

PlusOne

Mathematics



Grade

5

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 5 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 5 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
- Scenes/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 (0–100 000)

Unit objectives

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

- a** write numbers in words and numerals.
- b** express numbers in expanded notation/form.
- c** count in ascending and descending order.
- d** arrange numbers in order of size.
- e** give the values of digits in a number.
- f** write ordinal numbers up to the hundredth.
- g** use ordinal numbers in ranking and positioning.
- h** write ordinal numbers in words and numerals.
- i** write number sequences.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 1–12.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 1.1

- 1**
 - a** Fifteen thousand six hundred and seventy-eight
 - b** Forty-two thousand three hundred and ninety
 - c** Seventy-nine thousand and one
 - d** Sixty-eight thousand and forty-five
 - e** Ninety-one thousand two hundred and sixty-three
 - f** Ten thousand five hundred and nine
- 2**
 - a** 56 402
 - b** 99 710
 - c** 12 080
 - d** 81 305
 - e** 64 999
 - f** 33 006

Exercise 1.2

- a $56\,789 = 50\,000 + 6\,000 + 700 + 80 + 9$
- b $30\,421 = 30\,000 + 0 + 400 + 20 + 1$
- c $99\,999 = 90\,000 + 9\,000 + 900 + 90 + 9$
- d $88\,205 = 80\,000 + 8\,000 + 200 + 0 + 5$
- e $40\,060 = 40\,000 + 0 + 0 + 60 + 0$
- f $72\,319 = 70\,000 + 2\,000 + 300 + 10 + 9$

Activity 1.1

Learners follow the given instructions on **page 5** of the Learner’s Book. For example:

Ascending order: 12 345, 23 678, 34 210, 45 009, 56 890

Descending order: 56 890, 45 009, 34 210, 23 678, 12 345

Exercise 1.3

Compare these pairs of numbers using $>$, $<$ or $=$:

- | | |
|------------------------|-----------------------|
| a $34\,500 > 34\,050$ | d $29\,342 < 29\,432$ |
| b $45\,678 < 54\,678$ | e $51\,870 > 51\,708$ |
| c $99\,999 < 100\,000$ | f $12\,345 = 12\,345$ |

Activity 1.2

- | | |
|---------------------------|--------------------------|
| a Units or 2 | d Hundreds or 0 hundreds |
| b Ten thousands or 50 000 | e Thousands or 6 000 |
| c Thousands or 9 000 | f Hundreds or 100 |

Exercise 1.4

- | | |
|--------------------------|-----------------------|
| 1 Units or 7 | 6 Tens or 50 |
| 2 Units or 5 | 7 Tens or 30 |
| 3 Units or 9 | 8 Tens or 80 |
| 4 Hundreds or 0 hundreds | 9 Tens or 70 |
| 5 Thousands or 9 000 | 10 Thousands or 3 000 |

Exercise 1.5

- | | | | |
|-------------------|---------------------|---------------------|---------------------|
| 1 1 st | 9 9 th | 17 17 th | 25 25 th |
| 2 2 nd | 10 10 th | 18 18 th | 26 26 th |
| 3 3 rd | 11 11 th | 19 19 th | 27 27 th |
| 4 4 th | 12 12 th | 20 20 th | 28 28 th |
| 5 5 th | 13 13 th | 21 21 st | 29 29 th |
| 6 6 th | 14 14 th | 22 22 nd | 30 30 th |
| 7 7 th | 15 15 th | 23 23 rd | 31 31 st |
| 8 8 th | 16 16 th | 24 24 th | 32 32 nd |

33	33 rd	50	50 th	67	67 th	84	84 th
34	34 th	51	51 st	68	68 th	85	85 th
35	35 th	52	52 nd	69	69 th	86	86 th
36	36 th	53	53 rd	70	70 th	87	87 th
37	37 th	54	54 th	71	71 st	88	88 th
38	38 th	55	55 th	72	72 nd	89	89 th
39	39 th	56	56 th	73	73 rd	90	90 th
40	40 th	57	57 th	74	74 th	91	91 st
41	41 st	58	58 th	75	75 th	92	92 nd
42	42 nd	59	59 th	76	76 th	93	93 rd
43	43 rd	60	60 th	77	77 th	94	94 th
44	44 th	61	61 st	78	78 th	95	95 th
45	45 th	62	62 nd	79	79 th	96	96 th
46	46 th	63	63 rd	80	80 th	97	97 th
47	47 th	64	64 th	81	81 st	98	98 th
48	48 th	65	65 th	82	82 nd	99	99 th
49	49 th	66	66 th	83	83 rd	100	100 th

Exercise 1.6

- | | |
|-------------|----------------|
| 1 seventh | 4 fifty-fifth |
| 2 twelfth | 5 ninety-ninth |
| 3 thirtieth | 6 hundredth |

Exercise 1.7

- 1 6, 12, 18, 24, 30, 36
- 2 200, 180, 160, 140, 120
- 3 1, 2, 4, 8, 16, 32, 64
- 4 121, 144, 169, 196, 225
- 5 2, 3, 5, 8, 13, 21, 34

Unit revision answers

- 1 D
- 2 B
- 3 A
- 4 C
- 5 A
- 6 Sixty-seven thousand four hundred and thirty-two
- 7 $90\,000 + 8\,000 + 700 + 60 + 5$
- 8 12 345, 23 400, 34 500, 45 678
- 9 5 000
- 10 300, 500

Unit 2: Rounding off and comparing numbers

Unit objectives

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

- a round off numbers to a degree of accuracy.
- b apply approximation in life situations.
- c compare numbers.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 13–18.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 2.1

- 1
 - a 10
 - b 10
 - c 20
 - d 90
 - e 100
- 2
 - a 560
 - b 600
- 3
 - a 8 560
 - b 8 600
 - c 9 000
- 4
 - a 83 560
 - b 83 600
 - c 84 000
 - d 80 000

Exercise 2.2

- 1
 - nearest 10 $\rightarrow$ 3 490
 - nearest 100 $\rightarrow$ 3 500
 - nearest 1 000 $\rightarrow$ 3 000
- 2
 - nearest 100 $\rightarrow$ 58 600
 - nearest 1 000 $\rightarrow$ 59 000
 - nearest 10 000 $\rightarrow$ 60 000
- 3
 - nearest 10 $\rightarrow$ 29 760
 - nearest 100 $\rightarrow$ 29 800
- 4
 - nearest 1 000 $\rightarrow$ 15 000
- 5
 - nearest 10 000 $\rightarrow$ 70 000

- 6 nearest 100 $\rightarrow$ 5 200
nearest 1 000 $\rightarrow$ 5 000

Activity 2.1

Learners follow instructions on **page 17** of the Learner's Book.

- 1 Estimated total cost of three supermarket items: about \$1 500
- 2 Approximate distance between school and nearest town: about 10 km
- 3 Estimated number of learners in the school (nearest 100): about 800 learners

Exercise 2.3

- 1 $23\,482 < 23\,840$
- 2 $54\,710 > 54\,017$
- 3 $67\,000 = 67\,000$
- 4 $12\,345 < 12\,453$
- 5 $99\,999 < 100\,000$
- 6 $5\,001 > 4\,999$

Unit revision answers

- 1 C
- 2 D
- 3 C
- 4 B
- 5 C
- 6 C
- 7 \$29 678 rounded off to:
 - nearest hundred $\rightarrow$ 29 700
 - nearest thousand $\rightarrow$ 30 000
- 8 \$19 632 $>$ \$12 836
- 9 Estimated total cost:
 - \$3 990 = 4 000
 - \$5 250 = 5 000
 - \$6 180 = 6 000Estimated total = 15 000
- 10 56 738 km rounded to:
 - nearest thousand $\rightarrow$ 57 000 km
 - nearest ten thousand $\rightarrow$ 60 000 km
- 11 $1\,267 < 1\,725$
- 12 \$88 456 rounded to:
 - nearest ten thousand $\rightarrow$ \$90 000
 - nearest hundred thousand $\rightarrow$ \$100 000

Unit 3: Roman numerals

Unit objectives

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

- a read/sign Roman numerals.
- b write Roman numerals.
- c convert Roman numerals to Arabic numerals within the range (1–20).

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 19–24.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 3.1

- 1
 - a $4 \rightarrow \text{IV}$
 - b $8 \rightarrow \text{VIII}$
 - c $11 \rightarrow \text{XI}$
 - d $15 \rightarrow \text{XV}$
 - e $18 \rightarrow \text{XVIII}$
 - f $20 \rightarrow \text{XX}$
- 2
 - a $\text{IX} \rightarrow 9$
 - b $\text{XIII} \rightarrow 13$
 - c $\text{XVI} \rightarrow 16$
 - d $\text{XIX} \rightarrow 19$
 - e $\text{VII} \rightarrow 7$
 - f $\text{XII} \rightarrow 12$

Activity 3.1

- a I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX, XX
- b 1–I, 2–II, 3–III, 4–IV, 5–V, 6–VI, 7–VII, 8–VIII, 9–IX, 10–X, ... , 20–XX
- c I–1, V–5, X–10, XV–15, XX–20

Exercise 3.2

- 1 $\text{XX} \rightarrow 20$
- 2 $\text{XIV} \rightarrow 14$
- 3 $\text{XIX} \rightarrow 19$
- 4 $\text{XIII} \rightarrow 13$
- 5 $\text{VII} \rightarrow 7$
- 6 $\text{XI} \rightarrow 11$

- 7 IV $\rightarrow$ 4
8 XVI $\rightarrow$ 16

Exercise 3.3

- | | |
|------------------------|-------------------------|
| 1 IV $\rightarrow$ 4 | 4 XX $\rightarrow$ 20 |
| 2 XII $\rightarrow$ 12 | 5 XI $\rightarrow$ 11 |
| 3 XV $\rightarrow$ 15 | 6 XVII $\rightarrow$ 17 |

Unit revision answers

- 1 B
2 D
3 C
4 C
5 B
6 A
7 XIII
8 12
9 I, II, III, IV, V, VI, VII, VIII
10 Difference between XIV and XVII: $17 - 14 = 3$
11 IV, IX, XII, XVI, XIX

Unit 4: Proper fractions (denominators 2 to 10 and 20)

Unit objectives

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

- a identify proper fractions with denominators in the given range.
- b read/sign fractions with denominators in the given range.
- c write fractions with denominators in the given range.
- d compare fractions.
- e write fractions in their equivalent forms.
- f reduce fractions to their lowest terms.
- g arrange fractions in ascending or descending order.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 25–36.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Starter activity

- 1 Example fractions: $\frac{1}{2}$, $\frac{3}{4}$, $\frac{2}{5}$
- 2 Each whole is divided into equal parts.
- 3 Example: $\frac{3}{4} > \frac{1}{2}$
- 4 Written as numerals and words (for example, three-quarters).

Exercise 4.1

State the fractions of the shaded and unshaded parts

- 1 Shaded: $\frac{8}{10}$, Unshaded: $\frac{2}{10}$
- 2 Shaded: $\frac{5}{12}$, Unshaded: $\frac{7}{12}$
- 3 Shaded: $\frac{1}{10}$, Unshaded: $\frac{9}{10}$
- 4 Write the fractions:

a $\frac{3}{5}$

b $\frac{7}{10}$

c $\frac{2}{8}$

Activity 4.1

- | | |
|---------------------------------------|--|
| 1 $\frac{1}{4} > \frac{1}{8}$ | 5 $\frac{4}{8} < \frac{7}{8}$ |
| 2 $\frac{1}{6} > \frac{1}{10}$ | 6 $\frac{3}{5} < \frac{3}{4}$ |
| 3 $\frac{1}{2} > \frac{1}{4}$ | 7 $\frac{5}{10} = \frac{4}{8}$ |
| 4 $\frac{1}{5} > \frac{1}{10}$ | 8 $\frac{9}{10} > \frac{9}{15}$ |

Exercise 4.2

- | | |
|---------------------------------------|--|
| 1 $\frac{2}{5} < \frac{4}{5}$ | 4 $\frac{7}{8} > \frac{3}{4}$ |
| 2 $\frac{3}{6} = \frac{1}{2}$ | 5 $\frac{9}{20} < \frac{5}{10}$ |
| 3 $\frac{5}{10} = \frac{1}{2}$ | 6 $\frac{2}{3} = \frac{4}{6}$ |

Exercise 4.3

- | | |
|---------------------------------------|--|
| 1 $\frac{1}{2} = \frac{2}{4}$ | 4 $\frac{5}{8} = \frac{10}{16}$ |
| 2 $\frac{3}{5} = \frac{6}{10}$ | 5 $\frac{2}{7} = \frac{4}{14}$ |
| 3 $\frac{4}{6} = \frac{8}{12}$ | 6 $\frac{6}{9} = \frac{2}{3}$ |

Exercise 4.4

- | | |
|--|--|
| 1 $\frac{12}{18} = \frac{2}{3}$ | 3 $\frac{15}{25} = \frac{3}{5}$ |
| 2 $\frac{8}{10} = \frac{4}{5}$ | 4 $\frac{9}{12} = \frac{3}{4}$ |

5 $\frac{10}{20} = \frac{1}{2}$

6 $\frac{14}{21} = \frac{2}{3}$

Exercise 4.5

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

2 $\frac{5}{6}, \frac{7}{10}, \frac{4}{9}$

3 $2\frac{1}{3}, 1\frac{3}{4}, 3\frac{1}{2}$

4 $\frac{7}{9}, \frac{2}{3}, \frac{3}{5}$

5 $\frac{7}{12}$ is greater.

Unit revision answers

1 B

2 B

3 A

4 C

5 B

6 C

7 A

8 C

9 C

10 B

11 $\frac{3}{5} > \frac{4}{10}$

12 $\frac{2}{6}$ and $\frac{3}{9}$

13 $\frac{2}{3}$

14 a $0,3 = \frac{3}{10}$

b $0,7 = \frac{7}{10}$

15 $\frac{1}{4}, \frac{7}{20}, \frac{3}{8}$

Unit 5: Mixed numbers (denominators 2 to 10)

Unit objectives

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

- a identify mixed numbers.
- b read/sign mixed numbers.
- c write mixed numbers.
- d convert mixed numbers to improper fractions and vice versa.

- e compare mixed numbers.
- f solve problems involving mixed numbers.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 37–47.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Starter activity

Learners follow instructions on **page 38** of the Learner's Book.

Exercise 5.1

- 1
 - a $4\frac{1}{2}$
 - b $7\frac{1}{3}$
 - c $3\frac{2}{5}$
 - d $6\frac{3}{5}$
 - e $2\frac{3}{4}$
 - f $5\frac{2}{5}$

Exercise 5.2

- | | |
|------------------|------------------|
| 1 $\frac{27}{5}$ | 4 $\frac{39}{8}$ |
| 2 $\frac{15}{4}$ | 5 $\frac{37}{6}$ |
| 3 $\frac{38}{5}$ | 6 $\frac{44}{5}$ |

Converting improper fractions to mixed numbers:

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

Exercise 5.3

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

Exercise 5.4

- | | |
|-----------|-------------------------|
| 1 11 bags | 2 $6\frac{1}{8}$ metres |
|-----------|-------------------------|

3 $6\frac{1}{5}$ books

4 $3\frac{13}{15}$ kg

5 8 km

6 $9\frac{5}{8}$ metres

Unit revision answers

1 B

2 A

3 B

4 A

5 B

6 A

7 A

8 D

9 B

10 B

11 a $\frac{28}{5}$

b $\frac{39}{8}$

c $\frac{37}{5}$

12 a $5\frac{1}{6}$

b $4\frac{3}{5}$

c $5\frac{5}{8}$

13 a $2\frac{4}{5} > 2\frac{3}{4}$

b $3\frac{3}{5} > 3\frac{3}{8}$

c $4\frac{7}{8} > 4\frac{4}{5}$

14 a 17 bags

b $6\frac{1}{5}$ books

15 $5\frac{7}{8}, 5\frac{3}{4}, 5\frac{3}{5}, 5\frac{2}{5}$

Unit 6: Decimals (up to 2 decimal places)

Unit objectives

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

a identify decimals.

b read/sign decimals.

c write decimals.

- d** determine the place value of a digit in a decimal.
- e** interpret diagrammatic representation of decimals.
- f** compare decimals.
- g** round off decimals to the nearest unit (whole number) and one decimal place.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 48–55.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Starter activity

- 1** Learners follow instructions on **page 49** of the Learner's Book.
- 2** We use decimals when the number is not a whole number.

Decimals help us show:

- Parts of a whole
- Measurements that are not exact whole numbers
- Money (for example, dollars and cents)
- Length, mass, and capacity (for example, 2,5 kg, 3,75 m)

Whole numbers cannot show small parts accurately, but decimals can.

Example: 3,5 kg is more accurate than saying 3 kg.

- 3** Yes. To compare decimals:
 - a** Look at the whole number part first. The bigger whole number means the bigger decimal.
 - b** If the whole numbers are the same, compare the tenths.
 - c** If the tenths are the same, compare the hundredths and so on.

Example: Compare 4.56 and 4.65

- Whole numbers are the same (4).
- Compare tenths: $5 < 6$
So, $4,56 < 4,65$

You can also:

- Line them up vertically
- Add zeros if needed (for example, $4,5 = 4,50$)

- 4** To round to the nearest whole number:
 - a** Look at the digit in the tenths place.
 - b** If it is 5 or more, round up.
 - c** If it is 4 or less, round down.

Examples:

- $6,3 \rightarrow 6$ (because 3 is less than 5)
- $8,7 \rightarrow 9$ (because 7 is 5 or more)
- $12,5 \rightarrow 13$

Exercise 6.1

- | | | | |
|---|--------------|---|---------------|
| 1 | \$12.50 | 4 | 3,6l |
| 2 | 7,32 kg | 5 | 38,05 degrees |
| 3 | 9,87 seconds | 6 | 14,9l |

Activity 6.1

- | | | | |
|---|-------------------------------|---|--------------------------------|
| 1 | $3,97 \rightarrow$ tenths | 4 | $7,89 \rightarrow$ hundredths |
| 2 | $2,04 \rightarrow$ hundredths | 5 | $4,35 \rightarrow$ tenths |
| 3 | $18,56 \rightarrow$ tenths | 6 | $21,07 \rightarrow$ hundredths |

Exercise 6.2

- 1
- a 4,057
 - b 25,34
 - c 0,423
 - d 4 367
 - e 436
- 2
- Learners draw abacuses showing: (Abacus drawings should correctly show units, tenths and hundredths, among others.)
- a 5,04
 - b 500,000
 - c 40,500
 - d 1,555

Activity 6.2

- 1 Half of the grid shaded (5 out of 10 or 50 out of 100 squares).
- 2 75 squares shaded out of 100.
- 3 3 whole pizzas and 1 quarter of another pizza.
- 4 Between 2,8 and 2,9, closer to 2,9.

Exercise 6.3

- | | | | |
|---|----------------|---|-----------------|
| 1 | $7,6 < 7,65$ | 5 | $65,01 < 65,10$ |
| 2 | $12,34 < 12,4$ | 6 | $9,87 > 9,078$ |
| 3 | $0,78 < 0,8$ | 7 | $15,06 < 15,60$ |
| 4 | $5,09 < 5,90$ | 8 | $8,4 = 8,40$ |

Exercise 6.4

- 1 6
- 2 8,9
- 3 15
- 4 3,1
- 5 29,9
- 6 10
- 7
 - a 0,67
 - b 0,52
 - c 89,00
 - d 13,00
 - e 0,24

Revision exercise answers

- 1 B
- 2 B
- 3 B
- 4 B
- 5 A
- 6 A
- 7
 - a Three point two five
 - b Nine point zero eight
 - c Fourteen point six seven
- 8
 - a Tenths
 - b Hundredths
 - c Hundredths
- 9
 - a $3,65 > 3,6$
 - b $4,07 < 4,7$
 - c $5,90 = 5,9$
- 10
 - a 7
 - b 4
 - c 9
- 11
 - a 9,7
 - b 3,1
 - c 7,3
- 12
 - a $\frac{2}{5}$
 - b $\frac{1}{4}$
 - c $\frac{3}{4}$

- 13
- a Heaviest bag: 3,5 kg
 - b Ascending order: 2,75 kg, 2,8 kg, 3,05 kg, 3,5 kg
 - c Rounded off to nearest whole number:
2,8 $\rightarrow$ 3 kg; 3,5 $\rightarrow$ 4 kg; 2,75 $\rightarrow$ 3 kg; 3,05 $\rightarrow$ 3 kg
- 14 Eight point two seven
- 15 $\frac{89}{100}$
- 16 $6,32 > 6,23$
- 17 $36,9^{\circ}\text{C}$
- 18 Tenths
- 19 3,6, 3,7
- 20 Between 7 and 8, slightly after 7.
- 21 Learners draw abacuses to show:
- a 5 units, 2 tenths, 5 hundredths
 - b 6 units, 2 tenths, 5 hundredths
- 22
- a 10
 - b 5

Units 7: Percentages

Unit objectives

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

- a express fractions as percentages and vice-versa.
- b change one quantity/amount as a percentage of another.
- c compare percentages.
- d show relationships between percentages and fractions.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 56–63.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Starter activity

- 1 Examples: 20%, 25%, 50%, 75%
- 2 Percentages are used to compare parts of a whole.
- 3 Example: $75\% > 50\%$.
- 4 Percentages are fractions out of 100.

Exercise 7.1

- 1
 - a 60%
 - b 80%
 - c $16\frac{2}{3}\%$
 - d 62.5%
 - e 40%
 - f 75%
- 2
 - a $\frac{7}{20}$
 - b $\frac{7}{10}$
 - c $\frac{17}{20}$
 - d $\frac{2}{5}$
 - e $\frac{11}{20}$
 - f $\frac{19}{20}$

Exercise 7.2

- | | |
|-------|-------|
| 1 40% | 4 25% |
| 2 50% | 5 30% |
| 3 20% | 6 50% |

Exercise 7.3

- | | |
|------------------------|-------------------------|
| 1 $45\% < 55\%$ | 4 $90\% = \frac{9}{10}$ |
| 2 $\frac{3}{5} = 60\%$ | 5 $50\% = \frac{1}{2}$ |
| 3 $\frac{3}{4} = 75\%$ | 6 $\frac{2}{5} = 40\%$ |

Exercise 7.4

- | | |
|-----------------------------------|--------------------------|
| 1 $\frac{1}{3} = 33\frac{1}{3}\%$ | 4 $\frac{7}{8} = 87.5\%$ |
| 2 $\frac{1}{6} = 16\frac{2}{3}\%$ | 5 $\frac{5}{8} = 62.5\%$ |
| 3 $\frac{4}{5} = 80\%$ | 6 $\frac{3}{5} = 60\%$ |

Exercise 7.5

- | | |
|------------------------------|--------|
| 1 She is left with 76 cents. | 4 80% |
| 2 52% | 5 45% |
| 3 49 goats | 6 100% |

Revision exercise answers

- 1 B
- 2 C
- 3 B
- 4 B
- 5 B
- 6
 - a $\frac{9}{20}$
 - b $\frac{4}{5}$
 - c $\frac{5}{8}$
- 7
 - a 60%
 - b 87,5%
 - c 40%
- 8
 - a $\frac{3}{5} = 60$
 - b $\frac{4}{5} > 75$
 - c $\frac{2}{5} = 40$
- 9 40%
- 10 40%
- 11 10 learners.
- 12 75%
- 13 80 kg
- 14 80%
- 15 200 ml juice.

Examination 1

Paper 1

Multiple choice answers

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

Paper 2

Structured questions answers

- 1
- a Eighty-three thousand four hundred and six.
 - b $50\,000 + 6\,000 + 700 + 20$
 - c 35, 42, 49
 - d 18 108; 18 081; 18 018; 10 818
- 2
- a
 - i 94 000
 - ii 95 000
 - iii 90 000
 - b
 - i $14 \rightarrow \text{XIV}$
 - ii $\text{XVII} \rightarrow 17$
 - c $51\,999 < 52\,000$
 - d If the digit to the right is 5, round up.
- 3
- a $\frac{1}{2}$
 - b $\frac{1}{2}, \frac{9}{10}, 1\frac{1}{5}$
 - c
 - i $\frac{23}{5}$
 - ii $3\frac{1}{3}$
- 4
- a Tenths
 - b
 - i 80%
 - ii 0,18

c **i** 9 litres

ii 6 litres

5 **a** **i** 30 trees

ii 170 trees

b **i** $35,45 = 35$ kg

ii 35,5 kg

c **i** 25%

ii 0,75

Topic 2

Operations

Unit 8 – Addition

Unit objectives

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

- a** demonstrate an understanding of basic addition facts.
- b** add numbers that require carrying twice.
- c** demonstrate the commutative law in addition.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 70–75.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 8.1

- | | |
|-----------------|-----------------|
| 1 73 777 | 4 89 641 |
| 2 74 776 | 5 95 655 |
| 3 89 763 | 6 68 893 |

Exercise 8.2

- | | |
|------------------|---------------------|
| 1 100 975 | 7 406 328 |
| 2 122 260 | 8 766 308 |
| 3 151 971 | 9 1 183 513 |
| 4 145 308 | 10 1 162 210 |
| 5 81 029 | 11 1 023 999 |
| 6 133 119 | 12 903 892 |

Exercise 8.3

- 1** $27\,431 + 38\,569$
- 2** $28\,741 + 53\,214$

- 3 $45\ 678 + 67\ 345$
- 4 $32\ 658 + 100\ 342$
- 5 $12\ 478 + 85\ 219$
- 6 $26\ 543 + 48\ 901$

Exercise 8.4

- 1 159 000 passengers.
- 2 185 555 loaves.
- 3 222 823 learners.
- 4 142 940 seedlings.
- 5 102 625 cartons.

Unit revision answers

- 1 B
- 2 D
- 3 D
- 4 A
- 5 B
- 6
 - a 1 577 690
 - b 1 088 216
 - c 3 636 450
- 7
 - a $23\ 149 + 67\ 238$
 - b $876\ 231 + 145\ 872$
 - c $211\ 347 + 390\ 658$
- 8 153 860 kg.
- 9 377 365 books.
- 10 79 388 miles.
- 11 178 075 seats.
- 12 \$214 995
- 13 580 275 packets.
- 14 43 823 houses.
- 15 633 110 passengers.

Unit 9: Subtraction of whole numbers (0-100 000)

Unit objectives

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

- a subtract numbers within the range.
- b subtract numbers involving one or two equal additions.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 76–81.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 9.1

- | | | | |
|---|---------|----|-----------|
| 1 | 41 142 | 10 | 27 113 |
| 2 | 45 212 | 11 | 279 171 |
| 3 | 55 221 | 12 | 156 457 |
| 4 | 46 555 | 13 | 433 243 |
| 5 | 35 265 | 14 | 378 738 |
| 6 | 54 428 | 15 | 3 204 069 |
| 7 | 41 633 | 16 | 3 111 096 |
| 8 | 47 073 | 17 | 3 439 591 |
| 9 | 384 236 | 18 | 3 166 225 |

Exercise 9.2

- | | | | |
|---|-----------|---|-----------|
| 1 | 402 454 | 4 | 3 202 346 |
| 2 | 800 159 | 5 | 5 000 001 |
| 3 | 2 001 628 | 6 | 5 000 001 |

Exercise 9.3

- | | | | |
|---|---------------------|---|----------------|
| 1 | 102 882 kg | 4 | 36 730 items. |
| 2 | 101 521 spectators. | 5 | 72 306 litres. |
| 3 | 2 511 books. | | |

Unit revision answers

- | | |
|---|-------------|
| 1 | A |
| 2 | A |
| 3 | C |
| 4 | A |
| 5 | A |
| 6 | a 630 662 |
| | b 323 252 |
| | c 533 127 |
| 7 | a 500 001 |
| | b 452 352 |
| | c 5 000 002 |

- 8 1 225 learners.
- 9 41 725 kg
- 10 110 235 bricks.
- 11 37 765 employees.
- 12 65 253 loaves.
- 13 2 575 cars.
- 14 54 101 dollars.
- 15 63 667 doses.

Unit 10: Multiplication of whole numbers

Unit objectives

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

- a demonstrate an understanding of basic multiplication.
- b multiply numbers by two-digit numbers.
- c multiply numbers by multiples of 10 up to 100.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 82–87.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 10.1

- | | |
|-------|-------|
| 1 48 | 1 135 |
| 2 46 | 2 152 |
| 3 93 | 3 276 |
| 4 70 | 4 156 |
| 5 126 | 5 162 |
| 6 245 | 6 675 |

Exercise 10.2

- | | |
|-------|---------|
| 1 403 | 4 784 |
| 2 360 | 5 1 701 |
| 3 924 | 6 1 680 |

Exercise 10.3

- | | |
|-------|---------|
| 1 630 | 3 2 120 |
| 2 920 | 4 3 750 |

5 4 400

6 3 780

Exercise 10.4

1 875 loaves

2 56 learners

3 150 dollars

4 672 litres

5 1 296 muffins

6 1 080 pages

Unit revision answers

1 B

2 B

5 a 630

b 1 533

c 3 204

6 a 1 116 learners.

b 1 590 cartons.

7 9 375 seats.

8 5 160 bottles.

9 10 000 bags.

10 4 320 books.

11 2 250 trees.

12 25 550 newspapers.

13 2 640 meals.

14 1 536 packets.

15 2 240 flowers.

3 B

4 C

Unit 11: Division of whole numbers

Unit objectives

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

- a demonstrate division as repeated subtraction.
- b carry out division by a two-digit divisor without remainders (where the two-digit numbers are multiples of 10, that is 10, 20, 30... up to 90).
- c carry out division by a two-digit divisor with remainders where both the divisor and the dividend are multiples of 10.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 88–93.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 11.1

- | | | | |
|---|---|---|----|
| 1 | 4 | 4 | 10 |
| 2 | 5 | 5 | 4 |
| 3 | 6 | 6 | 9 |

Exercise 11.2

- | | | | |
|---|----|---|-----|
| 1 | 80 | 4 | 110 |
| 2 | 30 | 5 | 90 |
| 3 | 80 | 6 | 300 |

Exercise 11.3

- | | | | |
|---|----------|---|----------|
| 1 | 192 r10 | 4 | 183 r 20 |
| 2 | 225 | 5 | 122 |
| 3 | 105 r 30 | 6 | 118 r 43 |

Exercise 11.4

- | | | | |
|---|------------------------|---|-------------|
| 1 | 90 mangoes per basket. | 4 | 80 shops. |
| 2 | 40 classes. | 5 | 110 crates. |
| 3 | 60 km per day. | 6 | 90 packs. |

Unit revision answers

- | | |
|----|--------------------|
| 1 | B |
| 2 | B |
| 3 | D |
| 4 | a 133 |
| | b 124 r 20 |
| | c 165 r 40 |
| 5 | a 300 trucks. |
| | b 130 packs. |
| 6 | 90 learners. |
| 7 | 12 000 newspapers. |
| 8 | 750 cartons. |
| 9 | 60 cars. |
| 10 | \$4 000 |
| 11 | 481 bags. |
| 12 | 80 seats. |

- 13 539 books.
- 14 176 trays.
- 15 75 balls.

Unit 12: Multiplication of proper fractions

Unit objectives

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

- a multiply proper fractions by whole numbers.
- b multiply proper fractions by fractions.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 94–97.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 12.1

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

Exercise 12.2

- | | |
|-------------------|-------------------|
| 1 $\frac{6}{35}$ | 4 $\frac{14}{15}$ |
| 2 $\frac{1}{6}$ | 5 $\frac{9}{20}$ |
| 3 $\frac{10}{21}$ | 6 $\frac{5}{36}$ |

Activity 12.1

Learners follow the instructions on **page 96** of the Learner's Book.

- 1 Fraction charts show repeated addition of fractions.
- 2 Number lines show jumps of equal fractional lengths.
- 3 Example word problem:
If a recipe uses $\frac{2}{3}$ cup of sugar and is made 3 times, total sugar used is 2 cups.

Unit revision answers

- 1 B
- 2 C
- 3 A
- 4 B
- 5 A
- 6 C
- 7 $2\frac{2}{3}$
- 8 $\frac{5}{8}$
- 9 $\frac{3}{4}$
- 10 $\frac{2}{5}$ on a number line.
- 11 $\frac{12}{35}$
- 12 $3\frac{1}{3}$ kg
- 13 $1\frac{2}{3}$
- 14 $\frac{7}{25}$
- 15 $\frac{1}{6}$
- 16 Multiply the numerator by the whole number and keep the denominator the same.

Unit 13: HCF and LCM

Unit objectives

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

- a find the HCF of two numbers (where the HCF is less than 10).
- b calculate the LCM of two numbers (where the LCM is less than 50).

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 98–102.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 13.1

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

5 3

6 1

Activity 13.1

Learners follow the instructions on **page 101** of the Learner's Book.

- a LCM of learners' ages will differ (depends on ages chosen).
- b HCF is used in **fair sharing**, LCM is used in **planning events that repeat together**.

Exercise 13.2

Find the LCM of the following pairs of numbers:

1 4

2 30

3 24

4 9

5 20

6 24

Unit revision answers

1 B

2 C

3 C

4 A

5 C

6 D

7 HCF helps in dividing items into the largest equal groups without leftovers.

8 Multiples of 4: 4, 8, 12, 16, 20

Multiples of 6: 6, 12, 18, 24, 30

9 LCM is important for finding when events happen together.

10 a 2

b 3

c 2

11 a 24

b 10

12 6

Unit 14: Addition of proper fractions

Unit objectives

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

- a add (up to 3) proper fractions with the same denominators from 2 to 10 and 20.
- b add (up to 2) proper fractions with different denominators from 2 to 10 and 20.

- c** use visual aids such as fraction charts, blocks, counters and rods to understand fraction addition.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 103–107.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 14.1

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

Exercise 14.2

- | |
|---------------------------|
| 1 $\frac{1}{2}$ |
| 2 $\frac{1}{2}$ |
| 3 $\frac{7}{8}$ |
| 4 $1\frac{1}{6}$ |
| 5 $\frac{7}{10}$ |
| 6 $\frac{49}{180}$ |

Activity 14.1

Learners follow the instructions on **page 105** of the Learner's Book.

- a** Fraction rods correctly show combined parts.
- b** Fraction charts show equivalent fractions before addition.

Unit revision answers

- | | |
|------------------------|--------------------------|
| 1 B | 9 $\frac{3}{4}$ |
| 2 A | 10 1 |
| 3 B | 11 $\frac{7}{9}$ |
| 4 B | 12 $\frac{7}{10}$ |
| 5 C | 13 $\frac{5}{7}$ |
| 6 C | 14 1 |
| 7 $\frac{3}{5}$ | 15 $\frac{4}{8}$ |
| 8 $\frac{5}{8}$ | 16 $\frac{5}{9}$ |

Unit 15: Subtraction of proper fractions

Unit objectives

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

- a subtract proper fractions with the same denominators from 2 to 10 and 20.
- b subtract proper fractions with different denominators from 2 to 10 and 20.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 108–112.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 15.1

- | | |
|-----------------|-----------------|
| 1 $\frac{1}{5}$ | 4 $\frac{1}{4}$ |
| 2 $\frac{2}{9}$ | 5 $\frac{1}{3}$ |
| 3 $\frac{1}{2}$ | 6 $\frac{1}{2}$ |

Exercise 15.2

- | | |
|------------------|------------------|
| 1 $\frac{7}{10}$ | 4 $\frac{5}{8}$ |
| 2 $\frac{7}{12}$ | 5 $\frac{5}{12}$ |
| 3 $\frac{1}{2}$ | 6 $\frac{1}{3}$ |

Activity 15.1

Learners follow the instructions on **page 110** of the Learner's Book.

- 1 Fraction rods correctly show subtraction using equal parts.
- 2 Example: $\frac{3}{4} - \frac{1}{4} = \frac{1}{2}$.
- 3 Fruits, bread slices, or chocolate pieces can represent fractions and subtraction.

Unit revision answers

- 1 B
- 2 B
- 3 C
- 4 C
- 5 B
- 6 D
- 7 $\frac{1}{3}$

- 8 $\frac{4}{12}$
- 9 $\frac{3}{10}$
- 10 $\frac{1}{4}$
- 11 $\frac{1}{2}$
- 12 $\frac{1}{2}$
- 13 $\frac{3}{10}$
- 14 $\frac{1}{8}$
- 15 $\frac{8}{15}$
- 16 $\frac{7}{20}$

Unit 16: Addition of decimals

Unit objective

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

- a add decimals up to two decimal places.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 113–116.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 16.1

- | | |
|---------|----------|
| 1 7,7 | 6 7,95 |
| 2 8,34 | 7 2,583 |
| 3 8,15 | 8 4,58 |
| 4 4,20 | 9 0,055 |
| 5 10,00 | 10 5,498 |

Activity 16.1

Learners follow the instructions on **page 115** of the Learner's Book.

- a Total cost depends on selected items.
- b Total weight is the sum of measured weights.
- c Decimal points must be aligned to ensure correct place values.

Unit revision answers

- | | | | |
|---|--------|----|--------------|
| 1 | B | 9 | 3,80 m |
| 2 | C | 10 | 5,40 |
| 3 | B | 11 | 18,00 litres |
| 4 | A | 12 | 2,75 kg |
| 5 | A | 13 | 7,68 |
| 6 | B | 14 | 13,00 cm |
| 7 | 8,75 | 15 | 6,25 km |
| 8 | \$8.55 | 16 | \$201.25 |

Unit 17: Subtraction of decimals

Unit objective

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

- a subtract decimals with up to two decimal places.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 117–120.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 17.1

- 1 5,25
- 2 2,55
- 3 11,18
- 4 4,49
- 5 12,15
- 6 1,06
- 7 2,22
- 8 19,21

Activity 17.1

Learners follow the instructions on **page 119** of the Learner's Book.

- a Learners correctly represent decimal subtraction using an abacus by removing beads.
- b Shopping receipts show correct subtraction after discounts.
- c Differences in object lengths are correctly calculated.
- d Groups correctly solve decimal subtraction problems using work cards.

Unit revision answers

- | | |
|-----------|-------------|
| 1 C | 9 13,15 |
| 2 B | 10 \$54.25 |
| 3 A | 11 5,64 |
| 4 C | 12 2,43 km |
| 5 A | 13 5,7 kg |
| 6 B | 14 34,35 |
| 7 16,25 | 15 12,75 kg |
| 8 6,72 cm | 16 8,31 |

Unit 18: Multiplication of decimals

Unit objective

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

- a** multiply decimal numbers up to two decimal places by a one-digit whole number.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 121–124.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 18.1

- | | |
|---------|---------|
| 1 9,80 | 6 7,92 |
| 2 3,40 | 7 39,36 |
| 3 18,62 | 8 6,52 |
| 4 17,25 | 9 15,3 |
| 5 42,72 | 10 16,8 |

Activity 18.1

Learners follow the instructions on **page 123** of the Learner's Book.

- a** Learners correctly multiply decimals using flashcards.
b Work card answers are correct and checked with classmates.
c Examples include shopping totals, fuel costs and fabric lengths.

Unit revision answers

- 1 B
2 A

- 3 B
- 4 B
- 5 C
- 6 A
- 7 11,80
- 8 5,00 metres
- 9 6,00 kg
- 10 56,7
- 11 14,70 km
- 12 7,02 litres
- 13 34,44
- 14 Multiply as whole numbers, then place the decimal according to original decimal places.
- 15 1,75 kg
- 16 15,75

Unit 19: Division of decimal numbers

Unit objective

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

- a divide decimals up to two decimal places by a one-digit whole number.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 125–128.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 19.1

- | | |
|--------|---------|
| 1 2,4 | 6 1,25 |
| 2 1,47 | 7 1,69 |
| 3 2,4 | 8 1,9 |
| 4 2,07 | 9 2,53 |
| 5 1,68 | 10 2,14 |

Activity 19.1

Learners follow the instructions on **page 127** of the Learner's Book.

- 1 Learners correctly use abacuses to show decimal division by grouping beads equally.
- 2 Example: If 6,48 litres of juice is shared equally among 6 people, each person gets 1,08 litres.

Unit revision answers

- 1 A
- 2 A
- 3 A
- 4 A
- 5 A
- 6 A
- 7 0,98
- 8 1,08 metres
- 9 1,65
- 10 1,05 kg
- 11 0,92
- 12 2,4 km
- 13 1,44 kg
- 14 The decimal point stays aligned with the dividend because the divisor is a whole number.
- 15 1,35 metres
- 16 3,2 km per litre

Examination 2

Paper 1

Multiple choice answers

- | | | | |
|------|------|------|--------|
| 1 C | 11 A | 21 D | 31 60% |
| 2 B | 12 C | 22 D | 32 A |
| 3 D | 13 A | 23 A | 33 D |
| 4 D | 14 D | 24 A | 34 C |
| 5 C | 15 B | 25 D | 35 A |
| 6 B | 16 C | 26 D | 36 D |
| 7 A | 17 A | 27 D | 37 B |
| 8 C | 18 D | 28 A | 38 B |
| 9 C | 19 B | 29 A | 39 A |
| 10 A | 20 D | 30 D | 40 D |

Paper 2

Structured questions answers

- 1 8 494 298
- 2 \$170 000
- 3 60
- 4 $\frac{2}{5}$
- 5 $5\frac{1}{4}$
- 6 \$4.05
- 7 32%
- 8 155 550 boxes remaining.
- 9 32 550 books.
- 10 24 days.
- 11 0,7; 85
- 12 376 544

Topic 3

Measures

Unit 20: Money

Unit objectives

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

- a** identify features on Zimbabwean currency.
- b** demonstrate the relationship between notes and coins.
- c** convert money from cents to dollars and vice versa.
- d** calculate change.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 135–140.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 20.1

Learners follow the instructions on **page 136** of the Learner's Book. Learners should identify on Zimbabwean coins and notes:

- Numbers (values of notes and coins).
- Images such as the Zimbabwe bird and balancing rocks
- Colours and security features (watermark, serial number, windowed thread)

Exercise 20.1

- 1** Watermark
Serial number
Security thread
- 2** The Zimbabwe Bird
- 3** To help people easily identify different denominations and prevent confusion.
- 4** 10 cents
- 5** Learners draw and label a \$10 note. Labels should include:
 - Value (\$10)
 - Zimbabwe bird

- Serial number
- Watermark
- Colour and security thread

- 6 Coins are made of metal; notes are made of paper/polymer.
Coins are smaller and round; notes are flat and rectangular.

Activity 20.2

Learners follow the instructions on **page 137** of the Learner's Book. Learners correctly group coins and notes to show equal values, for example:

- $10 \times 10\text{c} = \$1$
- $2 \times 50\text{c} = \$1$
- $10 \times \$1 \text{ coins} = \10

Activity 20.3

Learners follow the instructions on **page 138** of the Learner's Book. Correct matches include:

- 25 cents $\rightarrow$ \$0.25
- 50 cents $\rightarrow$ \$0.50
- 100 cents $\rightarrow$ \$1.00

Exercise 20.2

- | | |
|-------------|-------------|
| 1 \$4.00 | 4 \$8.50 |
| 2 275 cents | 5 420 cents |
| 3 4 bottles | 6 \$1.50 |

Activity 20.4

Learners follow the instructions on **page 139** of the Learner's Book. Learners correctly role-play buying and selling and calculate change using:

Change = Amount paid – Cost

Exercise 20.3

- | | |
|----------|----------|
| 1 \$3.70 | 4 \$8.00 |
| 2 \$1.50 | 5 \$1.25 |
| 3 \$3.20 | 6 \$1.10 |

Unit revision answers

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

- 6 C
- 7 Labels: value (\$5), Zimbabwe bird, watermark, serial number.
- 8 \$2.50
- 9 \$3.30
- 10 Two security features:
 - Watermark
 - Serial number
- 11 \$3.50
- 12 \$11.75

Unit 21: Time

Unit objectives

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

- a tell time.
- b estimate time from shadows and the position of the sun.
- c estimate time intervals of different actions and activities.
- d convert units of time.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 141–151.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 21.1

- | | |
|---------------------------------|----------------------|
| 1 9:15 | 5 7:45 pm |
| 2 18:20 | 6 7 hours 30 minutes |
| 3 9:15 am | 7 15:30 |
| 4 10:09, 06:00, 05:45 and 7:17. | |

Exercise 21.2

- 1 Noon
- 2 Evening
- 3 Because the sun changes position in the sky.
- 4 By observing the length and direction of shadows.
- 5 Because the sun is directly overhead.
- 6 Forward

Activity 21.1

Expected results:

- 9 am → long shadow
- 12 pm → very short shadow
- 3 pm → medium shadow

Exercise 21.3

- | | |
|-----------------------|--|
| 1 A few seconds. | 4 About 10–30 minutes (estimate varies). |
| 2 Writing a sentence. | 5 Reading a book. |
| 3 About 90 minutes. | 6 About 1–2 minutes. |

Activity 21.2

- 1 About 20 – 30 seconds
- 2 About 10 – 20 seconds

Exercise 21.4

- | | |
|--------------|-------------|
| 1 2 hours | 4 28 days |
| 2 21 days | 5 6 minutes |
| 3 120 months | 6 48 hours |

Activity 21.3

- 1 The answer depends on the learner's birth year.
(Example: 10 years old = 120 months)
- 2 The answer depends on the date used.

Exercise 21.5

- 1
 - a Taking lunch at 1:00 pm.
 - b Waking up at 6:30 am.
 - c Watching the 9:00 news pm.
 - d Attending an early morning class at 8:00 am.
 - e Sleeping at 10:00 pm.
- 2
 - a Paying house rent - Monthly
 - b School assembly - Weekly
 - c Garbage collection in some towns - Fortnightly
 - d Paying electricity bills - Monthly
 - e Church services - Weekly

Unit revision answers

- 1 C
- 2 B
- 3 C
- 4 B
- 5 B
- 6 C
- 7
 - a 300 minutes
 - b 21 days
 - c 3 minutes
- 8 0 hours 45 minutes
- 9 12:00 noon
- 10 56 days
- 11 8 weeks
- 12 1 hour 50 minutes
- 13 90 minutes
- 14 30 minutes
- 15 12 weeks
- 16
 - a 3 600 seconds
 - b 120 minutes,
 - c 2 hours

Unit 22: Mass

Unit objectives

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

- a identify standard units of measuring mass.
- b convert grammes to kilogrammes and vice versa.
- c compare the mass of objects.
- d approximate mass up to 100 kg.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 152–157.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 22.1

- 1 Kilogrammes
- 2 They are equal ($2 \text{ kg} = 2\,000 \text{ g}$)

- 3 Sugar, salt, bread, among others.
- 4 Rice, maize, wheat, among others.
- 5 Weighing scale
- 6 To measure and compare the weight of objects correctly for fair trading and safety.

Activity 22.1

Learners follow the instructions on **page 153** of the Learner's Book.

- a Classroom objects classified into grammes and kilogrammes.
- b Objects are weighed and values recorded using a scale.

Exercise 22.2

- | | |
|-----------|-----------|
| 1 4,2 kg | 4 1,25 kg |
| 2 700 g | 5 3 000 g |
| 3 9 500 g | 6 2 800 g |

Activity 22.2

Learners follow the instructions on **page 153** of the Learner's Book.

- 1 Estimated classroom object masses converted correctly.
- 2 Grammes are used for lighter items, kilogrammes for heavier items.

Exercise 22.3

- 1 A cow is **heavier** than a goat.
- 2 A smartphone is **lighter** than a laptop.
- 3 A balloon is **lighter** than a rock.
- 4 A wooden table is **heavier** than a plastic stool.
- 5 A sack of potatoes is **heavier** than a sack of cotton.
- 6 A coin is **lighter** than a paper note.
- 7 A full water bottle is **heavier** than an empty water bottle.
- 8 A dictionary is **heavier** than a notebook.
- 9 A frying pan is **heavier** than a plastic plate.
- 10 A metal key is **heavier** than a piece of paper.

Exercise 22.4

- 1 $5 \text{ kg} > 500 \text{ g}$
- 2 $10\,000 \text{ g} = 10 \text{ kg}$
- 3 $2,3 \text{ kg} = 2\,300 \text{ g}$
- 4 $8 \text{ kg} < 9\,500 \text{ g}$
- 5 $7 \text{ kg} = 7\,000 \text{ g}$
- 6 $12 \text{ kg} > 11\,500 \text{ g}$

Activity 22.3

Learners follow the instructions on **page 156** of the Learner's Book. Two classroom objects are compared correctly using *heavy* and *light*.

Exercise 22.5

- 1 Bucket of water – 20 kg (approximate)
- 2 Goat – 30 kg
- 3 School desk – 15 kg
- 4 Bicycle – 10 kg
- 5 Football – 0.5 kg
- 6 Gas cylinder – 13 kg

Activity 22.4

Learners follow the instructions on **page 156** of the Learner's Book. The estimated mass is compared with the actual mass using a weighing scale.

Unit revision answers

- | | |
|-----------|--|
| 1 C | 10 4 kg of sugar |
| 2 A | 11 15 kg |
| 3 D | 12 2 kg |
| 4 B | 13 5 000 kg |
| 5 C | 14 13 000 g |
| 6 B | 15 3 000 g |
| 7 1,25 kg | 16 To ensure accurate and fair measurements in buying and selling. |
| 8 5 700 g | |
| 9 6 000 g | |

Unit 23: Length

Unit objectives

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

- a identify standard units of measuring length.
- b measure length using standard units.
- c estimate length using non-standard units.
- d convert units of length within the given range.
- e perform operations involving length.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 158–163.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 23.1

Learners follow the instructions on **page 159** of the Learner's Book.

- 1 Desk length measured and recorded in cm and m.
- 2 Door width measured using a metre rule.

Exercise 23.1

- | | |
|-----------------------|----------|
| 1 Centimetres, metres | 4 150 cm |
| 2 Metres | 5 0,9 m |
| 3 Millimetres | 6 8 cm |

Exercise 23.2

- 1 Measured value may vary: About 15–20 cm.
- 2 Metre rule
- 3 4,5 m
- 4 200 cm
- 5 140 cm
- 6 3,5 cm

Activity 23.2

Learners follow the instructions on **page 161** of the Learner's Book.

- Estimated width using hand spans varies.
- Measured width using a ruler is more accurate than estimation.

Exercise 23.3

- 1 Using paces or hand spans.
- 2 (*Estimate varies*)
About 10–20 paces
- 3 240 cm (or 2,4 m)
- 4 A ruler, because it gives exact measurements.
- 5 250 cm
- 6 14 m

Exercise 23.4

- 1 50 cm
- 2 300 cm
- 3 1,5 m
- 4 25 cm
- 5 175 cm
- 6 4 m

Unit revision answers

- 1 C
- 2 C
- 3 B
- 4 A
- 5 B
- 6 B
- 7 Length is the distance from one end of an object to the other.
- 8 **Standard units:** Centimetres, metres
Non-standard units: Paces, hand spans
- 9 0,65 m
- 10 240 cm
- 11 84 m
- 12 To ensure accuracy and fairness in measurement.
- 13 (*Measured values vary*) About 75 cm or 0,75 m
- 14 3,5 cm
- 15 10 000 cm
- 16 Examples:
 - Building houses
 - Measuring cloth
 - Sports fields

Unit 24: Shapes

Unit objectives

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

- a name plane and solid shapes.
- b describe properties of plane and solid shapes.
- c name polygons of up to 5 sides.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 164–171.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 24.1

- | | |
|-------------------------------|----------------|
| 1 Triangle, square, rectangle | 4 Birthday hat |
| 2 Square | 5 5 sides |
| 3 Cylinder | 6 Cube |

Activity 24.1

Learners follow the instructions on **page 166** of the Learner's Book.

- 1 Classroom objects are correctly identified and grouped by shape.
- 2 Plane and solid shapes drawn and labelled correctly.

Exercise 24.2

- | | |
|---|--|
| 1 4 equal sides and 4 right angles. | 4 It is round with no edges or vertices. |
| 2 Triangle: 3 sides, 3 angles
Rectangle: 4 sides, 4 right angles | 5 6 faces |
| 3 Tin can, drum | 6 Cube: all faces are squares
Rectangular prism: faces are rectangles |

Activity 24.2

Learners follow the instructions on **page 168** of the Learner's Book.

- Objects sorted correctly by faces, edges and vertices.
- Plane shapes drawn and labelled accurately.

Exercise 24.3

- | | |
|-------------|------------|
| 1 4 sides | 4 Square |
| 2 Triangle | 5 Pentagon |
| 3 Road sign | |

Exercise 24.4

- | | |
|---|--------------------------|
| 1 Identify the faces, edges and vertices. | 4 6 faces |
| 2 To help form 3D shapes from flat paper. | 5 Paper, cardboard, clay |
| 3 Cylinder | |

Activity 24.3

Learners follow the instructions on **page 170** of the Learner's Book.

- Nets of cubes, cones and cylinders correctly made.
- Solid shapes modelled accurately using clay.

Unit revision answers

- 1 C
- 2 C
- 3 B
- 4 B
- 5 B
- 6 C
- 7 Examples:
 - Cube – 6 faces, 12 edges
 - Cylinder – curved surface, 2 circular faces
 - Sphere – no edges or vertices
- 8 A cube has flat faces; a cylinder has a curved surface.
- 9 Rectangle and pentagon drawn correctly.
- 10 Examples: Ball, box, tin
- 11 All faces are equal squares.
- 12 Correct cube net drawn.
- 13 Plane shape: flat
Solid shape: has thickness
- 14 Hut roof (cone shape)
- 15 They help in building, storage and design.
- 16 Mortar, hoe handle

Unit 25: Perimeter

Unit objective

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

- a calculate perimeter of plane shapes.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 172–176.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 25.1

- 1 Classroom objects are measured using a string and a ruler; perimeters are calculated by adding all sides.
- 2 Plane shapes drawn and labelled correctly; perimeters calculated by partners accurately.
- 3 Playground perimeter measured using a tape measure and total distance recorded.

Exercise 25.1

- 1 Perimeter is the total distance around a shape.
- 2 Answers vary. Desk perimeter measured and calculated correctly.
- 3
 - a 30 cm
 - b 30 cm
 - c 26 cm

Unit revision answers

- 1 A
- 2 A
- 3 B
- 4 A
- 5 B
- 6 B
- 7 Perimeter is the total distance around a shape.
- 8 32 cm
- 9 12 cm
- 10 34 cm
- 11 26 cm
- 12 60 cm
- 13 (Measured value vary)
Classroom board perimeter measured and recorded.
- 14 It helps to know the amount of material needed for fencing and building.
- 15 86 m
- 16 86 m

Unit 26: Rate

Unit objective

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

- a relate two quantities as rate.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 177–180.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 26.1

- 1 50 km/h
- 2 15 litres/minute
- 3 20 km per litre
- 4 300 items/hour
- 5 \$120 per kg
- 6 30 km/h

Activity 26.1

Learners follow the instructions on **page 179** of the Learner's Book.

- a Rates such as cost per unit, electricity usage per day and water usage per day identified correctly.
- b Unit rates calculated and compared accurately.

Unit revision answers

- | | |
|--------------------|--------------------|
| 1 B | 9 \$100 per kg |
| 2 B | 10 600 pieces/hour |
| 3 B | 11 400 km |
| 4 A | 12 300 loaves/hour |
| 5 C | 13 15 km per litre |
| 6 C | 14 80 litres/day |
| 7 50 km/h | 15 4 hours |
| 8 20 litres/minute | 16 \$500 per hour |

Unit 27: Area

Unit objectives

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

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

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 181–189.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Activity 27.1

Learners follow the instructions on **page 183** of the Learner's Book. Different shapes drawn on grid paper and areas estimated correctly by counting full and half squares.

Exercise 27.1

- 1 64 cm^2 ; 32 cm^2 ; 54 cm^2 ; 30 cm^2
- 2 Rectangle and square compared accurately using the number of square units.
- 3 Shape drawn on grid and area estimated correctly.
- 4 Estimating area helps when exact measurements are not available.
- 5 Estimated areas of two triangles compared correctly.
- 6 Object drawn and area estimated using square units.

Exercise 27.2

- | | |
|---------------------|---------------------|
| 1 49 cm^2 | 4 200 m^2 |
| 2 135 m^2 | 5 8 cm |
| 3 40 cm^2 | 6 250 m^2 |

Exercise 27.3

- | | |
|----------------------|--------------------|
| 1 216 m^2 | 4 60 m^2 |
| 2 225 m^2 | 5 12 tiles |
| 3 375 cm^2 | 6 8 cm |

Unit revision answers

- 1 B
- 2 C
- 3 A
- 4 C
- 5 B
- 6 A
- 7 Area is the amount of space covered by a surface.
- 8 Measuring area helps in construction, farming, tiling floors and painting walls.
- 9
 - a 216 cm^2
 - b 285 cm^2
 - c 378 cm^2
 - d 165 cm^2
- 10 42 cm^2
- 11 432 m^2
- 12 80 carpets

- 13 8 m
- 14 300 m^2
- 15 4 m^2
- 16 $6,25 \text{ m}^2$

Unit 28: Volume and capacity

Unit objective

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

- a calculate the volume of a cube and a cuboid.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 190–196.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 28.1

- 1 The shoe box has more volume than the dice.
- 2 The bucket has a larger volume.
- 3 The television box has a bigger volume.
- 4 About $2\,000 \text{ cm}^3$ (estimate)
- 5 $500 \text{ ml} = 500 \text{ cm}^3$
- 6 Yes, because a bucket is larger and can hold more space.

Exercise 28.2

- | | |
|----------------------|---------------------|
| 1 125 cm^3 | 4 10 cm |
| 2 144 cm^3 | 5 10 cm |
| 3 7 cm | 6 360 m^3 |

Exercise 28.3

- | | |
|----------------------|----------------------|
| 1 729 cm^3 | 4 600 cm^3 |
| 2 168 cm^3 | 5 512 cm^3 |
| 3 6 cm | 6 10 cm |

Activity 28.1

Learners follow the instructions on **page 194** of the Learner's Book. Placing a 1 cm^3 cube in water raises the level by 1 ml, proving $1 \text{ cm}^3 = 1 \text{ ml}$.

Exercise 28.4

- 1 By submerging a 1 cm^3 cube in water and observing a 1 ml rise.
- 2 Water level rises to 52 ml.
- 3 500 ml
- 4 $1\,000\text{ cm}^3$
- 5 $10\,000\text{ cm}^3$
- 6 2 000 litres

Unit revision answers

- 1 B
- 2 C
- 3 A
- 4 A
- 5 C
- 6 D
- 7 8 cm
- 8 350 cm^3
- 9 729 cm^3
- 10 10 cm
- 11 By observing the rise in water level when a cube is submerged.
- 12 24 m^3
- 13 7 cm
- 14 750 cm^3
- 15 $1\,000\text{ cm}^3$
- 16 400 m^3

Unit 29: Direction, angles and lines

Unit objectives

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

- a identify the eight cardinal points.
- b locate positions using cardinal points.
- c identify horizontal and vertical lines.
- d illustrate quarter, half, three-quarter and complete revolution using a circle.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 197–204.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030.

Suggested answers

Exercise 29.1

- 1 North, South, East, West
- 2 North-East, South-East, South-West, North-West
- 3 The playground is North of the house.
- 4 (Compass rose with 8 directions correctly drawn)
- 5 The school is South-West of the library.
- 6 South

Exercise 29.2

- 1 Correctly labelled with N, S, E, W, NE, NW, SE, SW
- 2
 - a Your home is East of the supermarket.
 - b The forest is North-West of the lake.
 - c The school is South of the hospital.
 - d (Answers vary –for example, shops, clinic)
 - e The park is North-East of the post office.
 - f East

Exercise 29.3

- 1 A horizontal line runs from left to right; a vertical line runs up and down.
- 2 Table top, horizon, window sill.
- 3 Flagpole, door frame, tree trunk.
- 4 (Horizontal line drawn left to right; vertical line drawn up and down.)
- 5 90° (a right angle).
- 6 Road crossing a pole; wall meeting the floor.

Exercise 29.4

- | | |
|---------------|---------------------------|
| 1 90° | 4 360° |
| 2 180° | 5 Clock hand/fan / wheel. |
| 3 270° | 6 Half revolution. |

Unit revision answers

- 1 B
- 2 C
- 3 C
- 4 A
- 5 B
- 6 B
- 7 North – West

- 8 North – East
- 9 North
- 10 North, South, East, West; North-East, South-East, South-West, North-West
- 11 South
- 12 (Compass rose with 8 directions correctly labelled.)
- 13 Horizontal: road, table, horizon.
Vertical: pole, wall edge, tree.
- 14 A quarter revolution is 90° ; a half revolution is 180° .
- 15 Half revolution.
- 16 270°
- 17 Quarter revolution (90°).
- 18 West

Topic 4

Relationships

Unit 30: Data handling

Unit objectives

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

- a collect statistical data.
- b read and interpret data from:
 - tables,
 - bar graphs,
 - column graphs,
 - ready reckoners,
 - pie charts,
 - pictographs.

Teaching and learning materials

- PlusOne Mathematics Grade 5 Learner's Book pages 205–220.
- Heritage Based Curriculum (HBC) Junior Mathematics syllabus 2024–2030

Suggested answers

Activity 30.1

Learners follow the instructions on **page 206** of the Learner's Book.

Exercise 30.1

- 1 Emma
- 2 165
- 3 Felix
- 4 14
- 5 82,5

Activity 30.2

Learners follow the instructions on **page 207** of the Learner's Book.

Activity 30.3

Learners follow the instructions on **page 208** of the Learner's Book.

Exercise 30.2

- | | |
|--------------------------------------|----------------|
| 1 Mathematics | 4 30 learners. |
| 2 6 learners. | 5 60 learners. |
| 3 English and Science and Technology | |

Exercise 30.3

- | | |
|---------------|----------------|
| 1 5 learners. | 4 3 learners. |
| 2 28% | 5 10 learners. |
| 3 Shona | |

Activity 30.4

Learners follow the instructions on **page 213** of the Learner's Book.

Exercise 30.5

- | | |
|---------------|---------------|
| 1 12 bicycles | 4 36 bicycles |
| 2 Pedal Power | 5 12 bicycles |
| 3 8 bicycles | |

Activity 30.5

Learners follow the instructions on page 216 of the Learner's Book.

Exercise 30.6

- | | |
|---------|---------|
| 1 \$360 | 4 \$420 |
| 2 4 kg | 5 \$700 |
| 3 \$360 | |

Unit revision answers

- | | |
|--------------------------------------|------------|
| 1 B | |
| 2 B | |
| 3 B | |
| 4 B | |
| 5 C | |
| 6 B | |
| 7 Learners draw a correct bar graph. | |
| 8 | a Sleeping |
| | b 60% |
| | c 50% |

- 9 a Catherine
b 18 books
c 4 books
- 10 a \$450
b \$750
c \$375
- 11 Correct pictograph drawn.
- 12 Correct table and column graph drawn.

Examination 3

Paper 1

Multiple choice answers

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

Paper 2

Structured questions answers

- 4,5 hours
 - 57,8 km/hr
- 15 m
 - 110 m
 - \$5 500
- 36 m²
 - 32 m²
 - 68 m²
 - 54 m³
- Correct bar graph drawn.
 - 18 books
- 15 books
- Cube
 - 6 faces, 12 edges, 8 vertices
- South
 - South-East
- 10 000 g
 - 1 500 g
 - 7 200 g
 - 2,8 kg

- 9 a 90 m²
 b 0,2 m
 c 18 m³
 d 18 litres
- 10 a South-West
 b South-East
 c 5 m North
- 11 a 24 m³
 b 27 m³
 c Tank Q by 3 m³
 d 51 m³