- Distance from class to toilet: 25 m

Activity 20.4

Expected points (any two or more):

- Measuring land and fencing fields.
- Making clothes and cutting materials.
- Building houses and roads.
- Measuring distances in sports.
- Designing classrooms and playgrounds.

Exercise 20.6

- 1 10 cm
- 2 13 cm
- 3 18 cm

- 4 28 cm
- 5 28 cm
- 6 20 cm

Unit revision exercises

Multiple choice answers

- | | |
|-----|---------|
| 1 D | 4 D |
| 2 B | 5 10 cm |
| 3 B | 6 10 cm |

Structured questions answers

- 7 16 cm
8 19 cm
9 1 000 cm
10 6 m
11 **a** Measuring land and fencing.
b Building and construction.
c Measuring materials for clothes or furniture.
12 The best instrument to measure a matchbox is a ruler.

Unit 21: Shapes

Unit objectives

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

- a** classify shapes.
b name polygons with up to 4 sides.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 169–175.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 21.1

- 1 Square
2 Triangle
3 Rectangle
4 Square / Rectangle
5 4 sides
6 4 sides

Exercise 21.2

- 1
 - a Plate
 - b Coin
- 2
 - a Book
 - b Door
- 3
 - a Road sign
 - b Roof shape

Exercise 21.3

- 1 6 faces
- 2 12 edges
- 3 6 faces
- 4
 - All faces are squares
 - All sides are equal
- 5 It has rectangular faces

Exercise 21.4

- 1
 - a Brick
 - b Box
- 2
 - a Ball
 - b Orange
- 3
 - a Tomato can
 - b Drum

Activity 21.1

- 1 Matchbox – Cuboid (rectangular prism)
- 2 Tomato can – Cylinder
- 3 Perfume can – Cylinder
- 4 Book – Cuboid (rectangular prism)

Activity 21.2

Practical activity – accept any correct models and objects.

- 1 Sphere made using clay.
- 2 Cube made from paper or clay.
- 3
 - a Spheres: Ball, orange
 - b Cubes: Dice, sugar cube
 - c Cylinders: Can, candle
 - d Rectangular prisms: Book, box

Exercise 21.5

- 1 Learners draw shapes of:
 - a sphere
 - b cube
 - c rectangular prism
 - d cylinder
- 2
 - a Spheres
 - b Cubes
 - c Cylinders
 - d Rectangular prisms
- 3 Sculpture, Zimbabwe bird, jugs/mugs, carving

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 A | 4 B |
| 2 A | 5 B |
| 3 A | |

Structured questions answers

- 6
 - a Drinking cup
 - b Candle
 - c Gas cylinder
 - d Tin can
- 7
 - a Dice
 - b Box
- 8
 - a Traditional drum
 - b Clay pot
- 9
 - a Book
 - b Matchbox

Unit 22: Perimeter

Unit objective

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

- a calculate perimeter of a square, rectangle and triangle.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 176–181.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 22.1

Actual measurements may vary depending on the object. Sample answers are provided.

- 1 Exercise book
 - Length = 28 cm, Width = 21 cm
 - Perimeter = $2 \times (28 + 21) = 98$ cm
- 2 Classroom window
 - Length = 120 cm, Width = 90 cm
 - Perimeter = $2 \times (120 + 90) = 420$ cm
- 3 Length = 30 cm, Width = 20 cm
 - Perimeter = $2 (30 + 20) = 100$ cm

Activity 22.2

Learners may find different objects. Accept correct examples and calculations.

- 1 Square-shaped objects (floor tile, windowpane, chart paper)
 - a Side = 20 cm
 - b Perimeter = $4 \times 20 = 80$ cm
- 2 Rectangle-shaped objects (book, desktop, door)
 - a Length = 30 cm, Width = 15 cm
 - b Perimeter = $2 \times (30 + 15) = 90$ cm
- 3 Triangle-shaped objects (warning sign, roof design)
 - a Sides = 10 cm, 10 cm, 12 cm
 - b Perimeter = $10 + 10 + 12 = 32$ cm

Exercise 22.1

- 1 28 cm
- 2 28 cm
- 3 18 cm
- 4 12 cm
- 5 24 cm

Activity 22.3

Learners draw the following shapes.

- 1 Square, side = 4 cm
- 2 Rectangle, 6 cm by 2 cm
- 3 Triangle, sides = 3 cm, 4 cm, 5 cm

Exercise 22.2

Measurements will vary; sample answers given.

- 1 Pencil case
 - a Length = 20 cm, Width = 8 cm
 - b Perimeter = $2 \times (20 + 8) = 56$ cm
- 2 Book cover
 - a Length = 28 cm, Width = 21 cm
 - b Perimeter = 98 cm
- 3 Desktop
 - a Length = 60 cm, Width = 45 cm
 - b Perimeter = 210 cm

Unit revision exercises

Multiple choice answers

- 1 B
- 2 B
- 3 A
- 4 A
- 5 B

Structured questions answers

- 6 The perimeter of a square is $4 \times \text{side}$.
- 7 The perimeter of a triangle is the sum of its three sides.
- 8 The perimeter of a rectangle is $2 \times (\text{length} + \text{width})$.
- 9 Perimeter is measured in centimetres or metres.
- 10 A shape with four equal sides is called a square.

Unit 23: Area

Unit objectives

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

- a estimate the area of a square and rectangle using non-standard units.
- b calculate area of a square and rectangle.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 182–192.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 23.1

Answers depend on the size of the objects used. Sample estimates are provided.

- | | |
|---|--|
| 1 Maths exercise book cover
≈ 20 bottle tops or 20 tiles | 4 A square paper
≈ 16 bottle tops |
| 2 Desktop
≈ 60 bottle tops or 60 tiles | 5 Classroom door (using spans or string)
≈ 10 hand spans long $\times$ 4 hand spans wide
Estimated area ≈ 40 hand-span squares |
| 3 A brick on the ground
≈ 10 bottle tops | |

Exercise 23.1

- | | |
|---------------------|---------------------|
| 1 9 cm^2 | 5 49 cm^2 |
| 2 16 cm^2 | 6 64 cm^2 |
| 3 25 cm^2 | 7 81 cm^2 |
| 4 36 cm^2 | |

Exercise 23.2

- | | |
|---------------------|---------------------|
| a 8 cm^2 | d 35 cm^2 |
| b 15 cm^2 | e 48 cm^2 |
| c 24 cm^2 | f 63 cm^2 |

Exercise 23.3

- a $A = 9 \text{ cm}^2$
- b $B = 15 \text{ cm}^2$
- c $C = 12 \text{ cm}^2$
- d $D = 21 \text{ cm}^2$

- e $E = 28 \text{ cm}^2$
- f $F = 15 \text{ cm}^2$
- g $G = 16 \text{ cm}^2$
- h $H = 28 \text{ cm}^2$
- i $I = 22 \text{ cm}^2$

Unit revision exercises

Multiple choice answers

- 1 D
- 2 B
- 3 C
- 4 C
- 5 C

Structured questions answers

- 6 120 cm^2
- 7 12 cm^2
- 8 14 cm^2
- 9 128 cm^2
- 10 *(Learner practical task – sample answers)*
 - a Rectangle:
Length = 10 cm, Width = 5 cm
Area = 50 cm^2
 - b Square:
Side = 6 cm
Area = 36 cm^2
- 11 A = 6 cm^2
B = 9 cm^2

Unit 24: Volume and capacity

Unit objective

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

- a find the volume of liquids using half-litre and 1-litre containers.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 193–198.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 24.1

- 1

1 000 ml
- 2

3 000 ml
- 3

4 000 ml
- 4

5 000 ml
- 5

6 000 ml
- 6

7 000 ml

Exercise 24.2

- 1

2 litres
- 2

3 litres
- 3

4 litres
- 4

5 litres
- 5

6 litres
- 6

7 litres
- 7

8 litres
- 8

9 litres

Activity 24.1

- a

200 ml
- b

700 ml
- c

100 ml
- d

500 ml
- e

500 ml
- f

750 ml

Activity 24.2

Container	Volume
2 containers of $\frac{1}{2}$ litre each	1 litre
4 containers of $\frac{1}{2}$ litre each	2 litres
6 containers of $\frac{1}{2}$ litre each	3 litres
8 containers of 1 litre each	8 litres
10 containers of 1 litre each	10 litres
12 containers of 1 litre each	12 litres

Exercise 24.3

- 1

6 containers
- 2

8 containers
- 3

6 bottles
- 4

16 containers
- 5

5 containers
- 6

a

4 000 ml

b

4 one-litre cans

Unit revision exercises

Multiple choice answers

- 1 C
- 2 D
- 3 A

Structured questions answers

- 4 7 litres
- 5 9 000 millilitres
- 6 5 cups
- 7 20 cups
- 8 4 cups

Unit 25: Direction, angles and lines

Unit objectives

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

- a name the four main cardinal points.
- b identify the position of an object.
- c identify horizontal and vertical lines.
- d illustrate quarter and half revolution.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 199–205.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 25.1

- 1
 - a Animal in the North: Baboon
 - b Animal in the East: Dog
 - c Animal in the West: Hare
 - d Animal in the South: Bird
- 2 Baboon
- 3 Dog
- 4 Hare
- 5 Bird

Exercise 25.1

- | | |
|------------|------------|
| 1 Gweru | 4 Masvingo |
| 2 Gweru | 5 Gweru |
| 3 Bulawayo | 6 Masvingo |

Activity 25.2

- | | |
|---------------|--------------------|
| 1 Store | 4 Well/Muunze Road |
| 2 Police camp | 5 Garage |
| 3 Hospital | 6 Borehole |

Exercise 25.2

Learners should:

- start at point A,
- use cardinal directions (N, E, S, W),
- state the number of steps,
- pass through the given letters,
- end at point X.

Any correct route using cardinal points is acceptable.

Unit revision exercises

Multiple choice answers

- | | |
|-----|-----|
| 1 A | 4 C |
| 2 D | 5 B |
| 3 A | 6 B |

Structured questions answers

- 7
- North
 - South
 - East
 - West
- 8
- a True
 - b False
 - c False
 - d True

Topic 4

Relationships

Unit 26: Data handling

Unit objectives

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

- a collect data from the environment.
- b represent information using the tally system.
- c interpret information from tables.
- d interpret information from bar graphs.

Teaching and learning materials

- PlusOne Mathematics Grade 3 Learner's Book pages 206–215.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 26.1

- 1
 - a $4 \rightarrow$ ||||
 - b $8 \rightarrow$ |||| ||
 - c $9 \rightarrow$ |||| ||
 - d $11 \rightarrow$ |||| || |
 - e $13 \rightarrow$ |||| || ||
 - f $15 \rightarrow$ |||| || ||
 - g $19 \rightarrow$ |||| || || ||
- 2
 - a Mr Gusha (1): |
 - b Mr Nyemba (4): ||||
 - c Mr Gaba (8): |||| ||
 - d Mr Moja (14): |||| || || ||
 - e Mr Shoko (10): |||| ||
 - f Mr Mambara (13): |||| || ||

Exercise 26.1

- 1 |||
- 2 a ||| ||| ||
b ||| ||| |
- 3 ||| ||| ||| ||| |
- 4 ||| ||| ||| |||
- 5 ||| ||| ||| |||

Activity 26.2

- 1 1 day
- 2 4 days
- 3 Grag and Khosana
- 4 Gilbert
- 5 Gabriel
- 6 Grag and Khosana

Exercise 26.2

Digit	Tally	Frequency
1	One	3
2	Two	6
3	Three	5
4	Four	9
5	Five	3
6	Six	6

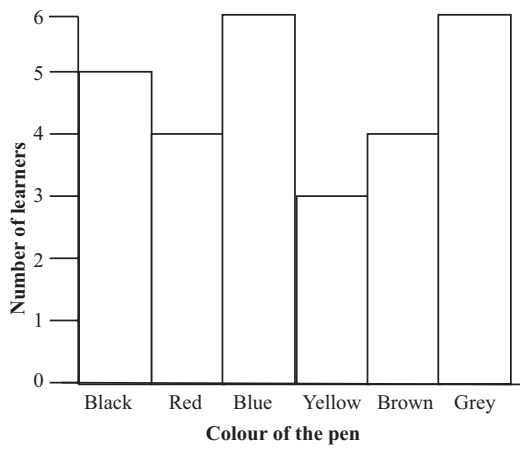
Frequency table

- Digit 1: ||| → 3
- Digit 2: ||| || → 6
- Digit 3: ||| | → 5
- Digit 4: ||| ||| → 9
- Digit 5: ||| → 3
- Digit 6: ||| → 6

Exercise 26.3

- 1 Wednesday
- 2 Monday and Friday
- 3 3 hours
- 4 4 hours
- 5 6 hours
- 6 5 hours

Exercise 26.4



Activity 26.3

In groups of five, learners share the information about their birth months. The facilitator marks the bar graphs. Facilitator guided – answers depend on class data.

- Learners create a table of months of birth with tallies.
- Learners draw a bar graph from their table.

Exercise 26.5

Learners draw and insert the tallies.

Age	Number	Tally
18	12	
19	10	
20	11	
21	8	
22	14	
23	6	
24	13	

Unit revision exercises

Multiple choice answers

- 1

A
- 2

B
- 3

C
- 4

B
- 5

C
- 6

D
- 7

A
- 8

C
- 9

B
- 10

B

Structured questions answers

11 ||| ||| |||

12 ||| ||

13 ||| ||| ||| |||

14 a 5 learners

b 3 learners

c 8 learners

d 2 learners

e Size 9

f Size 10

15 Table completed using the values below. Learners draw the tallies.

Shoe size	Frequency	Tally
6	8	
7	6	
9	4	
10	2	

Test 4

Paper 1

Multiple choice answers

1 B

2 D

3 B

4 D

5 C

6 D

7 B

8 D

9 A

10 B

11 B

12 B

13 C

14 B

15 D

16 C

17 D

18 B

19 C

20 A

21 B

22 B

23 C

24 A

25 B

26 A

27 A

28 C

29 C

30 B

31 B

32 B

33 A

34 D

35 B

36 A

37 C

38 C

39 B

40 B

Paper 2

Structured questions answers

- 1 a $231 = 200 + 30 + 1$
b Hundreds
c 13, 23, 33, 43, 53
- 2 a 30
b 300
c 36 teachers
- 3 a 38
b \$128
c 102 km
- 4 a 1, 2, 4
b 20 litres
c 1000 g
- 5 a VII, IX
b Quater to 5
c 4:45
- 6 June
- 7 a $\frac{9}{10}$
b $\frac{2}{5}$
c 10 mangoes
- 8 a 8 coins
b \$5 change
c 3 hours
- 9 a 5000 g
b 150 cm
c 65 cm^2
- 10 a $32 = \text{||||} \text{||||} \text{||||} \text{||||} \text{||||}$
b Bar graph
c 5 hours
d Monday and Friday
e Thursday