

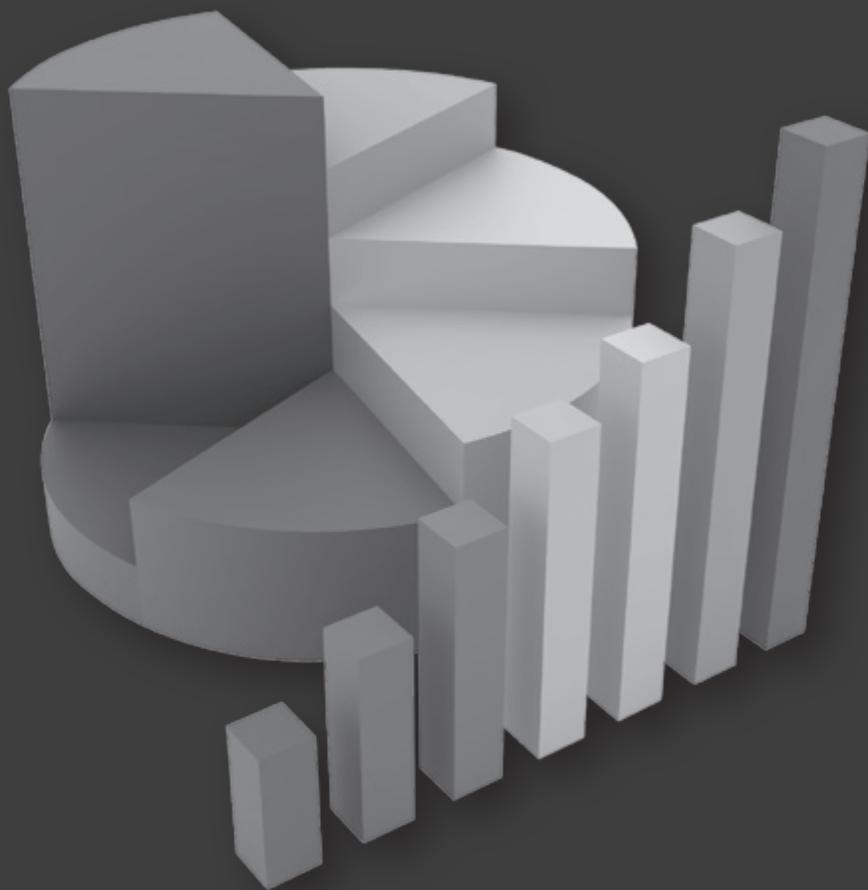
ESSENTIAL



Mathematics

Primary 4

Teacher's Guide



CAMBRIDGE
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ESSENTIAL Mathematics Primary 4

Teacher's Guide

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INTRODUCTION

The new *Mathematics Curriculum for Primary Schools (Basic 4–6)* is standards-based, which means that the Ministry of Education wants to place learning at the heart of every classroom and ensure that every learner receives quality education. Quality education should be accessible to everyone, without exception, so that the human capital needs of our country can be met.

This *Teacher's Guide* clearly sets out the learning areas recorded in the curriculum, how they should be taught and how they should be assessed. It provides a set of core competencies and standards that learners should know, understand and demonstrate as they progress through the content standards and phases.

This series promotes the fundamental belief of the curriculum that education should be inclusive and gender-responsive within the context of learning-centred teaching methods so that every learner can participate and enjoy learning.

The role of the teacher is vital to make these books work for the intended purpose – to teach the core competencies and values and to make learning happen and thereby improve learning outcomes.

RATIONALE FOR PRIMARY MATHEMATICS

Mathematics forms an integral part of our everyday lives. It is a never-ending creative process that serves to promote discovery and understanding. Mathematics is vital to the country's future development.

To provide quality Mathematics education, teachers must facilitate learning in the Mathematics classroom. This will provide the foundations for discovering and understanding the world around us and provide the basics for further studies in this field. This *Teacher's Guide* will help you to guide learners to understand how Mathematics can be used to explain what is occurring, predict how things will behave and analyse causes and origins of things in our environment. It considers the desired outcomes of education for learners at the basic level, in terms of the new curriculum. In order to ensure that the learners are mathematically and technologically literate, Mathematics ought to be taught using hands-on and minds-on approaches that learners will find fun and will remember for the rest of their lives.

PHILOSOPHY

The Ministry of Education promotes two basic philosophies:

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

GENERAL AIMS

This *Teacher's Guide* works in conjunction with the new curriculum to develop individuals to become mathematically literate, good problem solvers, have the ability to think creatively and have both the confidence and competence to participate fully in society as responsible local and global citizens.

SUBJECT AIMS

The *Teacher's Guide* follows the curriculum guidelines to help learners to:

- recognise that Mathematics permeates the world around us
- appreciate the usefulness, power and beauty of Mathematics
- enjoy Mathematics and develop patience and persistence when solving problems
- understand and be able to use the language, symbols and notation of Mathematics
- develop mathematical curiosity and use inductive and deductive reasoning when solving problems
- become confident in using Mathematics to analyse and solve problems both in school and in real-life situations
- develop the knowledge, skills and attitudes necessary to pursue further studies in Mathematics
- develop abstract, logical and critical thinking and the ability to reflect critically upon their work and the work of others.

INSTRUCTIONAL EXPECTATIONS

This *Teacher's Guide* will help you the teacher to:

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

CORE COMPETENCIES

The core competencies are a set of skills that teachers need to develop in their learners. These are ways in which teachers and learners engage with the subject matter as they learn the subject. These competencies form a connected body of core skills that are acquired throughout the processes of teaching and learning.

Critical thinking and problem solving (CP)	This skill develops learners' cognitive and reasoning abilities to enable them to analyse and solve problems. CP skill enables learners to draw on their own experiences to analyse situations and choose the most appropriate out of a number of possible solutions.
Creativity and innovation (CI)	This skill promotes entrepreneurial skills in learners through their ability to think of new ways of solving problems and developing technologies for addressing the problem at hand. It requires ingenuity of ideas, arts, technology and enterprise. Learners are also able to think independently and creatively.
Communication and collaboration (CC)	This promotes the skills to use language, symbols and text to exchange information about themselves and their life experiences. Learners actively participate in sharing their ideas. They engage in dialogue with others by listening to and learning from them. They also respect and value the views of others.

Cultural identity and global citizenship (CG)	Learners learn how to put country and service foremost by understanding what it means to be active citizens. They develop a strong sense of social and economic awareness and use their skills to contribute effectively towards the socioeconomic development of the country and on the global stage. They build skills to critically identify and analyse cultural and global trends.
Personal development and leadership (PL)	PL improves self-awareness and builds self-esteem. It also entails identifying and developing talents, fulfilling dreams and aspirations, and learning from mistakes and failures of the past. They recognise the importance of values such as honesty and empathy and seeking the well-being of others and to distinguish between right and wrong. PL helps them acquire the skill of leadership, self-regulation and responsibility.
Digital literacy (DL)	DL helps learners to discover, acquire, and communicate through ICT to support their learning. It also makes them use digital media responsibly.

LEARNING DOMAINS (EXPECTED LEARNING BEHAVIOURS)

There are three integral learning domains that should be the basis for instruction and assessment:

- Knowledge, understanding and application
- Process skills
- Attitudes and values.

Knowledge, understanding and application

Under this domain, learners may acquire some knowledge through some learning experiences. They may also show understanding of concepts by comparing, summarising, rewriting etc. in their own words and constructing meaning from instruction. The learner may also apply the knowledge acquired in some new contexts.

See the new *Mathematics Curriculum for Primary Schools (Basic 4–6)* pages ix–x for a more detailed description.

Skills and processes

The mathematical method is the means by which a mathematician solves problems or seeks to gain information about events. Learners should be exposed to situations that challenge them to raise questions and attempt to solve problems. The more often they are faced with these challenges, the more likely they are to develop a positive attitude toward Mathematics, and the more likely they are to develop the relevant process skills.

See the new *Mathematics Curriculum for Primary Schools (Basic 4–6)* pages x–xi for a more detailed description.

Attitudes

To be effective, competent and reflective citizens who are capable of solving personal and societal problems, learners should be exposed to situations that challenge them to raise questions and attempt to solve problems. Learners therefore need to acquire positive attitudes, values and psychosocial skills that will enable them to participate in debates and take a stand on issues affecting them and others.

See the new *Mathematics Curriculum for Primary Schools (Basic 4–6)* page xii for a more detailed description.

Values

At the heart of this curriculum is the belief in nurturing honest, creative and responsible citizens. As such, every part of this curriculum, including the related pedagogy should be consistent with a certain set of values.

See the new *Mathematics Curriculum for Primary Schools (Basic 4–6)* page xiii for a more detailed description.

ASSESSMENT

Assessment is a process of collecting and evaluating information about learners and using the information to make decisions to improve their learning.

In the curriculum, it is suggested that assessment is used to promote learning. Its purpose is to identify the strengths and weaknesses of learners to enable teachers to ascertain their learner’s response to instruction. This *Teacher’s Guide* contains a Teacher Assessment section to guide you how to assess the concepts taught. See the new *Mathematics Curriculum for Primary Schools (Basic 4–6)* page xiv for a detailed outline of the difference between formative and summative assessment and how to apply it to your classroom.

It is important to remember that, when developing assessment procedures, try to select indicators in such a way that you will be able to assess a representative sample from a given strand. Each indicator in the curriculum is considered a criterion to be achieved by the learners. When you develop assessment items or questions that are based on a representative sample of the indicators taught, the assessment is referred to as a “Criterion-Referenced Assessment”. In many cases, a teacher cannot assess all the indicators taught in a term or year. The assessment procedure you use i.e. class assessments, homework, projects etc. must be developed in such a way that the various procedures complement one another to provide a representative sample of indicators taught over a period.

SUGGESTED TIME ALLOCATION

2 periods per day (two 30-minute periods)

PEDAGOGICAL APPROACHES

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

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

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

Learning-centred pedagogy

A learning-centred classroom creates the opportunity for learners to engage in meaningful hands-on activities that relate what they are learning to the real world. It is a place for learners to discuss ideas, become actively engaged in looking for answers, working in groups to solve problems. They also research, analyse and evaluate information. The aim of the learning-centred classroom is to enable learners take ownership of their learning.

Inclusion

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

Differentiation and scaffolding

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

Technique	Process	Example
Differentiation by task	Teachers set different tasks for learners of different abilities.	When sketching the plan and shape of their classroom, some learners could be made to sketch with free hand while others would be made to trace the outline of the plan.
Differentiation by support	The teacher gives needed support.	The teacher refers weak learners to the Guidance and Counselling Unit for academic support.
Differentiation by outcome	The teacher allows learners to respond at different levels.	Weaker learners are allowed more time for complicated tasks.
Scaffolding	The teacher uses a variety of instructional techniques to progress learners towards stronger understanding.	Break up the learning task, experience or concept into smaller parts and then provide learners with the support they need to learn each part.

Information and communication technology (ICT)

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

Examples of ICT in the Mathematics classroom:

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

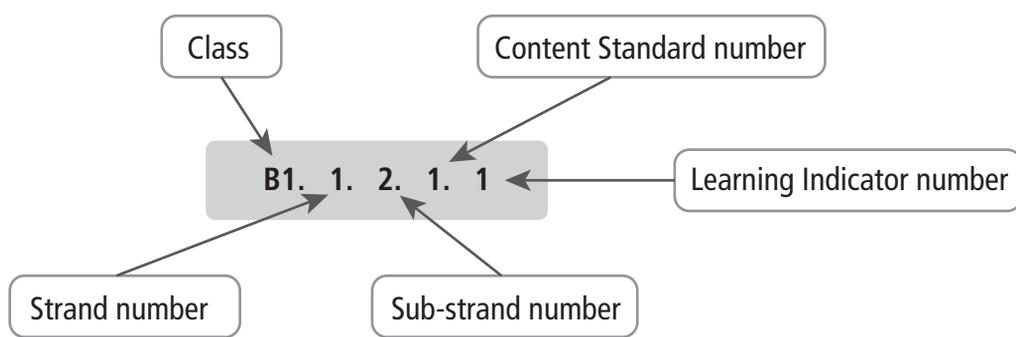
The use of ICT as a teaching and learning tool is to provide learners with access to large quantities of information online and offline. It also provides the framework for analysing data to investigate patterns and relationships. Once

learners have made their findings, ICT can help them organise, edit and print the information in many different ways.

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

ORGANISATION AND STRUCTURE OF THE CURRICULUM

The Learner's Book follows the curriculum in organising its content under key headings and annotations as shown in the figure below.



The content standards in this document are organised by grade level. Within each grade level, the contents are grouped first by strands. Each strand is further subdivided into sub-strands of related indicators.

- **Class** is the level/year being studied.
- **Indicators** are learning outcomes that define what learners should know and be able to do.
- **Content standards** are groups of related indicators. Note that indicators from different standards may sometimes be closely related, because Mathematics is a connected subject.
- **Strands** are the main branches of the Mathematics content to be studied.
- **Sub-strands** are larger groups of related indicators (or Mathematics topics to be studied). Indicators from different sub-strands may sometimes be closely related.

The Standards are organised under four strands:

1. Number
2. Algebra
3. Geometry and measurement
4. Data

CURRICULUM COVERAGE TABLE – BASIC 4

Content standard	Indicator	Page references	
		LB	TG
Strand 1: Number			
Sub-strand 1: Counting, representation and cardinality			
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit whole numerals up to 100,000 Refer to Workbook pages 1–24 for additional exercises. You can assign these as extension work or homework.	B4.1.1.1.1 Model number quantities, place value for multi-digit using graph sheets or multi-base materials up to 100,000	1–22	1–16
	B4.1.1.1.2 Read and write numbers in figures and in words up 100,000	23–32	17–23
	B4.1.1.1.3 Identify numbers in different positions around a given number in a number chart	33–34	23–25
	B4.1.1.1.4 Compare and order whole numbers up to 10,000 and represent comparisons using the symbols $<$, $=$ and $>$	35–41	25–29
	B4.1.1.1.5 Round (off, up, down) whole numbers up to 10,000 to the nearest thousands, hundreds and tens	42–47	29–33
	B4.1.1.1.6 Skip count forwards and backwards in 50s and 100s up to and from 10,000	48–50	34–36
B4.1.1.2 Demonstrate understanding of Roman numerals up to XXX (30) Refer to Workbook pages 25–28 for additional exercises.	B4.1.1.2.1 Develop an understanding of Roman numeral system up XXX (i.e. 30)	51–53	37–39
	B4.1.1.2.2 Count and convert Hindu Arabic numerals to Roman numerals up to 30 and vice versa	54–55	39–41
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.1 Determine set of factors of a given numbers up to 50	56–59	42–46

Content standard	Indicator	Page references	
		LB	TG
Refer to Workbook pages 29–39 for additional exercises.	B4.1.1.3.2 Determine the highest common factor (HCF) of any two whole numbers between 1 and 50	60–62	46–51
	B4.1.1.3.3 Determine the lowest common multiple (LCM) of at least any two given numbers up to 100	63–67	51–54
	B4.1.1.3.4 Recognise the relationship between factors and multiples	68–70	54–57
	B4.1.1.3.5 Generate and analyse patterns in square numbers	71–74	58–61
	B4.1.1.3.6 Represent square numbers using factors	75–76	61–63
B4.1.1.4 Interpret negative and positive numbers in context	B4.1.1.4.1 Describe real-life situations using positive and negative values	77–79	64–66
Refer to Workbook pages 40–42 for additional exercises.	B4.1.1.4.2 Count forwards and backwards with positive and negative whole numbers through zero	80	66–68
Sub-strand 2: Number operations			
B4.1.2.1 Recall basic multiplication facts up to 12×12 Refer to Workbook page 43 for additional exercises.	B4.1.2.1.1 Determine basic multiplication facts up to 12×12	81–85	69–72
B4.1.2.2 Describe and apply mental mathematics strategies and number properties to determine answers for basic multiplication facts to 81 and related division facts Refer to Workbook pages 44–46 for additional exercises.	B4.1.2.2.1 Apply mental mathematics strategies and number properties, such as skip counting from a known fact using doubling or halving using patterns in the 9s facts using repeated doubling or halving to determine answers for basic multiplication facts to 81 and related division facts	86–91	73–78
	B4.1.2.2.2 Apply mental mathematics strategies for multiplication, such as annexing then adding zero, halving and doubling using the distributive property	92–95	78–82

Content standard	Indicator	Page references	
		LB	TG
<p>B4.1.2.3 Demonstrate an understanding of multiplication (2- or 3-digit by 1-digit numbers)</p> <p>Refer to Workbook pages 47–50 for additional exercises.</p>	B4.1.2.3.1 Multiply multi-digit numbers efficiently	96–99	83–89
<p>B4.1.2.4 Recall basic division facts up to 100</p> <p>Refer to Workbook page 51 for additional exercises.</p>	B4.1.2.4.1 Determine basic division facts up to 81	100–101	90–92
<p>B4.1.2.5 Demonstrate an understanding of division (2- or 3-digit by 1-digit numbers)</p> <p>Refer to Workbook pages 51–56 for additional exercises.</p>	B4.1.2.5.1 Divide 2-digit numbers by 1-digit numbers efficiently	102–104	93–98
<p>B4.1.2.6 Translate and solve word problems involving the four basic operations on whole numbers</p> <p>Refer to Workbook pages 56–59 for additional exercises.</p>	B4.1.2.6.1 Solve multi-step word problems involving the four basic operations	105–110	99–103
Sub-strand 3: Fractions			
<p>B4.1.3.1 Develop an understanding of equivalent and improper fractions</p>	B4.1.3.1.1 Generate unit fractions and locate a unit fraction, e.g. one-eighth, on a number line by defining the interval from 0 to 1 as the whole and partitioning it into 8 equal parts and that each part has size $\frac{1}{8}$	111–112	104–107

Content standard	Indicator	Page references	
		LB	TG
Refer to Workbook pages 60–65 for additional exercises.	B4.1.3.1.2 Recognise and name equivalent fractions using pictorial representations and number line to determine the lowest common denominator (LCD)	113–118	108–110
	B4.1.3.1.3 Find the simplest form of given fractions by dividing through by the highest common factor (i.e. by cancelling through by factors)	119–121	111–116
	B4.1.3.1.4 Recognise fractions that are greater than one (i.e. improper fractions), draw and label such fractions with their symbols	122–126	116–121
B4.1.3.2 Demonstrate an understanding of strategies for comparing, adding and subtracting fractions (same denominator, or one being a multiple of the others) Refer to Workbook pages 66–70 for additional exercises.	B4.1.3.2.1 Compare and order fractions with like denominators by using pictorial representations and finding equivalent fractions using the lowest common denominator (LCD)	127–128	122–126
	B4.1.3.2.2 Add and subtract fractions	129	126–128
	B4.1.3.2.3 Provide examples of where fractions are used	130	129–131
Sub-strand 4: Decimals			
B4.1.4.1 Develop an understanding of decimals (tenths and hundredths) using concrete and pictorial representations and write decimal fractions as base ten numbers with place value Refer to Workbook pages 71–74 for additional exercises.	B4.1.4.1.1 Describe and represent decimals (tenths and hundredths) concretely, pictorially and symbolically	131–135	132–137
	B4.1.4.1.2 Round decimals to the nearest tenth	136–138	137–140
	B4.1.4.1.3 Use models to explain the result of addition and subtraction of decimals (up to hundredths)	139–142	140–143

Content standard	Indicator	Page references	
		LB	TG
Sub-strand 5: Percentage			
B4.1.5.1 Demonstrate an understanding of percentage (limited to whole numbers) concretely, pictorially, and symbolically Refer to Workbook pages 75–77 for additional exercises.	B4.1.5.1.1 Model or recognise percentage (as a fraction related to hundredths) using concrete models, pictorial representations and number line	143–148	144–149
	B4.1.5.1.2 Compare and order a mixture of common, decimal and percentage fractions (up to hundredths)	149–152	149–152
Strand 2: Algebra			
Sub-strand 1: Patterns and relationships			
B4.2.1.1 Demonstrate an understanding of how to identify and describe patterns found in tables and charts, including a multiplication chart Refer to Workbook pages 78–81 for additional exercises.	B4.2.1.1.1 Describe the pattern found in a given table or chart	153–157	153–159
	B4.2.1.1.2 Determine the missing element(s) in a given table or chart	158	160–163
	B4.2.1.1.3 Identify the error(s) in a given table or chart	159–160	163–166
B4.2.1.2 Translate among different representations of a pattern, such as a table, a chart or concrete material Refer to Workbook page 82 for additional exercises.	B4.2.1.2.1 Create a concrete representation of a given pattern displayed in a table or chart	161	167–169
	B4.2.1.2.2 Create a table or chart from a given concrete representation of a pattern	162–163	170–172
B4.2.1.3 Represent, describe and extend patterns and relationships, using charts and tables, to solve problems Refer to Workbook page 83 for additional exercises.	B4.2.1.3.1 Translate the information in a given problem into a table or chart	164	173–176
	B4.2.1.3.2 Identify and extend the patterns in a table or chart to solve a given problem	165	176–178

Content standard	Indicator	Page references	
		LB	TG
Sub-strand 2: Unknowns, expressions and equations			
B4.2.2.1 Express a given problem as an equation in which a symbol is used to represent an unknown number Refer to Workbook page 84 for additional exercises.	B4.2.2.1.1 Write a given problem as an equation in which a symbol is used to represent an unknown number	166–167	179–181
	B4.2.2.1.2 Express a given pictorial or concrete representation of an equation in symbolic form	168–169	182–184
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number Refer to Workbook pages 85–87 for additional exercises.	B4.2.2.2.1 Solve a given one-step equation using manipulatives	170	185–187
	B4.2.2.2.2 Describe orally, the meaning of a given one-step equation with one unknown	171	187–189
	B4.2.2.2.3 Solve a given equation when the unknown is on the left or right side of the equation	172	189–191
	B4.2.2.2.4 Solve a given one-step equation using “guess and check”	173	191–193
	B4.2.2.2.5 Identify the unknown in a problem, represent the problem with an equation, and solve the problem concretely, pictorially or symbolically	174	193–195
	B4.2.2.2.6 Represent and solve a given addition or subtraction problem involving a “part-part-whole” or comparison context, using a symbol to represent the unknown	175	195–197
	B4.2.2.2.7 Create a problem for a given equation with one unknown	176	197–199

Content standard	Indicator	Page references	
		LB	TG
Strand 3: Geometry and measurement			
Sub-strand 1: 2D and 3D shapes			
B4.3.1.1 Identify the lines of symmetry of regular and irregular 2D shapes Refer to Workbook pages 88–92 for additional exercises.	B4.3.1.1.1 Complete drawings of shapes to make them symmetrical	177–180	200–206
	B4.3.1.1.2 Identify the lines of symmetry of regular and irregular 2D shapes (triangles and quadrilaterals)	181–182	207–211
Sub-strand 2: Position/transformation			
B4.3.2.1 Describe the position of objects in space using the cardinal points Refer to Workbook pages 93–94 for additional exercises.	B4.3.2.1.1 Tell the position and motion of objects in space using the cardinal points north, south, east and west	183–186	212–219
Sub-strand 3: Measurement (perimeter)			
B4.3.3.1 Demonstrate an understanding of perimeter of regular and irregular shapes Refer to Workbook pages 95–97 for additional exercises.	B4.3.3.1.1 Estimate perimeter using referents for centimetre or metre	187–188	220–224
	B4.3.3.1.2 Measure and record perimeter for regular and irregular shapes in cm and m.	189–190	224–226
	B4.3.3.1.3 Develop and apply a formula for determining perimeter of square and rectangle	191	226–229
	B4.3.3.1.4 Construct different rectangles for a given perimeter (cm, m) to demonstrate that many shapes are possible for a perimeter	192	229–231
Sub-strand 3: Measurement (area)			
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.1 Recognise that area is measured in square units	193–194	232–234

Content standard	Indicator	Page references	
		LB	TG
Refer to Workbook pages 98–102 for additional exercises.	B4.3.3.2.2 Select and justify referents for the units cm^2 or m^2	195–197	234–236
	B4.3.3.2.3 Estimate area by using referents for cm^2 or m^2	198–199	236–238
	B4.3.3.2.4 Develop and apply a formula for determining area of a rectangle and square	200–204	239–243
	B4.3.3.2.5 Construct different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area	205	243–246
Sub-strand 3: Measurement (time)			
B4.3.3.3 Demonstrate an understanding of time taken by events in minutes and hours Refer to Workbook pages 103–113 for additional exercises.	B4.3.3.3.1 Tell the time in hours and minutes in analogue and digital watches including 24-hour clocks	206–211	247–253
	B4.3.3.3.2 Use clocks to measure time to complete simple events in minutes and seconds	212–214	254–257
	B4.3.3.3.3 State dates of events and record calendar dates in a variety of formats	215–217	257–261
Strand 4: Data			
Sub-strand 1: Data collection, organisation, presentation, interpretation and analysis			
B4.4.1.1 Demonstrate an understanding of many-to-one correspondence in displaying, and reading or interpreting, graphs Refer to Workbook pages 114–116 for additional exercises.	B4.4.1.1.1 Use an understanding of one-to-one correspondence to read and interpret graphs	218–222	262–267
	B4.4.1.1.2 Use an understanding of many-to-one correspondence to display or construct graphs	223–224	267–269
	B4.4.1.1.3 Compare graphs in which the same data has been displayed and explain how they are the same and different	225–226	269–271

Content standard	Indicator	Page references	
		LB	TG
	B4.4.1.1.4 Find examples of graphs in which many-to-one correspondence is used in print and electronic media, such as newspapers, magazines and the Internet, and describe the correspondence used	227–228	271–273
B4.4.1.2 Construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions Refer to Workbook pages 117–124 for additional exercises.	B4.4.1.2.1 Identify common features of graphs that use many-to-one correspondence and use that understanding to draw bar graphs or pictographs, complete with title, labelled axes, key or legend, to represent data collected (up to 4 categories of data)	229–233	274–276
	B4.4.1.2.2 Use understanding of many-to-one correspondence to solve simple problems (how many altogether, comparing, or take apart problems) requiring interpretation of many-to-one bar graphs (up to 4 categories of data)	234–236	277–280
Revision		237–249	281–286
Workbook answers			287–333

Sub-strand 1: Counting, representation and cardinality

The learner will be able to recognise, describe and represent numbers and their relationships, and to count, round and estimate with competence and confidence.

Content standard	Indicator
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit numerals up to 100,000	B4.1.1.1.1 Model number quantities, place value for multi-digit numbers using graph sheets or multi-base blocks up to 100,000

1. Learning expectations

Learners need to be able to:

- represent numbers in a variety of ways and move flexibly between representations.
- communicate their mathematical thinking coherently and clearly to peers and teacher.

2. Essential for learning

Learners have experience with counting forwards and backwards on number lines and number grids.

3. New words

Place value; digits; expanded notation

4. Resources used in this indicator

- Learner's book
- Workbook pages 1–11
- Grid paper
- Multi-base blocks
- Number charts; number cards

5. Large class teaching

The activities must be for an inclusive, learner centred class. Determine the learners' Zone of Proximal Development so that you know which learners will require further help and guidance. Learners must be in control of their learning and allowed to try a variety of strategies. This can be challenging in a large class.

Be well-prepared for lessons. Have resources available and see that there are enough resources for everyone to participate. If you are under-resourced allow learners to work in groups or stagger the activities so that everyone has a turn at participating.

6. Support for learners with special needs

It is important to understand the special needs of your learners. These may present as both physical and mental disabilities or challenges. Facilitate learning and keep content relevant to all learners. Break down content into small manageable and logical steps. You may need to work with small groups or individual learners separately while the rest of the class continues with group work. Develop a balance between individual, peer tutoring, cooperative learning, and whole class teaching.

The exercises for this indicator focus on visual interpretation. Those learners who have difficulties with vision will need careful support. Learners who have speech and hearing impairments may struggle to say the numbers correctly. Manipulating blocks or counters may prove difficult for those with muscle or nerve co-ordination problems.

Encourage social inclusion when discussing modelling numbers by asking learners to find out how deaf and blind people model and represent numbers.

7. Teaching methodology

Have the learners turn to the Learner's book page 1 and start there with a class activity. Read the instructions with the learners. Explain the examples and ensure they firstly understand the concept and then know what to do in the exercises. Work through each example carefully with the learners and ensure that they say, count, read and write these numbers.

Counting numbers that are represented by blocks involves an understanding of place value. Have the learners turn to page 7 in the Learner's book and explain the example carefully ensuring that they understand the concept and what shape represents which value. Make sure they get enough practical practice so they can understand it even better. This means they must pack out objects to represent the numbers before they even do it in their books. They can do the practical work with a friend. It is important that they know how to write the numbers in both the expanded form and the symbol form; they should practise this often.

Counting is another important aspect of this sub-strand. Ensure that the learners count properly and accurately. They can work together in pairs first, then individually. Display HTO charts up to 100,000 and ask learners to read off numbers from the chart.

Play games and have a class competition to encourage learner participation, particularly in place value. Games can be done in small groups, in pairs or as a class activity. The number game on pages 11 and 12 could be a fun way to keep confident learners busy while you help those who are struggling with these concepts.

Exercise 10 on pages 13 and 14 require the learners to make their own paper money. Allow learners to be creative but remember that the main focus must be on writing and counting the numbers on the play money notes.

The exercises could be done as pair work, individual work, or small group work. It depends a lot on the class context and learners as to what will work best in your class. Use your discretion as to what is best for your class. There are enough exercises to be done over a number of days.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 1 to 11.

9. Assessment

Learners have worked with modelling numbers since Basic 1. You can begin by asking learners to model smaller numbers in order to establish their prior knowledge, identify any

misconceptions and make informed decisions about your teaching moving forward.

This will also give you an opportunity to see the different ability groups within your class and assign groups or pairs accordingly.

10. Answers

Exercise 1

(LB page 2)

Missing numbers:

99,916; 99,921; 99,930; 99,939; 99,943; 99,947; 99,972;
99,975; 99,976; 99,991; 99,998; 99,999

Exercise 2

(LB page 3)

1. 99,900; 99,910; 99,920; 99,930; 99,940; 99,950; 99,960;
99,970; 99,980; 99,990; 100,000
2. 99,895; 99,900; 99,905; 99,910; 99,915; 99,920; 99,925;
99,930; 99,935; 99,940; 99,945; 99,950; 99,955; 99,960;
99,965; 99,970; 99,975; 99,980; 99,985; 99,990; 99,995;
100,000
3. 99,986; 99,902; 99,908; 99,914; 99,920; 99,926; 99,932;
99,938; 99,944; 99,950; 99,956; 99,962; 99,968; 99,974;
99,980; 99,986; 99,992; 99,998
4. 99,894; 99,898; 99,902; 99,906; 99,910; 99,914; 99,918;
99,922; 99,926; 99,930; 99,934; 99,938; 99,942; 99,946;
99,950; 99,954; 99,958; 99,962; 99,966; 99,970; 99,974;
99,978; 99,982; 99,986; 99,990; 99,994; 99,998

Exercise 3

(LB page 3)

1. GHC100
2. GHC140
3. GHC250
4. GHC90
5. GHC27

Exercise 4

(LB page 4)

1. 120 Pesewas
2. 10,000 Pesewas
3. 40,000 Pesewas
4. 100,000 Pesewas
5. 80,000 Pesewas
6. 1,500 Pesewas

Exercise 5

(LB page 6)

1. 3,012 to 3,041: count in 1s

3,012	3,013	3,014	3,015	3,016	3,017	3,018	3,019	3,020	3,021
3,022	3,023	3,024	3,025	3,026	3,027	3,028	3,029	3,030	3,031
3,032	3,333	3,034	3,035	3,036	3,037	3,038	3,039	3,040	3,041

2. 5,090 to 5,280: count in 10s

5,090	5,100	5,110	5,120	5,130	5,140	5,150	5,160	5,170	5,180
5,190	5,200	5,210	5,220	5,230	5,240	5,250	5,260	5,270	5,280

3. 9,951 to 10,000: count in 1s

9,951	9,952	9,953	9,954	9,955	9,956	9,957	9,958	9,959	9,960
9,961	9,962	9,963	9,964	9,965	9,966	9,967	9,968	9,969	9,970
9,971	9,972	9,973	9,974	9,975	9,976	9,977	9,978	9,979	9,980
9,981	9,982	9,983	9,984	9,985	9,986	9,987	9,988	9,989	9,990
9,991	9,992	9,993	9,994	9,995	9,996	9,997	9,998	9,999	10,000

4. 10,000 to 12,900: count in 100s

10,000	10,100	10,200	10,300	10,400	10,500	10,600	10,700	10,800	10,900
11,000	11,100	11,200	11,300	11,400	11,500	11,600	11,700	11,800	11,900
12,000	12,100	12,200	12,300	12,400	12,500	12,600	12,700	12,800	12,900

5. 10,000 to 40,000: count in 1,000s

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
11,000	12,000	13,000	14,000	15,000	16,000	17,000	18,000	19,000	20,000
21,000	22,000	23,000	24,000	25,000	26,000	27,000	28,000	29,000	30,000
31,000	32,000	33,000	34,000	35,000	36,000	37,000	38,000	39,000	40,000

6. 10,001 to 10,030: count in 1s

10,001	10,002	10,003	10,004	10,005	10,006	10,007	10,008	10,009	10,010
10,011	10,012	10,013	10,014	10,015	10,016	10,017	10,018	10,019	10,020
10,021	10,022	10,023	10,024	10,025	10,026	10,027	10,028	10,029	10,030

7. 50,099 to 50,108: count in 1s

50,099	50,100	50,101	50,102	50,103	50,104	50,105	50,106	50,107	50,108
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8. 89,995 to 90,005: count in 1s

89,995	89,996	89,997	89,998	89,999	90,000	90,001	90,002	90,003	90,004	90,005
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9. Learners say the numbers 99,991 to 100,000 aloud.

Exercise 6

(LB page 7)

1. 909 2. 1,009 3. 1,090 4. 2,651
5. 4,834 6. 3,726 7. 5,118

Exercise 7

(LB page 9)

1. Count in 5s

2,980	2,985	2,990	2,995	3,000	3,005	3,010	3,015	3,020	3,025	3,030
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2. Count in 10s

8,910	8,920	8,930	9,940	8,950	8,960	8,970	8,980	8,990	9,000	9,010
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3. Count on in 3s.

1,633	1,636	1,639	1,642	1,645	1,648	1,651	1,654	1,657	1,660
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4. Count on in 100s.

9,000	9,100	9,200	9,300	9,400	9,500	9,600	9,700	9,800	9,900
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5. Count on in 4s.

196	200	204	208	212	216	220	224	228	232
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6. Count on in 20s.

4,020	4,040	4,060	4,080	4,100	4,120	4,140	4,160	4,180	4,200
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7. Count on in 25s.

7,525	7,550	7,575	7,600	7,625	7,650	7,675	7,700	7,725	7,750
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8. Count on in 50s.

10,150	10,200	10,250	10,300	10,350	10,400	10,450	10,500	10,550	10,600
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9. Count on in 500s.

12,500	13,000	13,500	14,000	14,500	15,000	15,500	16,000	16,500	17,000
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10. Count on in 1,000s.

30,000	31,000	32,000	33,000	34,000	35,000	36,000	37,000	38,000	39,000
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Exercise 8

(LB page 10)

1. Count on in 7s.

90,000	90,007	90,014	90,021	90,028
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2. Count on in 8s.

99,996	100,004	100,012	100,020	100,028
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3. Count backwards in 1s.

2,999	2,998	2,997	2,996	2,995
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4. Count backwards in 1s.

4,021	4,020	4,019	4,018	4,017
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5. Count backwards in 1s.

7,111	7,110	7,109	7,108	7,107
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6. Count backwards in 1s.

18,350	18,349	18,348	18,347	18,346
--------	--------	--------	--------	--------

7. Count backwards in 1s.

44,010	44,009	44,008	44,007	44,006
--------	--------	--------	--------	--------

8. Count backwards in 1s.

90,119	90,118	90,117	90,116	90,115
--------	--------	--------	--------	--------

9. Count backwards in 1s.

99,500	99,499	99,498	99,497	99,496
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10. Count backwards in 1s.

100,000	99,999	99,998	99,997	99,996
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Exercise 9

(LB page 11)

Learners play the Number game, in pairs or groups. A sample game board is provided under Resources at the end of this guide.

Exercise 10

(LB page 13)

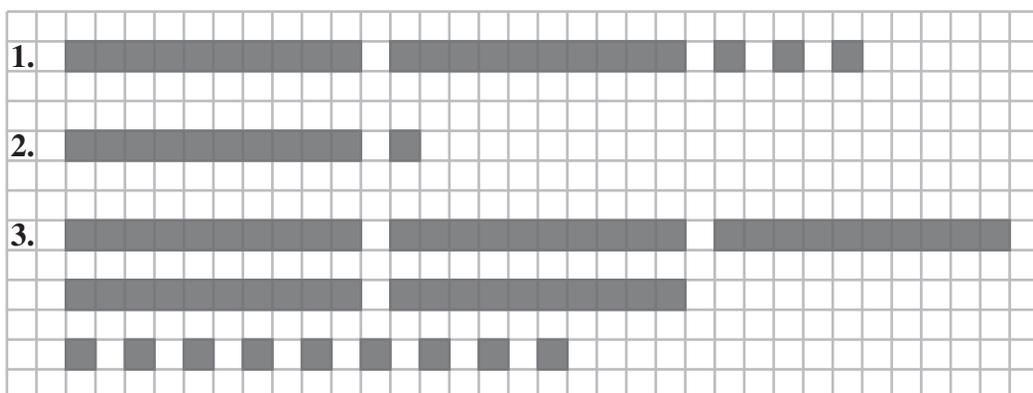
Learners work with a friend to experiment with counting paper money.

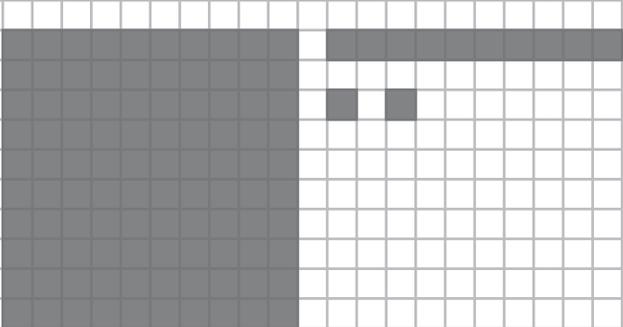
They should learn how to form a total with given notes and that having the most notes does not necessarily mean having the most money. Templates for paper money are provided under Resources at the end of this guide.

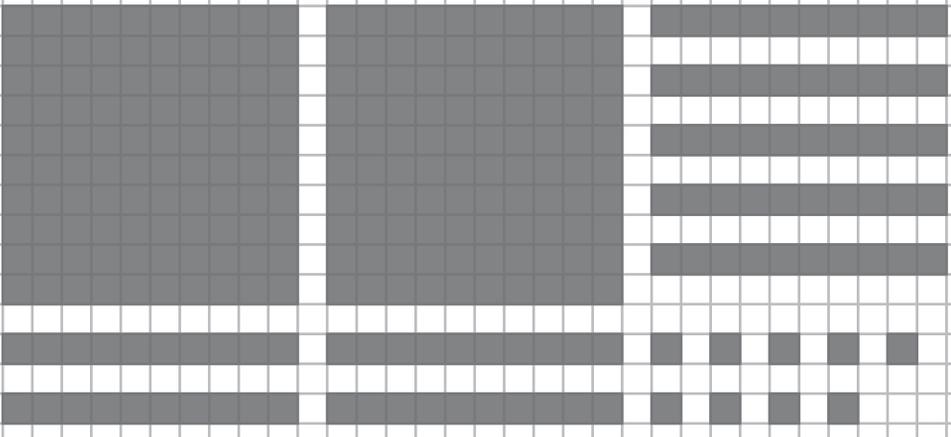
Exercise 11

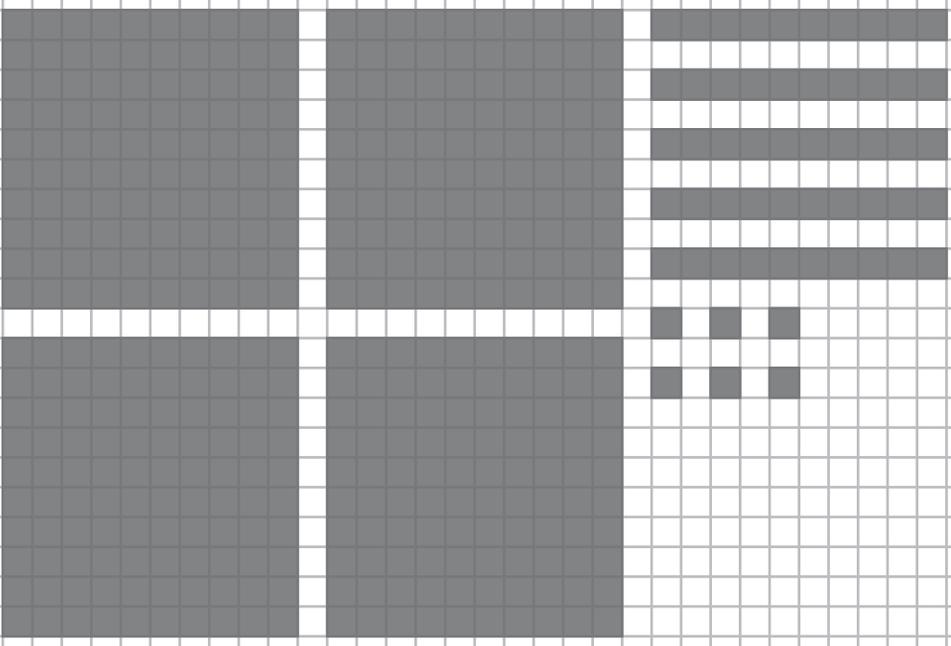
(LB page 15)

Learners' own work. They should represent results similar to the following.



4. 

5. 

6. 

Exercise 12

(LB page 16)

1. Learners say the numbers aloud and write them.

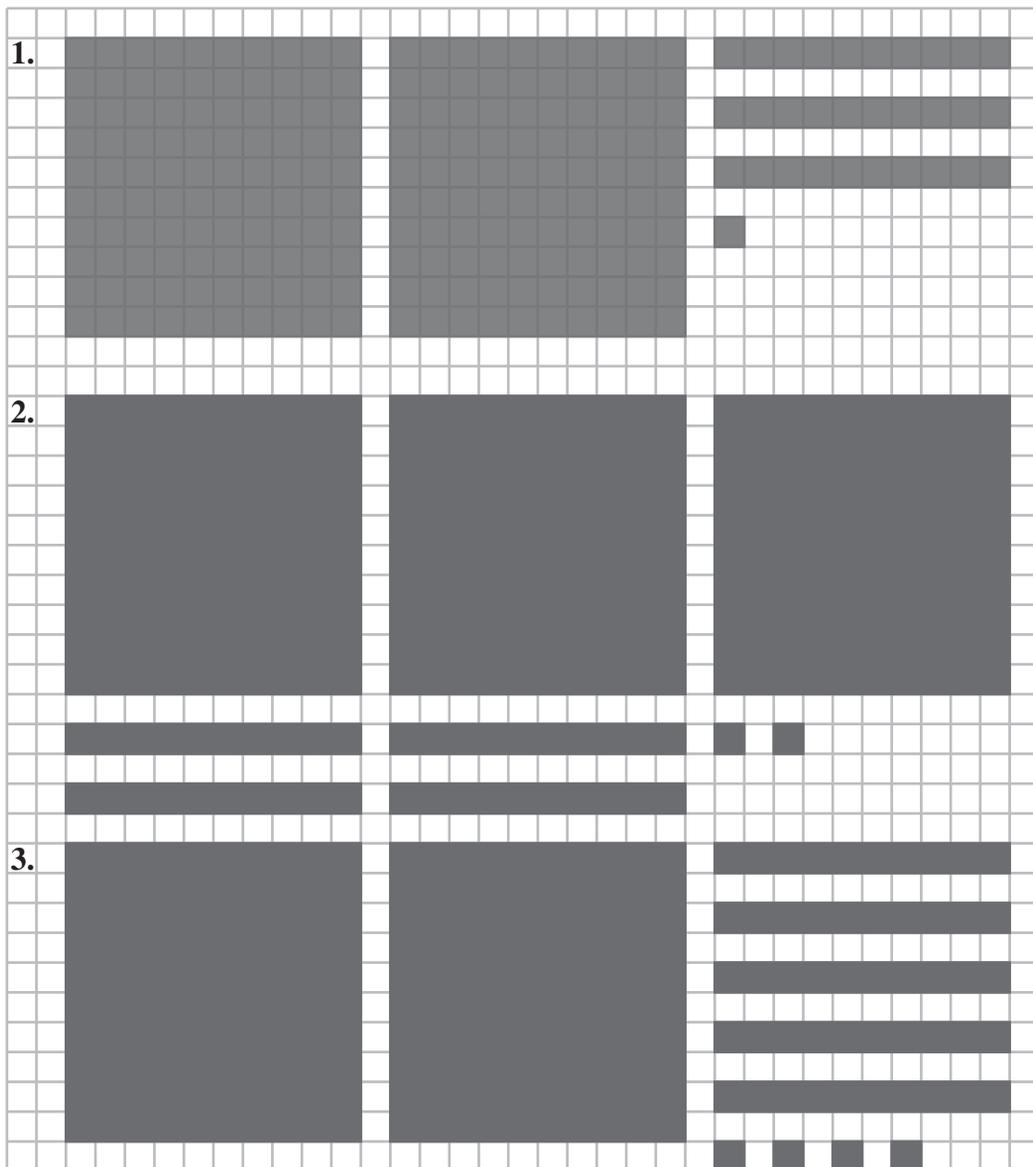
- a) 13,290 b) 14,520 c) 42,560 d) 25,280
e) 36,190 f) 41,470 g) 51,940 h) 36,950

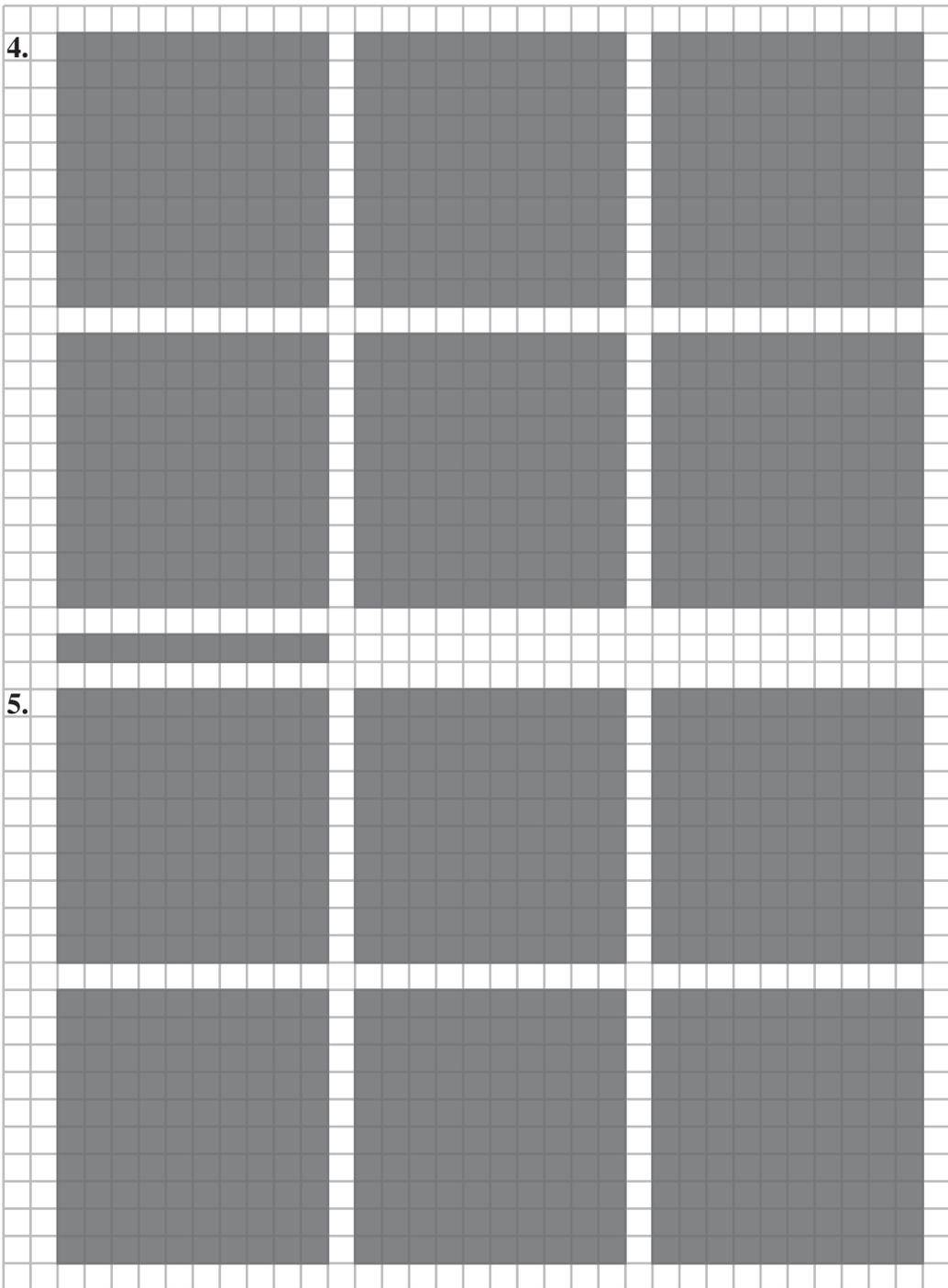
2. Learners' practical activity using Base-10 blocks.

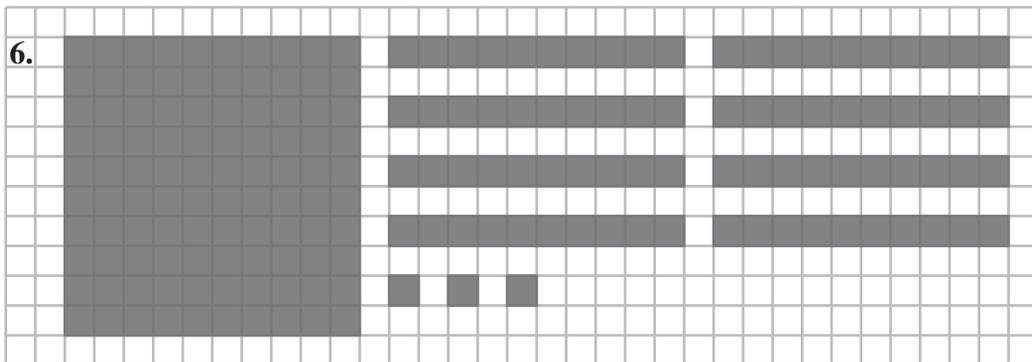
Exercise 13

(LB page 19)

Learners' own work. They should represent results similar to the following.







Exercise 14

(LB page 20)

TTH	TH	H	T	O	Number
1	0	1	0	0	10,100
1	7	9	4	5	17,945
3	9	1	9	9	39,199
6	4	5	3	1	64,531
5	1	2	1	2	51,212
8	5	4	8	3	85,483
4	6	3	7	8	46,378
9	0	0	0	0	90,000
7	2	8	6	4	72,864

Exercise 15

(LB page 21)

- 39,416 \rightarrow 400
- 11,511 \rightarrow 1,000
- 25,848 \rightarrow 8
- 36,292 \rightarrow 90
- 12,123 \rightarrow 2,000
- 45,850 \rightarrow 5,000
- 52,736 \rightarrow 700
- 61,736 \rightarrow 60,000
- 85,808 \rightarrow 80,000
- 99,909 \rightarrow 9,000

Exercise 16

(LB page 21)

- $875 = 800 + 70 + 5$
- $18,269 = 10,000 + 8,000 + 200 + 60 + 9$
- $963 = 900 + 60 + 3$
- $23,715 = 20,000 + 3,000 + 700 + 10 + 5$

5. $1,741 = 1,000 + 700 + 40 + 1$
6. $35,906 = 30,000 + 5,000 + 900 + 6$
7. $2,824 = 2,000 + 800 + 20 + 4$
8. $42,110 = 40,000 + 2,000 + 100 + 10$
9. $11,330 = 10,000 + 1,000 + 300 + 30$
10. $67,005 = 60,000 + 7,000 + 5$
11. $10,205 = 10,000 + 200 + 5$
12. $81,999 = 80,000 + 1,000 + 900 + 90 + 9$

Exercise 17

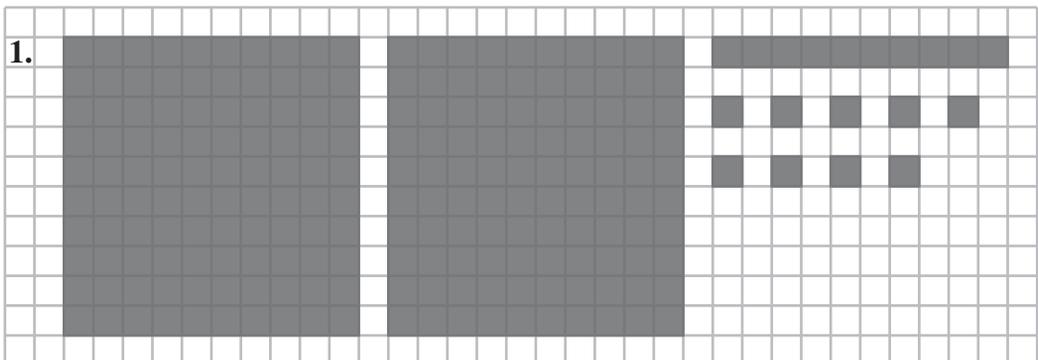
(LB page 21)

TTH	TH	H	T	O	NUMBER
1	0	1	9	5	10,195
1	2	5	6	1	12,561
3	6	4	3	7	36,437
5	1	9	1	2	51,912
9	5	2	7	6	95,276
2	8	6	5	3	28,653
7	3	7	2	2	73,722
9	9	9	9	9	99,999
6	4	2	1	5	64,215

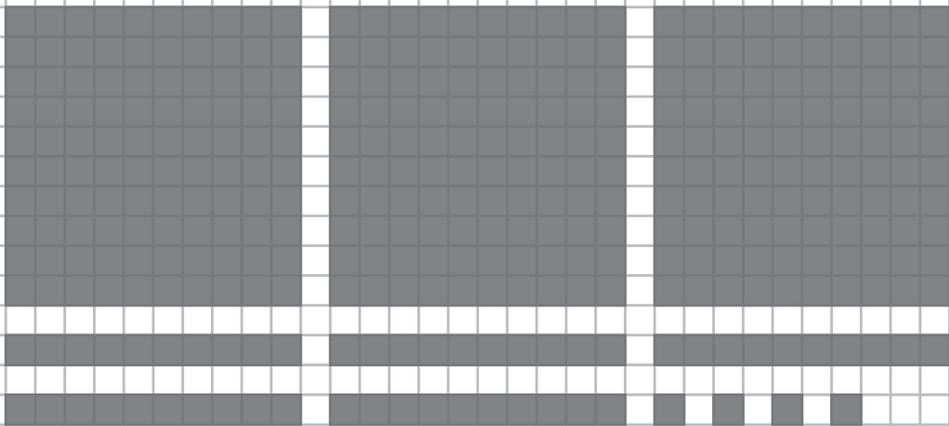
Exercise 18

(LB page 22)

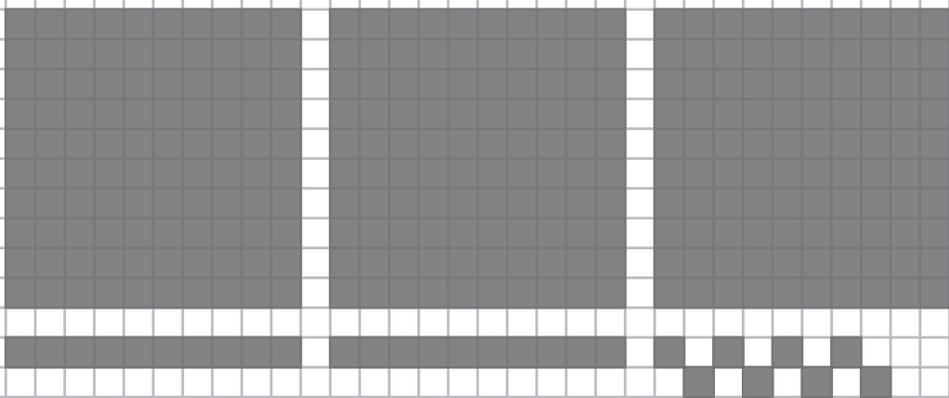
Learners' own work. They should represent results similar to the following.



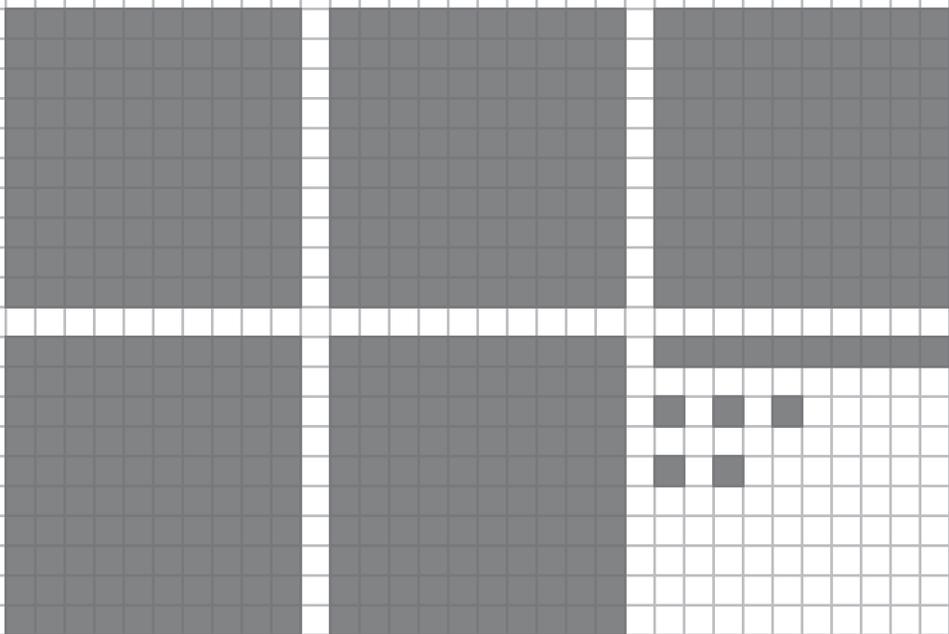
2.



3.



4.

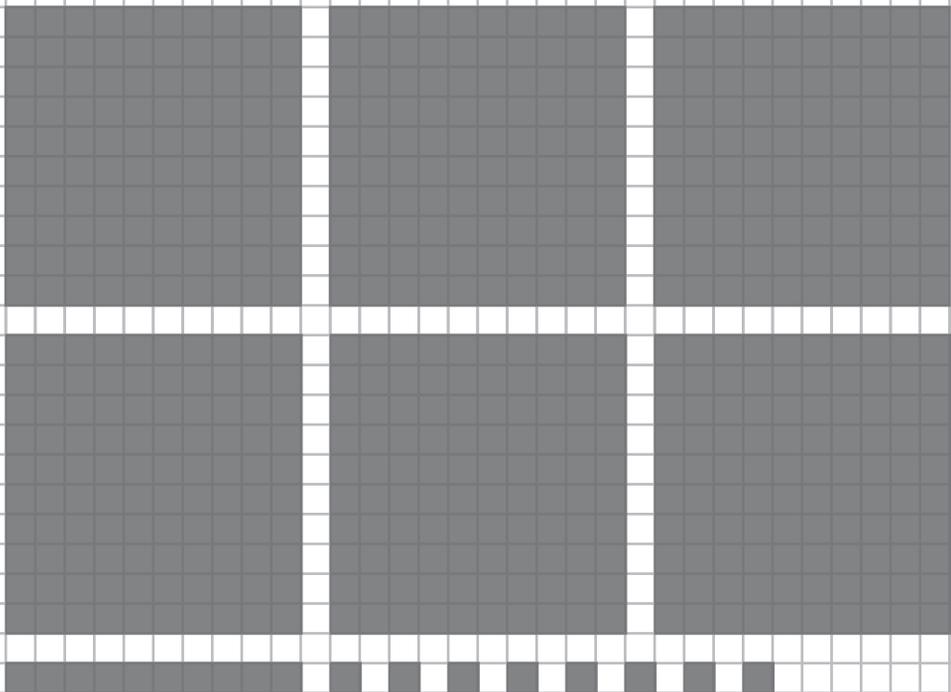


5.

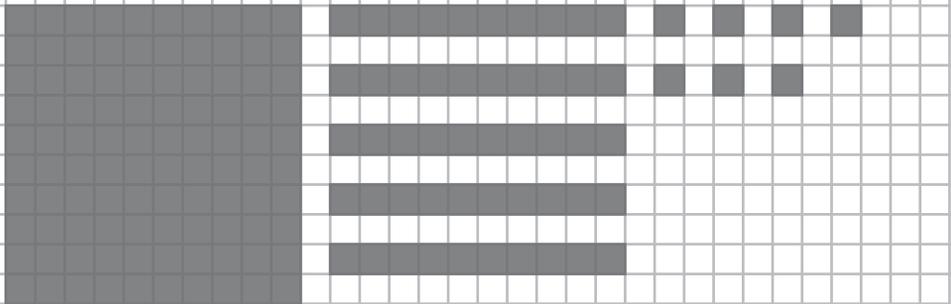
6.

7.

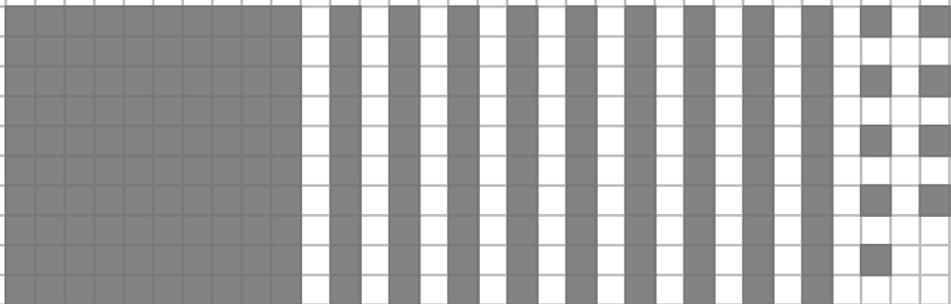
8.



9.



10.



B4.1.1.1.2

Content standard	Indicator
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit numerals up to 100,000	B4.1.1.1.2 Read and write numbers in figures and in words up to 100,000

1. Learning expectations

Learners need to be able to:

- write up to 6-digit numbers in words as well as to expand them.
- recognise and represent the numbers in order to describe and compare them.

2. Essential for learning

Learners have experience with number bases and place value.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 11–12
- Place value number wheel
- Bottle caps and place value chart

5. Large class teaching

Games and group activities help to develop and maintain interest. Remember to be available to those learners who will require further help and guidance or might not understand the rules of the games. Be careful about how you group learners.

Be well-prepared for lessons. Have resources available and see that there are enough resources for everyone to participate. If you are under-resourced, stagger the activities so that everyone has a turn at participating.

6. Support for learners with special needs

Facilitate learning and keep content relevant to all learners. Break down content into small manageable and logical steps.

Encourage your learners to help those who are differently abled, particularly in the practical activities.

Be sensitive to those learners who have learning difficulties. Ensure that they are included in games and understand the activity.

7. Teaching methodology

Remember to use HTO charts up to 100,000 and ask learners to read off numbers from the chart. This will keep up their practice in reading large numbers.

Have the learners turn to page 23 in the Learner's book. Read through the instructions together with them and ensure they understand the rules. Demonstrate one round from the front of the class for everyone to follow. Then let them play in pairs or in small groups of 4 to 6.

Continue with Exercise 2 in the Learner's book on page 24. Read through the example with the learners and ensure that they understand how to represent numbers on an abacus and then how to write it in expanded form and in symbol form. They should have enough practice in doing this to consolidate their learning.

Have the learners turn to page 27 in the Learner's book. Go through each exercise and read the instructions with them. They should use the bottle caps to do the exercises practically and place them on the place value chart in the class. Learners can check each other to see if they do it correctly and help each other. Ensure that they understand the concept. It is very important to understand the value of each digit in the number, how much each digit counts and to write that value.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 11 and 12.

9. Assessment

Assess the learners' understanding by observing them performing tasks and completing exercises. Identify learners who struggle with identifying numbers in various formats and provide extra support. It is critical that learners understand these fundamental concepts.

10. Answers

Exercise 1

(LB page 23)

Learners play the place value game in groups of 4. A sample number wheel is provided under Resources at the end of this guide.

Exercise 2

(LB page 24)

1. $4,278 = 4,000 + 200 + 70 + 8$
2. $3,447 = 3,000 + 400 + 40 + 7$
3. $3,527 = 3,000 + 500 + 20 + 7$
4. $3,961 = 3,000 + 900 + 60 + 1$
5. $14,236 = 10,000 + 4,000 + 200 + 30 + 6$
6. $11,093 = 10,000 + 1,000 + 90 + 3$
7. $28,193 = 20,000 + 8,000 + 100 + 90 + 3$
8. $30,264 = 30,000 + 200 + 60 + 4$
9. $41,626 = 40,000 + 1,000 + 600 + 20 + 6$
10. $28,193 = 20,000 + 8,000 + 100 + 90 + 3$

Exercise 3

(LB page 26)

1. 158
2. 4,147
3. 52,999
4. 99,999

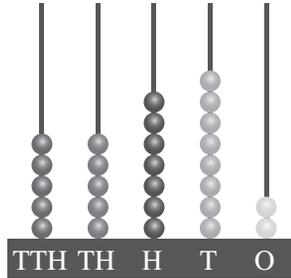
Exercise 4

(LB page 26)

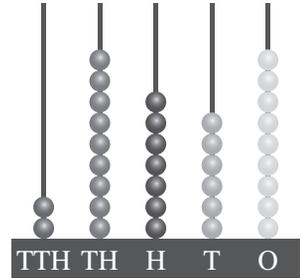
1.
 - a) nine thousand eight hundred and fifteen
 $9,000 + 800 + 10 + 5$
 - b) eleven thousand one hundred and thirty-five
 $10,000 + 1,000 + 100 + 30 + 5$
 - c) thirty-five thousand four hundred and eighty
 $30,000 + 5,000 + 400 + 80$

- d) seventy-two thousand five hundred
 $70,000 + 2,000 + 500$
- e) nine thousand one hundred and twenty-three
 $9,000 + 100 + 20 + 3$
- f) eighty-six thousand two hundred and fourteen
 $80,000 + 6,000 + 200 + 10 + 4$

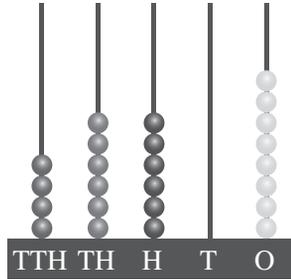
2. a)



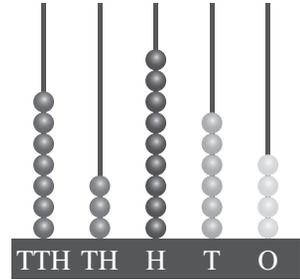
b)



c)



d)



- 3. a) eight thousand five hundred and seventy-nine
- b) three thousand four hundred and fifty-seven
- c) fourteen thousand eight hundred and ninety-three
- d) ten thousand six hundred and thirty-nine
- e) thirty-two thousand four hundred and sixty-eight
- f) sixty-three thousand five hundred and ninety-nine
- g) ninety-five thousand one hundred
- h) seventy-four thousand one hundred and eighty-three

Exercise 5

(LB page 27)

This is a practical activity for learners. They place bottle caps on the place value chart to represent the number.

Solution:

	TTH	TH	H	T	0
1. 423					
2. 995					
3. 1,786					
4. 21,119					
5. 48,920					
6. 50,831					
7. 2,555					
8. 10,880					
9. 13,127					
10. 70,326					
11. 86,359					
12. 90,565					

Exercise 6

(LB page 28)

- $10,000 + 100 + 20 + 9 = 10,129$
- $5,000 + 400 + 20 + 2 = 5,422$
- $9,000 + 900 + 90 + 5 = 9,995$
- $10,000 + 5,000 + 500 + 50 + 1 = 15,551$
- $40,000 + 2,000 + 80 + 6 = 42,086$
- $60,000 + 3,000 + 700 + 20 + 4 = 63,724$

Exercise 7

(LB page 30)

- 2,642
 - 1,265
 - 9,521
 - 11,111
 - 19,999
 - 54,637
 - 87,053
 - 100,000

2. a) 5,943 b) 7,617 c) 2,638 d) 6,023
 e) 5,206 f) 1,854 g) 4,111 h) 9,702
3. a) 1,927 → 900 b) 8,106 → 8,000
 c) 5,894 → 800 d) 4,892 → 2
 e) 3,258 → 8 f) 7,461 → 60
 g) 9,893 → 9,000 h) 3,642 → 600
 i) 4,578 → 4,000 j) 6,029 → 20
 k) 7,645 → 5 l) 3,092 → 2

Exercise 8

(LB page 31)

HTH	TTH	TH	H	T	O	Number
	5	2	7	3	4	52,734
	1	6	2	1	1	16,211
	1	9	1	8	7	19,187
1	4	3	4	5	0	143,450
	3	9	6	9	8	39,698
1	7	5	0	2	3	175,023
	9	9	9	9	9	99,999
1	0	0	0	0	0	100,000

Exercise 9

(LB page 31)

13,215
25,049
50,731
79,360
91,508
84,856
100,000

Exercise 10

(LB page 32)

- two thousand eight hundred and thirty-one
- five thousand six hundred and seventy-two
- ten thousand nine hundred and twenty-one
- twelve thousand six hundred and fifty-five

5. nineteen thousand four hundred and ten
6. twenty-five thousand one hundred and nine

Exercise 11

(LB page 32)

1. 60,000
2. 40,000
3. 80,000
4. 15,000
5. 18,000
6. 35,000
7. 71,000
8. 43,000
9. 99,000
10. 11,000
11. 91,000
12. 100,000

B4.1.1.1.3

Content standard	Indicator
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit numerals up to 100,000	B4.1.1.1.3 Identify numbers in different positions around a given number in a number chart

1. Learning expectations

Learners need to be able to:

- investigate the properties of whole numbers.
- recognise and list the multiples of 500 between 10,000 and 100,000.

2. Essential for learning

Learners have experience with ordering numbers, less than, greater than, equal.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 12–14
- Number charts

5. Large class teaching

As you get to know the learners in your class you will know which learners can work independently and which need

further help and guidance. Learners must be in control of their learning and allowed to try a variety of strategies. This can be challenging in a large class. Be attentive to what is happening during a lesson and change your pace to suit the needs of the learners.

6. Support for learners with special needs

Break down content into small manageable and logical steps. Develop a balance between individual, peer tutoring, cooperative learning and whole class teaching. Give more time for learners to complete the task if necessary. Learners should be able to explain their skills in determining the positioning of whole numbers in relationship with each other. Allow learners who know these answers to explain to the others how they have worked it out. This will help their peers and consolidate their own understanding.

7. Teaching methodology

Have the learners turn to page 33 in the Learner's book. Read through the exercises with the learners and ensure that they understand what to do before they start. They could work in pairs, in small groups or as a class activity.

Have a number chart up to 100,000 and ask learners in pairs to identify and read off numbers from the chart in different positions around a given number.

Allow the learners to watch appropriate YouTube videos on factors and multiples.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 12 to 14 (B4.1.1.1 Exercise 7).

9. Assessment

Use self/peer assessment. Learners can check each other's work.

4. Resources used in this indicator

- Learner's book
- Workbook pages 14–16
- Number charts, number cards

5. Large class teaching

As you get to know the learners in your class you will know which learners can work independently and which need further help and guidance. Do not neglect any learners who are struggling with this concept. This is a good time to pair stronger learners with weaker ones. Those who understand the concepts should be able to help the weaker classmates while you concentrate on those who are really struggling.

6. Support for learners with special needs

Ensure that learners understand the concepts related to 'not equal to'. It is very easy to confuse the inequality symbols. Encourage learners to make sense of this in their own way. Associate familiar items with the symbols to help them to grasp the concepts. Explain that a chicken with an open beak or a crocodile with its mouth wide open looks like the inequality symbol. The open side will always point to the bigger number. It is important that learners understand both the concepts and the language used to describe the concepts. Learners should be able to explain how they order numbers.

7. Teaching methodology

Let learners work in pairs to count in multiples of 1,000.

Have the learners turn page 35 in the Learner's book and take them through the instructions by reading it together with them. Explain the example and make sure they understand what the symbols mean. Explain how to use the image of a bird's beak as a reminder of the less than or greater than shape. The open side is always at the larger number. If necessary, use your own practical examples to explain the symbols in an easier way.

Allow learners to use the number line to say whether a number is nearer to a lower or higher value.

Exercises 9 and 10 provide opportunities for paired or group work and will help to consolidate their knowledge of whole numbers to this point.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 14 to 16 (B4.1.1.1 Exercises 8 and 9).

9. Assessment

Use teacher assessment. Exercises 9 and 10 provide a good assessment of how much learners understand about whole numbers.

10. Answers

Exercise 1

(LB page 35)

- | | |
|--------------------|--------------------|
| 1. is greater than | 2. is greater than |
| 3. is less than | 4. is less than |
| 5. is equal to | 6. is greater than |
| 7. is greater than | 8. is equal to |
| 9. is greater than | 10. is less than |

Exercise 2

(LB page 36)

Learners should read the statement aloud before deciding whether they are true or false.

- | | | |
|---------|----------|---------|
| 1. True | 2. True | 3. True |
| 4. True | 5. False | 6. True |

Exercise 3

(LB page 37)

- | | | | |
|----------|----------|----------|---------|
| 1. True | 2. True | 3. False | 4. True |
| 5. False | 6. False | 7. False | 8. True |

Exercise 4

(LB page 37)

- | | | |
|------|------|------|
| 1. = | 2. < | 3. > |
| 4. = | 5. = | 6. < |

Exercise 5

(LB page 37)

Learner's practical activity: make numbers with number cards.

Exercise 6

(LB page 38)

- 1,783; 1,782; 1,781; 1,780; 1,799
 - 3,238; 3,237; 3,236; 3,235; 3,234
 - 5,006; 5,005; 5,004; 5,003; 5,002
 - 7,479; 7,478; 7,477; 7,476; 7,475
 - 4,996; 4,995; 4,994; 4,993; 4,992
- 11,009; 10,509; 10,009; 9,509; 9,009; 8,509
 - 30,400; 20,800; 20,000; 19,600; 19,200; 18,800
 - 35,500; 35,250; 35,000; 34,750; 34,500; 34,250
 - 100,050; 100,000; 99,950; 99,900; 99,850; 99,800
- 4,010; 5,010; 6,010; 7,010; 8,010; 9,010
 - 16,406; 16,506; 16,606; 16,706; 16,806
 - 18,870; 18,880; 18,890; 18,900; 18,910
 - 99,500; 99,600; 99,700; 99,800; 99,900; 100,000

Exercise 7

(LB page 38)

- | | | |
|----------|----------|----------|
| a) True | b) True | c) True |
| d) True | e) False | f) False |
| g) False | h) False | i) True |
- a) = b) < c) > d) = e) = f) <

Exercise 8

(LB page 39)

- 6,819; 6,918; 8,916; 8,961; 9,168; 9,816
- 20,531; 15,320; 15,302; 13,250; 12,350; 10,532

Exercise 9

(LB page 40)

Learners' own work.

This is an activity for pairs. Encourage learners to produce creative pages or posters to explore the number facts.

Exercise 10

(LB page 41)

Learners' own work.

This is an activity for pairs. Encourage learners to produce creative pages or posters to explore the relationship between two numbers.

Exercise 11

(LB page 41)

- 1,637; 2,639; 3,852; 4,452; 4,999
- 5,297; 5,729; 7,925; 8,390; 9,938

3. 10,246; 12,064; 12,640; 14,260; 16,204
4. 52,784; 75,428; 78,254; 84,257; 87,425
5. 73,290; 79,320; 90,273; 93,207; 97,230

B4.1.1.1.5

Content standard	Indicator
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit numerals up to 100,000	B4.1.1.1.5 Round (off, up, down) whole numbers up to 10,000 to the nearest thousands, hundreds and tens

1. Learning expectations

Learners need to be able to:

- investigate relevant place values in the process of rounding a number.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with rounding to the nearest 5.

3. New words

Rounding up/down/off

4. Resources used in this indicator

- Learner's book
- Workbook pages 17–20
- Number lines

5. Large class teaching

The activities must be for an inclusive, learner centred class. The best way to work with large classes is to get to know your learners. Check which of your learners are comfortable speaking in front of the whole class and which learners are comfortable speaking in smaller groups. As the learners work in groups, monitor their progress closely.

6. Support for learners with special needs

The image on page 42 could be really difficult for learners who have visual difficulties. Use the opportunity to teach them about different ways to estimate. Explore the vocabulary in word problems first in order to ensure that learners understand the language and vocabulary used. If necessary, work through the word problems with special needs learners. Show them how to break down the question into small parts and how to relate the word problem into a number problem. Learners should be able to explain how they round off each number. If the size of the class permits, allow learners to take turns in explaining how they have approached a question. This peer support will help weaker learners.

7. Teaching methodology

Have the learners turn page 42 in the Learner's book. Read the instructions together with the learners. Ensure that they understand the concept of rounding numbers and that they understand the vocabulary that goes with it. Do the example thoroughly with them. Do a few more on the board before they do the exercises.

There are many YouTube videos on rounding off, up or down. Use these to supplement your lesson.

Your learners will use rounding and compensating to estimate their answers. They may use the number line to say whether the number is nearer to a lower or higher value.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 17 to 20 (B4.1.1.1 Exercise 10).

9. Assessment

Use a combination of teacher assessment and self/peer assessment.

10. Answers

Exercise 1

(LB page 44)

1. 70 2. 90 3. 100 4. 80
 5. 150 6. 190 7. 900 8. 960
 9. 1,950 10. 2,490 11. 3,280 12. 5,540

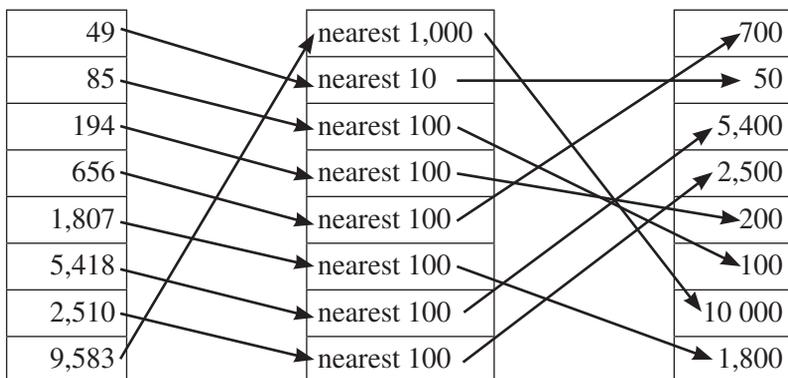
Exercise 2

(LB page 44)

1. 100 2. 300 3. 200 4. 400
 5. 100 6. 900 7. 1,200 8. 4,000

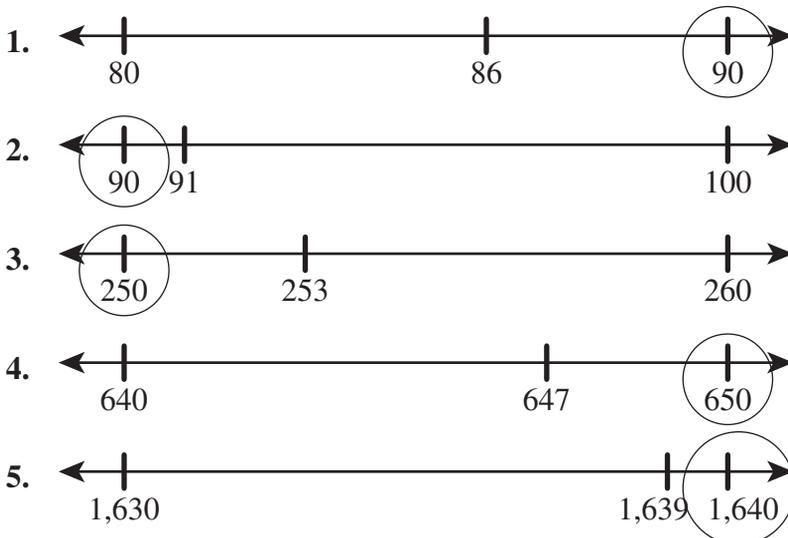
Exercise 3

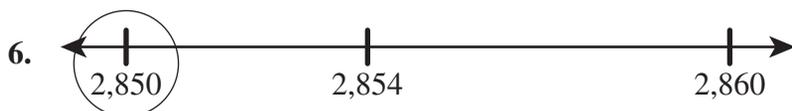
(LB page 44)



Exercise 4

(LB page 45)





7.–10. Learners' own work.

Exercise 5

(LB page 45)

- $10 + 20$
 - $60 + 20$
 - $90 - 40$
 - $90 - 60$
- Actual: 30 Estimate: 30
 - Actual: 79 Estimate: 80
 - Actual: 45 Estimate: 50
 - Actual: 38 Estimate: 30
- ≈ 800
 - ≈ 435
 - ≈ 600
 - ≈ 561
 - ≈ 450
 - ≈ 300

Exercise 6

(LB page 46)

- $97 + 48 \approx 100 + 50 \approx 150$
 - $41 + 39 \approx 40 + 40 \approx 80$
 - $122 + 55 \approx 120 + 60 \approx 180$
 - $207 + 36 \approx 210 + 40 \approx 250$
 - $353 - 54 \approx 350 - 50 \approx 300$
 - $98 - 71 \approx 100 - 70 \approx 30$
 - $22 \times 7 \approx 20 \times 10 \approx 200$
 - $85 \times 6 \approx 90 \times 10 \approx 900$
 - $11 \times 12 \approx 10 \times 10 \approx 100$
- $113 + 214 \approx 100 + 200 \approx 300$
 - $556 + 325 \approx 600 + 300 \approx 900$
 - $837 - 678 \approx 800 - 700 \approx 100$
 - $2,535 + 4,432 \approx 2,500 + 4,400 \approx 6,900$
 - $7,999 - 4,267 \approx 8,000 - 4,300 \approx 3,700$
 - $10,562 + 2,452 \approx 10,600 + 2,500 \approx 13,100$

Exercise 7

(LB page 46)

- A school week has 5 days.
The school sent out 34×5 letters.
Estimate: $30 \times 5 \approx 150$ letters
- There are 7 days in a week.
Over a week 169×7 bunches of flowers are sold.
Estimate: $200 \times 7 \approx 1,400$ bunches of flowers

3. The delivery van travels (380×5) km over 5 days.
Estimate: $400 \times 5 \approx 2,000$ km
4. There were $15,796 \times 3$ people at the stadium over 3 days.
Estimate: $16,000 \times 3 \approx 48,000$ people
5. The shopkeeper has $4,223 - 588$ tins of beans left.
Estimate: $4,200 - 600 \approx 3,600$ tins of beans

Exercise 8

(LB page 47)

Estimate the values as follows.

1. Group A: $341 + 257 \approx 300 + 300 \approx 600$ No
Group B: $241 + 361 \approx 200 + 400 \approx 600$ Yes
2. Group A: $201 + 315 \approx 200 + 300 \approx 500$... Yes
Group B: $228 + 320 \approx 200 + 300 \approx 500$... No
3. Group A: $297 + 131 \approx 300 + 100 \approx 400$... No
Group B: $151 + 278 \approx 200 + 300 \approx 500$... No
4. Group A: $455 + 182 \approx 500 + 200 \approx 700$... No
Group B: $111 + 479 \approx 100 + 500 \approx 600$... Yes

The table then shows:

	Group A (≈ 500)	Group B (≈ 600)
1.	✗	✓
2.	✓	✗
3.	✗	✗
4.	✗	✓

Exercise 9

(LB page 47)

1. A: $312 - 236 \approx 300 - 200 \approx 100$
B: $339 - 119 \approx 300 - 100 \approx 200$
C: $233 - 112 \approx 200 - 100 \approx 100$
D: $674 - 327 \approx 700 - 300 \approx 400$
 \therefore A and C give answers of about 100.
2. A: $374 - 142 \approx 400 - 100 \approx 300$
B: $311 - 144 \approx 300 - 100 \approx 200$
C: $936 - 725 \approx 900 - 700 \approx 200$
D: $521 - 401 \approx 500 - 400 \approx 100$
 \therefore B and C give answers of about 200.

B4.1.1.1.6

Content standard	Indicator
B4.1.1.1 Demonstrate an understanding of quantities and place value for multi-digit numerals up to 100,000	B4.1.1.1.6 Skip count forwards and backwards in 50s and 100s up to and from 10,000

1. Learning expectations

Learners need to be able to:

- develop attention to precision.
- revise the commutative and associative properties of numbers.

2. Essential for learning

Learners have experience of number patterns and sequences.

3. New words

Skip count, multiple, groups

4. Resources used in this indicator

- Learner's book
- Workbook pages 20–24
- Paper money in 50s and 100s
- Number charts

5. Large class teaching

Remember to be well-prepared for lessons. Have resources available and see that there are enough resources for everyone to participate. If you are under-resourced allow learners to work in groups or stagger the activities so that everyone has a turn at participating.

6. Support for learners with special needs

The game on page 48 is a good way to get everyone involved. Point out to your learners that some of the children in the illustration have physical challenges. One is wearing a hearing aid, while another has glasses. Have a brief discussion on how the game can be adapted to accommodate

these and other special needs. Allow learners to give their opinions, particularly those who do have special needs. Let this be a starting point for encouraging social inclusiveness. Encourage open discussion and re-assure them that there no right or wrong opinions but gently lead them to understand the importance of recognising and accommodating each other's differences. After the class discussion, form groups of mixed ability before starting the game.

7. Teaching methodology

Have the learners turn to page 48 in the Learner's book. Read through the game instructions together with the learners. Ensure that they understand the instructions and what to do before they start.

Learners can make their own money for Exercise 2 on page 49 or use any play notes that are available.

Pairs use number cards as a starting point, skip numbers forwards or backwards to reach the next target whole number.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. There are additional exercises in the Workbook: B4.1.1.1 Exercise 11.

9. Assessment

Use a combination of teacher assessment and self/peer assessment.

10. Answers

Exercise 1

(LB page 48)

Count-and-shout game

This is a practical group activity. Encourage learners to participate.

Exercise 2

(LB page 49)

This is a practical activity. Learners work on their own and in groups.

Exercise 3

(LB page 50)

1. 5,750; 5,700; 5,650; 5,600; 5,550; 5,500; 5,450; 5,400;
5,350; 5,300; 5,250; 5,200; 5,150; 5,100; 5,050

2. 5,700; 5,600; 5,500; 5,400; 5,300; 5,200; 5,100

Exercise 4

(LB page 50)

1.

10,000	9,900	9,800	9,700	9,600	9,500	9,400	9,300	9,200	9,100
9,000	8,900	8,800	8,700	8,600	8,500	8,400	8,300	8,200	8,100

2.

9,020	9,070	9,120	9,170	9,220	9,270	9,320	9,370	9,420	9,470
9,520	9,570	9,620	9,670	9,720	9,770	9,820	9,870	9,920	9,970

Sub-strand 1: Counting, representation and cardinality

The learner will be able to recognise and represent numbers written using Roman numerals and convert between the Hindu-Arabic and Roman numeral systems.

Content standard	Indicator
B4.1.1.2 Demonstrate an understanding of Roman numerals up to XXX (30)	B4.1.1.2.1 Develop an understanding of the Roman Numeral system up to XXX (i.e. 30).

1. Learning expectations

Learners need to be able to:

- investigate the relationship between Roman numerals and Hindu-Arabic numerals.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with the Hindu-Arabic system, a base-10 system.

3. New words

Numerals

4. Resources used in this indicator

- Learner's book
- Workbook pages 25–26
- Roman numeral chart

5. Large class teaching

When teaching a large class ensure that activities are for an inclusive, learner-centred class (determine the learner's Zone of Proximal Development).

There should be integration of other subjects. In this instance integrate with History.

Always plan classes and be well-prepared. Identify and prepare the resources and materials you will need for the lesson. Some exercises require class participation. For really large classes this may become unmanageable. Consider splitting activities and working with a part of the class at a time, while the rest of the class continues with other work.

Use effective questioning techniques that engage the learners. Allow enough time for learners to answer questions.

6. Support for learners with special needs

Ensure that learners understand the meaning of the different symbols. Pay particular attention to those with visual spatial difficulties, dyslexia and dyscalculia. These difficulties can present real challenges to understanding the Roman number system.

7. Teaching methodology

Have the learners turn to page 51 in the Learner's book. Read through the explanation together with the learners and ensure that they understand the Roman numeral system as well as the Arabic system. They need to do it enough times to be sure they know and understand what to do before they start the exercises.

Display a chart on Roman numeration. Let learners use the chart to place numbers in a sequential order. Exercise 2 on page 53 will allow for lots of practice in locating the numbers on a chart.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.2 Exercise 1.

9. Assessment

Use a combination of teacher assessment and self/peer assessment.

10. Answers

Exercise 1

(LB page 53)

- | | | | |
|-------|-------|--------|---------|
| 1. I | 2. II | 3. III | 4. IV |
| 5. V | 6. VI | 7. VII | 8. VIII |
| 9. IX | 10. X | 11. XI | 12. XII |

Exercise 2

(LB page 53)

1. This is a practical class/group activity.
2. Similar activity for pairs.

B4.1.1.2.2.

Content standard	Indicator
B4.1.1.2 Demonstrate an understanding of Roman numerals up to XXX (30)	B4.1.1.2.2 Count and convert Hindu Arabic numbers to Roman numerals up to 30 and vice versa.

1. Learning expectations

Learners need to be able to:

- investigate and convert between Roman numerals and Hindu-Arabic numerals.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with the Hindu-Arabic system, a base-10 system.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 26–28
- Roman numeral chart
- Clock faces with Roman numerals; clock faces with Arabic numerals

5. Large class teaching

Plan classes and be well-prepared. Identify and prepare the resources and materials you will need for the lesson. Give learners card to make clock faces and hands. Allow them to write the numbers on the faces in both Arabic and Roman numerals.

Some exercises require class participation. For really large classes this may become unmanageable. Consider splitting activities and working with a part of the class at a time, while the rest of the class continues with other work.

Use effective questioning techniques that engage the learners. Allow enough time for learners to answer questions.

6. Support for learners with special needs

Ensure that learners understand the meaning of the different symbols. Pay particular attention to those with visual spatial difficulties, dyslexia and dyscalculia. These difficulties can present real challenges to understanding the Roman number system.

7. Teaching methodology

It is important for the learners to practise writing Roman numbers on clock faces to show the time. They should also be able to read the time from various clock faces and must practise this often. Ensure that they can write numbers in both notations on clock faces.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.2 Exercise 2.

9. Assessment

Use class work activity as self/peer assessment by allowing learners to check each other.

10. Answers

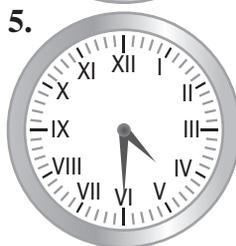
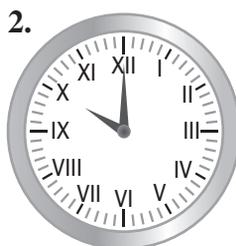
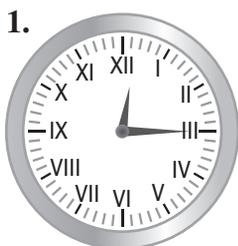
Exercise 1

(LB page 54)

Arabic	Work it out	Roman numeral
13	$10 + 3$	XIII
17	$10 + 5 + 2$	XVII
14	$10 + (5 - 1)$	XIV
18	$10 + 5 + 3$	XVIII
16	$10 + 5 + 1$	XVI
21	$10 + 10 + 1$	XXI
25	$10 + 10 + 5$	XXV
29	$10 + 10 + (10 - 1)$	XXIX
27	$10 + 10 + 5 + 2$	XXVII
30	$10 + 10 + 10$	XXX

Exercise 2

(LB page 54)



Exercise 3

(LB page 55)

$10 = X$; $9 = IX$; $8 = VIII$; $7 = VII$; $6 = VI$; $5 = V$; $4 = IV$;
 $3 = III$; $2 = II$; $1 = I$

Sub-strand 1: Counting, representation and cardinality

The learner will be able to determine factors and multiples, particularly the highest common factor (HCF) and the lowest common multiple (LCM), recognise the relationship between factors and multiples and generate square number patterns using factors.

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.1 Determine the set of factors of a given number up to 50

1. Learning expectations

Learners need to be able to:

- investigate and determine factors using the divisibility method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors and multiplication tables.

3. New words

Factor

4. Resources used in this indicator

- Learner's book
- Hundreds chart
- Counters (beads, buttons, pebbles, bottle caps)

5. Large class teaching

Plan and prepare lessons before the class. Ensure that there will be enough resources for everyone to participate. Move around the class to engage with all learners. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger learners. When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

Explore the vocabulary used. Ensure that learners understand the language and vocabulary used. It is crucial that learners understand the difference between factors and multiples. Many of the exercises include concrete, tangible examples. Allow learners to work with manipulatives to make the connection between the concrete and abstract concepts.

7. Teaching methodology

Let the learners turn to page 56 in the Learner's book and read through the explanation and example together with the learners. Ensure that they understand the concept of factors. Do a few more examples on the board to explain what a factor of a number is before they do the exercises in the book.

8. Homework

Exercise 4 may be completed as a homework task.

9. Assessment

Determine how well learners have understood this concept by checking their work.

Provide additional worksheets or problems for them and offer support as needed.

10. Answers

Exercise 1

(LB page 57)

Learners should group the images by circling them. If possible, let them use the items represented and physically manipulate them to find equal groups.

1. 14 sweets can be divided into 2 groups of 7 or 7 groups of 2.
 $14 \div 1 = 14$ and $14 \times 1 = 14 \therefore 1; 14$ are factors of 14.
 $14 \div 2 = 7$ and $7 \times 2 = 14 \therefore 2; 7$ are factors of 14.
 Factors of 14 are: 1; 2; 7; 14.
2. 9 marbles can be divided into 3 groups of 3.
 $9 \div 1 = 9$ and $1 \times 9 = 9 \therefore 1; 9$ are factors of 9.
 $9 \div 3 = 3$ and $3 \times 3 = 9 \therefore 3$ is a factor of 9.
 Factors of 9 are: 1; 3; 9.
3. 6 apples can be divided into 2 groups of 3 or 3 groups of 2.
 $6 \div 1 = 6$ and $1 \times 6 = 6 \therefore 1; 6$ are factors of 6.
 $6 \div 2 = 3$ and $3 \times 2 = 6 \therefore 2; 3$ are factors of 6.
 Factors of 6 are: 1; 2; 3; 6.
4. 8 socks can be divided into 2 groups of 4 or 4 groups of 2.
 $8 \div 1 = 8$ and $1 \times 8 = 8 \therefore 1; 8$ are factors of 8.
 $8 \div 2 = 4$ and $4 \times 2 = 8 \therefore 2; 4$ are factors of 8.
 Factors of 8 are: 1; 2; 4; 8.
5. 16 nuts can be divided into 2 groups of 8 or 8 groups of 2 or 4 groups of 4.
 $16 \div 1 = 16$ and $16 \times 1 = 16 \therefore 1; 16$ are factors of 16.
 $16 \div 2 = 8$ and $2 \times 8 = 16 \therefore 2; 8$ are factors of 16.
 $16 \div 4 = 4$ and $4 \times 4 = 16 \therefore 4$ is a factor of 16.
 Factors of 16: 1; 2; 4; 8
6. 5 coins cannot be divided into smaller groups.
 $5 \div 1 = 5$ and $1 \times 5 = 5 \therefore 1; 5$ are the only factors of 5.
 Factors of 5 are: 1; 5.
7. 18 balls can be divided into 2 groups of 9 or 9 groups of 2 or 3 groups of 6 or 6 groups of 3.
 $18 \div 1 = 18$ and $1 \times 18 = 18 \therefore 1; 18$ are factors of 18.
 $18 \div 2 = 9$ and $2 \times 9 = 18 \therefore 2; 9$ are factors of 18.
 $18 \div 3 = 6$ and $3 \times 6 = 18 \therefore 3; 6$ are factors of 18.
 Factors of 18 are: 1; 2; 3; 6; 9; 18.

Exercise 2

(LB page 58)

1. 20: factors are 1; 2; 4; 5; 10; 20.
2. 27: factors are 1; 3; 9; 27.

3. 15: factors are 1; 3; 5; 15.
4. 25: factors are 1; 5; 25.
5. 24: factors are 1; 2; 3; 4; 6; 8; 12; 24.
6. 21: factors are 1; 3; 7; 21.
7. 33: factors are 1; 3; 11; 33.
8. 10: factors are 1; 2; 5; 10.

Exercise 3

(LB page 58)

1. $36: 1 \times 36; 2 \times 18; 3 \times 12; 4 \times 9; 6 \times 6$
Set of factors of 36: {1; 2; 3; 4; 6; 9; 12; 18; 36}
2. $45: 1 \times 45; 3 \times 15; 5 \times 9$
Set of factors of 45: {1; 3; 5; 9; 15; 45}
3. $44: 1 \times 44; 2 \times 22; 4 \times 11$
Set of factors of 44: {1; 2; 4; 11; 22; 44}
4. $32: 1 \times 32; 2 \times 16; 4 \times 8$
Set of factors of 32: {1; 2; 4; 8; 16; 32}
5. $35: 1 \times 35; 5 \times 7$
Set of factors of 35: {1; 5; 7; 35}
6. $48: 1 \times 48; 2 \times 24; 3 \times 16; 4 \times 12; 6 \times 8$
Set of factors of 48: {1; 2; 3; 4; 6; 8; 12; 16; 24; 48}
7. $50: 1 \times 50; 2 \times 25; 5 \times 10$
Set of factors of 50: {1; 2; 5; 10; 25; 50}
8. $40: 1 \times 40; 2 \times 20; 4 \times 10; 5 \times 8$
Set of factors of 40: {1; 2; 4; 5; 8; 10; 20; 40}
9. $16: 1 \times 16; 2 \times 8; 4 \times 4$
Set of factors of 16: {1; 2; 4; 8; 16}
10. $42: 1 \times 42; 2 \times 21; 3 \times 14; 6 \times 7$
Set of factors of 42: {1; 2; 3; 6; 7; 14; 21; 42}
11. $28: 1 \times 28; 2 \times 14; 4 \times 7$
Set of factors of 28: {1; 2; 4; 7; 14; 28}
12. $18: 1 \times 18; 2 \times 9; 3 \times 6$
Set of factors of 18: {1; 2; 3; 6; 9; 18}

Exercise 4

(LB page 59)

1. 12; 24; 28; 40; 48
2. 35; 40; 50
3. 40; 50
4. 12; 24; 48
5. 28; 35
6. 24; 48
7. 12
8. 40
9. 35
10. 12; 24
11. 12; 24; 48
12. 50

B4.1.1.3.2

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.2 Determine the highest common factor (HCF) of any two whole numbers between 1 and 50

1. Learning expectations

Learners need to be able to:

- investigate and determine HCF using factor pair method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors.

3. New words

Highest common factor (HCF)

4. Resources used in this indicator

- Learner's book
- Workbook pages 29–31
- Hundreds chart
- Counters (beads, buttons, pebbles, bottle caps)

5. Large class teaching

Move around the class to engage with all learners. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger

learners. Use videos as support and to complement your teaching.

6. Support for learners with special needs

Explore the vocabulary used. Ensure that learners understand the language and vocabulary used. It is crucial that learners understand the difference between factors and multiples.

Many of the exercises include concrete, tangible examples. Allow learners to work with manipulatives to make the connection between the concrete and abstract concepts. Break down the process of finding HCF into small manageable tasks.

Be aware of specific disabilities that learners may have. In particular, those learners with dyscalculia and visual perception disorders will find many mathematical concepts challenging. You may need to use a multisensory approach to their lessons.

7. Teaching methodology

This is a class activity. Let the learners turn to page 60 in the Learner's book. Read through the explanation and example in the Learner's book together with the learners. Ensure that they understand the concept of HCF (highest common factor). Do a few more examples on the board using the Venn diagram to explain the common factors before they do the exercises in the book. The learners can work together to solve the examples you do on the board with them.

Use YouTube videos on the pair factor method to complement learning.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.3 Exercise 1.

9. Assessment

Determine how well learners have understood this concept by checking their work.

Provide additional worksheets or problems for them and offer support as needed.

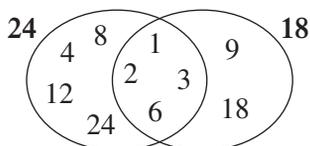
10. Answers

Exercise 1

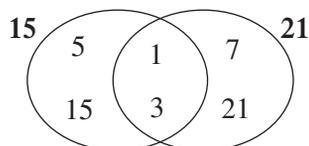
(LB page 61)

Learners draw their own diagrams to assist in finding the HCF.

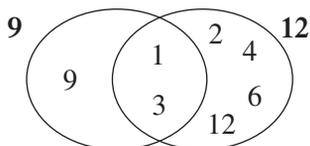
1. HCF: 6



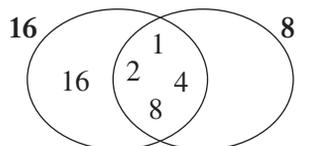
2. HCF: 3



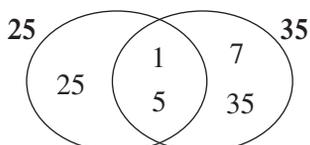
3. HCF: 3



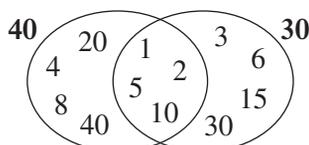
4. HCF: 8



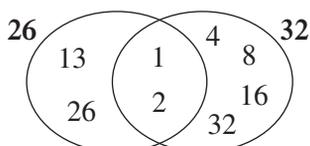
5. HCF: 5



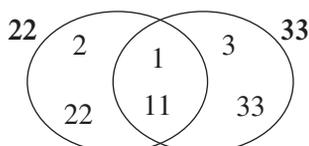
6. HCF: 10



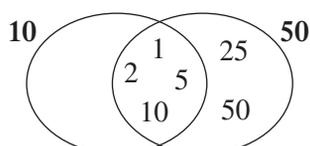
7. HCF: 2



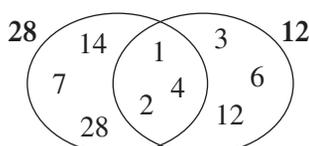
8. HCF: 11



9. HCF: 10



10. HCF: 4



Exercise 2

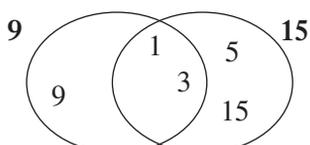
(LB page 61)

Learners draw their own diagrams and make lists to assist in finding the HCF.

1. Factors 9: 1; 3; 9

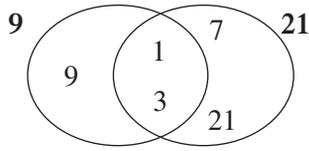
HCF: 3

15: 1; 3; 5; 15



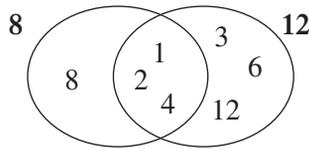
2. Factors 9: 1; 3; 9 HCF: 3

21: 1; 3; 7; 21



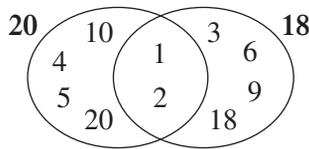
3. Factors 8: 1; 2; 4; 8 HCF: 4

12: 1; 2; 3; 4; 6; 12



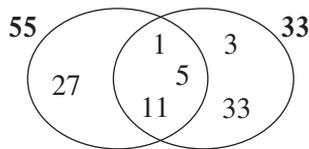
4. Factors 20: 1; 2; 4; 5; 10; 20 HCF: 2

18: 1; 2; 3; 6; 9; 18



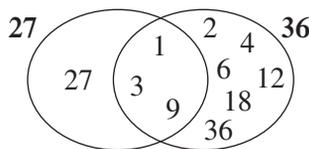
5. Factors 55: 1; 5; 11; 55 HCF: 11

33: 1; 3; 11; 33



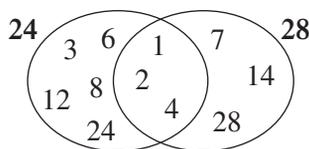
6. Factors 27: 1; 3; 9; 27 HCF: 9

36: 1; 2; 3; 4; 6; 9; 12; 18; 36



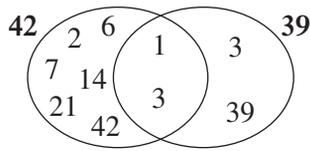
7. Factors 24: 1; 2; 3; 4; 6; 8; 12; 24 HCF: 4

28: 1; 2; 4; 7; 14; 28



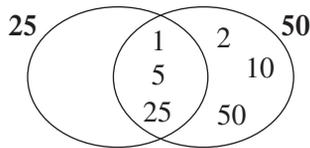
8. Factors 42: 1; 2; 3; 6; 7; 14; 21; 42
39: 1; 3; 13; 39

HCF: 3



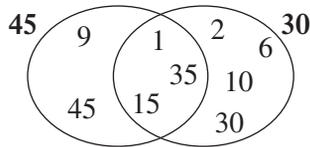
9. Factors 25: 1; 5; 25
50: 1; 2; 5; 10; 25; 50

HCF: 25



10. Factors 45: 1; 3; 5; 9; 15; 45
30: 1; 2; 3; 5; 6; 10; 15; 30

HCF: 15



Exercise 3

(LB page 61)

1. $16 = 2 \times 4 \times 2$
2. $40 = 5 \times 2 \times 4$
3. $21 = 7 \times 1 \times 3$
4. $28 = 7 \times 2 \times 2$
5. $20 = 5 \times 2 \times 2$
6. $35 = 1 \times 7 \times 5$
7. $9 = 3 \times 1 \times 3$
8. $24 = 4 \times 2 \times 3$
9. $27 = 3 \times 3 \times 3$
10. $50 = 5 \times 5 \times 2$

Exercise 4

(LB page 62)

Number	List of factors	HCF
48	1; 2; 3; 4; 6; 8; 12; 16; 24; 48	2
14	1; 2; 7; 14	
27	1; 3; 9; 27	1
32	1; 2; 4; 8; 16; 32	
44	1; 2; 4; 11; 22; 44	1
21	1; 3; 7; 21	

Number	List of factors	HCF
20	1; 2; 4; 5; 10; 20	5
35	1; 5; 7; 35	
50	1; 2; 5; 10; 25; 50	10
30	1; 2; 3; 5; 6; 10; 15; 30	

B4.1.1.3.3

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.3 Determine the lowest common multiple (LCM) of at least two given numbers up to 100

1. Learning expectations

Learners need to be able to:

- investigate and determine LCM using multiple method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors and multiplication tables.

3. New words

Lowest common multiple (LCM)

4. Resources used in this indicator

- Learner's book
- Workbook pages 32–34
- Hundreds chart

5. Large class teaching

Always be well prepared for lessons. Good preparation boosts your confidence and confidence helps to maintain control in a large class. Move around the class to engage with all learners. Change seating arrangements to allow different groupings of

learners. It may be effective in some situations to pair weaker learners with stronger learners. In other instances, it could be better to group strong learners to continue working on their own while you provide extra support for those who are struggling. It is vital that you know your learners so that you can determine the best grouping for any situation.

6. Support for learners with special needs

Explore the vocabulary used. Ensure that learners understand the language and vocabulary used. It is crucial that learners understand the difference between factors and multiples.

Many of the exercises include concrete, tangible examples. Allow learners to work with manipulatives to make the connection between the concrete and abstract concepts. Break down the process of finding LCM into small manageable tasks.

Be aware of specific disabilities that learners may have. In particular, those learners with dyscalculia and visual perception disorders will find many mathematical concepts challenging. You may need to use a multisensory approach to their lessons.

7. Teaching methodology

This can start out as a class activity. Have the learners turn to page 63 in the Learner's book and go through the explanation and example together with the learners and ensure that they understand the concept of common multiples. Do a few more examples on the board for the class to solve before they do the exercises in the book.

Demonstrate the use of the number line to show the multiples on the board before they do the exercises in the Learner's book. Explain the example on the table on page 65 as well as how to list multiples as shown on pages 66 and 67.

Do more examples on the board to ensure that the learners understand what to do. Use YouTube videos on the pair factor method and the common multiple method to further explain the concepts.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.3 Exercise 2.

9. Assessment

Determine how well learners have understood this concept by checking their work.

Provide additional worksheets or problems for them and offer support as needed.

10. Answers

Exercise 1

(LB page 63)

- 6; 12; 18; 24; 30
- 8; 16; 24; 32; 40
- 7; 14; 21; 28; 35
- 11; 22; 33; 44; 55
- 12; 24; 36; 48; 60
- 4; 8; 12; 16; 20
- 2; 4; 6; 8; 10
- 5; 10; 15; 20; 25
- 1; 2; 3; 4; 5
- 9; 18; 27; 36; 45
- 3; 6; 9; 12; 15
- 10; 20; 30; 40; 50

Exercise 2

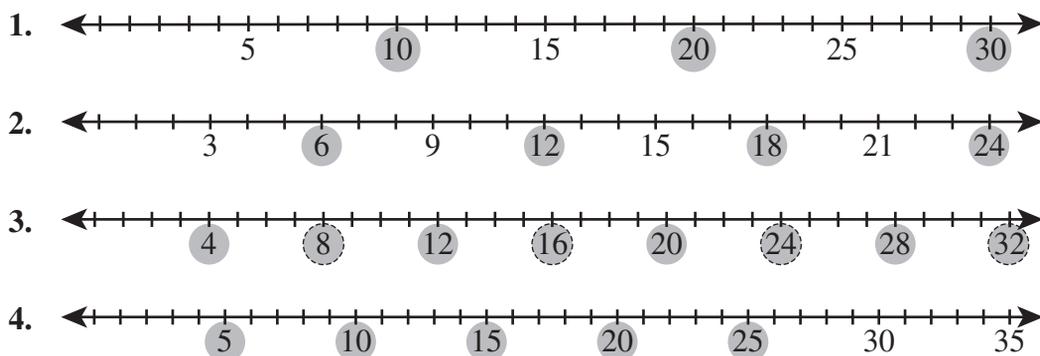
(LB page 64)

- 10; 20; 30; 40; 50; 60; 70; 80; 90; 100
- 4; 8; 12; 16; 20; 24; 28; 32; 36; 40
- 6; 12; 18; 24; 30; 36; 42; 48; 54; 60
- 9; 18; 27; 36; 45; 54; 63; 72; 81; 90; 99
- 7; 14; 21; 28; 35; 42; 49; 56; 63; 70; 77; 84

Exercise 3

(LB page 64)

Learners draw number lines and circle numbers to show multiples.



Factors of 25: 1; 5; 25

Exercise 4

(LB page 66)

- Multiples of 3: 3; 6; 9; 12; 15; 18; 21; 24; 27; 30; 33; 36; 39
Multiples of 4: 4; 8; 12; 16; 20; 24; 28; 32; 36; 40
Common multiples: 12; 24; 36
LCM: 12
- Multiples of 5: 5; 10; 15; 20; 25; 30; 35; 40; 45; 50; 55; 60
Multiples of 6: 6; 12; 18; 24; 30; 36; 42; 48; 54; 60
Common multiples: 30; 60
LCM: 30

Exercise 5

(LB page 66)

Numbers	List of multiples	LCM
7	7; 14; 21; 28; 35; 42; 49; 56; 63 ; 70	63
9	9; 18; 27; 36; 45; 54; 63 ; 72; 81; 90	
6	6; 12; 18; 24 ; 30; 36; 42; 48 ; 54; 60	24
8	8; 16; 24 ; 32; 40; 48 ; 56; 64; 72; 80	
2	2; 4; 6; 8; 10 ; 12; 14; 16; 18; 20	10
5	5; 10 ; 15; 20 ; 25; 30; 35; 40; 45; 50	
3	3; 6; 9; 12 ; 15; 18; 21; 24 ; 27; 30	12
4	4; 8; 12 ; 16; 20; 24 ; 28; 32; 36; 40	
11	11; 22; 33; 44; 55; 66; 77; 88; 99; 110; 121; 132	132
12	12; 24; 36; 48; 60; 72; 84; 96; 108; 120; 132 ; 144	

B4.1.1.3.4

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.4 Recognise the relationship between factors and multiples

1. Learning expectations

Learners need to be able to:

- investigate and determine factors using the divisibility method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors and multiplication tables.

3. New words

Odd; even

4. Resources used in this indicator

- Learner's book
- Workbook pages 35–37
- Hundreds chart
- Dice
- Counters (beads, buttons, pebbles, bottle caps) and game board with blank blocks

5. Large class teaching

The activities must be for an inclusive, learner centred class. Allow learners to try a variety of strategies to answer the questions as this will encourage creative thinking.

Plan and prepare lessons before the class. Ensure that there will be enough resources for everyone to participate. Move around the class to engage with all learners and check on those who are not participating. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger learners.

6. Support for learners with special needs

Be aware of specific disabilities that learners may have. In particular, the games used here may be difficult for some learners to master. Some may struggle with the physical aspect of throwing dice while others may be slow at adding numbers or identifying the odd or even number thrown. Do not allow the other learners to tease those who are struggling. Use this as a teaching moment for social inclusion and let them help you to find ways to accommodate the special needs of all learners so that everyone can enjoy the game.

7. Teaching methodology

Learners revise the use of factor pair method to determine factors and highest common factor.

This can be a class activity. Have the learners turn to page 68 in the Learner's book. Explain how factors and multiples work together. Do a few more examples on the board and have the learners solve them by working together before they do the exercises in the Learner's book.

Proceed to explain odd and even numbers. Have the learners turn to page 69 in the Learner's book. Read the instruction together with the learners to ensure they know what to do and also understand the difference between odd and even. Let learners play the game in Exercise 4.

Read the rules of the game in Exercise 5 with them to ensure they understand how to play the game correctly. Allow them to play a few rounds of the game. Provide enough opportunities for all learners to practise.

8. Homework

Exercise 6 may be completed as homework. Any exercises not completed in class could also be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.3 Exercises 3 and 4.

9. Assessment

Assess as you work through exercises with the class. Use the games to observe which learners are not participating. Encourage them to join in but if you find they become withdrawn, rather spend some one-on-one or small group time with them afterwards. Provide further support as necessary.

10. Answers

Exercise 1

(LB page 68)

- | | |
|--|---|
| 1. $56 \div 8 = 7$
\therefore True | 2. $27 \div 3 = 9$
\therefore True |
| 3. $48 \div 6 = 8$
\therefore True | 4. $33 \div 4 = 8\frac{1}{4}$
\therefore False |
| 5. $55 \div 5 = 11$
\therefore True | 6. $70 \div 10 = 7$
\therefore True |

7. $82 \div 9 = 9\frac{1}{9}$
 \therefore False

8. $61 \div 5 = 12\frac{1}{5}$
 \therefore False

Exercise 2

(LB page 69)

1. Learners draw blocks to represent numbers 6 to 10.



2. Learners work with a partner.

- a) 79 ends in 9 \therefore odd b) 82 ends in 2 \therefore even
 c) 103 ends in 3 \therefore odd d) 555 ends in 5 \therefore odd
 e) 1,248 ends in 8 \therefore even f) 4,999 ends in 9 \therefore odd
 g) 13,480 ends in 0 \therefore even h) 29,531 ends in 1 \therefore odd

Exercise 3

(LB page 69)

Learners will work with their own lists but should find the same solutions.

1. Even 2. Even 3. Odd

Exercise 4

(LB page 69)

Learners play the 'Odd or even' game in groups of 4 players, using 2 then 3 dice.

Exercise 5

(LB page 70)

Learners play the 'Odd or even – race to the end!' game in pairs, moving a counter along a gameboard according to the numbers thrown.

Exercise 6

(LB page 70)

1. 86 (87) 88 (89) 90 (91) 92 (93) 94 (95)
 2. 111 (112) 113 (114) 115 (116) 117 (118)
 3. 499 (500) 501 (502) 503 (504) 505 (506)
 4. 2,224 (2,225) 2,226 (2,227) 2,228 (2,229)

B4.1.1.3.5

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.5 Generate and analyse patterns in square numbers

1. Learning expectations

Learners need to be able to:

- investigate and determine factors using the divisibility method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors and multiplication tables.

3. New words

Square numbers

4. Resources used in this indicator

- Learner's book
- Workbook pages 37–38
- Hundreds chart
- Grid paper; ruler
- Counters (beads, buttons, pebbles, bottle caps)

5. Large class teaching

Plan and prepare lessons before the class. Ensure that there will be enough resources for everyone to participate. Move around the class to engage with all learners. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger learners.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

Explore the vocabulary used. Ensure that learners understand the language and vocabulary used. It is crucial that learners understand the meaning of the word 'square'. Many of the exercises include concrete, tangible examples. Allow learners to work with manipulatives to make the connection between the concrete and abstract concepts. This section also relies on using visual clues to identify shapes and cement the concept of 'square'. Be aware of those learners who may struggle to interpret these visual clues.

7. Teaching methodology

This can be a class activity at first and then a paired activity. Use your discretion to decide what works best for your class.

Read the instructions together with the learners on page 71 before doing the activities together. Then explain the example on page 72 as you read it together with the learners. Do a few more examples on the board which they can solve together before they do the exercises in the Learner's book. Ensure that they understand the concept of squared numbers before moving on to the exercises in the book. Some of these exercises can be done in pairs and individually.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Question 4 of Exercise 1 in the Learner's book may be used as an extension exercise for advanced learners. Further exercises are found in the Workbook: B4.1.1.3 Exercise 5.

9. Assessment

Use Teacher assessment. Identify weaknesses as learners work through the exercises.

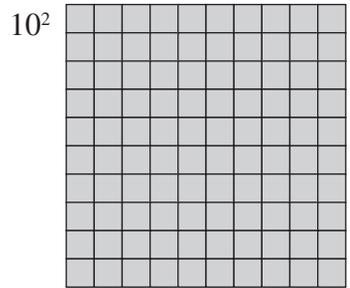
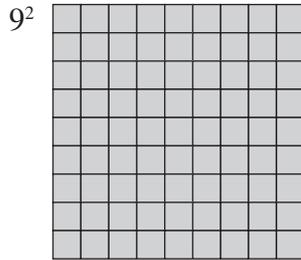
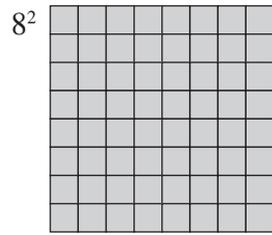
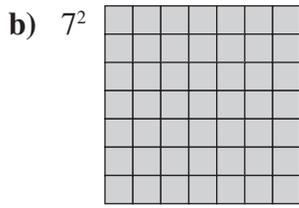
Also make use of self/peer assessment by allowing learners to check each other's work.

10. Answers

Exercise 1

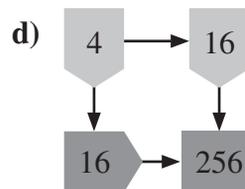
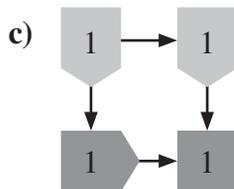
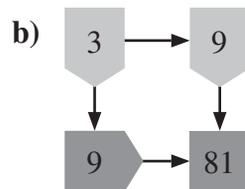
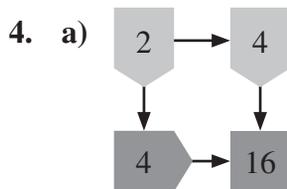
(LB page 72)

1. a) **A.** $1 = 1 \times 1$ **B.** $4 = 2 \times 2$ **C.** $9 = 3 \times 3$
D. $16 = 4 \times 4$ **E.** $25 = 5 \times 5$ **F.** $36 = 6 \times 6$



2. 1; 4; 9; 16; 25; 36; 49; 64; 81; 100

3. a) $1 \times 1 = 1^2 = 1$
 b) $2 \times 2 = 2^2 = 4$
 c) $3 \times 3 = 3^2 = 9$
 d) $4 \times 4 = 4^2 = 16$
 e) $11^2 = 11 \times 11 = 121$
 f) $12^2 = 12 \times 12 = 144$



Exercise 2

(LB page 73)

$$6^2 = 36 = 1 + 3 + 5 + 7 + 9 + 11$$

$$7^2 = 49 = 1 + 3 + 5 + 7 + 9 + 11 + 13$$

$$8^2 = 64 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$$

$$9^2 = 81 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17$$

Exercise 3

(LB page 74)

Learners' practical and discussion activity, working in pairs.

B4.1.1.3.6

Content standard	Indicator
B4.1.1.3 Demonstrate an understanding of factors, multiples and squared numbers	B4.1.1.3.6 Represent square numbers using factors

1. Learning expectations

Learners need to be able to:

- investigate and determine factors using the divisibility method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with factors and multiplication tables.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 38–39
- Grid paper; ruler

5. Large class teaching

Planned, well-prepared lessons and sufficient resources are key to keeping a large class under control and interested. Encourage everyone to participate and move around the class to engage with all learners.

Changing seating arrangements from time to time will allow different groupings of learners. How you group them

will depend on the area of work being covered and the strengths and weaknesses of your learners. It may sometimes be effective to pair weaker learners with stronger learners, but at other times you can split the work between remedial activities for weaker learners and extension work for the more advanced. In this case it would be usual to have a teaching assistant.

6. Support for learners with special needs

Explore the vocabulary used. Ensure that learners understand the language and vocabulary used. It is crucial that learners understand the difference between factors and multiples.

Be aware of specific disabilities that learners may have. In particular, those learners with dyscalculia and visual perception disorders will find many mathematical concepts challenging. You may need to use a multisensory approach to their lessons.

7. Teaching methodology

This can be a class activity at first and then a paired activity. Use your discretion to decide what works best for your class.

Read the instructions together with the learners on page 75. Get the whole class busy drawing squares on grid paper. Stress the importance of having the same number of blocks across and down. Do examples on the board of factorising numbers which they can solve together before they do the exercises in the Learner's book. Use a combination of square and non-square numbers so that they can see the difference.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.1.3 Exercise 6.

9. Assessment

Use a combination of teacher assessment and self/peer assessment.

10. Answers

Exercise 1

(LB page 76)

Calculate the products to find which are square numbers.

$$2 \times 2 \times 1 = 2^2 = 4, \text{ a square number}$$

$$3 \times 3 = 3^2 = 9, \text{ a square number}$$

$$4 \times 4 = 4^2 = 16, \text{ a square number}$$

$$2 \times 2 \times 2 = 8, \text{ not square}$$

$$3 \times 4 = 12, \text{ not square}$$

$$4 \times 4 \times 2 = 32, \text{ not square}$$

$$2 \times 2 \times 4 = 16 = 4^2, \text{ a square number}$$

$$3 \times 3 \times 4 = 36 = 6^2, \text{ a square number}$$

$$4 \times 4 \times 4 = 64 = 8^2, \text{ a square number}$$

$$2 \times 2 \times 2 \times 4 = 32, \text{ not square}$$

$$3 \times 3 \times 6 = 54, \text{ not square}$$

$$4 \times 4 \times 6 = 96, \text{ not square}$$

$$2 \times 2 \times 2 \times 5 = 40, \text{ not square}$$

$$3 \times 3 \times 3 \times 3 = 9^2 = 81, \text{ a square number}$$

$$4 \times 4 \times 4 \times 4 = 16^2 = 256, \text{ a square number}$$

Exercise 2

(LB page 76)

1. $2 \times 2 \times 2 \times 2 = 16$

2. $2 \times 3 \times 3 = 18$

3. $2 \times 2 \times 5 \times 5 = 100$

4. $2 \times 2 \times 3 \times 3 = 36$

5. $2 \times 3 \times 4 = 24$

6. $5 \times 5 \times 5 = 125$

7. $3 \times 3 \times 9 = 81$

8. $1 \times 7 \times 7 = 49$

9. $2 \times 4 \times 8 = 64$

10. $2 \times 6 \times 4 = 48$

Sub-strand 1: Counting, representation, cardinality and ordinality

The learner will be able to interpret negative and positive numbers in context.

Content standard	Indicator
B4.1.1.4 Interpret negative and positive numbers in context	B4.1.1.4.1 Describe real life situations using positive and negative values

1. Learning expectations

Learners need to be able to:

- investigate the meaning of negative numbers in real life context.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with positive whole numbers.

3. New words

Positive; negative; integers

4. Resources used in this indicator

- Learner's book
- Number lines with both positive and negative numbers
- Statements showing negative values
- Examples of negative values such as thermometers

5. Large class teaching

Always be well prepared for lessons. Decide on what techniques you will use to ensure active participation. Ensure

your content is engaging and memorable. Use a variety of teaching methods like activities in pairs or groups.

Use a variety of resources to demonstrate the use of negative values in the real world. If there is access to the internet or a library, encourage learners to find their own examples.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of negative and positive numbers and zero on the number line. As negative values are an abstract concept, learners who have learning disabilities might find it more difficult to grasp the concept. Be prepared to offer them extra support and time.

7. Teaching methodology

Learners revise the use of number line in determining the next number in the sequence and use the number line to order and compare the given numbers both positive and negative.

Have the learners turn to page 77 in the Learner's book. Read the instructions on this page together with the learners. Study the statement on page 78 and ensure that the learners clearly understand the difference between income, expenses and balances. Ensure they understand the vocabulary like increase in balance and decrease in balance as well loss and profit. This all leads the to their understanding of positive and negative numbers.

They must be clear on how to read and plot both positive and negative numbers on a number line including the use of the positive and negative symbols. Demonstrate a few examples on the board for them to solve together before they do the exercises in the Learner's book. It is important that learners read the numbers aloud in Exercise 1 so that they hear and see the minus values.

This topic can be well integrated with other subjects such as Science, Business, Economics or Accounting.

8. Homework

Finding examples of negative values as described in Exercise 4 is a good homework activity.

9. Assessment

Use the answers to the exercises to assess the level of understanding.

10. Answers

Exercise 1

(LB page 78)

Learner activity – they read aloud the numbers on the number line.

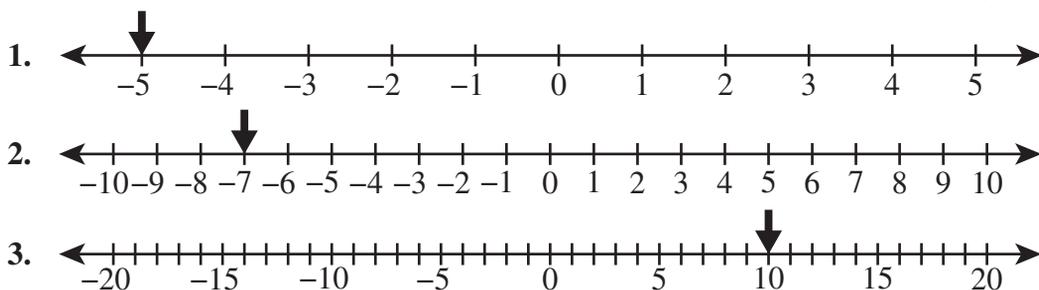
Exercise 2

(LB page 78)

1. A is -3 . 2. B is -1 3. True

Exercise 3

(LB page 79)



Exercise 4

(LB page 79)

Class activity to find and discuss examples of negative values.

B4.1.1.4.2

Content standard	Indicator
B4.1.1.4 Interpret negative and positive numbers in context	B4.1.1.4.2 Count forwards and backwards with positive and negative whole numbers through zero

1. Learning expectations

Learners need to be able to:

- investigate the meaning of negative numbers in real life contexts.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with positive whole numbers.

3. New words

Positive; negative; integers

4. Resources used in this indicator

- Learner's book
- Workbook pages 40–42
- Number lines with both positive and negative numbers

5. Large class teaching

Always be well prepared for lessons. Decide on what techniques you will use to ensure active participation. Ensure your content is engaging and memorable. Use a variety of teaching methods like activities in pairs or groups.

Use a variety of resources to demonstrate the use of negative values in the real world. If there is access to the internet or a library, encourage learners to find their own examples.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of negative and positive numbers and zero on the number line. As negative values are an abstract concept, learners who have learning disabilities might find it more difficult to grasp the concept. Be prepared to offer them extra support and time.

7. Teaching methodology

Learners revise the use of number line in determining the next number in the sequence and use the number line to order and compare the given numbers both positive and negative.

They must be clear on how to read and plot both positive and negative numbers on a number line including the use of the positive and negative symbols. It is important that learners read the numbers aloud in Exercise 1 so that they hear and see the minus values.

This topic can be well integrated with other subjects such as Science, Business, Economics or Accounting.

8. Homework

Further exercises are found in the Workbook: B4.1.1.4 Exercise 1.

9. Assessment

Use the answers to the exercises and observations in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 80)

1. Learner activity to count forwards, saying positive and negative numbers on number line aloud.
2. Learner activity to count backwards, saying positive and negative numbers on number line aloud.

3.

0									
-5	-4	-3	-2	-1	1	2	3	4	5

0							
-8	-6	-4	-2	2	4	6	8

Sub-strand 2: Number operations

The learner will be able to use a range of strategies to perform written and mental calculations with whole numbers, with competence and confidence in solving problems.

Content standard	Indicator
B4.1.2.1 Recall basic multiplication facts up to 12×12	B4.1.2.1.1 Determine basic multiplication facts up to 12×12

1. Learning expectations

Learners need to be able to:

- investigate the strategies used in multiplication problems.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with the different multiplication strategies.

3. New words

Inverse operation; product

4. Resources used in this indicator

- Learner's book
- Workbook page 43
- Straws; sticks
- Dice; counters (bottle caps; buttons; pebbles); number board

5. Large class teaching

The activities must be for an inclusive, learner-centred class (determine the learner's Zone of Proximal Development).

Allow learners to try a variety of strategies. When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

Be aware of learners with dyscalculia. Learners with dyscalculia may have difficulty understanding the concepts in this strand. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

This can start out as a class activity. Have the learners turn to page 81 in the Learner's book. Read through the example together with the learners. Ensure that they understand the concept of multiples and the different strategies that they can use to find their answers.

Exercise 4 on page 84 is a game. Read through the instructions with them and make sure they know how to play it beforehand.

The learners complete the exercises. There are enough exercises to give good practice in multiplication skills.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.2.1 Exercise 1.

9. Assessment

Use the answers to the exercises and observations in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 81)

Learners' practical activity. They use concrete representations to model the multiplication sentences.

1. $5 \times 3 = 15$ 2. $8 \times 4 = 32$ 3. $6 \times 5 = 30$
4. $10 \times 3 = 30$ 5. $2 \times 9 = 18$ 6. $12 \times 2 = 24$

Exercise 2

(LB page 82)

1. a) $A = 4 \times 5 = 20$
 $B = 6 \times 4 = 24$
 $C = 5 \times 8 = 40$
 $D = 9 \times 6 = 54$
 $E = 3 \times 8 = 24$
b) $A = 20 \times 2 = 40$
 $B = 24 \times 2 = 48$
 $C = 40 \times 2 = 80$
 $D = 54 \times 2 = 108$
 $E = 24 \times 2 = 48$

2. a) $5 \times 40 = 200$ b) $10 \times 48 = 480$
c) $6 \times 80 = 480$ d) $2 \times 108 = 216$
e) $3 \times 48 = 144$

Exercise 3

(LB page 83)

1. $8 \times 4 = 32$ C. $32 \div 4 = 8$
2. $7 \times 8 = 56$ B. $56 \div 7 = 8$
3. $5 \times 9 = 45$ F. $45 \div 9 = 5$

Sub-strand 2: Number operations

The learner will be able to use a range of strategies to perform written and mental calculations with whole numbers, with competence and confidence in solving problems.

Content standard	Indicator
B4.1.2.2 Describe and apply mental mathematics strategies and number properties to determine answers for basic multiplication facts to 81 and related division facts	B4.1.2.2.1 Apply mental mathematics strategies and number properties such as skip counting from a known fact using doubling or halving, using patterns in the 9s facts, using repeated doubling or halving to determine answers for basic multiplication facts to 81 and related division facts

1. Learning expectations

Learners need to be able to:

- investigate the relationship between different strategies in problem solving.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with the different multiplication strategies.

3. New words

Doubling; open sentence; magic square; pyramid

4. Resources used in this indicator

- Learner's book
- Multiplication tables

5. Large class teaching

Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used.

Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

Be aware of learners with dyscalculia. They may have difficulty understanding the concepts in this strand. One of the strategies to help these learners is to use concrete examples, with visual aids, to connect Mathematics to real life. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Have your learners watch a video on multiplication bonds as revision. There are many examples available on YouTube.

The learners complete the exercises. There are enough exercises to give good practice in mental mathematics skills.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks.

9. Assessment

Use the answers to the exercises to assess the level of understanding.

10. Answers

Exercise 1

(LB page 86)

1. 5 2. 8 3. 6 4. 6
5. 63 6. 12 7. 5 8. 24
9. 4 10. 2

Exercise 2

(LB page 86)

1. 9 2. 6 3. 6 4. 5
5. 8 6. 8 7. 12 8. 8
9. 10 10. 2 11. 12 12. 12

Exercise 3

(LB page 87)

Table shows the correct pairs.

\div	\times
$64 \div 8$	8×8
$35 \div 7$	5×7
$108 \div 9$	12×9
$72 \div 6$	12×6
$81 \div 9$	9×9
$63 \div 7$	9×7
$42 \div 6$	7×6
$80 \div 10$	8×10
$49 \div 7$	7×7
$60 \div 3$	3×20

Exercise 4

(LB page 87)

1. $9 \times 7 = 63$ and $63 \div 9 = 7$ or $63 \div 7 = 9$
2. $12 \times 12 = 144$ and $144 \div 12 = 12$
3. $8 \times 6 = 48$ and $48 \div 6 = 8$ or $48 \div 8 = 6$
4. $9 \times 8 = 72$ and $72 \div 9 = 8$ or $72 \div 8 = 9$

5. $12 \times 9 = 108$ and $108 \div 12 = 9$ or $108 \div 9 = 12$
6. $12 \times 10 = 120$ and $120 \div 10 = 12$ or $120 \div 12 = 10$
7. $8 \times 7 = 56$ and $56 \div 8 = 7$ or $56 \div 7 = 8$
8. $10 \times 9 = 90$ and $90 \div 10 = 9$ or $90 \div 9 = 10$
9. $5 \times 8 = 40$ and $40 \div 5 = 8$ or $40 \div 8 = 5$
10. $8 \times 11 = 88$ and $88 \div 8 = 11$ or $88 \div 11 = 8$
11. $7 \times 12 = 84$ and $84 \div 7 = 12$ or $84 \div 12 = 7$
12. $12 \times 8 = 96$ and $96 \div 12 = 8$ or $96 \div 8 = 12$

Exercise 5

(LB page 88)

- | | | | |
|-------|-------|-------|-------|
| 1. 8 | 2. 6 | 3. 6 | 4. 9 |
| 5. 9 | 6. 8 | 7. 7 | 8. 5 |
| 9. 12 | 10. 8 | 11. 9 | 12. 7 |

Exercise 6

(LB page 89)

$2 \times 6 = 12$ $4 \times 6 = 24$ $8 \times 6 = 48$	$3 \times 5 = 15$ $6 \times 5 = 30$ $12 \times 5 = 60$	$4 \times 4 = 16$ $8 \times 4 = 32$ $16 \times 4 = 64$
$2 \times 7 = 14$ $4 \times 7 = 28$ $8 \times 7 = 56$	$2 \times 9 = 18$ $4 \times 9 = 36$ $8 \times 9 = 72$	$9 \times 3 = 27$ $18 \times 3 = 54$ $36 \times 3 = 108$
$10 \times 3 = 30$ $20 \times 3 = 60$ $40 \times 3 = 120$	$3 \times 8 = 24$ $6 \times 8 = 48$ $12 \times 8 = 96$	$3 \times 6 = 18$ $6 \times 6 = 36$ $12 \times 6 = 72$

Exercise 7

(LB page 89)

1. example
2. $30 \div 10 = 3$; $7 + 3 = 10$
3. $32 \div 16 = 2$; $14 + 2 = 16$
4. $64 \div 16 = 4$; $4 + 12 = 16$
5. $56 \div 8 = 7$; $7 + 1 = 8$
6. $63 \div 9 = 7$; $2 + 7 = 9$

7. $45 \div 9 = 5$; $4 + 5 = 9$
8. $36 \div 12 = 3$; $3 + 9 = 12$
9. $24 \div 8 = 3$; $5 + 3 = 8$
10. $108 \div 12 = 9$; $3 + 9 = 12$
11. $48 \div 12 = 4$; $4 + 8 = 12$
12. $72 \div 9 = 8$; $1 + 8 = 9$

Exercise 8

(LB page 90)

1. 15 2. 7 3. 35 4. 5 5. 25
6. 12 7. 9 8. 55 9. 9 10. 1

Exercise 9

(LB page 90)

1.

9	2	7
4	6	8
5	10	3
2.

8	1	6
3	5	7
4	9	2
3.

6	5	10
11	7	3
4	9	8
4.

16	14	6
2	12	22
18	10	8
5.

7	16	15
18	10	10
13	12	13
6.

13	5	9
5	9	13
9	13	5
7.

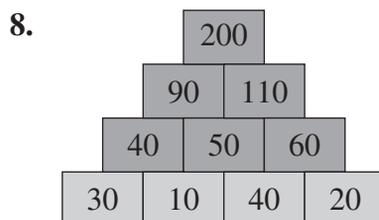
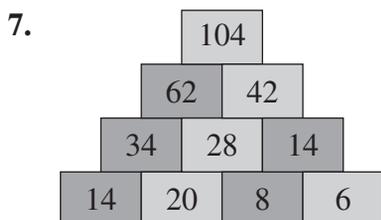
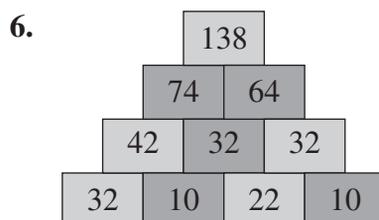
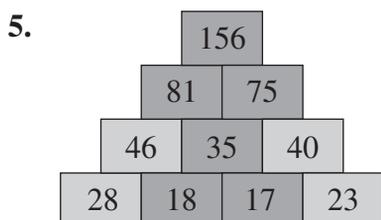
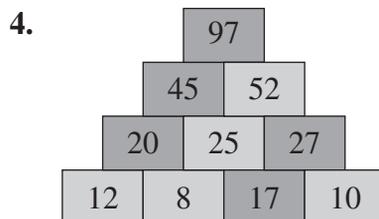
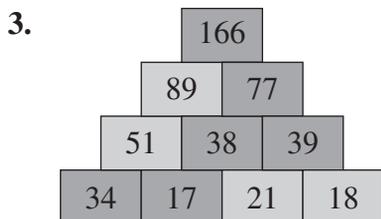
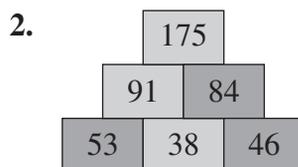
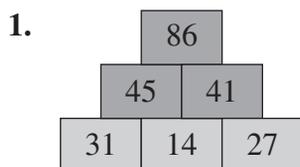
13	8	11	14
6	19	16	5
18	7	4	17
9	12	15	10
8.

8	13	9	20
19	10	14	7
18	11	15	6
5	16	12	17
9.

7	9	4	16
2	15	9	10
18	2	10	6
9	10	13	4

Exercise 10

(LB page 91)



B4.1.2.2.2

Content standard	Indicator
B4.1.2.2 Describe and apply mental mathematics strategies and number properties to determine answers for basic multiplication facts to 81 and related division facts.	B4.1.2.2.2 Apply mental mathematics strategies for multiplication such as annexing and then adding zero, halving and doubling using the distributive property

1. Learning expectations

Learners need to be able to:

- investigate and apply different multiplication strategies.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with the different multiplication strategies.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 44–46
- Multiplication tables

5. Large class teaching

Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

Ensure that learners understand what is required in the question. Mental mathematics can be very challenging. Allow extra time for these learners to develop and familiarise themselves with strategies for solving the problems. Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve and may feel frustrated when they are unable to complete certain tasks or need more time. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

Be aware of learners with dyscalculia. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are

working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Ensure that learners understand the concept of doubling and halving. Work through the table on page 92. Explain to the learners that we multiply numbers by tens, hundreds and thousands so we will be working with zeros. Show them how to do it by doing a few examples on the board. Use different examples until you are sure that learners know how to use these short cuts. There are many strategies that can be applied and many opportunities to practise them.

These strategies include:

- splitting numbers into factors and then multiplying
- using addition and subtraction to split numbers inside brackets i.e. apply distributive property
- using doubling and halving.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.2.2 Exercise 1.

9. Assessment

Use the answers to the exercises to assess the level of understanding.

10. Answers

Exercise 1

(LB page 92)

1.	$\times 1$	$\times 10$	$\times 100$	$\times 1,000$	$\times 10,000$
	7	70	700	7,000	70,000
	5	50	500	5,000	50,000
	9	90	900	9,000	90,000
	12	120	1,200	12,000	120,000
	10	100	1,000	10,000	100,000

2.

6	200	6,000	80,000
60	500	2,000	20,000
120	800	1,000	30,000
180	1,000	10,000	60,000

3.

14	16	18	12
140	160	180	120
210	240	270	180
280	320	360	240
350	400	450	300
420	480	540	360
490	560	630	420
560	640	720	480

Exercise 2

(LB page 94)

- | | | |
|---------|--------|--------|
| 1. 78 | 2. 96 | 3. 96 |
| 4. 160 | 5. 90 | 6. 108 |
| 7. 114 | 8. 168 | 9. 90 |
| 10. 108 | | |

Exercise 3

(LB page 94)

- | | |
|-----------------------|------------------|
| 1. $5 \times 6 = 30$ | $30 \div 6 = 5$ |
| 2. $6 \times 8 = 48$ | $48 \div 8 = 6$ |
| 3. $9 \times 9 = 81$ | $81 \div 9 = 9$ |
| 4. $10 \times 6 = 60$ | $60 \div 6 = 10$ |
| 5. $7 \times 7 = 49$ | $49 \div 7 = 7$ |
| 6. $8 \times 8 = 64$ | $64 \div 8 = 8$ |
| 7. $10 \times 9 = 90$ | $90 \div 9 = 10$ |
| 8. $7 \times 6 = 42$ | $42 \div 6 = 7$ |
| 9. $9 \times 8 = 72$ | $72 \div 8 = 9$ |
| 10. $5 \times 9 = 45$ | $45 \div 9 = 5$ |

Exercise 4

(LB page 95)

- | | | |
|--------|--------|---------|
| 1. 0 | 2. 50 | 3. 0 |
| 4. 18 | 5. 32 | 6. 0 |
| 7. 0 | 8. 25 | 9. 0 |
| 10. 0 | 11. 0 | 12. 90 |
| 13. 0 | 14. 30 | 15. 14 |
| 16. 0 | 17. 60 | 18. 49 |
| 19. 27 | 20. 0 | 21. 100 |
| 22. 0 | 23. 36 | 24. 56 |
| 25. 0 | 26. 80 | 27. 0 |
| 28. 30 | 29. 20 | 30. 14 |

Exercise 5

(LB page 95)

- | | |
|--------------------|-------------------|
| 1. $10 + 12 = 22$ | 2. $50 + 8 = 58$ |
| 3. $49 + 16 = 65$ | 4. $18 + 30 = 48$ |
| 5. $12 + 24 = 36$ | 6. $21 + 30 = 51$ |
| 7. $90 + 12 = 102$ | 8. $24 + 24 = 48$ |

Sub-strand 2: Number operations

The learner will be able to perform multiplication and division operations and translate and solve word problems using basic operations.

Content standard	Indicator
B4.1.2.3 Demonstrate an understanding of multiplication (2- or 3-digit by 1-digit)	B4.1.2.3.1 Multiply multi-digit numbers efficiently

1. Learning expectations

Learners need to be able to:

- investigate and apply different multiplication strategies.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with using different strategies to perform the four basic operations.

3. New words

Diagonal; multiplier; multiplicand; doubling; halving; lattice method

4. Resources used in this indicator

- Learner's book
- Workbook pages 47–50
- Multiplication chart

5. Large class teaching

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Some special-needs learners may have difficulty with oral directions, especially when there are more than two steps. Instructions with more than two steps should be given on the board or in written format. Break down complex problems into smaller steps.

Avoid lengthy oral presentations. Some learners may appear to ‘zone out’ during lengthy oral presentations. They may not remember information given orally without being able to see it as they memorise using visual cues. Ensure that you use several visual cues. It is important to work on the board as you explain. Every learner must be able to see the board.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding.

7. Teaching methodology

This can be a class activity. Have the learners turn to page 96 in the Learner’s book. Read through the example together with the learners. Explain the annexing and adding of zeros method. Annexing means that we cancel out zeros only in numbers where the zeros appear at the end of a number. Later we then put back the zeros that we cancelled out.

e.g. $17 \times \cancel{20}$...(Annex/cancel the zero by putting a line through it)
$17 \times 2 = 34$...(Calculate the simplified multiplication)
$17 \times 20 = 340$...(Now put back the zero that was cancelled out)
e.g. $2,4\cancel{00} \times \cancel{200}$...(Annex/cancel the zeroes)
$24 \times 2 = 48$...(Calculate the simplified multiplication)
$2,400 \times 200 = 480,000$...(Put back the four zeros you annexed/cancelled)

Remind learners to use annexing and adding zero when multiplying whenever there are zeroes at the end of a number.

The word sums in Exercise 2 are useful as extension work and also demonstrate that the methods learnt up to now are not always efficient. This serves as an introduction to the lattice method. The lattice method is a useful tool for determining multi-digit multiplication. Read through the example with learners on page 97 in the Learner's book. Do a few examples on the board for the learners to solve together. Ensure the learners understand the lattice method. Move on to the larger numbers once you are certain that your learners understand the basic concept.

Do the same with the example on page 99. Ensure that the learners are able to do a few examples together before they do it individually in their books.

8. Homework

Exercise 1 may be given as homework after working through the examples in class. Exercise 5 can be given as homework for the lattice method. Further exercises are found in the Workbook: B4.1.2.3 Exercise 1.

9. Assessment

Use the answers to the exercises and observation of the learners' responses in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 96)

- $$\begin{aligned} 1. \quad 153 \times 2 &= 100 \times 2 + 50 \times 2 + 3 \times 2 \\ &= 200 + 100 + 6 \\ &= 306 \end{aligned}$$
- $$\begin{aligned} 2. \quad 128 \times 2 &= 100 \times 2 + 20 \times 2 + 8 \times 2 \\ &= 200 + 40 + 16 \\ &= 256 \end{aligned}$$
- $$\begin{aligned} 3. \quad 136 \times 2 &= 100 \times 2 + 30 \times 2 + 6 \times 2 \\ &= 200 + 60 + 12 \\ &= 272 \end{aligned}$$
- $$\begin{aligned} 4. \quad 238 \times 3 &= 200 \times 3 + 30 \times 3 + 8 \times 3 \\ &= 600 + 90 + 24 \\ &= 714 \end{aligned}$$

$$\begin{aligned}
 5. \quad 219 \times 3 &= 200 \times 3 + 10 \times 3 + 9 \times 3 \\
 &= 600 + 30 + 27 \\
 &= 657
 \end{aligned}$$

$$\begin{aligned}
 6. \quad 254 \times 3 &= 200 \times 3 + 50 \times 3 + 4 \times 3 \\
 &= 600 + 150 + 12 \\
 &= 762
 \end{aligned}$$

$$\begin{aligned}
 7. \quad 312 \times 4 &= 300 \times 4 + 10 \times 4 + 2 \times 4 \\
 &= 1,200 + 40 + 8 \\
 &= 1,248
 \end{aligned}$$

$$\begin{aligned}
 8. \quad 329 \times 4 &= 300 \times 4 + 20 \times 4 + 9 \times 4 \\
 &= 1,200 + 80 + 36 \\
 &= 1,316
 \end{aligned}$$

$$\begin{aligned}
 9. \quad 423 \times 5 &= 400 \times 5 + 20 \times 5 + 3 \times 5 \\
 &= 2,000 + 100 + 15 \\
 &= 2,115
 \end{aligned}$$

$$\begin{aligned}
 10. \quad 416 \times 5 &= 400 \times 5 + 10 \times 5 + 6 \times 5 \\
 &= 2,000 + 50 + 30 \\
 &= 2,080
 \end{aligned}$$

$$\begin{aligned}
 11. \quad 508 \times 5 &= 500 \times 5 + 0 \times 5 + 8 \times 5 \\
 &= 2,500 + 0 + 40 \\
 &= 2,540
 \end{aligned}$$

$$\begin{aligned}
 12. \quad 424 \times 6 &= 400 \times 6 + 20 \times 6 + 4 \times 6 \\
 &= 2,400 + 120 + 24 \\
 &= 2,544
 \end{aligned}$$

Exercise 2

(LB page 96)

1. One pair costs GHC180, 15 pairs were bought

\therefore total cost is 180×15 .

$$\begin{aligned}
 180 \times 15 &= 100 \times 15 + 80 \times 15 + 0 \times 15 \\
 &= 1,500 + 1,200 + 0 \\
 &= 2,700
 \end{aligned}$$

15 pairs cost GHC2,700

2. The doctor sees 22 patients on 1 day, he works for 364 days in a year \therefore he sees 22×364 patients in a year.

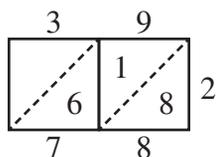
$$\begin{aligned}
 364 \times 22 &= 300 \times 22 + 60 \times 22 + 4 \times 22 \\
 &= 6,600 + 1,320 + 88 \\
 &= 8,008
 \end{aligned}$$

8,008 patients in a year

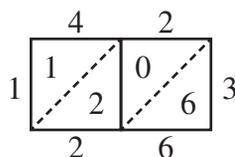
Exercise 3

(LB page 98)

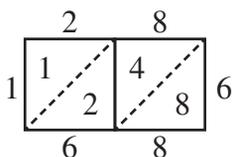
1. $39 \times 2 = 78$



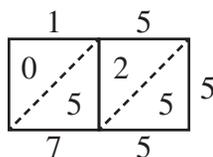
2. $42 \times 3 = 126$



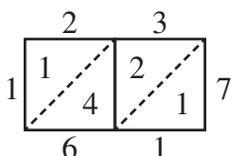
3. $28 \times 6 = 168$



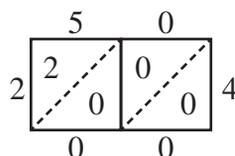
4. $15 \times 5 = 75$



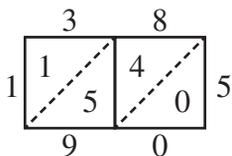
5. $23 \times 7 = 161$



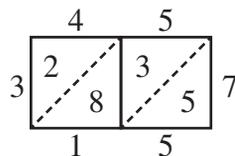
6. $50 \times 4 = 200$



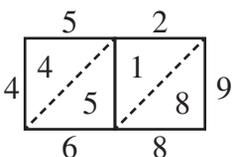
7. $38 \times 5 = 190$



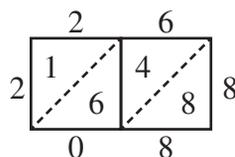
8. $45 \times 7 = 315$



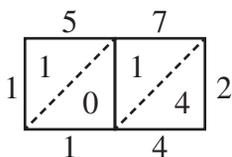
9. $52 \times 9 = 468$



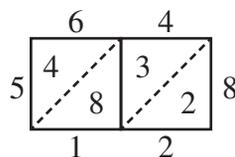
10. $26 \times 8 = 208$



11. $57 \times 2 = 114$



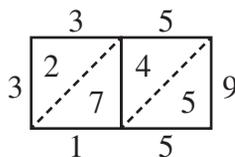
12. $64 \times 8 = 512$



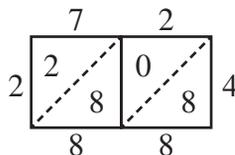
Exercise 4

(LB page 98)

- There are 35 players on 1 bus
 \therefore there are 35×9 players on 9 buses.
 $35 \times 9 = 315$ players



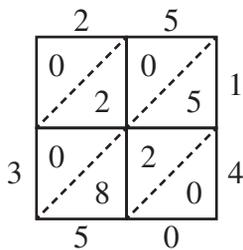
- A cow has 4 legs \therefore 72 cows have 72×4 legs.
 $72 \times 4 = 288$ cow legs



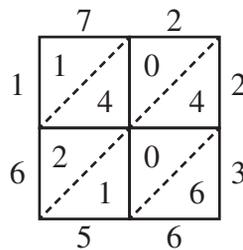
Exercise 5

(LB page 99)

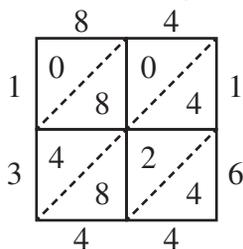
- $25 \times 14 = 350$



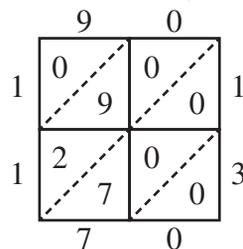
- $72 \times 23 = 1,656$



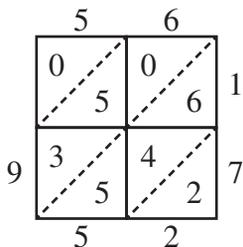
- $84 \times 16 = 1,344$



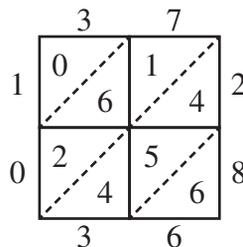
- $90 \times 13 = 1,170$



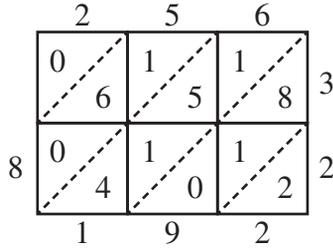
- $56 \times 17 = 952$



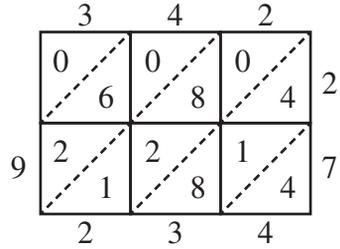
- $37 \times 28 = 1,036$



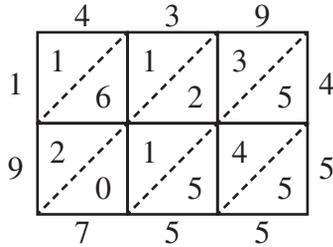
7. $256 \times 32 = 8,192$



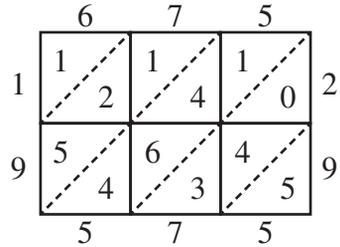
8. $342 \times 27 = 9,234$



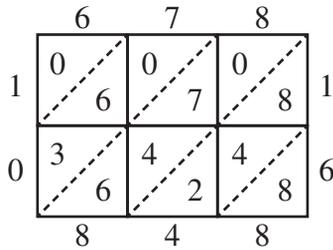
9. $439 \times 45 = 19,755$



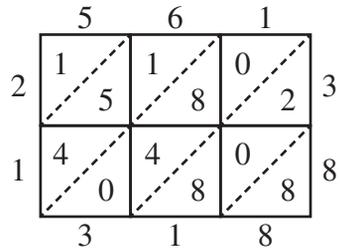
10. $675 \times 29 = 19,575$



11. $678 \times 16 = 10,848$



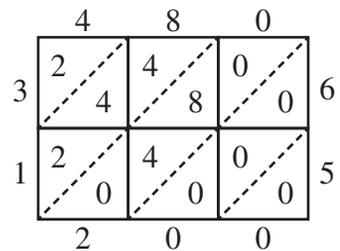
12. $561 \times 38 = 21,318$



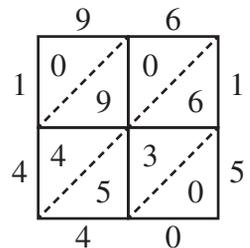
Exercise 6

(LB page 99)

1. One basket has 480 sweets.
 There are 65 baskets \therefore
 there are 480×65 sweets in
 65 baskets.
 $480 \times 65 = 31,200$ sweets



2. One taxi carries 15 passengers. There
 are 96 taxis \therefore 96×15 passengers
 can be transported.
 $96 \times 15 = 1,440$ passengers



Sub-strand 2: Number operations

The learner will be able to perform multiplication and division operations and translate and solve word problems using basic operations.

Content standard	Indicator
B4.1.2.4 Recall basic division facts up to 100	B4.1.2.4.1 Determine basic division facts up to 81

1. Learning expectations

Learners need to be able to:

- demonstrate their understanding of basic division strategies.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with using different strategies to perform the four basic operations.

3. New words

Remainder; divisible; divisibility test

4. Resources used in this indicator

- Learner's book
- Workbook page 51

5. Large class teaching

Prepare the classes and the teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. Have posters on display showing multiples. Create a poster showing the divisibility test. These visual clues help

to reinforce the learning and make it easier for learners to work independently.

Praise the learners who are doing well and reward their successes. When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Identify learners who are not succeeding and provide remedial attention as soon as you can so that they do not fall too far behind. This may involve re-arranging seating arrangements or groups within the classroom. Remember that the classroom is not static and can be adapted as you move through different topics.

6. Support for learners with special needs

As always, ensure that learners understand the language and vocabulary used. Some learners will have difficulty working with complex problems or even dealing with larger numbers. Complex instructions, especially when there are more than two steps, should be given on the board or in written format.

Be aware of learners who ‘zone out’ during lengthy oral presentations. They may not remember information given orally without being able to see it as they memorise using visual cues.

Model, praise and encourage good behaviour. Praise learners when they behave well so that you encourage the behaviour you want to see.

7. Teaching methodology

This can be a pairs activity. Have the learners turn to page 100 in the Learner’s book. Read through the example together with the learners. They need to understand the terms ‘multiples’ and ‘division’. Ensure they understand the divisibility test before moving on.

After going through the example do a few examples on the board for them to solve together before they do the exercises in the Learner’s book.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.2.4 Exercise 1.

9. Assessment

Use the answers to the exercises and observation of the learners' responses in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 101)

Answers are written according to the multiplication chart given.

1. 20; 24; 28; 32; 36; 40
2. 10; 12; 14; 16; 18; 20
3. 10; 15; 20; 25; 30; 35; 40; 45; 50
4. 15; 18; 21; 24; 27; 30

Exercise 2

(LB page 101)

1.
 - a) 33: sum of digits is $3 + 3 = 6$ (is divisible by 3)
 \therefore 33 can be divided by 3.
 - b) 48: sum of digits is $4 + 8 = 12$ and $1 + 2 = 3$ (is divisible by 3) \therefore 48 can be divided by 3.
 - c) 81: sum of digits is $8 + 1 = 9$ (is divisible by 3)
 \therefore 81 can be divided by 3.
 - d) 79: sum of digits is $7 + 9 = 16$ and $1 + 6 = 7$ (is not divisible by 3) \therefore 33 cannot be divided by 3
2.

a) 28: yes	b) 61: no
c) 52: yes	d) 76: yes

Sub-strand 2: Number operations

The learner will be able to perform multiplication and division operations and translate and solve word problems using basic operations.

Content standard	Indicator
B4.1.2.5 Demonstrate an understanding of division 2-digit or 3-digit by 1-digit numbers	B4.1.2.5.1 Divide 2-digit numbers by 1-digit numbers efficiently

1. Learning expectations

Learners need to be able to:

- investigate and demonstrate their understanding on the usage of the long division method.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with using different strategies to perform the four basic operations.

3. New words

Quotient; remainder; divisor; Big-7

4. Resources used in this indicator

- Learner's book
- Workbook pages 51–56

5. Large class teaching

Prepare the classes and the teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. Have posters on display showing multiplication

tables. Create a poster showing the Big-7 method. These visual clues help to reinforce the learning and make it easier for learners to work independently.

Praise the learners who are doing well and reward their successes. When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Identify learners who are not succeeding and provide remedial attention as soon as you can so that they do not fall too far behind. This may involve re-arranging seating arrangements or groups within the classroom. Remember that the classroom is not static and can be adapted as you move through different topics.

6. Support for learners with special needs

As always, ensure that learners understand the language and vocabulary used. Some learners will have difficulty working with complex problems or even dealing with larger numbers. Complex instructions, especially when there are more than two steps, should be given on the board or in written format.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding. A concept like the Big-7 may be difficult for many learners to grasp. This will require extra time and explanation.

7. Teaching methodology

This can be conducted as a class activity at first. Let the learners turn to page 102 in the Learner's book. Read through the example together with the learners. Ensure that the learners understand the steps to determining the answer. Do a few examples on the board for the learners to solve together before they do the exercises individually in their books.

The 'Big 7' method is important for them to understand and get right. Carefully explain and work through the example on page 103. They need to understand their multiplication tables so they can estimate the groups. They also need to be clear on how to follow the steps to complete and solve the problem. Doing a few examples for them to solve together is helpful before they continue individually in their books.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.2.5 Exercise 1

9. Assessment

Use the answers to the exercises and observation of the learners' responses in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 103)

1. $36 \div 3$: $36 - 3 \rightarrow 33 - 3 \rightarrow 30 - 3 \rightarrow 27 - 3 \rightarrow 24 - 3 \rightarrow 21 - 3 \rightarrow 18 - 3 \rightarrow$
① ② ③ ④ ⑤ ⑥ ⑦
 $15 - 3 \rightarrow 12 - 3 \rightarrow 9 - 3 \rightarrow 6 - 3 \rightarrow 3 - 3 \rightarrow 0$
⑧ ⑨ ⑩ ⑪ ⑫
 $36 \div 3 = 12$

2. $24 \div 2$: $24 - 2 \rightarrow 22 - 2 \rightarrow 20 - 2 \rightarrow 18 - 2 \rightarrow 16 - 2 \rightarrow 14 - 2 \rightarrow 12 - 2 \rightarrow$
① ② ③ ④ ⑤ ⑥ ⑦
 $10 - 2 \rightarrow 8 - 2 \rightarrow 6 - 2 \rightarrow 4 - 2 \rightarrow 2 - 2 \rightarrow 0$
⑧ ⑨ ⑩ ⑪ ⑫
 $24 \div 2 = 12$

3. $30 \div 5$: $30 - 5 \rightarrow 25 - 5 \rightarrow 20 - 5 \rightarrow 15 - 5 \rightarrow 10 - 5 \rightarrow 5 - 5 \rightarrow 0$
① ② ③ ④ ⑤ ⑥
 $30 \div 5 = 6$

4. $28 \div 4$: $28 - 4 \rightarrow 24 - 4 \rightarrow 20 - 4 \rightarrow 16 - 4 \rightarrow 12 - 4 \rightarrow 8 - 4 \rightarrow 4 - 4 \rightarrow 0$
① ② ③ ④ ⑤ ⑥ ⑦
 $28 \div 4 = 7$

5. $48 \div 2$: $48 - 2 \rightarrow 46 - 2 \rightarrow 44 - 2 \rightarrow 42 - 2 \rightarrow 40 - 2 \rightarrow 38 - 2 \rightarrow 36 - 2 \rightarrow$
① ② ③ ④ ⑤ ⑥ ⑦
 $34 - 2 \rightarrow 32 - 2 \rightarrow 30 - 2 \rightarrow 28 - 2 \rightarrow 26 - 2 \rightarrow 24 - 2 \rightarrow 22 - 2 \rightarrow$
⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭
 $20 - 2 \rightarrow 18 - 2 \rightarrow 16 - 2 \rightarrow 14 - 2 \rightarrow 12 - 2 \rightarrow 10 - 2 \rightarrow 8 - 2 \rightarrow$
⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑
 $6 - 2 \rightarrow 4 - 2 \rightarrow 2 - 2 \rightarrow 0$
㉒ ㉓ ㉔
 $48 \div 2 = 24$

6. $55 \div 5$: $55 - 5 \rightarrow 50 - 5 \rightarrow 45 - 5 \rightarrow 40 - 5 \rightarrow 35 - 5 \rightarrow 30 - 5 \rightarrow 25 - 5 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $20 - 5 \rightarrow 15 - 5 \rightarrow 10 - 5 \rightarrow 5 - 5 \rightarrow 0$
 $\textcircled{8} \quad \textcircled{9} \quad \textcircled{10} \quad \textcircled{11}$
 $55 \div 5 = 11$

7. $20 \div 2$: $20 - 2 \rightarrow 18 - 2 \rightarrow 16 - 2 \rightarrow 14 - 2 \rightarrow 12 - 2 \rightarrow 10 - 2 \rightarrow 8 - 2 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $6 - 2 \rightarrow 4 - 2 \rightarrow 2 - 2 \rightarrow 0$
 $\textcircled{8} \quad \textcircled{9} \quad \textcircled{10}$
 $20 \div 2 = 10$

8. $40 \div 5$: $40 - 5 \rightarrow 35 - 5 \rightarrow 30 - 5 \rightarrow 25 - 5 \rightarrow 20 - 5 \rightarrow 15 - 5 \rightarrow 10 - 5 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $5 - 5 \rightarrow 0$
 $\textcircled{8}$
 $40 \div 5 = 8$

9. $26 \div 2$: $26 - 2 \rightarrow 24 - 2 \rightarrow 22 - 2 \rightarrow 20 - 2 \rightarrow 18 - 2 \rightarrow 16 - 2 \rightarrow 14 - 2 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $12 - 2 \rightarrow 10 - 2 \rightarrow 8 - 2 \rightarrow 6 - 2 \rightarrow 4 - 2 \rightarrow 2 - 2 \rightarrow 0$
 $\textcircled{8} \quad \textcircled{9} \quad \textcircled{10} \quad \textcircled{11} \quad \textcircled{12} \quad \textcircled{13}$
 $26 \div 2 = 13$

10. $24 \div 3$: $24 - 3 \rightarrow 21 - 3 \rightarrow 18 - 3 \rightarrow 15 - 3 \rightarrow 12 - 3 \rightarrow 9 - 3 \rightarrow 6 - 3 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $3 - 3 \rightarrow 0$
 $\textcircled{8}$
 $24 \div 3 = 8$

11. $30 \div 3$: $30 - 3 \rightarrow 27 - 3 \rightarrow 24 - 3 \rightarrow 21 - 3 \rightarrow 18 - 3 \rightarrow 15 - 3 \rightarrow 12 - 3 \rightarrow$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $9 - 3 \rightarrow 6 - 3 \rightarrow 3 - 3 \rightarrow 0$
 $\textcircled{8} \quad \textcircled{9} \quad \textcircled{10}$
 $30 \div 3 = 10$

12. $28 \div 4$: $28 - 4 \rightarrow 24 - 4 \rightarrow 20 - 4 \rightarrow 16 - 4 \rightarrow 12 - 4 \rightarrow 8 - 4 \rightarrow 4 - 4 \rightarrow 0$
 $\textcircled{1} \quad \textcircled{2} \quad \textcircled{3} \quad \textcircled{4} \quad \textcircled{5} \quad \textcircled{6} \quad \textcircled{7}$
 $28 \div 4 = 7$

Exercise 2

(LB page 104)

Learners should use the Big-7 method. Workings may differ from those shown, but the final answer should be the same.

1. $284 \div 4 = 71$

$$\begin{array}{r} 4 \overline{) 284} \quad 70 \\ - 000 \\ \hline 4 \quad 1 \\ - 4 \\ \hline 0 \quad \overline{71} \end{array}$$

2. $393 \div 3 = 131 \text{ rem } 2$

$$\begin{array}{r} 3 \overline{) 395} \quad 100 \\ - 300 \\ \hline 95 \quad 30 \\ - 90 \\ \hline 5 \quad 1 \\ - 3 \\ \hline 2 \quad \overline{131} \text{ rem } 2 \end{array}$$

3. $639 \div 3 = 213$

$$\begin{array}{r} 3 \overline{) 639} \quad 200 \\ - 600 \\ \hline 39 \quad 10 \\ - 30 \\ \hline 9 \quad 9 \\ - 9 \\ \hline 0 \quad \overline{213} \end{array}$$

4. $266 \div 4 = 66 \text{ rem } 2$

$$\begin{array}{r} 4 \overline{) 266} \quad 40 \\ - 160 \\ \hline 106 \quad 25 \\ - 100 \\ \hline 6 \quad 1 \\ - 4 \\ \hline 2 \quad \overline{66} \text{ rem } 2 \end{array}$$

5. $755 \div 5 = 151$

$$\begin{array}{r} 5 \overline{) 755} \quad 100 \\ - 500 \\ \hline 255 \quad 50 \\ - 250 \\ \hline 5 \quad 1 \\ - 5 \\ \hline 0 \quad \overline{151} \end{array}$$

6. $590 \div 5 = 118$

$$\begin{array}{r} 5 \overline{) 590} \quad 100 \\ - 500 \\ \hline 90 \quad 10 \\ - 50 \\ \hline 40 \quad 8 \\ - 40 \\ \hline 0 \quad \overline{118} \end{array}$$

7. $426 \div 2 = 213$

$$\begin{array}{r} 2 \overline{) 426} \quad 200 \\ - 400 \\ \hline 26 \quad 13 \\ - 26 \\ \hline 0 \quad \overline{213} \end{array}$$

8. $462 \div 4 = 115 \text{ rem } 2$

$$\begin{array}{r} 4 \overline{) 462} \quad 100 \\ - 400 \\ \hline 62 \quad 10 \\ - 40 \\ \hline 22 \quad 5 \\ - 20 \\ \hline 2 \quad \overline{115} \text{ rem } 2 \end{array}$$

$$9. 805 \div 5 = 161$$

$$\begin{array}{r} 5 \overline{) 805} \quad 100 \\ - 500 \\ \hline 305 \quad 60 \\ - 300 \\ \hline 5 \quad 1 \\ - 5 \\ \hline 0 \quad 141 \end{array}$$

$$10. 236 \div 2 = 118$$

$$\begin{array}{r} 2 \overline{) 236} \quad 100 \\ - 200 \\ \hline 36 \quad 15 \\ - 30 \\ \hline 6 \quad 3 \\ - 6 \\ \hline 0 \quad 118 \end{array}$$

$$11. 633 \div 3 = 211$$

$$\begin{array}{r} 3 \overline{) 633} \quad 200 \\ - 600 \\ \hline 33 \quad 10 \\ - 30 \\ \hline 3 \quad 1 \\ - 3 \\ \hline 0 \quad 211 \end{array}$$

$$12. 303 \div 3 = 101$$

$$\begin{array}{r} 3 \overline{) 303} \quad 100 \\ - 300 \\ \hline 3 \quad 1 \\ - 3 \\ \hline 0 \quad 101 \end{array}$$

Exercise 3

(LB page 104)

They were 330 people and only 5 buses. On each bus
 \therefore they had to fit $330 \div 5$ people.
 $330 \div 5 = 66$ people on each bus.

Sub-strand 2: Number operations

The learner will be able to perform multiplication and division operations and translate and solve word problems using basic operations.

Content standard	Indicator
B4.1.2.6 Translate and solve word problems involving the four basic operations on whole numbers	B4.1.2.6.1 Solve multi-step word problems involving the four basic operations

1. Learning expectations

Learners need to be able to:

- use all the strategies learnt to solve word problems involving the four basic operations.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with using different strategies to perform the four basic operations.

3. New words

Word problem; number sentence; spreadsheet; sum; difference; product; quotient

4. Resources used in this indicator

- Learner's book
- Workbook pages 56–59
- Multiplication chart
- Counters
- Play money
- Old bus tickets

5. Large class teaching

Prepare the classes and the teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency.

Look for different ways to make the lessons interesting. The role-play exercise gives you scope to engage those learners who do not usually find Mathematics exciting. Praise the learners who are doing well and reward their successes.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

6. Support for learners with special needs

As always, ensure that learners understand the language and vocabulary used. This is particularly important with word sums where it is crucial to understand the language. Translating between words and numbers may be difficult for learners who struggle with language or abstract ideas. It is important to work through many examples with these learners so that they can start to see the strategies used.

7. Teaching methodology

Do this as a class activity. Let the learners turn to page 105 in the Learner's book. Read through the description together as a class. Let the learners explore the problem together and find solutions. You can do another example on the board for them to complete before they do the exercises in the Learner's book. Practise converting the word problems into number sentences so that your learners can develop a strategy for identifying the key words in any scenario.

Some of the exercises can be done individually and some in pairs or small groups. Use your discretion depending on your learners.

Remind your learners to use the strategies they have learnt when solving the problems. They can use annexing and adding zero when multiplying; apply the doubling and halving strategy; use the long division (Big-7) method.

Allow the role-play exercise to be a fun activity. This is a good way to demonstrate how important Mathematics is in real life.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.2.6 Exercises 1 and 2.

9. Assessment

Use the answers to the exercises and observation of the learners' responses in class to assess the level of understanding.

10. Answers

Exercise 1

(LB page 106)

- Sum \rightarrow add \therefore add the numbers.
 $137 + 218 + 192 = 547$
- 7 days in one week \therefore calculate 7×24 .
 $7 \times 24 = 168$ days
- $36 \times 12 = 432$ pages
- $72 \div 6 = 12$ strips
- $386 - 261 = 125$
- $93 - \square = 36$
 $93 - 36 = 57$
- Difference \rightarrow subtract \therefore subtract the numbers.
 $428 - 108 = 320$
- Product \rightarrow multiply \therefore multiply the numbers.
 $127 \times 8 = 1,016$
- Quotient \rightarrow divide \therefore divide the numbers.
 $256 \div 4 = 64$
- $148 + 136 = 284$ children
- $96 \div 6 = 16$
- $183 \times 7 = 1,281$
- $398 \div 2 = 199$
- $(105 \times 8) \div 2 = 840 \div 2 = 420$
- $(999 - 509) + 320 = 490 + 320 = 810$

Exercise 2

(LB page 107)

- Jojo: GH¢280; Kesse: GH¢355; Father: $3 \times (\text{Jojo} + \text{Kesse})$
 - Jojo and Kesse together: $280 + 355 = \text{GH¢}635$
 - Father: $3 \times 635 = \text{GH¢}1,905$
 - Altogether: $635 + 1,905 = \text{GH¢}2,540$
- 672 eggs distributed in 6 boxes $\therefore 672 \div 6 = 112$ eggs per box.
 - $672 \div 2 = 336$ eggs are bad $\therefore 336$ eggs are edible.
- Green hats: $215 \times 6 = 1,290$ spectators
Red hats: $200 \times 4 = 800$ spectators
 - $1,290 + 800 = 2,090$ spectators (wearing hats)
- The middle of the book is at $1,080 \div 2 = 540$ pages.
 $540 - 228 = 312$ pages
- He delivers $9 \times 240 = 2,160$ milk cartons
 - Damaged cartons: $2 \times 240 = 480$ milk cartons
Total cartons in the van originally: $2,160 + 480 = 2,640$ milk cartons
- Holiday days: $280 \div 4 = 70$ weekdays on holiday
 - $280 - 70 = 210$ weekdays at school OR $(280 \div 4) \times 3 = 210$ weekdays at school
- Number of boxes: $972 \div 9 = 108$ boxes are filled
 - Faulty bicycles: $972 \div 3 = 324$ bicycles not boxed
- Shoes: $590 \div 2 = \text{GH¢}295$
Total spend: shoes + trousers = $295 + 110 = \text{GH¢}405$
 - Money left: $590 - 405 = \text{GH¢}185$

Exercise 3

(LB page 108)

This can be used as a class or group activity.

- Oval beads: $3 \times 2 = 6$
Round beads: $2 \times 10 = 20$
Total beads: $6 + 20 = 26$
Two-for-one gives another 26 beads for the 26 they have:
 $26 + 26 = 52$ beads altogether.
- David has $90 + 20 = \text{GH¢}110$
Yard work: $2 \times 20 = \text{GH¢}40$
Total money: $110 + 40 = \text{GH¢}150$

3. Children in groups: $12 \div 4 = 3$ children per group
Children left: $12 - 3 = 9$ children
4. Cost per ticket: $36 \div 12 = \text{GH}\text{C}3$
Cost excluding luggage: $30 \div 12 = \text{GH}\text{C}2.50$

Exercise 4

(LB page 109)

Learners complete the table as they answer the questions.

Children attending the local clinic							
	Mon	Tues	Wed	Thurs	Fri	Sat	Total
Eyes	10	5	2	8	4	12	41
Ears	9	2	10	6	3	1	31
Teeth	20	10	8	10	9	10	67
Flu	8	5	4	10	2	5	34
Measles	2	1	1	0	0	4	8
Total	49	23	25	34	18	32	181

1. Add the values in the first row:
 $10 + 5 + 2 + 8 + 4 + 12 = 41$
2. Add the values in the second row:
 $9 + 2 + 10 + 6 + 3 + 1 = 31$
3. Add the values in the third row:
 $20 + 10 + 8 + 10 + 9 + 10 = 67$
4. Serwa says that $8 + 5 + 4 + 10 + 2 + 5 = 70$
The sum should be: $8 + 5 + 4 + 10 + 2 + 5 = 34$
 \therefore Serwa should have said that 34 children were treated for 'flu this week.
5. Add the values in the fifth row: $2 + 1 + 1 + 4 = 8$
6. Add the totals of each column.
Monday: $10 + 9 + 20 + 8 + 2 = 49$
Tuesday: $5 + 2 + 10 + 5 + 1 = 23$
Wednesday: $2 + 10 + 8 + 4 + 1 = 25$
Thursday: $8 + 6 + 10 + 10 + 0 = 34$
Friday: $4 + 3 + 9 + 2 + 0 = 18$
Saturday: $12 + 1 + 10 + 5 + 4 = 32$
 \therefore Monday was the busiest day.

Sub-strand 3: Fractions

The learner will be able to generate, recognise and name equivalent and improper fractions, find the simplest form of a fraction and to compare, order, add and subtract fractions.

Content standard	Indicator
B4.1.3.1 Develop an understanding of equivalent and improper fractions	B4.1.3.1.1 Generate unit fractions and locate a unit fraction e.g. one-eighth, on a number line by defining the interval from 0 to 1 as the whole and partitioning it into 8 equal parts and that each part has size $\frac{1}{8}$.

1. Learning expectations

Learners need to be able to:

- identify objects that are considered whole.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

Unit fractions, part of a whole

4. Resources used in this indicator

- Learner's book
- Workbook page 60
- Fraction chart (wall); fraction strips
- Number lines

5. Large class teaching

Prepare the classes and the different teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

Allow for peer assisted learning.

6. Support for learners with special needs

Learners with a keen sense of observation need to be able to focus on the teacher. Make sure these learners sit close enough to pick up visual cues, and repeat information when close to the learner. Outside noises can be distracting for these learners as many have difficulty filtering out sounds.

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding.

Explore the vocabulary to ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of fractions in relationship with each other on a number line.

7. Teaching methodology

Let the learners turn to pages 111–112 in the Learner's book. Explain the unit fractions so that they clearly understand the concept. Do a few more examples of other fractions on the board for them to solve together before they do the exercises individually in their books.

Allow learners to partition concrete objects into parts and state the part as a fraction of the whole.

Use mental maths activities such as “How many more fingers to make 10?”

Have learners draw whole items and partition them according to teacher’s instruction.

Have groups colour in the whole or parts of the whole (fractions) using different shapes.

Ensure that learners understand the vocabulary: ‘Denominator’ tells how many parts the whole is divided into; ‘Numerator’ tells how many parts there are.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.1 Exercise 1.

9. Assessment

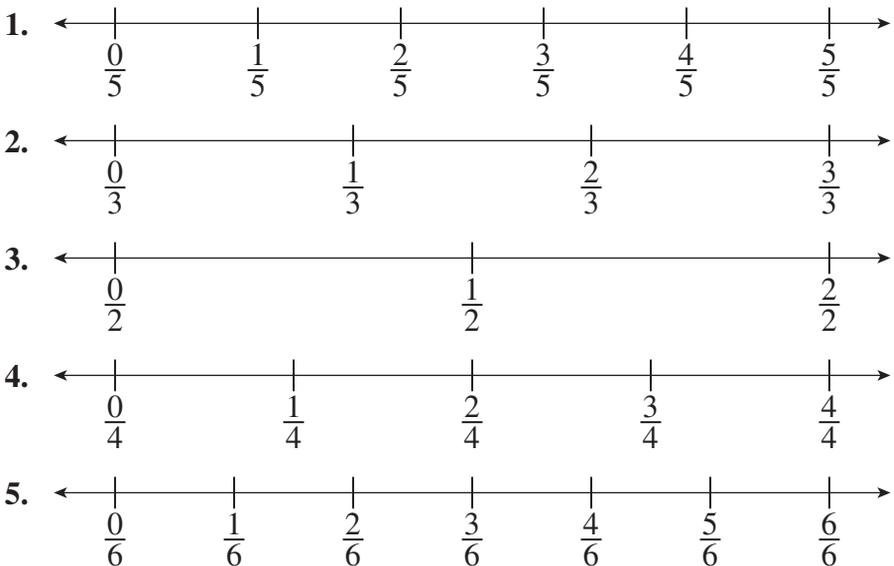
Use the answers to the exercises to assess the level of understanding. Learners may check each other’s answers as peer assessment.

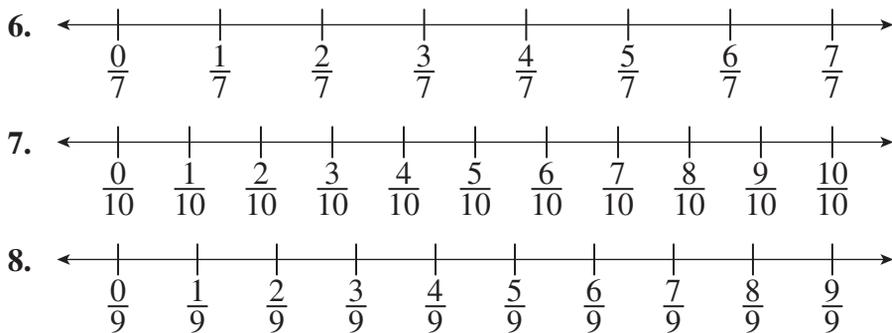
10. Answers

B4.1.3.1.1

Exercise 1

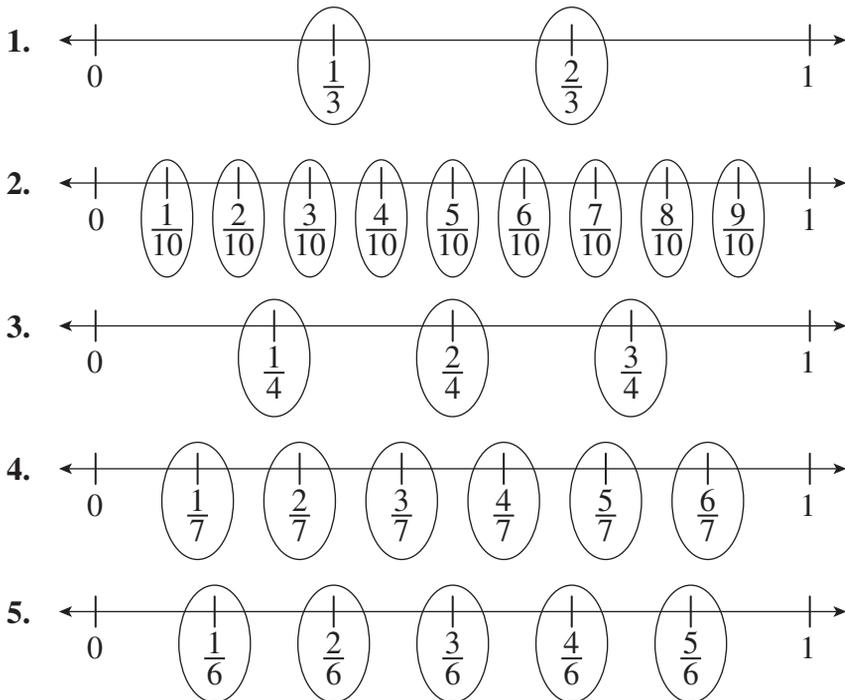
(LB page 111)





Exercise 2

(LB page 112)



B4.1.3.1.2

Content standard	Indicator
B4.1.3.1 Develop an understanding of equivalent and improper fractions	B4.1.3.1.2 Recognise and name equivalent fractions using pictorial representation and number lines to determine the lowest common denominator (LCD)

1. Learning expectations

Learners need to be able to:

- use pictures to interpret equivalent fractions and determine the LCD.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

Equivalent fractions, part of a whole, numerator; denominator; common denominator

4. Resources used in this indicator

- Learner's book
- Workbook pages 60–63
- Fraction chart (wall); fraction strips
- Number lines

5. Large class teaching

Prepare the classes and the different teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

Allow for peer assisted learning.

6. Support for learners with special needs

Learners with a keen sense of observation need to be able to focus on the teacher. Make sure these learners sit close enough to pick up visual cues, and repeat information when close to the learner. Outside noises can be distracting for these learners as many have difficulty filtering out sounds.

Avoid lengthy oral presentations. Some learners may appear to ‘zone out’ during lengthy oral presentations. They may not remember information given orally without being able to see it as they memorise using visual cues. Ensure that you use several visual cues.

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Explore the vocabulary to ensure that learners understand the language and vocabulary used.

7. Teaching methodology

Let the learners turn to pages 113–118 in the Learner’s book.

Explain the example on page 113 to the learners. Ensure they understand the concepts of equivalent fractions and lowest common denominator.

Do a few more examples on the board to practise before they do the exercises individually in their books. The fraction strips are fairly easy to follow and understand.

Use the fraction chart or fraction wall to make the operations easier and have a visual reminder of equivalent fractions and fraction relationships.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.1 Exercise 2.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other’s answers as peer assessment.

10. Answers

Exercise 1

(LB page 113)

1. $\frac{2}{4}$ 2. $\frac{4}{8}$ 3. $\frac{8}{16}$ 4. $\frac{4}{8}$
5. $\frac{8}{16}$ 6. $\frac{3}{6}$ 7. $\frac{4}{4}$ 8. $\frac{2}{8}$

Exercise 2

(LB page 113)

1. $\frac{3}{6}$ 2. $\frac{1}{4}$ 3. $\frac{6}{6}$
4. $\frac{3}{6}$ 5. $\frac{2}{6}$ 6. $\frac{4}{4}$

Exercise 3

(LB page 114)

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

Additional questions: $\frac{4}{4} = \frac{8}{8}$; $\frac{5}{5} = \frac{10}{10}$; $\frac{6}{6} = \frac{12}{12}$; $\frac{3}{3} = \frac{6}{6}$

Exercise 4

(LB page 115)

Learners own answers. Learners draw equivalent diagrams for $\frac{1}{3}$.

Exercise 5

(LB page 117)

1. $\frac{3}{4}$ 2. $\frac{4}{28} = \frac{8}{56}$
3. $\frac{2}{6} = \frac{4}{12} = \frac{6}{18}$ 4. $\frac{2}{10} = \frac{4}{20} = \frac{8}{40}$
5. $\frac{3}{6} = \frac{9}{18} = \frac{18}{36}$ 6. $\frac{10}{20} = \frac{2}{4}$
7. $\frac{4}{5}$ 8. $\frac{6}{8} = \frac{3}{4}$

Exercise 6

(LB page 118)

Learners find their own equivalent fractions.

B4.1.3.1.3

Content standard	Indicator
B4.1.3.1 Develop an understanding of equivalent and improper fractions	B4.1.3.1.3 Find the simplest form of given fractions by dividing through by the highest common factor (i.e. by cancelling through by factors)

1. Learning expectations

Learners need to be able to:

- express fractions in simplest form.
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

Simplest form

4. Resources used in this indicator

- Learner's book
- Workbook page 63
- Fraction chart (wall); fraction strips

5. Large class teaching

Prepare your lessons and teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners and look for different ways to make the lessons interesting.

Allow for peer assisted learning by grouping stronger learners with weaker learners. Adapt seating arrangements to allow for group work.

6. Support for learners with special needs

Avoid lengthy oral presentations. Some learners may appear to ‘zone out’ during lengthy oral presentations. They may not remember information given orally without being able to see it as they memorise using visual cues. Ensure that you use several visual cues such as the fraction walls and charts.

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Explore the vocabulary to ensure that learners understand the language and vocabulary used.

7. Teaching methodology

Let the learners turn to pages 119–121 in the Learner’s book. Work through the examples together with the learners. Ensure they understand the concepts of simplest form and improper fractions.

Learners must know the method for how to write fractions in the simplest form. Do a few examples on the board for them to solve together before they attempt the exercises in the book.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.1 Exercise 3.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other’s answers as peer assessment.

10. Answers

Exercise 1

(LB page 120)

1. Factors numerator 18: 1; 2; 3; 6; 9; 18
Factors denominator 24: 1; 2; 3; 4; 6; 8; 12; 24
HCF: 6

2. Factors numerator 20: 1; 2; 4; 5; 10; 20
Factors denominator 22: 1; 2; 11; 22
HCF: 2
3. Factors numerator 12: 1; 2; 3; 4; 6; 12
Factors denominator 16: 1; 2; 4; 8; 16
HCF: 4
4. Factors numerator 16: 1; 2; 4; 8; 16
Factors denominator 24: 1; 2; 3; 4; 6; 8; 12; 24
HCF: 8
5. Factors numerator 28: 1; 2; 4; 7; 14; 28
Factors denominator 32: 1; 2; 4; 8; 16; 32
HCF: 4
6. Factors numerator 28: 1; 2; 4; 7; 14; 28
Factors denominator 36: 1; 2; 3; 4; 6; 9; 12; 18; 36
HCF: 4
7. Factors numerator 14: 1; 2; 7; 14
Factors denominator 18: 1; 2; 3; 6; 9; 18
HCF: 2
8. Factors numerator 12: 1; 2; 3; 4; 6; 12
Factors denominator 16: 1; 2; 4; 8; 16
HCF: 4
9. Factors numerator 15: 1; 3; 5; 15
Factors denominator 30: 1; 2; 3; 5; 6; 10; 15; 30
HCF: 15
10. Factors numerator 25: 1; 5; 25
Factors denominator 35: 1; 5; 7; 35
HCF: 5
11. Factors numerator 21: 1; 3; 7; 21
Factors denominator 27: 1; 3; 9; 27
HCF: 3
12. Factors numerator 18: 1; 2; 3; 6; 9; 18
Factors denominator 30: 1; 2; 3; 5; 6; 10; 15; 30
HCF: 6

Exercise 2

1. Factors numerator 5: 1; 5
Factors denominator 12: 1; 2; 3; 4; 6; 12
HCF: 1
 $\therefore \frac{5}{12}$ is the simplest form
2. Factors numerator 2: 1; 2
Factors denominator 8: 1; 2; 4; 8
HCF: 2
 $\therefore \frac{2}{8} \div \frac{2}{2} = \frac{1}{4}$ is the simplest form
3. Factors numerator 4: 1; 2; 4
Factors denominator 12: 1; 2; 3; 4; 6; 12
HCF: 4
 $\therefore \frac{4}{12} \div \frac{4}{4} = \frac{1}{3}$ is the simplest form
4. Factors numerator 2: 1; 2
Factors denominator 10: 1; 2; 5; 10
HCF: 2
 $\therefore \frac{2}{10} \div \frac{2}{2} = \frac{1}{5}$ is the simplest form
5. Factors numerator 8: 1; 2; 4; 8
Factors denominator 32: 1; 2; 4; 8; 16; 32
HCF: 8
 $\therefore \frac{8}{32} \div \frac{8}{8} = \frac{1}{4}$ is the simplest form
6. Factors numerator 3: 1; 3
Factors denominator 9: 1; 3; 9
HCF: 3
 $\therefore \frac{3}{9} \div \frac{3}{3} = \frac{1}{3}$ is the simplest form
7. Factors numerator 3: 1; 3
Factors denominator 15: 1; 3; 5; 15
HCF: 3
 $\therefore \frac{3}{15} \div \frac{3}{3} = \frac{1}{5}$ is the simplest form
8. Factors numerator 7: 1; 7
Factors denominator 28: 1; 2; 4; 7; 14; 28
HCF: 7
 $\therefore \frac{7}{28} \div \frac{7}{7} = \frac{1}{4}$ is the simplest form

9. Factors numerator 16: 1; 2; 4; 8; 16
 Factors denominator 24: 1; 2; 3; 4; 6; 8; 12; 24
 HCF: 8
 $\therefore \frac{16}{24} \div \frac{8}{8} = \frac{2}{3}$ is the simplest form
10. Factors numerator 10: 1; 2; 5; 10
 Factors denominator 40: 1; 2; 4; 5; 8; 10; 20; 40
 HCF: 10
 $\therefore \frac{10}{40} \div \frac{10}{10} = \frac{1}{4}$ is the simplest form
11. Factors numerator 17: 1; 17
 Factors denominator 34: 1; 2; 17; 34
 HCF: 17
 $\therefore \frac{17}{34} \div \frac{17}{17} = \frac{1}{2}$ is the simplest form
12. Factors numerator 12: 1; 2; 3; 4; 6; 12
 Factors denominator 18: 1; 2; 3; 6; 9; 18
 HCF: 6
 $\therefore \frac{12}{18} \div \frac{6}{6} = \frac{2}{3}$ is the simplest form
13. Factors numerator 9: 1; 3; 9
 Factors denominator 45: 1; 3; 5; 9; 15; 45
 HCF: 9
 $\therefore \frac{9}{45} \div \frac{9}{9} = \frac{1}{5}$ is the simplest form
14. Factors numerator 15: 1; 3; 5; 15
 Factors denominator 50: 1; 2; 5; 10; 25; 50
 HCF: 5
 $\therefore \frac{15}{50} \div \frac{5}{5} = \frac{3}{10}$ is the simplest form
15. Factors numerator 6: 1; 2; 3; 6
 Factors denominator 48: 1; 2; 3; 6; 8; 16; 24; 48
 HCF: 6
 $\therefore \frac{6}{48} \div \frac{6}{6} = \frac{1}{8}$ is the simplest form
16. Factors numerator 6: 1; 2; 3; 6
 Factors denominator 36: 1; 2; 3; 4; 6; 9; 12; 18; 36
 HCF: 6
 $\therefore \frac{6}{36} \div \frac{6}{6} = \frac{1}{6}$ is the simplest form

17. Factors numerator 18: 1; 2; 3; 6; 9; 18
 Factors denominator 54: 1; 2; 3; 6; 9; 18; 27; 54
 HCF: 18
 $\therefore \frac{18}{54} \div \frac{18}{18} = \frac{1}{3}$ is the simplest form
18. Factors numerator 9: 1; 3; 9
 Factors denominator 36: 1; 2; 3; 4; 6; 9; 12; 18; 36
 HCF: 9
 $\therefore \frac{9}{36} \div \frac{9}{9} = \frac{1}{4}$ is the simplest form
19. Factors numerator 60: 1; 2; 3; 4; 5; 6; 10; 12; 15; 20; 30; 60
 Factors denominator 72: 1; 2; 3; 4; 6; 8; 9; 12; 18; 24; 36; 72
 HCF: 12
 $\therefore \frac{60}{72} \div \frac{12}{12} = \frac{5}{6}$ is the simplest form
20. Factors numerator 10: 1; 2; 5; 10
 Factors denominator 60: 1; 2; 3; 4; 5; 6; 10; 12; 15; 20; 30; 60
 HCF: 10
 $\therefore \frac{10}{60} \div \frac{10}{10} = \frac{1}{6}$ is the simplest form

B4.1.3.1.4

Content standard	Indicator
B4.1.3.1 Develop an understanding of equivalent and improper fractions	B4.1.3.1.4 Recognise fractions that are greater than 1 (i.e. improper fractions), draw and label such fractions with their symbols

1. Learning expectations

Learners need to be able to:

- recognise improper fractions
- develop problem solving skills and critical thinking.
- justify their ideas.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

Proper fractions, improper fractions; mixed numbers (fractions)

4. Resources used in this indicator

- Learner's book
- Workbook pages 63–65

5. Large class teaching

Prepare the classes and the different teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

Allow for peer assisted learning by grouping stronger learners with weaker learners. Adapt seating arrangements to allow for group work.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

7. Teaching methodology

Let the learners turn to page 122–126 in the Learner's book. Go through the examples together with the learners. Let the learners discuss together. Ensure that they understand the concepts of proper fractions, improper fractions and mixed numbers.

On pages 125–126 make sure the learners understand the strategies they can use to find the solutions. Do a few examples on the board for them to solve together and show their understanding.

The learners complete the exercises in the Learner's book individually or in pairs. Use your discretion for what works best in your class.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.1 Exercises 4 to 6.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other's answers as peer assessment.

10. Answers

Exercise 1

(LB page 124)

1.	Proper fraction	Improper fraction	Mixed number
	$\frac{8}{9}$	$\frac{17}{8}$	$1\frac{1}{2}$
	$\frac{4}{5}$	$\frac{11}{10}$	$2\frac{1}{3}$
	$\frac{7}{8}$	$\frac{10}{7}$	$1\frac{1}{6}$
	$\frac{6}{18}$	$\frac{9}{3}$	$2\frac{1}{12}$
	$\frac{7}{13}$	$\frac{13}{12}$	$5\frac{3}{4}$
	$\frac{1}{50}$	$\frac{13}{7}$	$2\frac{2}{11}$
	$\frac{90}{100}$	$\frac{7}{2}$	$1\frac{8}{10}$
	$\frac{1}{6}$		$10\frac{1}{2}$
			$3\frac{1}{14}$

2. a) 1 b) 4 c) $\frac{6}{3}$
 d) $\frac{9}{3}$ e) $3\frac{1}{3}$ f) $\frac{5}{3}$
 g) $2\frac{1}{3}$ h) $\frac{8}{3}$ i) $\frac{11}{3}$

Exercise 2

(LB page 125)

1. a) $\frac{8}{5} = 8 \div 5$
 $= 1 \text{ rem } 3$
 $= 1\frac{3}{5}$
- b) $\frac{11}{6} = 11 \div 6$
 $= 1 \text{ rem } 5$
 $= 1\frac{5}{6}$
- c) $\frac{17}{7} = 17 \div 7$
 $= 2 \text{ rem } 3$
 $= 2\frac{3}{7}$
- d) $\frac{16}{3} = 16 \div 3$
 $= 5 \text{ rem } 1$
 $= 5\frac{1}{3}$
- e) $\frac{21}{4} = 21 \div 4$
 $= 5 \text{ rem } 1$
 $= 5\frac{1}{4}$
- f) $\frac{50}{8} = 50 \div 8$
 $= 6 \text{ rem } 2$
 $= 6\frac{2}{8}$
- g) $\frac{143}{100} = 143 \div 100$
 $= 1 \text{ rem } 43$
 $= 1\frac{43}{100}$
- h) $\frac{43}{10} = 43 \div 10$
 $= 4 \text{ rem } 3$
 $= 4\frac{3}{10}$
- i) $\frac{28}{8} = 28 \div 8$
 $= 3 \text{ rem } 4$
 $= 3\frac{4}{8}$
- j) $\frac{64}{9} = 64 \div 9$
 $= 7 \text{ rem } 1$
 $= 7\frac{1}{9}$
- k) $\frac{45}{6} = 45 \div 6$
 $= 7 \text{ rem } 3$
 $= 7\frac{3}{6}$
- l) $\frac{33}{5} = 33 \div 5$
 $= 6 \text{ rem } 3$
 $= 6\frac{3}{5}$
2. a) $1\frac{2}{3} = [(1 \times 3) + 2] \div 3$
 $= 5 \div 3$
 $= \frac{5}{3}$
- b) $4\frac{5}{8} = [(4 \times 8) + 5] \div 8$
 $= 37 \div 8$
 $= \frac{37}{8}$
- c) $6\frac{1}{4} = [(6 \times 4) + 1] \div 4$
 $= 25 \div 4$
 $= \frac{25}{4}$
- d) $2\frac{4}{7} = [(2 \times 7) + 4] \div 7$
 $= 18 \div 7$
 $= \frac{18}{7}$

- e) $7\frac{3}{5} = [(7 \times 5) + 3] \div 5$
 $= 38 \div 5$
 $= \frac{38}{5}$
- f) $3\frac{7}{8} = [(3 \times 8) + 7] \div 8$
 $= 31 \div 8$
 $= \frac{31}{8}$
- g) $6\frac{5}{6} = [(6 \times 6) + 5] \div 6$
 $= 41 \div 6$
 $= \frac{41}{6}$
- h) $5\frac{7}{9} = [(5 \times 9) + 7] \div 9$
 $= 52 \div 9$
 $= \frac{52}{9}$
- i) $3\frac{4}{10} = [(3 \times 10) + 4] \div 10$
 $= 34 \div 10$
 $= \frac{34}{10}$
- j) $2\frac{57}{100} = [(2 \times 100) + 57] \div 100$
 $= 257 \div 100$
 $= \frac{257}{100}$
- k) $7\frac{3}{4} = [(7 \times 4) + 3] \div 4$
 $= 31 \div 4$
 $= \frac{31}{4}$
- l) $5\frac{5}{9} = [(5 \times 9) + 5] \div 9$
 $= 50 \div 9$
 $= \frac{50}{9}$
- m) $9\frac{1}{2} = [(9 \times 2) + 1] \div 2$
 $= 19 \div 2$
 $= \frac{19}{2}$
- n) $4\frac{1}{7} = [(4 \times 7) + 1] \div 7$
 $= 29 \div 7$
 $= \frac{29}{7}$
- o) $9\frac{2}{5} = [9 \times 5 + 2] \div 5$
 $= 47 \div 5$
 $= \frac{47}{5}$

<p>3. a) $\frac{12}{7} = 12 \div 7$ $= 1 \text{ rem } 5$ $= 1\frac{5}{7}$</p> <p>c) $\frac{17}{4} = 17 \div 4$ $= 4 \text{ rem } 1$ $= 4\frac{1}{4}$</p> <p>e) $\frac{23}{4} = 23 \div 4$ $= 5 \text{ rem } 3$ $= 5\frac{3}{4}$</p> <p>g) $\frac{37}{12} = 37 \div 12$ $= 3 \text{ rem } 1$ $= 3\frac{1}{12}$</p>	<p>b) $\frac{15}{8} = 15 \div 8$ $= 1 \text{ rem } 7$ $= 1\frac{7}{8}$</p> <p>d) $\frac{35}{6} = 35 \div 6$ $= 5 \text{ rem } 5$ $= 5\frac{5}{6}$</p> <p>f) $\frac{14}{5} = 14 \div 5$ $= 2 \text{ rem } 4$ $= 2\frac{4}{5}$</p> <p>h) $5\frac{1}{2} = [(5 \times 2) + 1] \div 2$ $= 11 \div 2$ $= \frac{11}{2}$</p>
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Exercise 3

(LB page 126)

- Isaac uses $10 \times \frac{1}{3} = \frac{10}{3}$ m of wire.
 Answer: $\frac{10}{3} = 3\frac{1}{3}$
- Mrs Sowah uses $8 \times \frac{4}{5} = \frac{32}{5}$ m of towelling cloth.
 Answer: $\frac{32}{5} = 6\frac{2}{5}$
- Afua uses $6 \times \frac{3}{4} = \frac{18}{4}$ m of material.
 Answer: $\frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$
- Adu uses $5 \times \frac{7}{8} = \frac{35}{8}$ m of wire.
 Answer: $\frac{35}{8} = 4\frac{3}{8}$
- Vida uses $\frac{5}{6}$ of a tub of butter for 2 dozen biscuits
 \therefore she will use 3 times more for 6 dozen biscuits.
 $3 \times \frac{5}{6} = \frac{15}{6}$ m of a tub of butter
 Answer: $\frac{15}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

Sub-strand 3: Fractions

The learner will be able to generate, recognise and name equivalent and improper fractions, find the simplest form of a fraction and to compare, order, add and subtract fractions.

Content standard	Indicator
<p>B4.1.3.2 Demonstrate an understanding of strategies for comparing, adding and subtracting fractions (same denominator, or one being a multiple of the others)</p>	<p>B4.1.3.2.1 Compare and order fractions with like denominators by using pictorial representations and finding equivalent fractions using the lowest common denominator (LCD)</p>

1. Learning expectations

Learners need to be able to:

- compare and order fractions and express them in simplest form.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook page 66–67

5. Large class teaching

Being well prepared for a class creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding. Explore the vocabulary to ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of fractions in relationship with each other on a number line.

7. Teaching methodology

Use videos on comparing fractions to introduce the topic. There are many available on YouTube. Start by working through page 127 as a class activity before moving on to the exercises as individual or pair work.

Go through the explanation and examples together with the learners and ensure that they understand the concepts.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.2 Exercises 1 and 2.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other's answers as peer assessment.

10. Answers

Exercise 1

(LB page 127)

1. Order $\frac{2}{3}$, $\frac{1}{3}$, $\frac{3}{4}$, $\frac{5}{5}$.

Find the LCD.

3: 3; 6; 9; 12; 15; 18; 21; 24; 27; 30; 33; 36; 39; 42; 45;
48; 51; 54; 57; 60

4: 4; 8; 12; 16; 20; 24; 28; 32; 36; 40; 44; 48; 52; 56; 60

5: 5; 10; 15; 20; 25; 30; 35; 40; 45; 50; 55; 60

LCD is 60.

$$\frac{2}{3} = \frac{40}{60}, \frac{1}{3} = \frac{20}{60}, \frac{3}{4} = \frac{45}{60}, \frac{5}{5} = \frac{60}{60}$$

\therefore in descending order: $\frac{5}{5}$, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{1}{3}$

2. Order $\frac{1}{8}$, $\frac{1}{4}$, $\frac{5}{10}$, $\frac{3}{5}$.

Find the LCD.

4: 4; 8; 12; 16; 20; 24; 28; 32; 36; 40; 44; 48; 52; 56; 60

5: 5; 10; 15; 20; 25; 30; 35; 40; 45; 50; 55; 60

8: 8; 16; 24; 32; 40; 48; 56

10: 10; 20; 30; 40; 50; 60

LCD is 40.

$$\frac{1}{8} = \frac{5}{40}, \frac{1}{4} = \frac{10}{40}, \frac{5}{10} = \frac{20}{40}, \frac{3}{5} = \frac{24}{40}$$

\therefore in descending order: $\frac{3}{5}$, $\frac{5}{10}$, $\frac{1}{4}$, $\frac{1}{8}$

3. Order $\frac{4}{8}$, $\frac{1}{6}$, $\frac{2}{7}$, $\frac{2}{9}$. Write $\frac{4}{8}$ in simplest form: $\frac{1}{2}$

Find the LCD.

2: 2; 4; 6; 8; 10; 12; 14; 16; 18; 20; 22; 24.....126

6: 6; 12; 18; 24; 30; 36; 42; 48; 54; 60; 66; 72; 78; 84;

90; 96; 102; 108; 114; 120; 126

7: 7; 14; 21; 28; 35; 42; 49; 56; 63; 70; 77; 84; 91; 98;

105; 112; 119; 126

9: 9; 18; 27; 36; 45; 54; 63; 72; 81; 90; 99; 108; 117; 126

LCD is 126.

$$\frac{4}{8} = \frac{63}{126}, \frac{1}{6} = \frac{21}{126}, \frac{2}{7} = \frac{36}{126}, \frac{2}{9} = \frac{28}{126}$$

\therefore in descending order: $\frac{4}{8}$, $\frac{2}{7}$, $\frac{2}{9}$, $\frac{1}{6}$

4. Order $\frac{7}{7}$, $\frac{3}{4}$, $\frac{1}{10}$, $\frac{3}{6}$. Write $\frac{7}{7}$ in simplest form: 1 ; $\frac{3}{6} = \frac{1}{2}$

Find the LCD.

2: 2; 4; 6; 8; 10; 12; 14; 16; 18; 20

4: 4; 8; 12; 16; 20; 24; 28; 32; 36; 40

10; 10; 20; 30; 40; 50; 60

LCD is 20.

$$\frac{7}{7} = \frac{20}{20}, \frac{3}{4} = \frac{15}{20}, \frac{1}{10} = \frac{2}{20}, \frac{3}{6} = \frac{10}{20}$$

\therefore in descending order: $\frac{7}{7}, \frac{3}{4}, \frac{3}{6}, \frac{1}{10}$

Exercise 2

(LB page 128)

1.
 - a) $\frac{4}{5} = \frac{16}{20}, \frac{3}{4} = \frac{15}{20} \therefore \frac{4}{5} > \frac{3}{4}$
 - b) $\frac{3}{11} = \frac{12}{44}, \frac{1}{4} = \frac{11}{44} \therefore \frac{3}{11} > \frac{1}{4}$
 - c) $\frac{1}{3} = \frac{3}{9} \therefore \frac{1}{3} < \frac{4}{9}$
 - d) $\frac{2}{10} = \frac{14}{70}, \frac{3}{7} = \frac{30}{70} \therefore \frac{2}{10} < \frac{3}{7}$
 - e) $\frac{8}{9} = \frac{96}{108}, \frac{5}{12} = \frac{45}{108} \therefore \frac{8}{9} > \frac{5}{12}$
 - f) $\frac{2}{4} = \frac{1}{2}, \frac{4}{8} = \frac{1}{2} \therefore \frac{2}{4} = \frac{4}{8}$
 - g) $\frac{2}{5} = \frac{12}{30}, \frac{3}{6} = \frac{15}{30} \therefore \frac{2}{5} < \frac{3}{6}$
 - h) $\frac{2}{11} = \frac{24}{132}, \frac{6}{12} = \frac{66}{132} \therefore \frac{2}{11} < \frac{6}{12}$
 - i) $\frac{2}{9} = \frac{14}{63}, \frac{2}{7} = \frac{18}{63} \therefore \frac{2}{9} < \frac{2}{7}$
2.
 - a) All numerators are 1, so we compare the denominators. The greater the denominator, the smaller the number. $\therefore \frac{1}{8}, \frac{1}{7}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}$
 - b) All numerators are 1, so we compare the denominators. The greater the denominator, the smaller the number. $\therefore \frac{1}{10}, \frac{1}{9}, \frac{1}{7}, \frac{1}{6}, \frac{1}{2}$
 - c) Order $\frac{2}{10}, \frac{1}{3}, \frac{5}{9}, \frac{4}{5}, \frac{7}{8}$. Write $\frac{2}{10}$ in simplest form: $\frac{1}{5}$
Use the LCD method shown above or draw the fractions on a number line.
 $\frac{1}{5} \approx \frac{14}{72}, \frac{4}{5} \approx \frac{56}{72}, \frac{1}{3} = \frac{24}{72}, \frac{5}{9} = \frac{40}{72}, \frac{7}{8} = \frac{63}{72}$
 \therefore in ascending order: $\frac{2}{10}, \frac{1}{3}, \frac{5}{9}, \frac{4}{5}, \frac{7}{8}$
 - d) Order $\frac{3}{6}, \frac{2}{3}, \frac{3}{5}, \frac{9}{10}, \frac{5}{7}$. Write $\frac{3}{6}$ in simplest form: $\frac{1}{2}$
Use the LCD method shown above or draw the fractions on a number line.
 $\frac{1}{2} = \frac{15}{30}, \frac{2}{3} = \frac{20}{30}, \frac{3}{5} = \frac{18}{30}, \frac{9}{10} = \frac{27}{30}, \frac{5}{7} \approx \frac{22}{30}$
 \therefore in ascending order: $\frac{3}{6}, \frac{3}{5}, \frac{2}{3}, \frac{5}{7}, \frac{9}{10}$

e) Order $\frac{1}{2}, \frac{4}{9}, \frac{5}{6}, \frac{3}{10}, \frac{3}{4}$.

Use the LCD method shown above or draw the fractions on a number line.

$$\frac{1}{2} = \frac{18}{36}, \frac{4}{9} = \frac{16}{36}, \frac{5}{6} = \frac{30}{36}, \frac{3}{10} \approx \frac{10}{36}, \frac{3}{4} \approx \frac{27}{36}$$

$$\therefore \text{in ascending order: } \frac{3}{10}, \frac{4}{9}, \frac{1}{2}, \frac{3}{4}, \frac{5}{6}$$

f) Order $\frac{2}{3}, \frac{1}{5}, \frac{3}{10}, \frac{5}{8}, \frac{4}{5}$.

Use the LCD method shown above or draw the fractions on a number line.

$$\frac{2}{3} \approx \frac{26}{40}, \frac{1}{5} = \frac{8}{40}, \frac{3}{10} = \frac{12}{40}, \frac{5}{8} = \frac{25}{40}, \frac{4}{5} = \frac{32}{40}$$

$$\therefore \text{in ascending order: } \frac{1}{5}, \frac{3}{10}, \frac{5}{8}, \frac{2}{3}, \frac{4}{5}$$

3. a) $\frac{1}{2}$ of GHC100 = GHC50; $\frac{1}{4}$ of GHC100 = GHC25

$$\therefore \frac{1}{2} \text{ of GHC100 is more.}$$

b) $\frac{3}{4}$ of a chocolate = $\frac{9}{12}$ of the chocolate;

$$\frac{3}{9} = \frac{1}{3} = \frac{4}{12} \text{ of the chocolate.}$$

$$\therefore \frac{3}{4} \text{ of the chocolate is more.}$$

4. For these questions the numerators are the same, a larger denominator is a smaller value.

a) $\frac{7}{10}$ is smaller.

b) $\frac{3}{9}$ is smaller.

c) $\frac{1}{4}$ is smaller.

d) $\frac{1}{6}$ is smaller.

B4.1.3.2.2

Content standard	Indicator
B4.1.3.2 Demonstrate an understanding of strategies for comparing, adding and subtracting fractions (same denominator, or one being a multiple of the others)	B4.1.3.2.2 Add and subtract fractions

1. Learning expectations

Learners need to be able to:

- add and subtract fractions and express them in simplest form.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook page 67–69
- Fraction strips

5. Large class teaching

Being well prepared for a class creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding. Explore the vocabulary to ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of fractions in relationship with each other on a number line.

7. Teaching methodology

Exercises 1 and 2 on page 129 are fairly easy to follow as the fraction strips will assist the learners. They may work in pairs.

Ensure that learners understand the vocabulary: ‘Denominator’ tells how many parts the whole is divided into; ‘Numerator’ tells how many parts there are.

Use concrete objects to add and subtract fractions of a whole.

Use a fraction chart or fraction wall to make the operations easier and have a visual reminder of equivalent fractions and fraction relationships.

Use YouTube videos on addition and subtraction of fractions and simplification of fractions, as an extra resource.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.2 Exercises 3 and 4.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other’s answers as peer assessment.

10. Answers

Exercise 1

(LB page 129)

- | | |
|-----------------------------------|--|
| 1. $\frac{1}{2}$ or $\frac{3}{6}$ | 2. 1 or $\frac{2}{2}$ or $\frac{4}{4}$ or $\frac{3}{3}$ or $\frac{6}{6}$ |
| 3. $\frac{3}{4}$ | 4. $\frac{1}{3}$ or $\frac{2}{6}$ |
| 5. $\frac{2}{3}$ or $\frac{4}{6}$ | 6. $\frac{1}{4}$ |
| 7. 0 | 8. $\frac{3}{4}$ |
| 9. 0 | 10. 0 |

Exercise 2

(LB page 129)

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

B4.1.3.2.3

Content standard	Indicator
B4.1.3.2 Demonstrate an understanding of strategies for comparing, adding and subtracting fractions (same denominator, or one being a multiple of the others)	B4.1.3.2.3 Provide examples of where fractions are used

1. Learning expectations

Learners need to be able to:

- provide examples of fractions in real life contexts.

2. Essential for learning

Learners have experience with objects that are whole and objects with parts missing and using different strategies to perform the four basic operations.

3. New words

Common fractions, part of a whole, equivalent, improper fractions; mixed numbers (fractions); numerator; denominator; common denominator; simplest form

4. Resources used in this indicator

- Learner's book
- Workbook page 69–70
- Clock face

5. Large class teaching

Being well prepared for a class creates a sense of order and promotes efficiency. For example, have fraction walls available to display in the classroom.

Form a good relationship with your learners. Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. Praise the learners who are doing well and reward their successes.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding. Explore the vocabulary to ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of fractions in relationship with each other on a number line.

7. Teaching methodology

Use previous knowledge of fractions to discuss real life contexts. Go through the explanation on page 130 with the learners to ensure that they understand how time works and how it relates to fractions.

Discuss various contexts where fractions are used such as:

- purchasing liquids e.g. half a litre of milk
- portioning pizza, cake, pie
- lengths of rope, string, material e.g. half a metre
- telling time e.g. quarter to ten
- reading values off a pie chart.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.3.2 Exercise 5.

9. Assessment

Use the answers to the exercises to assess the level of understanding. Learners may check each other's answers as peer assessment.

10. Answers

Exercise 1

(LB page 130)

1. $2 \text{ hours} = 2 \times 60 \text{ minutes} = 120 \text{ minutes}$
2. $2\frac{1}{2} \text{ hours} = (2 \times 60) + 30 \text{ minutes} = 150 \text{ minutes}$
3. $2\frac{1}{4} \text{ hours} = (2 \times 60) + 15 \text{ minutes} = 135 \text{ minutes}$
4. $12 \text{ hours} = 12 \times 60 \text{ minutes} = 720 \text{ minutes}$
5. $2\frac{3}{4} \text{ hours} = (2 \times 60) + 45 \text{ minutes} = 165 \text{ minutes}$
6. $4 \text{ hours} = 4 \times 60 \text{ minutes} = 240 \text{ minutes}$
7. $8 \text{ hours} = 8 \times 60 \text{ minutes} = 480 \text{ minutes}$
8. $24 \text{ hours} = 24 \times 60 \text{ minutes} = 1,440 \text{ minutes}$

Exercise 2

(LB page 130)

The man walks 3 km in 1 hour \therefore in $3\frac{1}{2}$ hours he walks

$$3 \times 3\frac{1}{2} = 10\frac{1}{2} \text{ km.}$$

Sub-strand 4: Decimals

The learner will be able represent decimal numbers concretely, pictorially and symbolically.

Content standard	Indicator
B4.1.4.1 Develop an understanding of decimals (tenths and hundredths) using concrete and pictorial representations and write decimals fractions as base ten numbers with place value	B4.1.4.1.1 Describe and represent decimals concretely, pictorially and symbolically

1. Learning expectations

Learners need to be able to:

- show their understanding of relationships between decimals expressed in various ways i.e. concretely, pictorially and symbolically.

2. Essential for learning

Learners have experience with decimal fractions, rounding off strategies and ordering and reading decimals.

3. New words

Decimal fractions; tenth; hundredth

4. Resources used in this indicator

- Learner's book
- Workbook pages 71–72
- Fraction charts
- Decimal place value charts
- Number lines
- Grid paper
- Straws

5. Large class teaching

Plan and prepare before the start of the class. Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

Show and tell new concepts. Start each lesson with a ‘show and tell.’ Telling is the process of sharing information and knowledge with learners, while showing involves modelling how to do something. Carefully plan how you can clearly show and tell specific concepts in Mathematics in an engaging and interesting way.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of decimal numbers on a place value chart.

Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty understanding several instructions at once. For a learner with special needs you might have to break down the process to describe, represent and manipulate decimal numbers into a few smaller steps to ensure they understand what you are asking.

Be aware of learners with dyscalculia. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner’s understanding of decimal numbers. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

This can be a class activity at first and then they work in pairs or small groups or individually. Let the learners turn to pages 131–135 in the Learner’s book. Go through the explanations with the learners on pages 131 and 132 and the models/examples on pages 134 and 135. Ensure that they understand the concept and the strategies to find the solutions. They complete the exercises in the Learner’s book.

Use YouTube videos on the relationship between pictorial and concrete representation of decimals to supplement your lesson.

You can further extend your teaching with the following activities. Express decimals as fractions and place them on the place value chart; investigate fractions using concrete items, pictures and symbols; use the fraction chart to split the fractions into their place values and express them as decimals.

Ensure that all learners understand the concept of decimals, place value and decimal notation. Give real-life examples on expressing decimals either in pictures or in concrete form.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.4.1 Exercise 1.

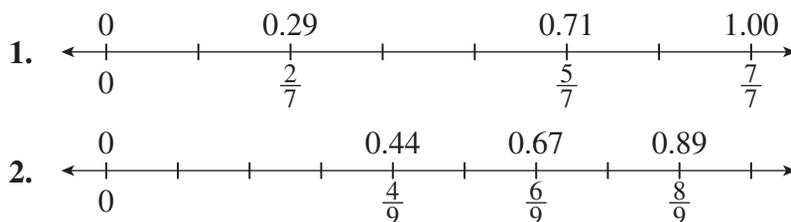
9. Assessment

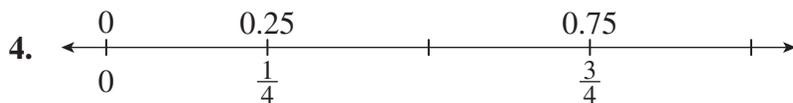
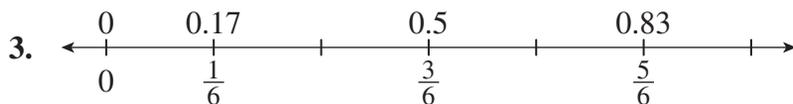
Use a combination of teacher assessment such as class work activity, work sheets and self/peer assessment to determine the level of understanding.

10. Answers

Exercise 1

(LB page 132)





Exercise 2

(LB page 133)

- | | |
|------------------------|------------------------|
| 1. $\frac{6}{10}; 0.6$ | 2. $\frac{9}{10}; 0.9$ |
| 3. $\frac{2}{10}; 0.2$ | 4. $\frac{8}{10}; 0.8$ |
| 5. $\frac{5}{10}; 0.5$ | 6. $\frac{1}{10}; 0.1$ |

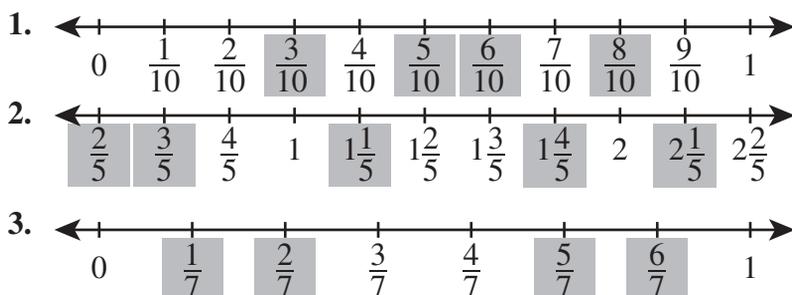
Exercise 3

(LB page 133)

- | | | |
|--------------------|-------------------|-------------------------|
| 1. $\frac{2}{10}$ | 2. $\frac{7}{20}$ | 3. $\frac{5}{10}$ |
| 4. $\frac{13}{20}$ | 5. $\frac{8}{10}$ | 6. $\frac{10}{10}$ or 1 |

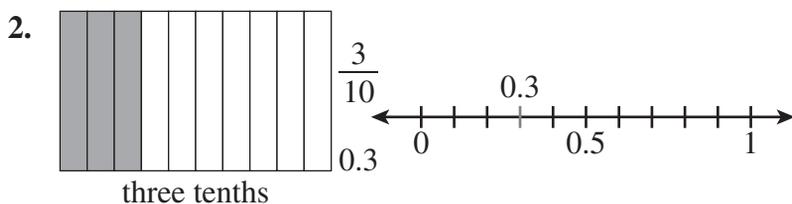
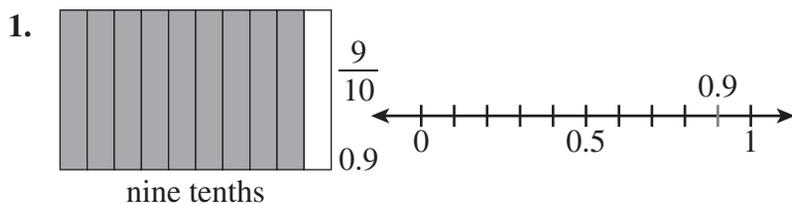
Exercise 4

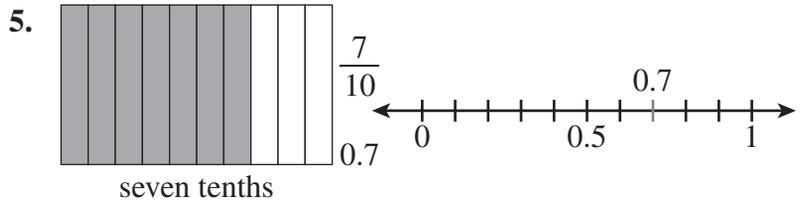
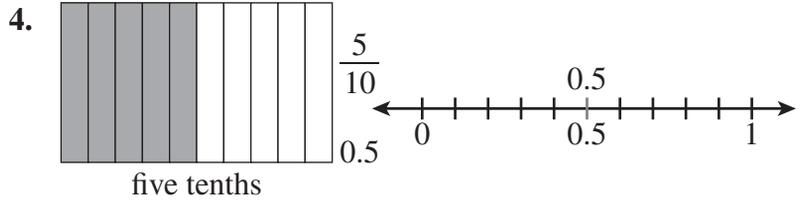
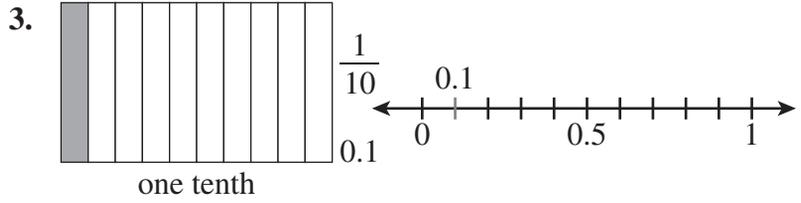
(LB page 133)



Exercise 5

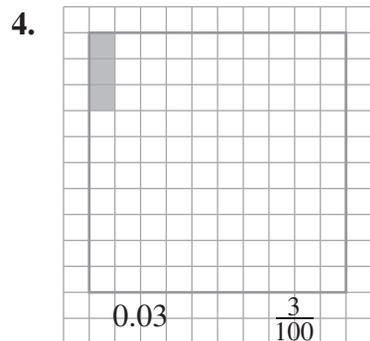
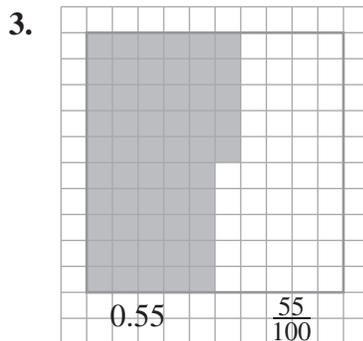
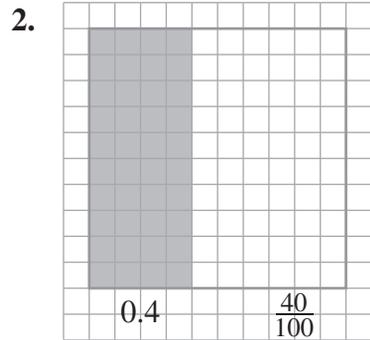
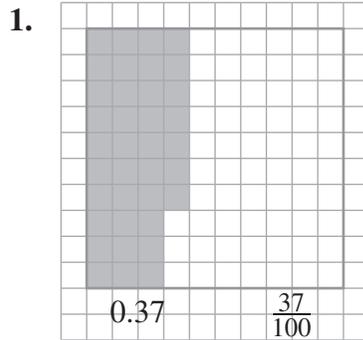
(LB page 134)

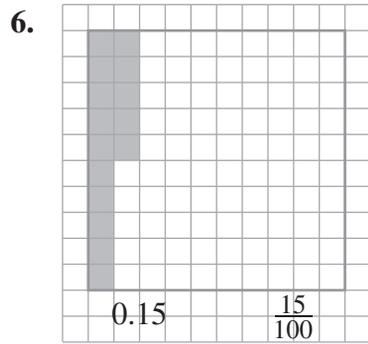
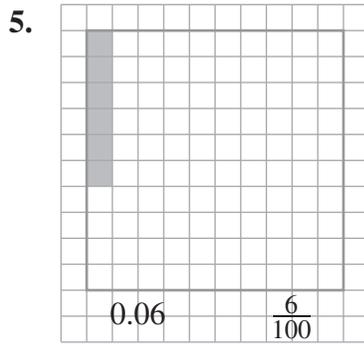




Exercise 6

(LB page 134)





Exercise 7

(LB page 135)

Fraction	tenths	hundredths
$\frac{5}{10}$	0.5	–
$\frac{3}{100}$	–	0.03
$2\frac{1}{5}$	2.2	–
$2\frac{4}{50}$	–	2.08

1. $\frac{3}{10} = 0.3$ 2. $9\frac{1}{2} = 9.5$ 3. $\frac{7}{25} = 0.28$ 4. $4\frac{1}{5} = 4.2$
 5. $1\frac{2}{5} = 1.4$ 6. $\frac{4}{5} = 0.8$ 7. $\frac{3}{4} = 0.75$ 8. $\frac{9}{100} = 0.09$
 9. $\frac{1}{3} = 0.33$ 10. $\frac{3}{20} = 0.15$ 11. $3\frac{1}{4} = 3.25$ 12. $2\frac{1}{5} = 2.2$
 13. $6\frac{2}{3} = 6.66$ 14. $\frac{2}{10} = 0.2$ 15. $\frac{8}{10} = 0.8$ 16. $\frac{4}{100} = 0.04$

B4.1.4.1.2

Content standard	Indicator
B4.1.4.1 Develop an understanding of decimals (tenths and hundredths) using concrete and pictorial representations and write decimals fractions as base ten numbers with place value	B4.1.4.1.2 Round decimals to the nearest tenth

1. Learning expectations

Learners need to be able to:

- round decimals to the nearest tenth.

2. Essential for learning

Learners have experience with decimal fractions, rounding off strategies and ordering and reading decimals.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook page 72

5. Large class teaching

Plan and prepare before the start of the class. Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

Show and tell new concepts. Start each lesson with a 'show and tell.' Telling is the process of sharing information and knowledge with learners, while showing involves modelling how to do something. Carefully plan how you can clearly show and tell specific concepts in Mathematics in an engaging and interesting way.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of decimal numbers on a place value chart.

Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty

understanding several instructions at once. For a learner with special needs you might have to break down the process to describe, represent and manipulate decimal numbers into a few smaller steps to ensure they understand what you are asking.

Be aware of learners with dyscalculia. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner's understanding of decimal numbers. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Go through the example on page 136 in the Learner's book. The learners must be clear in their understanding of the fraction and the decimal. Explain the rounding off to the nearest whole number. Ensure they understand the concept and the strategy to find their solutions.

Learners complete the exercises in the Learner's book. Ensure that learners are able round off given decimals to the nearest tenth and can convert decimals to fractions and vice versa.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.4.1 Exercise 2.

9. Assessment

Use a combination of teacher assessment such as class work activity, work sheets and self/peer assessment to determine the level of understanding.

10. Answers

Exercise 1

(LB page 137)

- | | | | |
|------|-------|-------|-------|
| 1. 4 | 2. 1 | 3. 1 | 4. 3 |
| 5. 0 | 6. 3 | 7. 2 | 8. 4 |
| 9. 1 | 10. 4 | 11. 1 | 12. 3 |

Exercise 2

(LB page 137)

- | | | | |
|--------|--------|--------|---------|
| 1. 5 | 2. 6 | 3. 6 | 4. 50 |
| 5. 51 | 6. 51 | 7. 10 | 8. 20 |
| 9. 120 | 10. 8 | 11. 9 | 12. 9 |
| 13. 80 | 14. 81 | 15. 81 | 16. 101 |

Exercise 3

(LB page 138)

	Number	Round off nearest whole number	Round off to 1 decimal place
1.	1.54	2	1.5
2.	19.94	20	19.9
3.	10.50	11	10.5
4.	78.96	79	79.0

B4.1.4.1.3

Content standard	Indicator
B4.1.4.1 Develop an understanding of decimals (tenths and hundredths) using concrete and pictorial representations and write decimals fractions as base ten numbers with place value	B4.1.4.1.3 Use models to explain the result of addition and subtraction of decimals up to hundredths

1. Learning expectations

Learners need to be able to:

- extend their scope of working with decimals to add and subtract.

2. Essential for learning

Learners have experience with decimal fractions, rounding off strategies and ordering and reading decimals.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 73–74

5. Large class teaching

Plan and prepare before the start of the class. Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

When assessing, give learners recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

Show and tell new concepts. Start each lesson with a 'show and tell.' Telling is the process of sharing information and knowledge with learners, while showing involves modelling how to do something. Carefully plan how you can clearly show and tell specific concepts in Mathematics in an engaging and interesting way.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining the positioning of decimal numbers on a place value chart.

Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty understanding several instructions at once. For a learner with special needs you might have to break down the process to describe, represent and manipulate decimal numbers into a few smaller steps to ensure they understand what you are asking.

Be aware of learners with dyscalculia. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner's understanding of

decimal numbers. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Approach this as a class activity at first. Let the learners turn to pages 139–142. Work through the example on page 139. Ensure the learners understand how to add using the vertical column method. Also make sure that they understand using the zero as a place holder.

They complete the exercises in the book either individually or in pairs to assist each other.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook: B4.1.4.1 Exercises 3 and 4.

9. Assessment

Use a combination of teacher assessment such as class work activity, work sheets and self/peer assessment to determine the level of understanding.

10. Answers

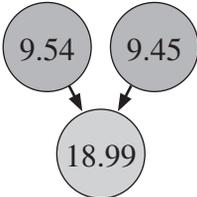
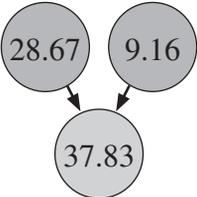
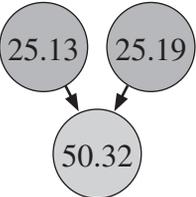
Exercise 1

(LB page 140)

- | | | | | |
|----|--------|--------|---------|---------|
| 1. | a) 1.5 | b) 2.6 | c) 0.11 | d) 3.41 |
| 2. | a) 0.4 | b) 0.9 | c) 0.02 | d) 4.25 |
| 3. | a) 2.1 | b) 8.0 | c) 2.9 | d) 0.6 |
| | e) 5.7 | f) 8.0 | g) 4.6 | h) 5.9 |
| | i) 5.2 | j) 3.1 | | |

Exercise 2

(LB page 140)

1. 
2. 
3. 

Exercise 3

(LB page 141)

1. a) 1.34 b) 1.12 c) 2.44 d) 50.2
e) 709.63 f) 262.91 g) 0.95 h) 0.76

2. a) 0.42 b) 0.65 c) 5.36 d) 27.77
e) 194.36 f) 0.16 g) 11.07 h) 45.64

3. a)

4.4		
1.8	2.6	
0.3	1.5	1.1
- b)

9.6		
3.7	5.9	
0.9	2.8	3.1
- c)

5.3			
	2.7	2.6	
1.3	1.4	1.2	
0.7	0.6	0.8	0.4

Exercise 4

(LB page 142)

- $2.47 + 4.32 = 6.79$ cm
- $3.58 - 2.47 = 1.11$ cm
- $2.3 + 1.06 + 2.47 = 5.83$ cm
- $2.3 + 1.06 + 2.47 + 3.58 + 4.32 = 13.73$ cm
- The first two books: $1.06 + 3.58 = 4.64$ cm
The last three books: $2.3 + 2.47 + 4.32 = 9.09$ cm
Difference: $9.09 - 4.64 = 4.45$ cm

Sub-strand 5: Percentage

The learners will be able to use pictures and concrete materials in expressing percentages.

Content standard	Indicator
B4.1.5.1 Demonstrate an understanding of percentages (limited to whole numbers) concretely, pictorially and symbolically	B4.1.5.1.1 Model or recognise percent as a fraction related to hundredths, using concrete models, pictorial representations and number lines

1. Learning expectations

Learners need to be able to:

- use their understanding of percentages to represent them using concrete objects, models and pictorial representations.

2. Essential for learning

Learners have experience and knowledge of percentage.

3. New words

Percentage (%); hundredth

4. Resources used in this indicator

- Learner's book
- Workbook page 75
- Fraction chart
- 100-number grid

5. Large class teaching

Plan and prepare lessons before the class. Being well-prepared is key to managing a large class. Move around

the class to engage with all learners. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger learners.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining and comparing equivalent values in different formats.

Be aware of specific disabilities that learners may have. In particular, those learners with dyscalculia and visual perception disorders will find many mathematical concepts challenging.

Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

7. Teaching methodology

Use previous lesson work sheets to ensure that all learners understand the concepts of percentages being part of a hundredth.

Let the learners turn to pages 143–148 in the Learner's book. Explain what a percentage is and work through the example together with learners so they can understand the concept. Also explain the instructions for the exercises before the learners start working to be sure they understand how to proceed.

On page 147 it is important that the learners understand how to use long division to convert the fractions to decimals. Explain the example carefully to give the clarity they need. Perhaps do a few more examples on the board before they do the exercises in the Learner's book.

Use YouTube videos that describe the use of percentages.

Find relevant examples of percentage values in real life such as VAT rates, sale reductions, profit/loss case studies, pass rates, rainfall predictions and so on. You may set this as a homework task.

There should be integration of other subjects. Decimal and percentage values are used in other subjects. Be sure to make the connection to the mathematical theory.

8. Homework

Ask learners to find examples of percentages in real life. They should look at newspapers, magazines, television and weather reports to find references to percentage values. Let them see if they can explain what the percentage value means in each context. Additional exercises not completed in class could be used as extension activities or as homework tasks. Further questions are found in the Workbook on page 75 (B4.1.5.1 Exercise 1).

9. Assessment

Use a combination of teacher assessment such as class work activity, work sheets and self/peer assessment to determine the level of understanding.

10. Answers

Exercise 1

(LB page 144)

	Fraction	Decimal	Percentage	Number line
1.	$\frac{32}{100}$	0.32	32%	<p>A vertical number line with arrows at both ends. Major tick marks are labeled 0.30, 0.35, and 0.40. There are 10 small tick marks between each major tick mark, representing increments of 0.005. The value 0.32 is marked and circled in a hand-drawn oval.</p>
2.	$\frac{80}{100}$	0.80	80%	<p>A vertical number line with arrows at both ends. Major tick marks are labeled 0.75 and 0.85. There are 10 small tick marks between each major tick mark, representing increments of 0.01. The value 0.80 is marked and circled in a hand-drawn oval.</p>

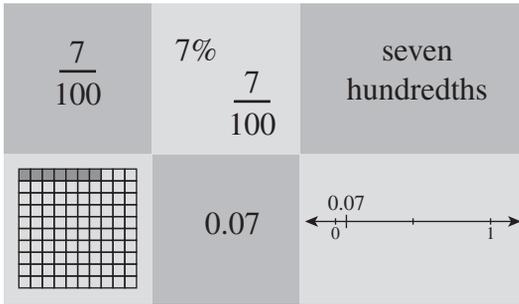
3.	$\frac{56}{100}$	0.56	56%	
4.	$\frac{79}{100}$	0.79	79%	

Exercise 2

(LB page 145)

1.	eight tenths	0.8	$\frac{8}{10}$	2.	two tenths	$\frac{2}{10}$	$\frac{20}{100}$ 20% $\frac{1}{5}$
		$\frac{4}{5}$ 80% $\frac{80}{100}$			0.2		
3.	0.5	$\frac{5}{10}$	$\frac{1}{2}$ 50% $\frac{50}{100}$	4.	$\frac{3}{100}$	0.03	three hundredths
			five tenths		$\frac{3}{100}$ 3%		

5.

**Exercise 3**

(LB page 147)

$$\begin{array}{r} 1. \quad 0.8 \\ 5 \overline{)4.00} \\ \underline{-40} \\ 8 \end{array}$$

$$\begin{array}{r} 2. \quad 0.8 \\ 10 \overline{)8.00} \\ \underline{-80} \\ 8 \end{array}$$

$$\begin{array}{r} 3. \quad 0.5 \\ 2 \overline{)1.00} \\ \underline{-10} \\ 5 \end{array}$$

$$\begin{array}{r} 4. \quad 0.66 \\ 3 \overline{)2.00} \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

$$\begin{array}{r} 5. \quad 0.25 \\ 4 \overline{)1.00} \\ \underline{-08} \\ 20 \\ \underline{-20} \\ 5 \end{array}$$

$$\begin{array}{r} 6. \quad 0.4 \\ 5 \overline{)2.00} \\ \underline{-20} \\ 4 \end{array}$$

$$\begin{array}{r} 7. \quad 00.15 \\ 100 \overline{)15.00} \\ \underline{-100} \\ 500 \\ \underline{-500} \\ 5 \end{array}$$

$$\begin{array}{r} 8. \quad 00.5 \\ 20 \overline{)10.00} \\ \underline{-100} \\ 5 \end{array}$$

Exercise 4

(LB page 148)

Fractions	Decimal	Percentage
$\frac{8}{10}$	0.80	80%
$\frac{2}{3}$	0.66	66%
$\frac{3}{4}$	0.75	75%
$\frac{35}{100}$	0.35	35%
$\frac{14}{100}$	0.14	14%
$\frac{27}{100}$	0.27	27%

Fractions	Decimal	Percentage
$\frac{9}{12}$	0.75	75%
$\frac{6}{10}$	0.60	60%
$\frac{13}{30}$	0.43	43%
$\frac{5}{6}$	0.83	83%

B4.1.5.1.2

Content standard	Indicator
B4.1.5.1 Demonstrate an understanding of percentages (limited to whole numbers) concretely, pictorially and symbolically	B4.1.5.1.2 Compare and order a mixture of common, decimal and percentage fractions up to hundredths

1. Learning expectations

Learners need to be able to:

- use their understanding of percentages to represent them using concrete, models and pictorial representations.

2. Essential for learning

Learners have experience and knowledge of percentage.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 76–77
- Fraction chart
- 100-number grid

5. Large class teaching

Plan and prepare lessons before the class. Being well-prepared is key to managing a large class. Move around the class to engage with all learners. Change seating arrangements to allow different groupings of learners. It may be effective to pair weaker learners with stronger learners.

6. Support for learners with special needs

Ensure that learners understand the language and vocabulary used. Learners should be able to explain their skills in determining and comparing equivalent values in different formats.

Be aware of specific disabilities that learners may have. In particular, those learners with dyscalculia and visual perception disorders will find many mathematical concepts challenging.

Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

7. Teaching methodology

On pages 149–152 the learners will order fractions, decimals and percentages as numbers are represented in different forms. Work through the examples carefully together with the learners so they can clearly understand the process and the concept. They complete the exercises in the Learner's book. Some exercises can be done in pairs and some individually. The learners can work together to compare their answers to assist them with any clarity they may require.

There should be integration of other subjects. Decimal and percentage values are used in other subjects. Be sure to make the connection to the mathematical theory.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 76 and 77 (B4.1.5.1 Exercises 2 and 3).

9. Assessment

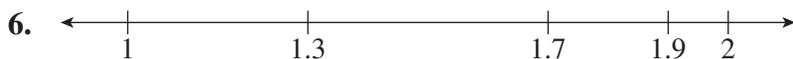
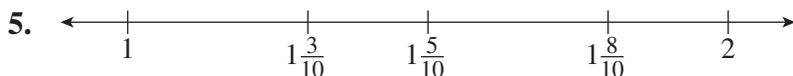
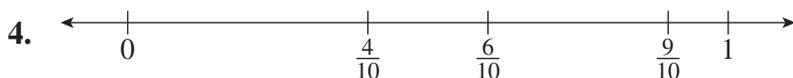
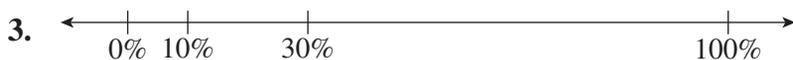
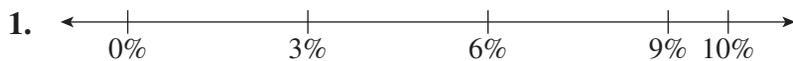
Use a combination of teacher assessment such as class work activity, work sheets and self/peer assessment to determine the level of understanding. When assessing, give learners

recognition of sound logic, give credit to strategy used even if there might be a mechanical error that gives rise to wrong answers.

10. Answers

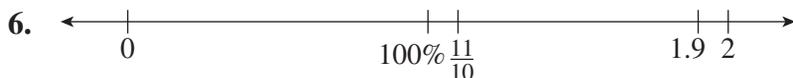
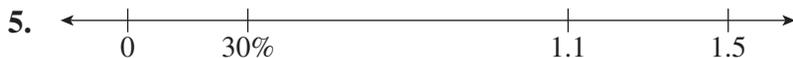
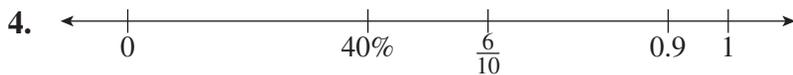
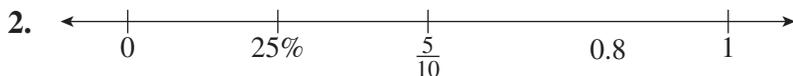
Exercise 1

(LB page 149)



Exercise 2

(LB page 150)



Exercise 3

(LB page 151)

1.

Decimal	Percentage	Fraction
0.75	75%	$\frac{3}{4}$
0.2	20%	$\frac{1}{5}$
0.33	33%	$\frac{1}{3}$
0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$

2. a) no, $33\% < 50\%$ $\therefore \frac{1}{3}$ is not greater than 0.5.
b) $\frac{1}{3}$ is smaller than 0.75. ($33\% < 75\%$)

Sub-strand 1: Patterns and relationships

The learner will be able to identify and describe patterns found in tables and charts.

Content standard	Indicator
B4.2.1.1 Demonstrate an understanding of how to identify and describe patterns found in tables and charts, including a multiplication chart	B4.2.1.1.1 Describe the pattern found in a given table or chart

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of how to describe patterns found in tables and charts.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Workbook pages 78–80
- Grids/charts with number patterns

5. Large class teaching

Plan and prepare before the start of the class. Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy

and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

Use effective questioning techniques. Effective questioning techniques must engage the learners. Many teachers do not give learners enough time to answer the question. Give wait time after you asked a question, wait a few extra seconds before asking for volunteers. By extending the wait time, learners have time to process their ideas and produce more thoughtful answers. When the learners have bit more time to think they can organise their reasoning and they will be more confident in their response.

Show and tell new concepts. Start each lesson with a ‘show and tell.’ Telling is the process of sharing information and knowledge with learners, while showing involves modelling how to do something. Carefully plan how you can clearly show and tell specific concepts in Mathematics in an engaging and interesting way.

6. Support for learners with special needs

Be aware of learners with dyscalculia. Dyscalculia is a specific learning disability in Mathematics, and it can show up when working with patterns. Learners with dyscalculia may have difficulty understanding the concepts in this strand; they often do not understand concepts such as biggest vs smallest. This might impact on their understanding of number patterns. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner’s understanding of number patterns. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Recognising, describing and generalising patterns are important to develop understanding of algebra and provide powerful tools for problem solving. A table displays positional relationships in patterns and is an important early stage in the development of algebraic thinking and reasoning.

Learners should verbalise and communicate rules to help them understand the predictability of a pattern. Remember that these patterning concepts are the basis for further algebraic thinking and will be extended in later grades.

Have the learners turn to page 153 in the Learner's book. Introduce the concept of patterns by working through the multiplication table below or do Exercise 1 together as a class activity.

Display the multiplication grid and talk about the number patterns. Show learners the line of symmetry in the multiplication grid. It is on the diagonal and formed by the square numbers. Half of the multiplication grid is a mirror image of the other. Note the tables are repeated due to the commutative property of multiplication: $9 \times 4 = 36$ is the same as $4 \times 9 = 36$.

	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4								20
3	3	6	9							30
4	4	8	12	16						40
5	5	10	15	20	25					50
6	6	12	18	24	30	36				60
7	7	14	21	28	35	42	49			70
8	8	16	24	32	40	48	56	64		80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Multiplication patterns help learners to remember the tables and can be used to verify the products. There are many fascinating patterns on the grid. Here are some that you can share with the learners.

- Show learners the multiples of two are even and always end in 0; 2; 4; 6 or 8.
- Show learners the multiples of three. Every alternate number is an even number (3; 6; 9; 12; 15; 18; 21; 24; 27; 30).
- Multiplication by 4 does not end with 1; 3; 5; 7 or 9. In the ones column it ends with 0; 2; 4; 8. Trick: Double the number and then double it again.
- Show learners the multiples of seven. Every alternate number is an even number.
- Show learners the multiples of six are all even numbers.
- Show the learners that the digits of the multiples of nine add up to 9.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook: B4.2.1.1 Exercise 1 on pages 78–80.

For extension work more advanced patterns can be found by exploring Fibonacci numbers and the golden section in nature, seeds, flowers and petals. Advanced learners may be interested in extending their knowledge.

9. Assessment

Individual assessment

1. Learners identify the type of pattern.

Number pattern	Increasing or decreasing number pattern	Pattern rule
312; 315; 318; 321; 324; 327; 330	Increasing	Add three
280; 275; 270; 265; 260; 255; 250	Decreasing	Subtract 10

The following activity requires more input from the learner.

2. Write down the next two terms for each sequence below.

Number pattern	Increasing or decreasing number pattern	Pattern rule
60; 63; 66; 69; 72; <u> 75 </u> ; <u> 78 </u>	Increasing	Add three
28; 25; 22; 19; 16; 13; <u> 10 </u> ; <u> 7 </u>	Decreasing	Subtract three

Number pattern	Increasing or decreasing number pattern	Pattern rule
285; 280; 275; 270; 265; <u> 260 </u> ; <u> 255 </u>	Decreasing	Subtract five
3; 6; 12; 24; 48; <u> 96 </u> ; <u> 192 </u>	Increasing	Double it
800; 400; 200; 100; <u> 50 </u> ; <u> 25 </u>	Decreasing	Halve it

10. Answers

Exercise 1

(LB page 153)

- 906; 908; 910; 912; 914; 916; 918; 920; 922; 924; 926; 928; 930; 932; 934; 936.
- 910; 920; 930; 940; 950; 960; 970; 980; 990.
- 950; 955; 960; 965; 970; 975; 980; 985; 990; 995; 1,000.
- 1,000; 1,002; 1,004; 1,006; 1,008; 1,010; 1,012; 1,014; 1,016; 1,018; 1,020.

Exercise 2

(LB page 154)

- 9,920; 9,930; 9,940; 9,950; 9,960; 9,970; 9,980; 9,990.
- 9,906; 9,912; 9,918; 9,924; 9,930; 9,936; 9,942; 9,948; 9,954; 9,960; 9,966; 9,972; 9,978.
- 9,928; 9,936; 9,944; 9,952; 9,960; 9,968; 9,976; 9,984; 9,992.
- 9,940; 9,947; 9,954; 9,961; 9,968; 9,975; 9,982.

Exercise 3

(LB page 154)

- | | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
- | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|
| 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1,000 | 1,100 | 1,200 |
- | | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1,000 | 900 | 800 | 700 | 600 | 500 | 400 | 300 | 200 | 100 |
| 995 | 895 | 795 | 695 | 595 | 495 | 395 | 295 | 195 | 95 |

4. 70; 90; 110; 130; 150; 170; 190

1	3	5	7	9	11	13	15	17	19
10	30	50	70	90	110	130	150	170	190

Exercise 4

(LB page 155)

- 35; 42; 49; 56; 63; 70; 77; 84; 91
- 300; 291; 282; 273; 264; 255; 246; 237; 228
- 99; 108; 117; 126; 135; 144; 153; 162; 171
- 99; 106; 113; 120; 127; 134; 141; 148; 155
- 210; 203; 196; 189; 182; 175; 168; 161; 154
- 172; 166; 160; 154; 148; 142; 136; 130; 124

Exercise 5

(LB page 155)

1.	halve	40	42	44	46	48	50	52	54
	double	80	84	88	92	96	100	104	108
2.	double	220	240	260	280	300	320	340	360
	halve	110	120	130	140	150	160	170	180

Exercise 6

(LB page 156)

$4 + 6 = 10$	$10 \times 5 = 50$	$2 \times 2 = 4$	$3 \times 10 = 30$
$14 + 6 = 20$	$20 \times 5 = 100$	$4 \times 4 = 16$	$6 \times 10 = 60$
$24 + 6 = 30$	$30 \times 5 = 150$	$6 \times 6 = 36$	$12 \times 10 = 120$
$34 + 6 = 40$	$40 \times 5 = 200$	$8 \times 8 = 64$	$24 \times 10 = 240$
$44 + 6 = 50$	$50 \times 5 = 250$	$10 \times 10 = 100$	$48 \times 10 = 480$
$54 + 6 = 60$	$60 \times 5 = 300$	$12 \times 12 = 144$	$96 \times 10 = 960$
$64 + 6 = 70$	$70 \times 5 = 350$	$14 \times 14 = 196$	$192 \times 10 = 1,920$
_____	_____	_____	_____

Exercise 7

(LB page 156)

- | | |
|--------------------|--------------------|
| 1. $198 - 6 = 192$ | 2. $365 - 5 = 360$ |
| $188 - 6 = 182$ | $355 - 5 = 350$ |
| $178 - 6 = 172$ | $345 - 5 = 340$ |
| $168 - 6 = 162$ | $335 - 5 = 330$ |

3. $4 \times 2 = 8$
 $40 \times 2 = 80$
 $400 \times 2 = 800$
 $4,000 \times 2 = 8,000$
 $40,000 \times 2 = 80,000$
4. $70 \times 2 = 140$
 $140 \times 2 = 280$
 $210 \times 2 = 420$
 $280 \times 2 = 560$
 $350 \times 2 = 700$
5. $550 \div 11 = 50$
 $660 \div 11 = 60$
 $770 \div 11 = 70$
 $880 \div 11 = 80$
 $990 \div 11 = 90$
6. $550 \div 10 = 55$
 $660 \div 10 = 66$
 $770 \div 10 = 77$
 $880 \div 10 = 88$
 $990 \div 10 = 99$
7. $3 + 12 = 15$
 $13 + 12 = 25$
 $23 + 12 = 35$
 $33 + 12 = 45$
8. $101 + 90 = 191$
 $1,101 + 90 = 1,191$
 $2,101 + 90 = 2,191$
 $3,101 + 90 = 3,191$

Exercise 8

(LB page 157)

1. Halve numbers from 30,000 to 25,000.

Double	30,000	29,000	28,000	27,000	26,000	25,000
Halve	15,000	14,500	14,000	13,500	13,000	12,500

2. Number + 6 for numbers from 612 to 622.

Number	612	613	614	615	616
+6	618	619	620	621	622

3. Halve numbers from 12,030 to 12,130 counting in 20s.

Double	12,030	12,050	12,070	12,090	12,110	12,130
Halve	6,015	6,025	6,035	6,045	6,055	6,065

B4.2.1.1.2

Content standard	Indicator
B4.2.1.1 Demonstrate an understanding of how to identify and describe patterns found in tables and charts, including a multiplication chart	B4.2.1.1.2 Determine the missing element(s) in a given table or chart

1. Learning expectations

Learners need to be able to:

- determine the missing elements in given tables and charts.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Workbook page 81
- Grids/charts with number patterns

5. Large class teaching

Plan and prepare before the start of the class. There are many important pedagogical decisions that you have to make before teaching a large class.

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

Use a variety of teaching methods. Engage the learners and promote active participation.

Do not overly focus on the weak learners. Sometimes weaker learners require so much extra attention that those who want to learn may be ignored. Reflect on how each

class was and note changes that you can make the next time you teach the same topic. It may be possible to pair weaker learners with those who are more capable and set up a ‘buddy’ system.

6. Support for learners with special needs

Focus on the learners’ strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

7. Teaching methodology

Have the learners turn to page 158 in the Learner’s book. Explain that they need to identify the missing elements. Learners may complete these exercises individually or in small groups.

Learners should verbalise and communicate rules to help them understand the predictability of a pattern. Remember that these patterning concepts are the basis for further algebraic thinking and will be extended in later grades. Encourage learners to use the correct language to explain how they have identified missing elements.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on page 81, B4.2.1.1 Exercise 2.

9. Assessment

Diagnostic assessment

Use the table below by leaving out parts of it and asking the learners to explain how to complete it. That way you will see where their strengths are, and you can then guide them by explaining the weaknesses in knowledge and skills before you formally explain the content.

	Sequence	Next two terms in the pattern	Rule
a)	18; 27; 36; 45; 54	63; 72	Add 9 to the previous term
b)	42; 49; 56; 63; 70	77; 84	Add 7 to the previous term
c)	4; 8; 16; 32; 64	128; 256	Multiply the term by two or double the previous term
d)	10; 100; 1,000; 10,000	100,000; 1,000,000	Multiply the term by ten
e)	125; 145; 165; 185	205; 225	Add 20 to the previous term
f)	3; 9; 27; 81	243; 729	Multiply the term by three
g)	900; 850; 800; 750	700; 650	Subtract 50 from the previous term

10. Answers

Exercise 1

(LB page 158)

1. Number + 6 for numbers from 5,001 to 5,018

Number	5,001	5,002	5,003	5,004	5,005	5,006
+6	5,007	5,008	5,009	5,010	5,011	5,012
+6	5,013	5,014	5,015	5,016	5,017	5,018

2. Number + 12 for odd numbers from 1,471 to 1,505

Number	1,471	1,473	1,475	1,477	1,479	1,481
+12	1,483	1,485	1,487	1,489	1,491	1,493
+12	1,495	1,497	1,499	1,501	1,503	1,505

Exercise 2

(LB page 158)

- 1.

double		round up to 10
846	423	430
612	306	310
4,022	2,011	2,020

2.	halve		double
	3,000	6,000	12,000
	1,004	2,008	4,016
	5,110	10,220	20,440
	10,250	20,500	41,000

B4.2.1.1.3

Content standard	Indicator
B4.2.1.1 Demonstrate an understanding of how to identify and describe patterns found in tables and charts, including a multiplication chart	B4.2.1.1.3 Identify the error(s) in a given table or chart

1. Learning expectations

Learners need to be able to:

- identify errors in given tables and charts.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Workbook page 81

5. Large class teaching

Plan your learning outcomes and clearly articulate what you want your learners to get out of the class. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

Give wait time after you ask a question, wait a few extra seconds before asking for volunteers. By extending the wait time, learners have time to process their ideas and produce more thoughtful answers. When the learners have more time to think they can organise their reasoning and they will be more confident in their response.

Generally, learners have short attention spans and lose focus after 10 to 15 minutes. Break the content into smaller segments. For example, teach for 15 minutes, and then get the learners involved in activities. Intersperse your teaching with visual examples. Make sure each lesson has at least one exciting example: visual examples of number patterns in real life can help to solidify their understanding of the concept.

6. Support for learners with special needs

Be aware of learners with visual perception disorders. Not all learners process the information immediately. Some learners have a neurological disorder that might lead to difficulty in seeing the logic of mathematical calculations. They tend to see it as one chunk of work and not several steps. Visual perception disorders fall under the umbrella of learning disorders. Many learners with ADHD may also have a type of visual perception disorder.

Offer learners with visual perception disorders need a multisensory approach to learning. Take advantage of all the senses to help them to interact with the content. Plan to repeat instructions and present information in both written and oral formats. Encourage cooperative learning activities when possible. Create an atmosphere of a community of learners to enhance the learning process.

7. Teaching methodology

Have the learners turn to pages 159–160 in the Learner's book. Explain that they need to identify errors in the charts and tables. Learners may complete these exercises individually or in small groups. Work through the first question of each exercise with your learners, it may be difficult for them to understand that there is a given error. Encourage learners to use the correct language to explain how they have identified the errors.

We want learners to make connections between the patterns and addition and multiplication facts. Use the correct mathematical language with the learners to assist them to talk through their thinking. For example, 3, 6, 9, 12... learners describing this pattern may say, “It goes up by threes”, or, “It looks like the three times tables”. Encourage learners to refer to this pattern as showing the “multiples of threes”. This wider classification will help learners when they are required to find solutions to problems involving finding higher terms, for example the 8th term in a pattern.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on page 81, B4.2.1.1 Exercise 3.

9. Assessment

Self/peer assessment

Ask learners to work in pairs and then assess each other’s patterns. This can be a valuable activity to help the learners to identify numbers that should not be in the pattern. Use the following as examples.

- a) Create three different decreasing sequences, starting at 500 and show the common difference. Describe the rule used to generate the sequence.

Solution:

500; 450; 400; 350; 300: Subtract 50 from the term to get the next term

500; 490; 480; 470; 460: Subtract 10 from the term to get the next term

500; 100; 20; 4; 0.8: Divide by five to get the next term

- b) Create three different growing sequences, starting at 900 and show the common difference. Describe the rule used to generate the sequence.

Solution:

900; 950; 1,000; 1,050; 1,100: Add 50 to the term to get the next term

900; 1,800; 3,600; 7,200: Multiply by two to get the next term

900; 9,000; 90,000; 900,000: Multiply by 10 to get the next term

- c) Create three different patterns using shapes like triangles, circles and squares. Describe the rule used to generate the sequence.

Solution:

\triangle ; $\triangle\triangle$; $\triangle\triangle\triangle$; $\triangle\triangle\triangle\triangle$; $\triangle\triangle\triangle\triangle\triangle$: Add one triangle

10. Answers

Exercise 1

(LB page 159)

- Rule: Add 10 to the first row of numbers odd numbers from 588 to 597.
- Error 1: 590 should be 589; Error 2: 592 should be 593.

Exercise 2

(LB page 159)

1. Number sentences

$12 \times 6 = 72$
 $8 \times 6 = 48$
 $3 \times 6 = 18$
 $9 \times 6 = 54$
 $20 \times 6 = 120$
 $6 \times 6 = 36$
 $10 \times 6 = 60$
 $7 \times 6 = 42$

Corrections

12	$\times 6$	72
8		48
3		18
9		54
20		120
6		36
10		60
7		42

2. a)

Number of bicycles	20	25	30	35
Number of wheels	40	50	60	70
- b)

Number of cars	16	40	100	400
Number of wheels	64	160	400	1,600
- c)

Number of ants	1	12	7	10
Number of legs	6	72	42	60
- d)

Number of spiders	1	12	9	8
Number of legs	8	96	72	64

Sub-strand 1: Patterns and relationships

The learner will be able to identify and describe patterns found in tables and charts.

Content standard	Indicator
B4.2.1.2 Translate among different representations of a pattern, such as a table, a chart or concrete material	B4.2.1.2.1 Create a concrete representation of a given pattern displayed in a table or chart

1. Learning expectations

Learners need to be able to:

- create concrete representations of a given pattern.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Workbook page 82
- Dice; cubes; straws; sheets of paper

5. Large class teaching

Plan and prepare before the start of the class. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities. Design a variety of activities to

ensure the learners achieve the learning outcomes. Decide on what techniques you will use to ensure active participation. Ensure your content is engaging and memorable.

Use a variety of teaching methods like activities in pairs or groups. Identify and prepare the resources and materials you will need for the lesson. Ensure that you have enough concrete resources for everyone to participate in building patterns. Be creative and use pebbles, straws and differently shaped paper cut-outs as materials. Engage the learners and promote active participation.

6. Support for learners with special needs

Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement.

Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty understanding several instructions at once.

Be aware of learners with visual perception disorders. Offer learners with visual perception disorders need a multisensory approach to learning. Take advantage of all the senses to help them to interact with the content. Plan to repeat instructions and present information in both written and oral formats.

7. Teaching methodology

Have the learners turn to page 161 in the Learner's book. This lesson is a practical one. Adapt the instructions and exercises to your circumstances. It may be better to complete the activities as a whole class or in small groups. Work through similar examples at first to show them what to do.

Use physical objects like beads and straws so that learners can build consecutive pictures in a pattern. This will help them to get a feel for how the number sequence which the pattern represents is extended, and thus to get a feel for the rule or general term of the sequence.

The purpose of teaching through a concrete-to-representational-to-abstract sequence of instruction is to ensure that learners develop a tangible understanding of the concepts. This will also help develop the skills the learners need in order to describe and generate arithmetic

and geometric sequences later on as part of algebra. When learners are supported to first develop a concrete level of understanding for any mathematical concept, they can use this foundation to later link their conceptual understanding to abstract Mathematics learning activities. Have learners represent their concrete understandings by drawings, as this process will support the transfer of their concrete understandings to the abstract.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on page 82, B4.2.1.2 Exercise 1.

9. Assessment

Teacher assessment

Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 161)

These questions have a practical element.

- Learners model the patterns with cubes.

Number of cubes	1	2	3	4	5	6
Number of faces	6	12	18	24	30	36

- Learners model the patterns making triangles with straws.

Number of triangles	1	2	3	4	5	6
Number of points	3	6	9	12	15	18

- Learners model the patterns making patterns with pages or sheets of paper.

Number of rectangles	1	2	3	4	5	6
Number of corners	4	8	12	16	20	24

B4 2.1.2.2

Content standard	Indicator
B4.2.1.2 Translate among different representations of a pattern, such as a table, a chart or concrete material	B4.2.1.2.2 Create a table or chart from a given concrete representation of a pattern.

1. Learning expectations

Learners need to be able to:

- create a table or chart from a concrete representation of a given pattern.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Cut-out shapes. dice; cubes; straws

5. Large class teaching

Move around. In a traditional class the teacher stands in front of the class and interacts with the few learners sitting in the front of the class. To engage all the learners in a larger class you must walk around in the classroom.

Generally, learners have short attention spans and lose focus after 10 to 15 minutes. Break the content into smaller segments. For example, teach for 15 minutes, and then get the learners involved in activities. Intersperse your teaching with visual examples. Make sure each lesson has at least one exciting example: visual examples of number patterns in real life can help to solidify their understanding of the concept.

6. Support for learners with special needs

Be aware of learners with dyscalculia. Dyscalculia is a specific learning disability in Mathematics, and it can show up when working with patterns. Learners with dyscalculia

may have difficulty understanding the concepts in this strand; they often do not understand concepts such as biggest vs smallest. This might impact on their understanding of number patterns. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner's understanding of number patterns. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Have the learners turn to pages 162–163 in the Learner's book. You may present this lesson as a practical one by using shapes and cut-outs to represent the patterns in the book. Adapt the instructions and exercises to your circumstances. Work through similar examples at first to show them what to do. Learners will work from the pattern to the chart in this case.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks.

9. Assessment

Teacher assessment

Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 162)

1.

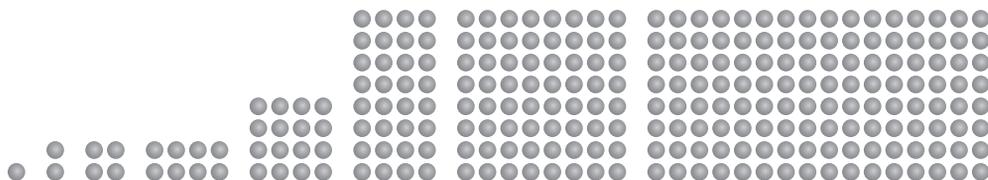


Image	Number of circles
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128



Image	Number of points
1	3
2	5
3	7
4	9
5	11
6	13
7	15



Image	Number of blocks
1	1
2	3
3	5
4	7
5	9
6	11
7	13

Sub-strand 1: Patterns and relationships

The learner will be able to identify and describe patterns found in tables and charts.

Content standard	Indicator
B4.2.1.3 Represent, describe and extend patterns and relationships, using charts and tables, to solve problems	B4.2.1.3.1 Translate the information in a given problem into a table or chart

1. Learning expectations

Learners need to be able to:

- represent information as a pattern in a chart or table to solve a problem.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Dice; cubes

5. Large class teaching

Plan and prepare before the start of the class. There are many important pedagogical decisions that you have to make before teaching a large class. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

Use effective questioning techniques. Effective questioning techniques must engage the learners. Many teachers do not give learners enough time to answer the question. Give wait time after you asked a question, wait a few extra seconds before asking for volunteers. By extending the wait time, learners have time to process their ideas and produce more thoughtful answers. When the learners have bit more time to think they can organise their reasoning and they will be more confident in their response.

6. Support for learners with special needs

Focus on the learners' strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete certain tasks. One way you can move a learner from such a negative attitude is to focus on his or her strengths. Let each learner know that you believe in them.

Offer learners with visual perception disorders need a multisensory approach to learning. Take advantage of all the senses to help them to interact with the content. Plan to repeat instructions and present information in both written and oral formats. Encourage cooperative learning activities when possible. Create an atmosphere of a community of learners to enhance the learning process.

7. Teaching methodology

Have the learners turn to page 164 in the Learner's book. This can be done as a whole class or group activity. This is a practical lesson where learners are encouraged to work with concrete elements to complete a chart. Adapt the instructions and exercises to your circumstances.

Learners are required to be able to generate number patterns, describe and record the patterns using diagrams, words or symbols. Play games like 'guess my rule' for example 112, 120, 128,what is my rule? This will provide learners with the chance to talk about patterns and to apply their knowledge. Gently guide the learners to use the correct terminology. We also want learners to make connections between the patterns they are creating and describing with addition and multiplication facts.

Show learners how to generate increasing and decreasing pattern. In an increasing pattern, the values increase: you add. In a decreasing pattern, the values get less: you subtract.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Teacher assessment

Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 164)

1. a) Multiples of 9

12	108
11	99
10	90
9	81
8	72
7	63

- b) Learners model the pattern with cubes.
- c) Learners describe how their models represent the pattern.

2. a) Multiples of 8

10	80
9	72
8	64
7	56
6	48
5	40

- b) Learners model the pattern with cubes.
- c) Learners describe how their models represent the pattern.

3. a) Multiples of 6

3	18
6	36
12	72
24	144
48	288
96	576

- b) Learners model the pattern with cubes.
c) Learners describe how their models represent the pattern.

4. a) Multiples of 10.

1	10
10	100
100	1,000
1,000	10,000
10,000	100,000

- b) Learners model the pattern with cubes.
c) Learners describe how their models represent the pattern.

B4.2.1.3.2

Content standard	Indicator
B4.2.1.3 Represent, describe and extend patterns and relationships, using charts and tables, to solve problems	B4.2.1.3.2 Identify and extend the patterns in a table or chart to solve a given problem

1. Learning expectations

Learners need to be able to:

- identify and extend patterns in a chart or table to solve a problem.

2. Essential for learning

Learners have experience with patterns and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words used in this indicator.

4. Resources used in this indicator

- Learner's book
- Workbook page 83

5. Large class teaching

Plan and prepare before the start of the class. There are many important pedagogical decisions that you have to make before teaching a large class. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities.

Do not overly focus on the weak learners. Sometimes weaker learners require so much extra attention that those who want to learn may be ignored. Reflect on how each class was and note changes that you can make the next time you teach the same topic. It may be possible to pair weaker learners with those who are more capable and set up a 'buddy' system.

6. Support for learners with special needs

Be aware of learners with dyscalculia. Dyscalculia is a specific learning disability in Mathematics, and it can show up when working with patterns. Learners with dyscalculia may have difficulty understanding the concepts in this strand; they often do not understand concepts such as biggest vs smallest. This might impact on their understanding of number patterns. One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. This can help strengthen the learner's understanding of number patterns. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

7. Teaching methodology

Have the learners turn to page 165 in the Learner's book. Adapt the instructions and exercises to your circumstances.

Work through similar examples at first to show them what to do. Learners may work as a class activity at first and then in pairs.

Provide learners with the chance to talk about patterns and to apply their knowledge. Gently guide the learners to use the correct terminology. We also want learners to make connections between the patterns they are creating and describing with addition and multiplication facts. Use the correct mathematical language with the learners to assist them to talk through their thinking.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on page 83, B4.2.1.3 Exercise 1.

9. Assessment

Assess learners' work by observation in class. There will also be peer assessment as they check each other's work.

10. Answers

Exercise 1

(LB page 165)

1. a) A

1	2
2	7
3	12
4	17
5	22
6	27
7	32
8	37
9	42

B

1	5
2	10
3	15
4	20
5	25
6	30
7	35
8	40
9	45

- b) Learners will give their own answers. They should explain how both patterns increase by 5 but starting at different points. Table B gives multiples of 5, whereas Table A is counting in 5s starting from 2.

2. Learners work in pairs and create their own patterns.

Sub-strand 2: Unknowns, expressions and equations

The learner will be able to express a given problem as an equation in which a symbol is used to represent the unknown and solve the equation.

Content standard	Indicator
B4.2.2.1 Express a given problem as an equation in which a symbol is used to represent an unknown number	B4.2.2.1.1 Write a given problem as an equation in which a symbol is used to represent an unknown number

1. Learning expectations

Learners need to be able to:

- express a given problem as an equation.
- use a symbol to represent an unknown number.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

Symbol; unknown

4. Resources used in this indicator

- Learner's book
- Workbook page 84

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Consider these guidelines when you plan the lesson:

- Prepare your teaching strategy and activities in advance.
- Decide on what techniques you will use to ensure active participation.
- Consider examples that will challenge the learners and provoke critical thinking.

Use a variety of teaching methods to engage the learners and to promote active participation. Intersperse teaching the content with activities and visual examples.

Show and tell new concepts. Start each lesson with a ‘show and tell.’ Show and tell specific concepts in Mathematics in an engaging and interesting way.

6. Support for learners with special needs

Focus on the learner’s strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Let each learner know that you believe in them. All special-needs learners are capable of success. Each learner will succeed according to individual ability, but all can succeed. Keep that constantly in mind when working with special-needs learners in your class.

Give immediate feedback to these learners as they need to quickly see the relationship between what was taught and what was learned. Make activities short, whenever possible. Long, drawn-out activities can be frustrating for these learners.

7. Teaching methodology

Have the learners turn to page 166 in the Learner’s book. Read through the page as a class. Allow time for questions and discussion. Work through some examples on the board at first to show them what to do. Learners work through the exercises individually.

This sub-strand is all about setting the foundations for algebra. Spend some time on the language of algebra towards the end of teaching time, once learners have spent some time exploring the concepts. Ensure that they understand what is meant by an unknown, an expression and an equation.

8. Homework

Additional exercises not completed in class could be used as

homework tasks. Further exercises are found in the Workbook on page 84, B4.2.2.1 Exercises 1 and 2.

9. Assessment

Individual assessment

Ask learners to represent a simple addition problem as an equation with an unknown. This should give you an idea of how much the learner has understood.

Diagnostic assessment

Ask a series of simple addition and subtraction problems orally and let learners write them as number sentences using unknowns.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 167)

- | | |
|--------------------------------|--------------------------------|
| 1. $45 = 9 \times 5$ | 2. $108 \div 9 = 12$ |
| 3. $8 \times 8 = 64$ | 4. $30 \times 2 = 60$ |
| 5. $50 + 50 = 100$ | 6. $10 \times 10 = 100$ |
| 7. $93 - 33 = 60$ | 8. $56 \div 7 = 8$ |
| 9. $\frac{1}{2}$ of 64 = 32 | 10. $6 \times 6 \times 2 = 72$ |
| 11. $5 \times 5 \times 2 = 50$ | 12. $16 = 4 \times 4$ |

Exercise 2

(LB page 167)

- | | | | | |
|--------|--------|--------|--------|--------|
| 1. 13 | 2. 10 | 3. 12 | 4. 10 | 5. 11 |
| 6. 5 | 7. 7 | 8. 12 | 9. 8 | 10. 2 |
| 11. 10 | 12. 22 | 13. 50 | 14. 9 | 15. 3 |
| 16. 5 | 17. 12 | 18. 5 | 19. 70 | 20. 20 |

B4.2.2.1.2

Content standard	Indicator
B4.2.2.1 Express a given problem as an equation in which a symbol is used to represent an unknown number	B4.2.2.1.2 Express a given pictorial or concrete representation of an equation in symbolic form

1. Learning expectations

Learners need to be able to:

- express a given pictorial representation of an equation using symbols.
- express a given concrete representation of an equation using symbols.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book

5. Large class teaching

Plan and prepare before the start of the class. When teaching a large class your lesson planning is of utmost importance. Prepare your teaching strategy and activities in advance. Learners in large classes will be more attentive if they are exposed to a variety of learner-centred activities. Decide on what techniques you will use to ensure active participation. Identify and prepare the resources and materials you will need for the lesson. Consider examples that will challenge the learners and provoke critical thinking.

6. Support for learners with special needs

Break down instructions into smaller, manageable tasks. Learners with special needs often have difficulty

understanding several instructions at once. For a learner with special needs you might have to break down a process into a few smaller steps to ensure learners with special needs understand what you are asking. Ask learners with special needs to repeat the instructions and ask them to demonstrate that they understand. Do not give further instructions until a learner has completed the previous task.

Be aware of learners with dyscalculia. Dyscalculia is a specific learning disability that may be as common as dyslexia. Learners with dyscalculia may have difficulty understanding the concepts in this strand. They often do not understand concepts such as biggest vs smallest. This might impact on their understanding of equations and comparison. Learners with dyscalculia also have trouble with the mechanics of doing Mathematics, like identifying the operation needed to make two sides of an equation equal.

7. Teaching methodology

Learners must be able to translate from the concrete representation of a problem to the abstract symbolic form used in algebra. Ensure that enough time and practice is given to this activity. Give the learners manipulatives (blocks and counters) and set simple addition and subtraction problems. Let them represent the problems using the counters and then write the equation. This can be done as a class activity.

Have the learners turn to page 168 in the Learner's book. Work through the example with them. Allow time for questions and discussion. The focus here is not on solving the problem but rather on writing the problem as an equation and using a symbol to represent the unknown. Work through some examples on the board at first to show them what to do. Learners work through the exercises individually.

Once learners are secure in applying manipulatives to solving problems concretely or pictorially, you can move on to more formal mathematical language. You start by setting simple addition and subtraction problems and allow learners to develop these problems from a concrete representation to a written format with a symbol representing the unknown.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 168)

Learners should draw diagrams to help understand the problem.

1. $4 + 8 + \square = 24$; $\square = 12$

2. $3 + 18 + \square = 25$; $\square = 4$

3. $12 + \square = 18$; $\square = 6$

4. $150 \div 30 = \square$; $\square = 5$

5. $4 \times 12 = \square$; $\square = 48$

6. $15:00 + 40 = \square$; $\square = 15:40$

7. $12 \times 8 = \square$; $\square = 96$

8. $\square^2 = 16$; $\square = 4$

Sub-strand 2: Unknowns, expressions and equations

The learner will be able to express a given problem as an equation in which a symbol is used to represent the unknown and solve the equation.

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.1 Solve a given one-step equation using manipulatives

1. Learning expectations

Learners need to be able to:

- solve a given one-step equation.
- use a symbol to represent an unknown number.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Pan balance

5. Large class teaching

When teaching a large class, it is particularly important to plan and prepare before the start of the class. Use a variety of teaching methods to engage the learners and to promote active participation.

Use effective questioning techniques. Give learners enough time to answer questions. This gives learners time to process their ideas and produce more thoughtful answers. Intersperse teaching the content with activities and visual examples.

6. Support for learners with special needs

One of the strategies to help learners with dyscalculia is to use concrete examples, with visual aids, to connect Mathematics to real life. You can help a learner with dyscalculia to focus by using a piece of paper to cover up all their work except for the problem they are working on. The learner is then able to focus on one problem at a time and one step at a time.

One of the key problems for dyscalculic learners is retention of basic mathematical facts and procedures in their long-term memory. Patiently help learners with dyscalculia to identify their errors. Do not just say, ‘wrong’. Explain and show why it is wrong.

7. Teaching methodology

Once learners are secure in applying manipulatives to represent problems concretely or pictorially, move on to solving the problems. Ensure that learners understand that the symbol is simply a placeholder and that any symbol can be used. Do not use letters at this stage.

Have the learners complete the exercises on page 170 in the Learner’s book. Work through the first few with them. Allow the learners to be creative and use any method to solve the equations. Ideally these should be solved using the pan balance.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 170)

1. 5 2. 8 3. 20 4. 6 5. 6
6. 54 7. 10 8. 10 9. 75 10. 30
11. 75 12. 60 13. 5 14. 17 15. 45
16. 12 17. 9 18. 9

B4.2.2.2.2

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.2 Describe orally, the meaning of a given one-step equation with one unknown

1. Learning expectations

Learners need to be able to:

- describe the meaning of a given one-step equation, with one unknown.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.

- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

Focus on the learner's strengths and be supportive of their weaknesses. Special-needs learners need a great deal of encouragement. Let each learner know that you believe in them. All special-needs learners are capable of success. Each learner will succeed according to individual ability, but all can succeed. Keep that constantly in mind when working with special-needs learners in your class.

One of the key problems for dyscalculic learners is retention of basic mathematical facts and procedures in their long-term memory. Patiently help learners with dyscalculia to identify their errors. Do not just say, 'wrong'. Explain and show why it is wrong.

Give immediate feedback to these learners as they need to quickly see the relationship between what was taught and what was learned. Make activities short, whenever possible. Long, drawn-out activities can be frustrating for these learners.

7. Teaching methodology

Learners should begin by constructing the problem with manipulatives and describing the scenario orally before moving to written formats. This will cement the relationships between the variables in the problem with the unknown and allow learners to use all their senses in solving the problem. This is the basis for further algebraic thinking and will be extended in later grades. Many learners struggle with the abstract concept of an unknown and this understanding must be firmly developed at this stage.

Have your learners work in pairs or small groups. Walk around and monitor the discussions. Have some groups explain their thinking to the rest of the class. Allow time for discussion and sharing of ideas.

8. Homework

Ask learners to think of five more problems that can be discussed the following day. Learners can then swap their problems and discuss ways of solving them.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 171)

Learners should work in pairs and discuss how they would solve these problems.

- | | | | |
|--------|--------|--------|--------|
| 1. 7 | 2. 11 | 3. 12 | 4. 7 |
| 5. 24 | 6. 35 | 7. 54 | 8. 108 |
| 9. 12 | 10. 34 | 11. 30 | 12. 62 |
| 13. 12 | 14. 8 | 15. 11 | 16. 5 |

B4.2.2.2.3

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.3 Solve a given equation when the unknown is on the left or right side of the equation

1. Learning expectations

Learners need to be able to:

- solve a given equation when the unknown is on either side of the equation.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Base-10 blocks

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.
- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

When teaching learners with special needs remember:

- Focus on the learner's strengths and be supportive of their weaknesses.
- Break down instructions into smaller, manageable tasks.
- Be aware of learners with dyscalculia.
- Be aware of learners with visual perception disorders.
- Give immediate feedback to these learners.

7. Teaching methodology

Have the learners turn to page 172 in the Learner's book.

Group learners and ensure that each group has a set of base-10 blocks. Work through the example with them. The idea is to model the equation and show how numbers move from one side of the equality to the other.

8. Homework

Ask learners to write six equations, half with a symbol on the left and half on the right.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 172)

Learners should use base-ten blocks to solve these problems.

1. 13
2. 63
3. 200
4. 22
5. 13
6. 35
7. 130
8. 115
9. 100
10. 49

B4 2.2.2.4

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.4 Solve a given one-step equation using “guess and check”

1. Learning expectations

Learners need to be able to:

- solve a given one-step equation using “guess and check”.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner’s book

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.
- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

When teaching learners with special needs remember:

- Focus on the learner's strengths and be supportive of their weaknesses.
- Break down instructions into smaller, manageable tasks.
- Be aware of learners with dyscalculia.
- Be aware of learners with visual perception disorders.
- Give immediate feedback to these learners.

7. Teaching methodology

The exercises on page 173 includes oral work as well as written work. Work through an example and let learners continue working in pairs. Explain how to “guess and check”. They have done these kinds of calculations previously. It is the symbol that is new.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 173)

Learners give their own explanations of what the symbol means. They should use base-ten blocks to solve these problems.

1. $25 - \boxed{16} = 9$

2. $10 \times 5 = \boxed{50}$

3. $38 + \boxed{17} = 55$

4. $35 \div \boxed{7} = 5$

5. $21 + 21 = \boxed{42}$

6. $64 \div \boxed{4} = 16$

7. $9 \times \boxed{11} = 99$

8. $55 - 5 = \boxed{50}$

Exercise 2

(LB page 173)

- $36 - 18 = 18$ $18 + 18 = 36$
- $28 - 18 = 10$ $18 + 10 = 28$
- $35 \div 5 = 7$ $7 \times 5 = 35$
- $64 \div 8 = 8$ $8 \times 8 = 64$
- $9 \times 12 = 108$ $108 \div 9 = 12$
- $8 \times 7 = 56$ $56 \div 7 = 8$
- $10 \times 10 = 100$ $100 \div 10 = 10$
- $28 + 32 = 60$ $60 - 32 = 28$
- $53 + 30 = 83$ $83 - 30 = 53$
- $184 - 102 = 82$ $102 + 82 = 184$

B4.2.2.2.5

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.5 Identify the unknown in a problem, represent the problem with an equation, and solve the problem concretely, pictorially or symbolically

1. Learning expectations

Learners need to be able to:

- identify the unknown in a problem.
- represent the problem with an equation.
- solve the problem.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.
- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

When teaching learners with special needs remember:

- Focus on the learner's strengths and be supportive of their weaknesses.
- Break down instructions into smaller, manageable tasks.
- Be aware of learners with dyscalculia.
- Be aware of learners with visual perception disorders.
- Give immediate feedback to these learners.

7. Teaching methodology

Being able to identify the unknown in a problem is key to problem solving in algebra.

The exercise on page 174 gives the learners practice in constructing an algebraic equation to solve a problem. Work through some on the board with the class before letting them complete the exercise. Encourage learners to solve problems in more than one way. This may also be a new experience for learners – the idea that there is not just one solution may need some discussion.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 174)

Learners are encouraged to find their own way to solve these problems, using any method.

1. $4 \times 15 = 60$ bunches of flowers
2. $7 + 25 = 32$ kg
3. $96 \times 6 = 576$ pens
4. $24 \div 4 = 6$ tennis balls
5. $49 \times 2 = 98$ km
6. $1,500 + (1,500 \div 2) = 2,250$ pineapples

B4.2.2.2.6

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.6 Represent and solve a given addition or subtraction problem involving a “part part-whole” or comparison context, using a symbol to represent the unknown

1. Learning expectations

Learners need to be able to:

- represent and solve a given addition problem in a comparison context.
- represent and solve a given subtraction problem in a comparison context.
- use a symbol to represent an unknown.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner’s book

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.
- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

When teaching learners with special needs remember:

- Focus on the learner's strengths and be supportive of their weaknesses.
- Break down instructions into smaller, manageable tasks.
- Be aware of learners with dyscalculia.
- Be aware of learners with visual perception disorders.
- Give immediate feedback to these learners.

7. Teaching methodology

Being able to identify the unknown in a problem is key to problem solving in algebra. These problems involve comparison of quantities and working with different parts of a whole. Explain that learners need to pay careful attention to the language of the question when representing it as an equation.

The exercise on page 175 gives the learners practice in constructing an algebraic equation to solve a problem. Work through some on the board with the class before letting them complete the exercise. Encourage learners to solve problems in more than one way. They may still struggle with the idea that there is not just one way to find a solution.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 175)

Learners should write number sentences using symbols to solve these problems.

1. $946 - 530 = 416$ beads
2. $45 - 26 = 19$ boys
3. $50 \div 5 = 10$ loaves of bread, or $5 \times \square = 50$; $\square = 10$
4. $180 \times 2 = \text{GH}\text{C}360$
5. $24 + 12 = 36$ years old
6. $4 \div \frac{1}{2} = 8$ boys, or $\square \times 0.5 = 4$; $\square = 8$ boys
7. $180 - 70 = 110$ pages
8. $9 \times 8 = 72$ pineapples
9. $885 - 535 = 350$

B4.2.2.2.7

Content standard	Indicator
B4.2.2.2 Solve one-step equations involving a symbol to represent an unknown number	B4.2.2.2.7 Create a problem for a given equation with one unknown

1. Learning expectations

Learners need to be able to:

- create a problem for a given equation with one unknown.

2. Essential for learning

Learners have experience with word problems and basic number operations of addition, subtraction, multiplication and division.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 85–87

5. Large class teaching

When teaching a large class your lesson planning is of utmost importance. Remember the key elements of teaching a large class:

- Plan and prepare before the start of the class.
- Use effective questioning techniques.
- Move around.
- Use a variety of teaching methods to engage the learners.
- Show and tell new concepts.

6. Support for learners with special needs

When teaching learners with special needs remember:

- Focus on the learner's strengths and be supportive of their weaknesses.
- Break down instructions into smaller, manageable tasks.
- Be aware of learners with dyscalculia.
- Be aware of learners with visual perception disorders.
- Give immediate feedback to these learners.

7. Teaching methodology

Learners should now be secure in applying manipulatives to solving problems concretely or pictorially and are able to move on to more formal mathematical language. Simple addition and subtraction problems can now be done in a written format with a symbol representing the unknown. Again, ensure that learners understand that the symbol is simply a placeholder and that any symbol can be used. Do not use letters at this stage.

Working backwards from the equation to the problem can be a fun class or group activity. Work through the example on page 176 and then allow learners to be creative in their suggestions.

8. Homework

Additional exercises not completed in class could be used as extension activities or as homework tasks. Further exercises are found in the Workbook on pages 85–87, B4.2.2.2 Exercise 1.

9. Assessment

Summarise and consolidate the content by using the assessment suggestions provided under the indicator 4.2.2.1.1.

10. Answers

Exercise 1

(LB page 176)

Learners should write a story to fit the word problem. They may use any method to solve the problems.

1. $9 \times 3 = 27$

2. $24 \div 6 = 4$

3. $10 \times 5 = 50$

4. $54 \div 9 = 6$

5. $50 + 25 = 75$

6. $69 - 14 = 55$

7. $45 + 45 = 90$

8. $99 - 46 = 53$

Sub-strand 1: 2D and 3D shapes

The learner will be able to complete drawings to make them symmetrical and identify lines of symmetry of regular and irregular shapes.

Content standard	Indicator
B4.3.1.1 Identify the lines of symmetry of regular and irregular 2D shapes	B4.3.1.1.1 Complete drawings of shapes to make them symmetrical

1. Learning expectations

Learners need to be able to:

- identify lines of symmetry of 2D shapes.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes.

3. New words

Symmetry; symmetrical; asymmetrical

4. Resources used in this indicator

- Learner's book
- Grid paper
- Mirror
- Newspaper or magazine pictures
- Scissors

5. Large class teaching

Organise learners in groups strategically. Allow learners to work in groups of five to seven. Have learners sit in a circle so that everyone has a chance to participate. Try to pair

weaker learners with stronger learners. Note that in a large class the quiet learners tend to get even less attention.

Silence does not always mean high-level learning. Learners need opportunities to check their work and when you encourage group work, they will tend to check their learning, ask questions, and guide each other. This can lead to a healthy ‘buzz’ of work activity in the classroom. It is not always the case that silence in the classroom equates to high-level learning. If you prepare and plan the lesson carefully and then give a challenging task to the learners sitting in groups, it can lead to high-level learning.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. For the activities in this strand it might be best to put the learners in groups, rather than having all the learners facing the front of the class, as in the traditional arrangement. You might also find that it works well to be flexible with the classroom arrangement. For some activities, you might group learners according to different abilities, for others it may be better to pair stronger learners with those who are struggling.

Introduce new concepts with care. Most remedial learners face difficulty in understanding new concepts. Relate the new concepts to previously learnt concepts as that will help with understanding.

Some learners may have difficulty with the practical nature of this exercise. It may be difficult to neatly draw mirror images and symmetry lines. Make allowances for these difficulties.

7. Teaching methodology

Most work with symmetry must be done practically with concrete objects. Use drawings, photos and flat items like leaves to show symmetry. Many regular and irregular 2D shapes have lines of symmetry, and the shape of many living things are also approximately symmetrical. When looking at natural objects like faces we are looking at approximate symmetry. For example, the left side of a face is not exactly the same as the right side.

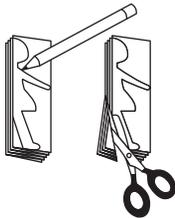
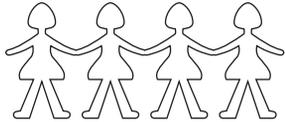
A *line of symmetry* divides a shape into two mirror-image halves. When folded, the two sides overlap and cover

each other perfectly. This is reflection symmetry. The mirror or fold line that gives these two equal reflections is called the line of symmetry. Show learners that they can use a mirror on the line of symmetry to see the reflected part.

Allow the learners to do these activities in a practical way with engagement and discussion with other learners in small groups or in pairs. Ask the learners to turn to pages 177–180 in the Learner’s book. Work through the examples and instructions together with the learners to ensure that they understand the concept and what is expected of them. They complete their exercises.

Additional content

Follow the instructions in the diagrams to see how we can use the line of symmetry to create a chain through paper folding and reflection.

<p>Fold a sheet of paper into eight rectangles.</p>	
<p>Draw half of yourself along the left folded side with arms extending to the cut edge. Use scissors to cut around the outline.</p>	
<p>Unfold the paper strip and decorate it. Join the strips and decorate the classroom with it.</p>	

Create your own symmetrical shape with a vertical axis of symmetry by following these steps:

- Fold a piece of paper into two halves along the centre crease.
- Spill drops of paint on one half of the sheet to create a pattern.
- Gently press both the halves together and rub all around the folded paper.

- This will give you a symmetrical shape. The fold of the paper is the line of symmetry. Draw the line of symmetry on the shape. You can also use a template like the butterfly in the example:

8. Homework

Additional exercises not completed in class could be used as homework tasks.

Ask learners to cut out pictures from magazines to identify and draw in the symmetry lines.

9. Assessment

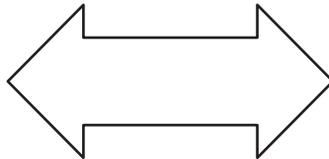
Geometrical concepts need incubation time to develop. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Individual assessment

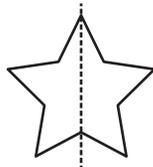
Use this assessment to assess learner's understanding of symmetry.

Test your knowledge of symmetry.

1. How many lines of symmetry in this shape?



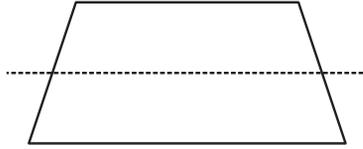
2. Explain why the dotted line on the shape below is a line of symmetry.



3. Insert a line of symmetry on the flag of Ghana.

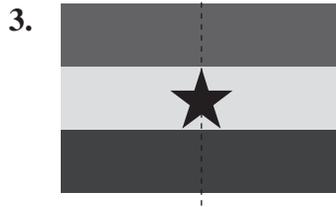


4. Explain whether or not the dotted line on the shape is a line of symmetry.



Solutions:

1. 2
2. There is a mirror image on either side of the line.



4. Not a line of symmetry, it does not create mirror images.

Diagnostic assessment

You can use the paper folding method to assess if the learner understands lines of symmetry and two-dimensional shapes. Focus on the terminology the learners use and gently correct it to ensure geometrical concept building.

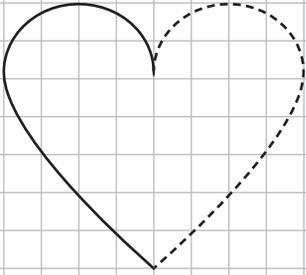
<p>A rectangle has two lines of symmetry.</p>	<p>Some triangles have three lines of symmetry.</p>	<p>A square has four lines of symmetry.</p>

10. Answers

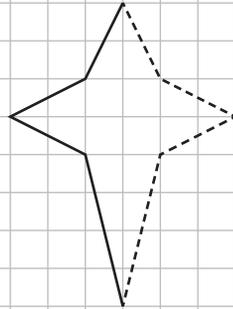
Exercise 1

(LB page 179)

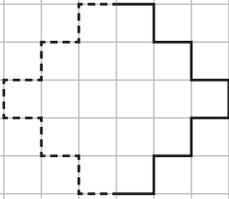
1.



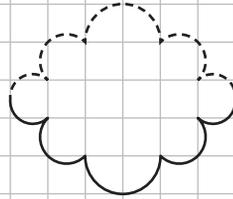
2.



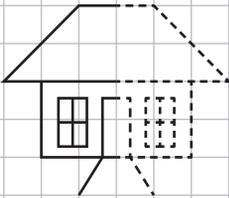
3.



4.



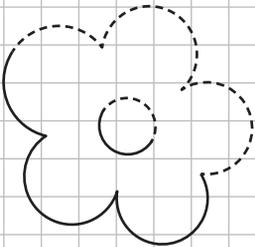
5.



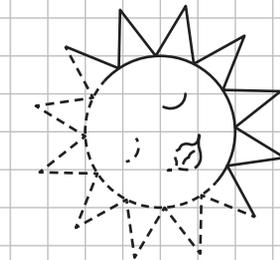
6.



7.



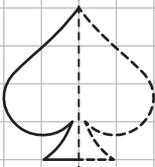
8.



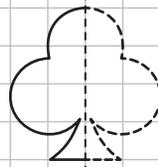
Exercise 2

(LB page 180)

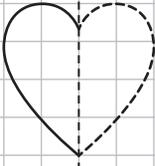
1.



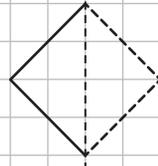
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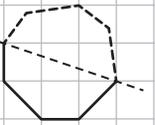
3.



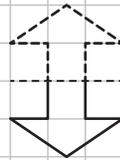
4.



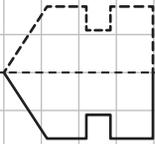
5.



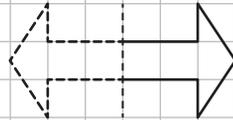
6.



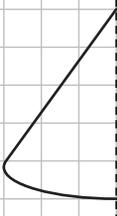
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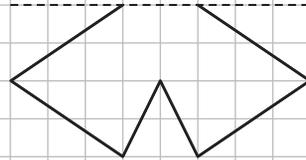
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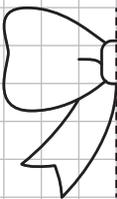
9.



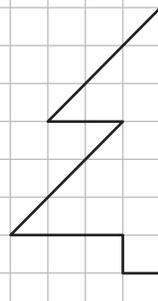
10.



11.



12.



B4.3.1.1.2

Content standard	Indicator
B4.3.1.1 Identify the lines of symmetry of regular and irregular 2D shapes	B4.3.1.1.2 Identify the lines of symmetry of regular and irregular 2D shapes (triangles and quadrilaterals)

1. Learning expectations

Learners need to be able to:

- identify lines of symmetry of 2D shapes.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 88–92

5. Large class teaching

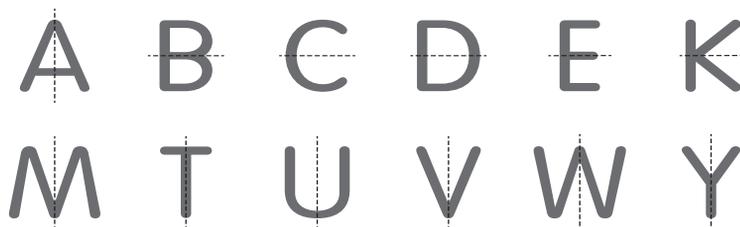
Prepare the classes and the different teaching resources beforehand. Being well prepared creates a sense of order and promotes efficiency. For example, create different 2D shapes to present to the learners to show them how to identify the lines of symmetry.

Present structured group work activities related to symmetry.

- Vary groups so that learners work with different classmates. Use different ways to divide learners into groups. You can give each group a different shape and then ask them to identify the line of symmetry and let the learners discover that some shapes do not have a line of symmetry and other shapes have a vertical and a horizontal line of symmetry in the same group.
- Note that you must explain the activity and assign roles to group members before starting an activity.

Example: Show the learners that the capital letter B has a line of symmetry. Ask the groups to identify the capital letters of the English alphabet that have only one line of symmetry.

Solution:



6. Support for learners with special needs

Model, praise and encourage good behaviour. Praise learners when they behave well so that you encourage the behaviour you want to see. Model the behaviour that you want to see: if you tell learners that they should not shout at each other, make sure that you also do not shout.

Some learners may have difficulty with the practical nature of this topic. Cutting and folding shapes may be challenging. Be aware of learners with physical constraints as well as those with intellectual challenges. Make allowances for these difficulties.

7. Teaching methodology

Allow the learners to do these activities in a practical way with engagement and discussion with other learners in small groups or in pairs. Ask the learners to turn to pages 181–182 in the Learner's book. Work through some of the questions together with the learners to ensure that they understand the concept and what is expected of them. They complete their exercises.

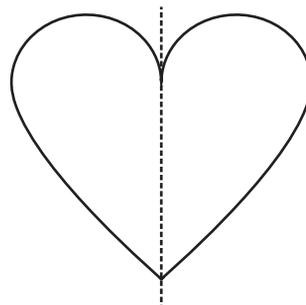
Learners may not realise that some pictures do not have any symmetry. The concept of symmetry will take time to develop. Give the learners a variety of activities to develop the concepts.

Additional content

Show learners how to recognise symmetry and draw lines of symmetry in two-dimensional geometrical and non-geometrical shapes.

Ask learners to explain whether the dotted line on the heart is a line of symmetry.

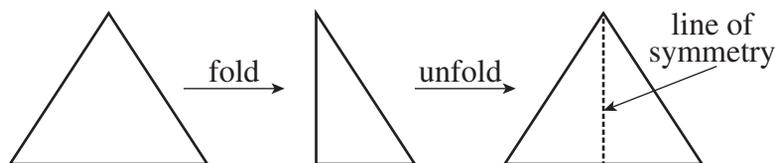
Allow some discussion and then consolidate the learning that the dotted line is a line of symmetry because if we fold the paper through the dotted line, the two halves on either side of the line match.



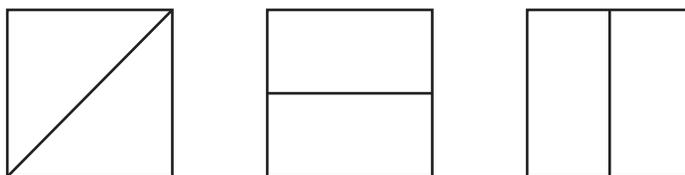
Explain by using different examples that a line-of-symmetry divides a shape into two mirror-image halves. Some shapes will have no line of symmetry while others have infinite lines of symmetry.

Visually show the learners how to identify the lines of symmetry of regular and irregular 2D shapes as that will help the learners to store the information in their long-term memory and can help them to anchor the concepts.

Show the learners that a shape is symmetrical when its two halves are mirror images along the line of symmetry. Look at the diagram of how we can determine the line of symmetry through paper folding and reflection.



Some learners think that a line of symmetry can only be vertical. Ensure learners can see horizontal lines of symmetry by giving examples. If learners are not sure whether a picture or shape has a line of symmetry, they can test by folding the piece of paper and seeing whether the two halves match exactly. If they do, then the fold line is the line of symmetry. Note that a square has four lines of symmetry: one vertical, one horizontal and two diagonals.



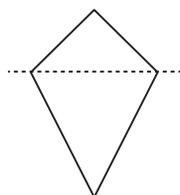
8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook: B4.3.1.1 Exercises 1 and 2.

9. Assessment

Self/peer assessment

Let the learners draw a two-dimensional shape with a dotted line and then ask a friend to explain if the dotted line on the shape is a line of symmetry. You may use this shape as an example.



Solution: No, the dotted line is not a line of symmetry. If we fold the paper through the dotted line, the shapes on either side of the line do not match, so the dotted line is not a line of symmetry.

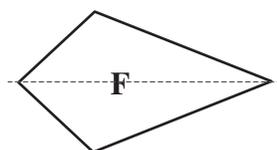
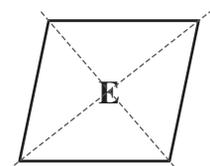
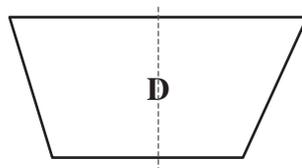
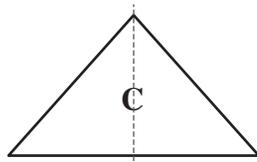
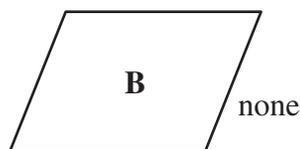
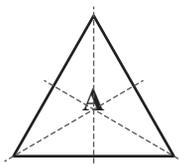
10. Answers

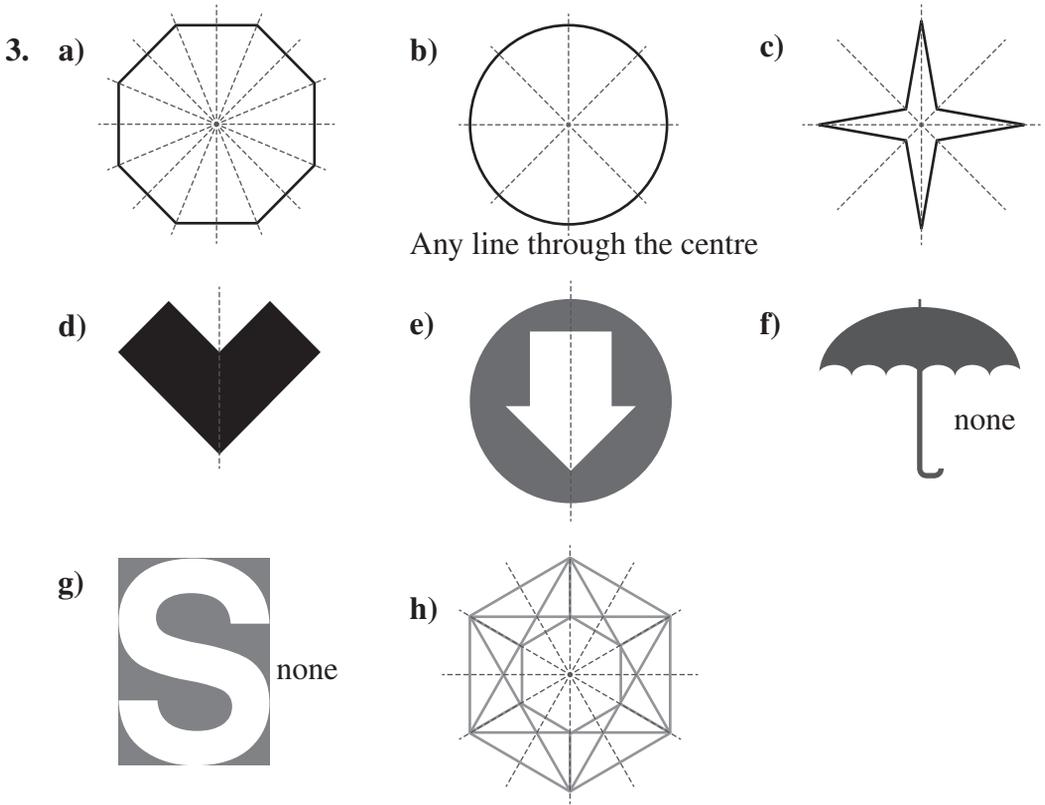
Exercise 1

(LB page 181)

1. A, C, D, E, F are symmetrical.

2.





Exercise 2

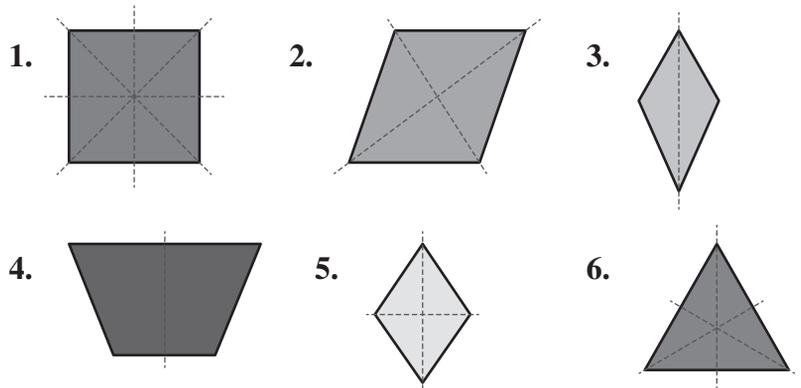
(LB page 182)

Learner's practical activity, working with a partner.

They should find that:

more than 1 line of symmetry: 1, 2, 5 and 6.

1 line of symmetry: 3 and 4.



Sub-strand 2: Position/transformation

The learner will be able to describe the position of objects in space using the cardinal points north, south, east and west.

Content standard	Indicator
B4.3.2.1 Describe the position of objects in space using the cardinal points	B4.3.2.1.1 Tell the position and motion of objects in space using the cardinal points north, south, east and west

1. Learning expectations

Learners need to be able to:

- describe the position of objects using the cardinal points.

2. Essential for learning

Learners have experience with terms such as left, right, above and below to describe relative position.

3. New words

Cardinal points, north, south, east, west

4. Resources used in this indicator

- Learner's book
- Workbook pages 93–94
- Ruler
- Compass; shadow stick; direction app on mobile phone (if available)
- Poster showing the cardinal points north, south, east and west

5. Large class teaching

Teaching large classes is a challenge, but it can also offer opportunities to improve your teaching and to make it enjoyable for your learners.

Creatively organise the classroom into a welcoming learning environment. Ensure you create a physical space that makes the learners comfortable to enter into a discussion and group activities. To maximise the learning space, you may consider removing unnecessary furniture to reduce the feeling of overcrowding and to facilitate movement. Consider using the space outside the classroom. This topic particularly lends itself to outdoor work.

Use your interpersonal skills and aim to connect to each learner as an individual. Learners will then be more motivated to apply their knowledge of position and cardinal points. Ask two or three learners each day to be class assistants to help you with the demonstrations and activities. Talk to them while busy with the activity so that you can learn about their backgrounds and interests.

Use an interactive presentation. Lecturing to a large class can be boring for learners. The advantage of a large class is that it contains a diversity of learners and you need to use different, active, and fun ways of teaching to connect to all the learners. The cumulative knowledge, experiences, skills, and interests of your many learners can be valuable starting points for planning the activities so that the learning becomes meaningful for them.

6. Support for learners with special needs

You should be aware of different types of memory problems and make allowances for these. Learners who have deficits in registering information in short-term memory often have difficulty remembering instructions and directions. Learners who have difficulty with working memory often forget what they are doing while doing it. For example, they may understand the cardinal points but forget to tell the position and the motion of the object. Learners with memory problems might forget the steps while trying to solve a mathematical problem with several steps. These learners may also have difficulty with reading comprehension. This problem can be

more severe if a learner is studying in a language different to their mother tongue. A learner with these special needs may also have trouble in the storage and retrieval of information from long-term memory when they need to recall the information when taking tests.

Dyscalculia is a learning disability that affects performance in Mathematics. There are many special needs and challenges faced by learners with dyscalculia, such as:

- Difficulty with abstract concepts of time and direction
- Difficulty with left and right orientation
- Confusing operations signs or performing them in wrong order.

7. Teaching methodology

Note that while learning left and right is difficult, cardinal directions are even more abstract to learners. Spend enough time and use examples relative to the learner. The understanding of cardinal directions means understanding that there is permanence and that directions are unmoving. Let learners draw their own grid map outside using chalk. This will help the learners to understand the permanency and the unchanging nature of north, south, east, and west.

Ask the learners to turn to pages 183–186 in the Learner’s book. Work through the explanation on cardinal points on page 183 together with the learners. Ensure they understand the cardinal points before they do the exercises.

Additional content

Being able to give good directions is an important skill. Discuss some examples of giving directions to get to a friend’s house or guide a stranger to a church or to the nearest clinic. Giving good directions, is more complicated than just telling someone how to get to a certain location. You need to present the information in a way that’s best suited to how the other person processes information. You must be able to communicate effectively and pick the most appropriate route for that person.

We generally use a compass to find the direction of north. We could also use a shadow stick to determine the four cardinal points. We seldom use a compass or shadow stick nowadays but rather use electronic instruments. You can even use an app on your mobile phone.

Explain to the learners that the cardinal directions or cardinal points are the four main directions or points of the compass: North (N), East (E), South (S) and West (W). Explain to the learners by showing on a compass (or your app) the directions relative to the geographic cardinal directions. Ask the learners to stand up and have them face north. Ask them to point forward; this is north. Then, ask them to point to the right; this is east. If they point behind them, this is south. If they point to the left, this is west. Repeat this for a few times and play a version of Simon Says where you tell them to point in a variety of directions.

Put up visual aids in the classroom for the four cardinal directions: north, east, south and west. On the east and west walls, place a sign that shows a picture and names one of the cardinal directions. On the east wall, place a picture of the sun that has an arrow pointing up to show the sunrise; on the west wall, attach a picture of the sun that has an arrow pointing down to show the sunset. Use these as tools for teaching the cardinal directions. On the north wall, have an arrow that points up; on the south wall, have an arrow that points down.

You can rearrange your classroom so that all the seats face the north wall. This makes it easier for your learners to practice the cardinal directions. Explain that there are four main directions a person can go: north, east, south and west. Show how you have labelled these directions on the walls.

The cardinal directions or cardinal points are dealt with in detail in Geography and Science.

Different cultures have given different values to each direction. For example, in Asian culture, each direction is given a colour: East (green); South (red); West (white) and North (black). The cardinal points are also associated in some cultures with each the four elements (earth, air, fire, and water).

There are a number of versions of a song about the cardinal directions available on YouTube. Play the Cardinal Direction Song for your class. Some learners learn better when they have a song or a rhyme to help them memorise information. The song uses a mnemonic to teach learners the order of the directions. A mnemonic is a strategy for making memorisation easier using letters, words, or ideas. The silliness of the saying and the use of simple words makes

the mnemonic easy for learners to memorise. The first letter of each word is the same as the cardinal direction that it represents. The order of the words mimics the order in which the cardinal directions appear on a compass: North, East, South and West.

- Never Eat Salty Watermelon.
- Never Eat Soggy Worms.
- Never Eat Soggy Waffles.
- Naughty Elephants Squirt Water.

Use group work activities such as the following games:

Scavenger hunt

Play a cardinal direction scavenger hunt game. Ask one learner to go outside and hide the board duster. The other learners must direct the learner to find the hidden duster, only using cardinal direction as cues. Play this a few times, letting other learners have a turn giving and receiving directions.

Direction game

Let the learners stand facing the teacher. Call this direction north. Let them turn 90° and explain that they now face east. They turn another 90° and explain that they now face south; another 90° turn and they face west. Once they understand these instructions you can give instructions faster and include some random directions. If they turn the wrong way or hesitate too long, they are out and must sit down. You can divide the learners into smaller groups and ask the learners to give the instructions and to check it. Kinaesthetic learners will enjoy this activity as they process information best when they are physically engaged during the learning process.

Four corners

Label the four corners of the classroom with north, south, east, west and play the game. The teacher or a learner starts by covering the players' eyes and counting to 10, or to 100 by tens, and players all go to one of the four places. The teacher calls out one direction and whomever is there, is out. Those learners need to return to their seats and watch as the game is played again. Teacher covers the players' eyes and counts out again, while learners move quietly to a new direction. The winner gets to count and call out directions for the next round.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook: B4.3.2.1 Exercise 1.

9. Assessment

Remember that geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Individual assessment

You may adapt the following activities to assess the learner's understanding of the topic.

1. Let the learners use a map with a legend to find their very own hidden treasure within the classroom or school. The first clue leads them to the next clue and so on.
2. Give the learners a diagram of the school's floor plan and let them give directions to find a certain place using the cardinal points.
3. Learners can create a map of their house with step by step directions leading to their bedroom or kitchen. The directions must include cardinal directions.

Diagnostic assessment

Create an enlarged map. Show the learners the map and the cardinal directions, north, south, west and east that they will use for the activity. Learners follow directions and place the words north, south, west, and east in their proper places on the map.

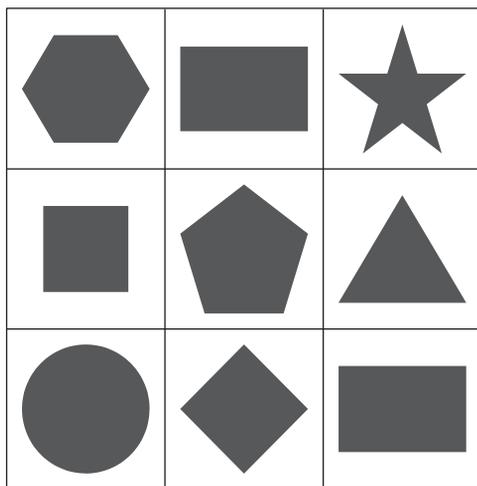
Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Let the learners create their own grids with shapes and then create a few questions using the cardinal points. Let the learners assess each other by asking similar questions as given in the example below.

Look at the grid.



1. What shape is north of the pentagon?
2. What shape is east of the pentagon?
3. What shape is west of the pentagon?
4. What shape is south of the pentagon?
5. What shape is north of the circle?

Solutions:

1. Rectangle
2. Triangle
3. Square
4. Diamond/square
5. Square

10. Answers

Exercise 1

(LB page 184)

1. A is at $(-3; 2)$ the position given by the x -axis and the y -axis.
2. B is at $(3; 2)$.
3. T is at $(3; -3)$.
4. P is at $(-3; -3)$.

Exercise 2

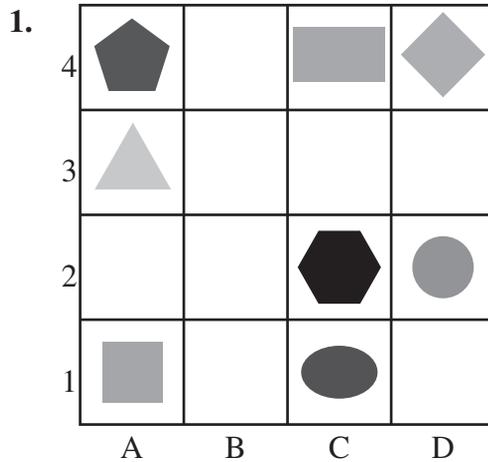
(LB page 184)

1. C is in the south west (SW).
2. M is in the north west (NW).

- G is in the north east (NE).
- D is in the south east (SE).

Exercise 3

(LB page 185)



- SE
- The blue circle, 
- North
- The blue pentagon , yellow triangle , green square .

Exercise 4

(LB page 186)

- the church is at F3.
- The hospital is at D4.
- The bank is at F5.
- The house is at B1.
- The school is at A4.
- The dentist is at E1.
- The coffee shop is at A2.
- The park is at C6.

**Sub-strand 3: Measurement
(perimeter)**

The learner will be able to understand the perimeter of regular and irregular 2D shapes.

Content standard	Indicator
B4.3.3.1 Demonstrate understanding of perimeter of regular and irregular shapes	B4.3.3.1.1 Estimate perimeter using referents for centimetre or metre

1. Learning expectations

Learners need to be able to:

- demonstrate understanding of perimeter.
- estimate perimeter.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

Perimeter

4. Resources used in this indicator

- Learner's book
- Ruler; tape measure

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

Maintain a healthy balance of structured and unstructured learning. Include activities where all learners can discover the content related to geometry and

measurement. Encourage learners to measure the perimeter of the desks, class door, windows and the class. Learners will move around and must record their measurements.

In a large class, it is important to manage the class carefully. Follow these guidelines to manage a large class effectively:

- Prepare the classes and the different teaching resources beforehand. That will create a sense of order from the start that will promote a time at task efficiency.
- Structure the lessons to minimise boredom and plan challenging activities.
- Praise the learners who are being good and reward their successes. This will help to form a good relationship with your learners.
- Use checklists to help the learners to keep their notebooks organised and regular check the books.

Use group work activities. Learners will benefit from structured group work activities that contain a variety of practical skills. Design the group work activities so that every learner is actively involved in the learning process by:

- Letting them check each other's measurements and calculations and report back to the specific learner.
- Allowing learners in a group to ask one another questions without disrupting the class. Encourage the learners to guide one another and promote a positive team spirit.
- Varying the groups for different activities so that learners work with several different classmates. Use different ways to divide learners into groups.
- Using the elbow partners technique in a large class. This involves two learners sitting close to each other. Elbow partners is a good way of giving quiet learners a chance to be heard.
- Explaining the activity and assigning roles to group members before starting the activity.

6. Support for learners with special needs

Plan how you will use the physical space of your classroom. You might find that it works well to be flexible with the classroom arrangement. For some activities, it might work well to have learners grouped according to different abilities.

Be flexible in all aspects of your teaching and be prepared to change your plans or arrangements if they seem not to be working well.

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Use the best teaching strategy to engage the kinaesthetic learners. They prefer to learn new or difficult information through real-life experiences and concentrate best when they are physically active and using their large muscle groups in the learning process. Make sure you allow the kinaesthetic learners a variety of activities to ensure they focus on the task.

7. Teaching methodology

Explain the skills required to measure perimeter using real-life examples. Use different types of measuring instruments. Revise the concept of estimation. Guide the learners to determine, through investigation, the perimeter of different shapes. Note that learners easily confuse perimeter and area calculations.

Have the learners turn to pages 187 to work through the explanation and example on perimeter. ensure the learners understand the concept before they do the exercises.

Additional content

Use the Van Hiele levels to help learners to learn geometry. The Van Hiele Model is a theory that describes how learners learn geometry.

According to the model, learners with a low Van Hiele level will not achieve geometrical understanding. Learning the complex concepts in geometry requires a high Van Hiele level or the learner will not have the ability to apply geometrical knowledge and will become frustrated. The levels are based on the idea that a learner can understand geometry visually at a young age. Adding a series of experiences that allows the learner to interact with geometric figures, helps them to move on to the next level. Use the correct terminology when you are teaching and support the learner by explaining and showing them the new terms. A learner who does not progress through the Van Hiele levels

in geometry, will fall behind and try to memorise the content. They will not fully understand the concepts, and this can prevent them from achieving the next level in geometry.

8. Homework

Ask learners to estimate the perimeter of shapes found at home.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 187)

This exercise involves estimating and measuring. Learners will have different answers. A general estimate is given below.

- | | |
|---------------------------------------|--|
| a) $2\text{ m} \times 1\text{ m}$ | b) $2\text{ m} \times 0.75\text{ m}$ |
| c) $0.9\text{ m} \times 1.4\text{ m}$ | d) $1.2\text{ m} \times 0.75\text{ m}$ |
- Learners measure their own classrooms.
- Learners compare the actual measurements with the estimated values.

Exercise 2

(LB page 188)

All the answers for this exercise will be the Learner's own estimates and ideas. Sample answers are given below.

- The side view of the house is not given so it could be wider or narrower than the visible side. Assume that it is at least as long as the front view, then the perimeter is at least $7 \times 4 = 28\text{ m}$.
- If the perimeter of A is 28 m then the perimeter of B is 56 m . It is twice the perimeter of the estimate for A.

3. Not necessarily, the perimeter is measured around the space it takes up on the ground, not the height.

B4.3.3.1.2

Content standard	Indicator
B4.3.3.1 Demonstrate understanding of perimeter of regular and irregular shapes	B4.3.3.1.2 Measure and record perimeter for regular and irregular shapes in cm and m

1. Learning expectations

Learners need to be able to:

- demonstrate understanding of perimeter.
- measure perimeter for regular and irregular shapes.
- record perimeter.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Ruler; tape measure

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

For learners with special needs and learning disabilities, hearing instructions or following directions can be very

difficult. Schedule breaks throughout the day. Learners with special needs will find it difficult to concentrate for long periods.

Seat learners with special needs in an area of the classroom that limits distractions. Do not seat these learners by a window or in front of an open door. Outside noises can impact on the ability of these learners to stay focused, because many have difficulty filtering out sounds.

Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult. Learners who struggle with motor sequencing will often count on their fingers when adding numbers.

7. Teaching methodology

Explain the skills required to measure perimeter using real-life examples. Use different types of measuring instruments. Have learners work in small groups and measure the perimeter of items in the classroom and outside. Allow them to explore different ways of determining the perimeter. Learners write down their findings informally.

Work through the example on page 189 with the learners. They can complete the exercises in small groups or pairs.

8. Homework

Ask learners to measure and record the perimeter of shapes found at home.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 189)

1. $(5 \text{ cm} + 3 \text{ cm}) \times 2 = 16 \text{ cm}$
2. $13 \text{ m} \times 4 = 52 \text{ m}$
3. $10 \text{ mm} + 12 \text{ mm} + 20 \text{ mm} = 42 \text{ mm}$
4. $3.5 \text{ m} + 3.7 \text{ m} + 1 \text{ m} + 1.2 \text{ m} + 2.5 \text{ m} + 2.5 \text{ m} = 14.4 \text{ m}$

Exercise 2

(LB page 190)

1. $4 \text{ cm} + 7 \text{ cm} + 6 \text{ cm} = 17 \text{ cm}$
2. $14 \text{ m} + 26 \text{ m} + 10 \text{ m} + 26 \text{ m} = 76 \text{ m}$
3. $216 \text{ cm} + 40 \text{ cm} + 216 \text{ cm} = 472 \text{ cm}$
4. $12 \text{ cm} + 12 \text{ cm} + 24 \text{ cm} + 18 \text{ cm} + 24 \text{ cm} = 90 \text{ cm}$
5. $55 \text{ m} + 34 \text{ m} + 43 \text{ m} = 132 \text{ m}$
6. $[(2 \text{ m} + 2 \text{ m}) \times 4] + 6 \text{ m} + 6 \text{ m} + 5 \text{ m} + 5 \text{ m} = 38 \text{ m}$

B4.3.3.1.3

Content standard	Indicator
B4.3.3.1 Demonstrate understanding of perimeter of regular and irregular shapes	B4.3.3.1.3 Develop and apply a formula for determining perimeter of square and rectangle

1. Learning expectations

Learners need to be able to:

- demonstrate understanding of perimeter.
- develop a formula for determining perimeter of square and rectangle.
- apply a formula for determining perimeter of square and rectangle.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Square and rectangular cut-out shapes
- Straws or sticks

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

For learners with special needs and learning disabilities, hearing instructions or following directions can be very difficult.

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Explore the methods that learners have used to find perimeter. Give them a number of square and rectangular shapes. Lead them to determine that there is a standard method for finding the perimeter of these shapes.

Work through page 191 with the learners. Complete the exercise as a class activity.

Give more clarity where required. They need to understand that the formula only applies to regular shapes.

Additional content

Group activity – explore the perimeter of shapes:
Cut straws or sticks into lengths of 5 cm, 10 cm and 15 cm. Ask the learners, in groups, to explore perimeter by making polygons with sides of various lengths. First let the group members estimate the perimeter of the shapes. They then measure and record the lengths and draw the shapes in their books, labelling the lengths of each side. Finally, they calculate the perimeter.

Group activity – explore the perimeter of squares and rectangles:

Learners can also use the straws or sticks to build squares and rectangles. Let the group members estimate the perimeter of the squares and rectangles. The learners then measure and record the lengths and draw the squares and rectangles in their books, labelling the lengths of each side and then calculating the perimeter. Guide the learners to develop and apply a formula for determining the perimeter of squares and rectangles. By using premeasured lengths, it makes it easier to compare and to check the calculations.

8. Homework

Ask learners to identify shapes that apply to the formulas.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 191)

Learner activity. They should investigate how to find the perimeter of the given shapes and identify any shortcuts that can be taken.

1. 24 blocks
2. 26 blocks
3. 30 blocks
4. 22 blocks

B4.3.3.1.4

Content standard	Indicator
B4.3.3.1 Demonstrate understanding of perimeter of regular and irregular shapes	B4.3.3.1.4 Construct different rectangles for a given perimeter (cm; m) to demonstrate that many shapes are possible for a perimeter

1. Learning expectations

Learners need to be able to:

- demonstrate understanding of perimeter.
- construct different rectangles for a given perimeter.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 95–97
- Ruler
- Timer

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.

- In a large class, it is important to manage the class carefully.
- Use group work activities

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Explore perimeter size in relation to different rectangles. Lead them to determine that there is no standard rectangular shape for a given perimeter.

Carefully explain the game on page 192 to the learners. Divide the class into groups and complete the exercise as a group activity.

8. Homework

Further exercises are found in the Workbook: B4.3.3.1 Exercise 1. These exercises consolidate the work on perimeters.

9. Assessment

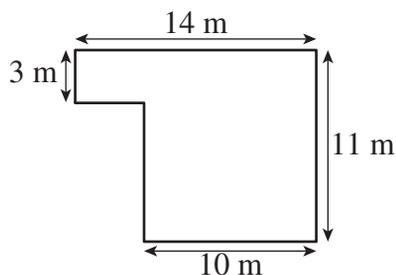
Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not

pressurise learners to perform within a certain time as this can decrease their confidence.

Individual assessment

You may adapt the following activity to assess the learner's understanding of the topic.

The diagram shows the floor plan of a house.



1. Explain the term perimeter.
2. Explain how you will measure the length of a house to calculate the perimeter.
3. What measuring instrument will you use to measure the perimeter of this house.
4. Calculate the perimeter of the house.

Solutions:

1. A measure of the distance around a shape.
2. Calculate the sum of all the lengths of the outside walls of the house.
3. Tape measure, metre stick
4. Perimeter = $14 + 11 + 10 + 4 + 8 + 3 = 50$ m

10. Answers

Exercise 1

(LB page 192)

Learners play the shapes game in groups.

Sub-strand 3: Measurement (area)

The learner will be able to understand the area of regular and irregular 2D shapes.

Content standard	Indicator
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.1 Recognise that area is measured in square units

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of area of 2D shapes.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

Area

4. Resources used in this indicator

- Learner's book
- Ruler; metre stick; tape measure
- Cut-out squares and rectangles

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Learners need a great deal of encouragement when doing area calculations. Some learners want to achieve but feel frustrated if they cannot grasp the content immediately.

Explain the meaning of square units. Ensure that learners understand that the unit is square, not necessarily the shape. Learners may confuse the unit with the shape or the number.

On page 193 explain the unit of area clearly and work through the example with the learners to ensure they understand the concept. Allow learners to work in groups to complete the exercise. Encourage discussion and debate but monitor and guide their thinking.

8. Homework

Ask learners to think about what they have learnt and write down what they do not understand or what they would like revised. It is important that they feel that they understand each step of the process.

9. Assessment

Teacher assessment

Monitor learners during classwork to assess their understanding.

10. Answers

Exercise 1

(LB page 194)

1. Learners work in groups to discuss how they would work out the area of a graph sheet.
2. Learners complete a practical exercise to determine area.

B4.3.3.2.2

Content standard	Indicator
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.2 Select and justify referents for the units cm^2 or m^2

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of area of 2D shapes.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.

- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Encourage learners to always use the correct terminology when describing and measuring perimeter and area. This can promote the logical reasoning required in geometry.

Guide the learners to determine, through investigation, the appropriate unit to use for different area sizes. Note that learners easily confuse perimeter and area calculations.

Make sure the learners understand all the examples as they are provided on pages 195 and 196 before they complete the exercise. Allow learners to work in groups. Encourage discussion and debate but monitor and guide their thinking.

8. Homework

Ask learners to find three items that would be measured in square centimetres and three items that would be measured in square metres.

9. Assessment

Teacher assessment

Monitor learners during classwork to assess their understanding.

Adapt your teaching if you find that your learners have not grasped the concepts.

10. Answers

Exercise 1

(LB page 197)

- a) cm^2 b) m^2 c) cm^2 d) m^2
e) cm^2 f) cm^2 g) cm^2 h) cm^2
- Learners should give adequate reasons why they have chosen a unit.
- Learners may suggest alternative units.
- The Digya National Park is $3,743 \text{ km}^2$. The unit is square kilometres.

B4.3.3.2.3

1. Learning outcomes

The learner will be able to understand the perimeter and area of regular and irregular 2D shapes.

Content standard	Indicator
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.3 Estimate area by using referents for cm^2 or m^2

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of area of 2D shapes.
- estimate area of 2D shapes.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Ruler; metre stick; tape measure
- Cut-out squares and rectangles
- Grid paper
- String
- Scissors

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Learners need a great deal of encouragement when doing area calculations. Some learners want to achieve but feel frustrated if they cannot grasp the content immediately.

Guide the learners to determine, through investigation, the area of different shapes. Note that learners easily confuse perimeter and area calculations.

Revise the idea of estimation and let learners explore estimation and measurement using their own methods. Make sure the learners understand the example provided on page 198.

Learners complete the practical exercises. There are a variety of individual, pair and group exercises. Encourage discussion and debate but monitor and guide their thinking.

8. Homework

Ask learners to estimate the area of three items at home. They must explain to the class how they estimated.

9. Assessment

Monitor learners during classwork to assess their understanding.

10. Answers

Exercise 1 (LB page 198)

Practical exercise to estimate area.

Exercise 2 (LB page 198)

Practical exercise to estimate, measure and compare areas within the classroom.

Exercise 3 (LB page 199)

Practical exercise to estimate, measure and compare areas outside the classroom.

Exercise 4 (LB page 199)

One scarf will measure $1.2 \text{ m} \times 0.4 \text{ m}$.

We can estimate: $1 \text{ m} \times 0.5 \text{ m} = 0.5 \text{ m}^2$ fabric is needed for one headscarf. Mrs Damte needs at least 2 square metres of fabric.

B4.3.3.2.4

Content standard	Indicator
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.4 Develop and apply a formula for determining area of a rectangle and square

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of area of 2D shapes.
- develop a formula for determining area of square and rectangle.
- apply a formula for determining area of square and rectangle.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 98–102
- Grid paper

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously

learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Learners need a great deal of encouragement when doing area calculations. Some learners want to achieve but feel frustrated if they cannot grasp the content immediately.

Note that learners easily confuse perimeter and area calculations. Ensure that they do not confuse the area formula with the perimeter formula.

Make sure the learners understand all the examples as they are provided on pages 200 and 202.

Give more clarity where required. They need to understand the formulas to calculate their answers correctly.

8. Homework

Additional exercises not completed in class could be used as homework tasks.

There are additional exercises in the Workbook: B4.3.3.2 Exercises 1 to 5. These exercises consolidate the work on area.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not

pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

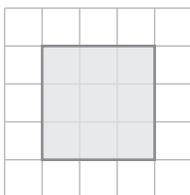
Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

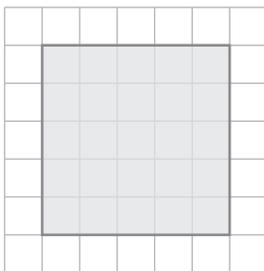
(LB page 200)

1. a) Learners count 9 squares.



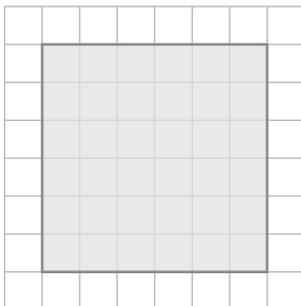
b) $3 \times 3 = 9$

2. a) Learners count 25 squares.



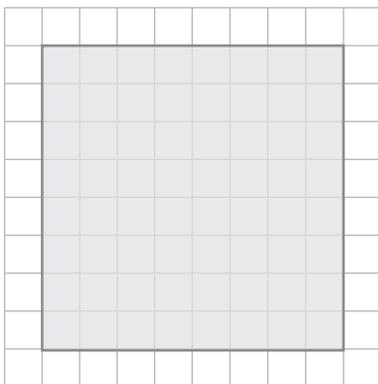
b) $5 \times 5 = 25$

3. a) Learners count 36 squares.



b) $6 \times 6 = 36$

4. a) Learners count 64 squares.



b) $8 \times 8 = 64$

Exercise 2

(LB page 201)

1. a) 4 b) 6 c) 9 d) 12 e) 16 f) 24

2. a) 2 b) 2 c) 3 d) 3 e) 4 f) 8

3. a) 2 b) 3 c) 3 d) 4 e) 4 f) 3

4. a) $2 \times 2 = 4$ b) $2 \times 3 = 6$ c) $3 \times 3 = 9$
 d) $3 \times 4 = 12$ e) $4 \times 4 = 16$ f) $8 \times 3 = 24$

5.

	Shape	Area	Across	Down	Product
a)	Square	4	2	2	4
b)	Rectangle	6	2	3	6
c)	Square	9	3	3	9
d)	Rectangle	12	3	4	12
e)	Square	16	4	4	16
f)	Rectangle	24	8	3	24

Exercise 3

(LB page 203)

1. $6 \text{ m} \times 6 \text{ m} = 36 \text{ m}^2$

2. $5 \text{ m} \times 14 \text{ m} = 70 \text{ m}^2$

3. $110 \text{ m} \times 15 \text{ m} = 165 \text{ m}^2$

4. $8 \text{ m} \times 8 \text{ m} = 64 \text{ m}^2$

5. $2 \text{ cm} \times 5 \text{ cm} = 10 \text{ cm}^2$

6. $3 \text{ cm} \times 3 \text{ cm} = 9 \text{ cm}^2$

7. $7 \text{ cm} \times 4 \text{ cm} = 28 \text{ cm}^2$

8. $8 \text{ cm} \times 15 \text{ cm} = 120 \text{ cm}^2$

9. $20 \text{ cm} \times 20 \text{ cm} = 400 \text{ cm}^2$

10. $12 \text{ cm} \times 12 \text{ cm} = 144 \text{ cm}^2$

Exercise 4

(LB page 204)

1. $3 \text{ cm} \times 6 \text{ cm} = 18 \text{ cm}^2$
2. $2 \text{ cm} \times 8 \text{ cm} = 16 \text{ cm}^2$
3. $4 \text{ cm} \times 9 \text{ cm} = 36 \text{ cm}^2$
4. $8 \text{ cm} \times 10 \text{ cm} = 80 \text{ cm}^2$
5. $5 \text{ cm} \times 6 \text{ cm} = 30 \text{ cm}^2$
6. $6 \text{ cm} \times 4 \text{ cm} = 24 \text{ cm}^2$
7. $9 \text{ cm} \times 5 \text{ cm} = 45 \text{ cm}^2$
8. $7 \text{ cm} \times 8 \text{ cm} = 56 \text{ cm}^2$
9. $1 \text{ cm} \times 9 \text{ cm} = 9 \text{ cm}^2$
10. $8 \text{ cm} \times 1 \text{ cm} = 8 \text{ cm}^2$
11. $4 \text{ cm} \times 7 \text{ cm} = 28 \text{ cm}^2$
12. $3 \text{ cm} \times 10 \text{ cm} = 30 \text{ cm}^2$

B4.3.3.2.5

Content standard	Indicator
B4.3.3.2 Demonstrate an understanding of area of regular and irregular 2D shapes	B4.3.3.2.5 Construct different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area

1. Learning expectations

Learners need to be able to:

- demonstrate an understanding of area of 2D shapes.
- construct different rectangles for a given area.

2. Essential for learning

Learners have experience with regular and irregular 2D shapes; length; units of measurement of length (cm and m).

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Grid paper

5. Large class teaching

To teach geometry and measurement to a large class you must be well prepared and organised.

- Maintain a healthy balance of structured and unstructured learning.
- In a large class, it is important to manage the class carefully.
- Use group work activities.

6. Support for learners with special needs

Most remedial learners face difficulty in understanding new concepts. Relate the new concepts with previously learnt concepts as that will help them to understand the new concepts better.

Remember the following guidelines:

- Schedule breaks throughout the day.
- Seat learners with special needs in an area of the classroom that limits distractions.
- Be aware that learners who struggle with motor sequencing that involve numbers will also find these topics difficult.
- Instructions with more than two steps should be given on the board or in written format.
- Praise learners when they behave well so that you encourage the behaviour you want to see.
- Involve parents and caregivers in their learners' education.
- Plan how you will use the physical space of your classroom.
- Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Remember that learners easily confuse perimeter and area calculations. Make sure the learners understand the example as provided on page 205. Give more clarity where required. They need to understand the formulas to complete their answers correctly.

8. Homework

Ask learners to present an example of two different rectangles having the same area.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not

pressurise learners to perform within a certain time as this can decrease their confidence.

Individual assessment

You may adapt the following activities to assess the learner's understanding of the topic.

Look at the poster with dimensions of 80 cm × 50 cm.



1. Explain the term area.
2. What measuring instrument would you use to measure the perimeter of this poster.
3. Explain how you would calculate the area of the poster.

Solutions:

1. A measure of the surface space that the shape takes up.
2. Ruler, tape measure
3. Multiply the short side by the long side.

Diagnostic assessment

Use the following example as a diagnostic assessment tool.

Example: The standard size of the Ghana flag is 180 cm × 120 cm.



1. Determine the perimeter of a standard size Ghanaian flag in metres.
2. Explain how you will calculate the area of the flag.

3. Explain how you will calculate the area of the red part of the flag.

Solutions:

1. $180 + 120 + 180 + 120 = 600$ m
2. Multiply the short side by the long side.
3. The red part is one-third of the short side. Area of the short side is the long side times one-third of the short side.

10. Answers

Exercise 1

(LB page 205)

Learners' own drawings: they give three different examples to show rectangles having the same area but different dimensions.

Sub-strand 3: Measurement (time)

The learner will be able to demonstrate an understanding of time taken by events in minutes and hours.

Content standard	Indicator
B4.3.3.3 Demonstrate understanding of time taken by events in minutes and hours	B4.3.3.1 Tell the time in hours and minutes on analogue and digital watches including 24-hour clocks

1. Learning expectations

Learners need to be able to:

- tell time in hours and minutes.

2. Essential for learning

Learners have experience with using calendars and telling time.

3. New words

Analogue; digital; calendar

4. Resources used in this indicator

- Learner's book
- Workbook pages 103–108
- Analogue and digital watches
- Blank clock faces

5. Large class teaching

It is not always the exact number of learners in a class that matters but how you see the class size in your own specific situation.

Positive reinforcement can motivate the learner. The quality of teaching has a big impact on learners and effective questioning and assessment are at the heart of great teaching. This involves giving enough time for a learner to practise new skills and introducing learning progressively. Think of innovative ways to motivate learners. If you see a learner is behaving well, they can earn a letter. At the end of the day, if they have spelled the word TIME they receive a reward. This is a great trick to help learners to focus.

Make sure the work is achievable and appropriate. Look for different ways to make the lessons interesting. When preparing the lessons on time use different digital and analogue clocks to show the time calculations.

6. Support for learners with special needs

Many learners find it difficult to tell the time in hours and minutes and this can be a major learning disadvantage. Time is a complex concept and some learners may need one-on-one support from the teacher. Being able to read the time is an important life skill.

One of the concepts that confuses learners about telling time on an analogue clock is the two hands. They must be able to recognise which hand is which and the relationship between the two hands.

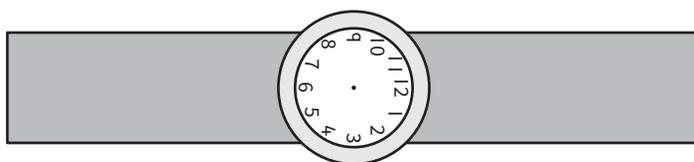
Another difficulty is the fact that the numbers have two separate meanings. You could explain that the numbers on a clock are double agents and they each have a secret identity. Explain that the secret identity of the number one is five, and so on.

Learners that struggle with motor sequencing that involves numbers will also find these topics difficult. They will often count on their fingers when adding numbers.

7. Teaching methodology

Keep these lessons very practical for the learners to engage with each other as they learn to read and tell the time. Start with an analogue clock, do not be tempted to show a digital clock first. It may seem like an easier instruction tool, but the analogue clock allows for better comprehension of time by providing hands which consistently move.

Make the lessons concrete and use different types of analogue clocks. You may print blank watches like these.



Draw hands on each face and record what time each learner's watch reads on a record sheet. This will make the assessment process easier. Let the learners decorate their own watch band. Secure each learner's watchband around their wrist with a stapler. Then tape their watch face on top of the band. The learners then need to move around the class and read each other's time. If the learner does not read the correct time the owner of the watch must explain it to the learner.

Ask the learners to turn to pages 206–211 in the Learner's book. Be sure to work through all the examples to ensure that your learners understand the various concepts related to telling time and how to read and interpret the time in different ways. They can complete all the exercises in the Learner's book.

Additional content

To tell the time on an analogue clock involves spatial awareness and the ability to differentiate between up and down, left and right, before and after. Many factors can affect a learner's spatial awareness and therefore it can take some learners longer to tell the time in hours and minutes. The skills needed to read an analogue clock include concepts like counting in fives and fractions. To tell the time in hours and minutes looking at an analogue clock requires complex mathematical manipulations. Be patient with the learners and use a variety of real-world examples.

Start by explaining time in hours. Then show how to read half-hours. Once learners are comfortable with these concepts, move on to quarters. Do not be tempted to tell time in minutes straight away.

The concepts of 'quarter past' and 'a quarter to' need to be explained several times to most learners before they will notice the difference.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on pages 103–108, B4.3.3.3 Exercises 1 to 3.

9. Assessment

To understand time taken by events in minutes and hours needs incubation time to develop the concepts. Encourage learners not to give up but to keep on trying. Logical and structured instructions will give learners multiple entry points to a problem and promote critical thinking. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners' work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 208)

1.

A. 6.06	B. 5.50	C. 7.50
D. 12.05	E. 6.15	F. 11.45
G. 12.30	H. 10.15	I. 7.35
J. 2.20	K. 9.50	L. 11.05

2.
 - A.** 6 minutes past 6
 - B.** 10 minutes to 6
 - C.** 10 minutes to 8
 - D.** 5 minutes past 12 a.m.
 - E.** 15 minutes past 6 p.m. or quarter past 6 p.m.
 - F.** 15 minutes to 12 noon or quarter to 12 noon
 - G.** half past 12 or 12 thirty
 - H.** 15 minutes past 10 or quarter past 10
 - I.** 25 minutes to 8 or 7 thirty-five
 - J.** 20 minutes past 2 p.m.
 - K.** 10 minutes to 10 a.m.
 - L.** 5 minutes past 11 a.m.

3. a) Time 5 minutes before

A. 6.01	B. 5.45	C. 7.45	D. 12.00
E. 6.10	F. 11.40	G. 12.25	H. 10.10
I. 7.30	J. 2.15	K. 9.45	L. 11.00

b) Time 10 minutes before

A. 5.56	B. 5.40	C. 7.40	D. 11.55
E. 6.05	F. 11.35	G. 12.20	H. 10.05
I. 7.25	J. 2.10	K. 9.40	L. 10.55

c) Time 15 minutes before

A. 5.51	B. 5.35	C. 7.35	D. 11.50
E. 6.00	F. 11.30	G. 12.15	H. 10.00
I. 7.20	J. 2.05	K. 9.35	L. 10.50

d) Time 30 minutes before

A. 5.36	B. 5.20	C. 7.20	D. 11.35
E. 5.45	F. 11.15	G. 12.00	H. 9.45
I. 7.05	J. 1.50	K. 9.20	L. 10.35

4. a) Time 5 minutes later

A. 6.11	B. 5.55	C. 7.55	D. 12.10
E. 6.20	F. 11.50	G. 12.35	H. 10.20
I. 7.40	J. 2.25	K. 9.55	L. 11.10

b) Time 10 minutes later

A. 6.16	B. 6.00	C. 8.00	D. 12.15
E. 6.25	F. 11.55	G. 12.40	H. 10.25
I. 7.45	J. 2.30	K. 10.00	L. 11.15

c) Time 15 minutes later

A. 5.51	B. 5.35	C. 8.05	D. 12.20
E. 6.30	F. 12.00	G. 12.45	H. 10.30
I. 7.50	J. 2.35	K. 10.05	L. 11.20

d) Time 30 minutes later

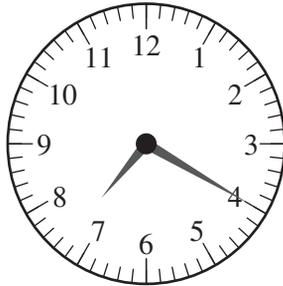
A. 5.36	B. 5.20	C. 8.20	D. 12.35
E. 6.45	F. 12.15	G. 13.00	H. 10.45
I. 8.05	J. 2.50	K. 10.20	L. 11.35

Exercise 2

(LB page 209)

Learners draw the hour and minute hands on blank clock faces.

1.



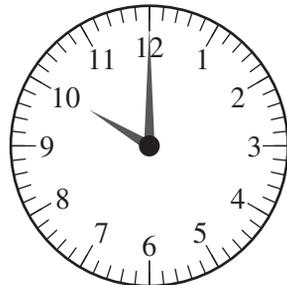
2.



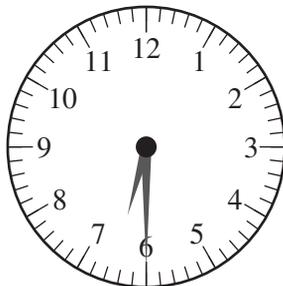
3.



4.



5.



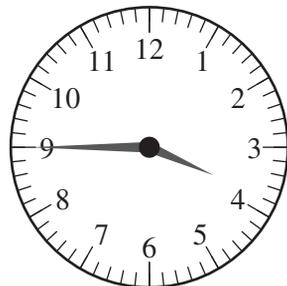
6.



7.



8.



Exercise 3

(LB page 209)



Exercise 4

(LB page 210)

1.

24-hour	+12	20:40	23:30	15:25	22:36	20:15	00:54	18:12	19:45	16:18	17:01
12-hour	-12	8.40 p.m.	11.30 p.m.	3.25 p.m.	10.36 p.m.	8.15 p.m.	12.54 a.m.	6.12 p.m.	7.45 p.m.	4.18 p.m.	5.01 p.m.

2. a) 10 minutes past 12 p.m.
 b) 25 minutes past 6 a.m.
 c) 15 minutes to 11 a.m.
 d) 29 minutes past 4 a.m.
 e) 13 minutes past 8 a.m.
 f) 25 minutes to 8 a.m.
 g) 9 minutes past 11 a.m.
 h) 18 minutes past 5 a.m.
 i) 6 minutes to 10 a.m.

3. a) 17:35 b) 07:30 c) 12:00
 d) 22:00 e) 9:45 f) 23:15
 g) 20:10 h) 6:05 i) 23:22
 j) 9:38 k) 12:52 l) 14:40

4. a) 20 minutes past 10
 b) 20 minutes
 c) 5 minutes

B4.3.3.3.2

Content standard	Indicator
B4.3.3.3 Demonstrate understanding of time taken by events in minutes and hours	B4.3.3.2 Use clocks to measure time to complete simple events in minutes and seconds.

1. Learning expectations

Learners need to be able to:

- measure time in minutes and seconds.

2. Essential for learning

Learners have experience with using calendars and telling time.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 108–111
- Analogue and digital watches
- Different calendars

5. Large class teaching

It is not always the exact number of learners in a class that matters but how you see the class size in your own specific situation.

Some learners will arrive in class with an agenda other than learning. Create a disciplinary contract with the learners during the first lesson. Give them ownership of the task of coming up with ideas such as 'I will not shout in class or talk while the teacher is teaching.' Give the learners the responsibility to come up with a fair consequence for each of their actions. The more invested they are in the outcome, the more they will take it seriously. Post it on the wall and refer to it when a behavioural issue arises.

Respect the needs of quieter introvert learners. Do not call on quieter and introvert learners to speak up in front of

a large class. Get to know the learners and become aware of those who are uncomfortable speaking in large groups. Call on them when they are in a smaller group and monitor the progress.

6. Support for learners with special needs

Find practical opportunities to let learners tell the time. Give the learners reminders when it's time for break or let them calculate what time the lesson will be completed. You can also allow the learners to play or read for 15-minutes and let the learners tell each other when time is up.

One of the symptoms of dyscalculia is having difficulty with telling the time and reading an analogue clock. Dyscalculia is a learning disability where a learner struggles to represent and process numerical content. Other common symptoms of dyscalculia include difficulty with sorting right from left and difficulty with mathematical reasoning. The learner may find it difficult to link numbers and symbols to directions.

Remember that some special-needs learners may struggle with oral directions, especially those with more than two steps. Instructions with more than two steps should be given on the board or in written format. Learners may appear to 'zone out' during lengthy oral presentations. They may not remember information given orally without being able to see it. They memorise using visual clues. Ensure that you use several visual clues.

7. Teaching methodology

When teaching about time, you can start with the abstract concepts as that will help the learner to get a feel for the time increments before they do the numerical parts. Make a habit of announcing when certain events will take place for example: "In 15 minutes it will be break-time." You can use a kitchen timer to develop time concepts. Time some of the learner's activities to help them to personally connect with the time intervals.

Incorporate general concepts like morning, noon, afternoon, evening, and night times into the lessons as that will help with the understanding of the 24-hour clock.

Ask the learners to turn to pages 212–214 in the Learner’s book. Be sure to work through all the examples to ensure that your learners understand the various concepts related to duration of time. They can complete all the exercises in the Learner’s book.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on pages 108–111, B4.3.3.3 Exercises 4 to 6.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Teacher assessment

Use Section 10. Answers to assess learners’ work.

Self/peer assessment

Go through the answers with the class. Write them on the board. Ask learners to correct their own work.

10. Answers

Exercise 1

(LB page 213)

1. Learners work with a partner to record duration in analogue and digital time. They should be able to record a more accurate digital time.
2. Learners time morning activities, times will vary.
 - a) 5–10 minutes
 - b) 15 minutes
 - c) 2 minutes
3. Learners record activities that should take less than one minute.

Exercise 2

(LB page 214)

1.
 - a) $12.23 - 12.20 = 3$ minutes
 - b) $12.45 - 12.30 = 15$ minutes
 - c) $15.00 - 12.45 = 2$ hours 15 minutes

- d) $13.50 - 13.15 = 35$ minutes
 e) $16.15 - 15.00 = 1$ hour 15 min
2. a) $12.25 - 08.00 = 4$ hours 25 minutes
 b) 35 minutes
 c) $9.45 - 08.00 = 1$ hour 45 minutes
 d) Break ends at 10.00, time to closing: $12.25 - 10.00 = 2$ hours 25 minutes

B4.3.3.3.3

Content standard	Indicator
B4.3.3.3 Demonstrate understanding of time taken by events in minutes and hours	B4.3.3.3.3 State dates of events and record calendar dates in a variety of formats.

1. Learning expectations

Learners need to be able to:

- state dates of events.
- record calendar dates.

2. Essential for learning

Learners have experience with using calendars and telling time.

3. New words

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 111–113
- Different calendars

5. Large class teaching

It is not always the exact number of learners in a class that matters but how you see the class size in your own specific situation.

Maintain a healthy balance of different kinds of learning. To teach measurement of time to a large class you must be well prepared and organised. You need to maintain a healthy

balance of structured learning as well as activities where all learners can discover the content. Allow unstructured learning to take place such as asking learners to create their own calendars.

Plan for the unexpected. Being well prepared ensures that you will not have any classroom management problems, and this includes preparing for unexpected events. There will be times when learners will finish early, or a class may run late. You need to have back-up plans prepared for these moments. If a learner finishes a task earlier than the others, this learner may disrupt the whole class.

6. Support for learners with special needs

Many learners find it difficult to tell the time in hours and minutes and this can be a major learning disadvantage.

Find practical opportunities to let learners tell the time.

One of the symptoms of dyscalculia is having difficulty with telling the time and reading an analogue clock.

Learners that struggle with motor sequencing involving numbers will also find these topics difficult.

Remember that some special-needs learners may struggle with oral directions, especially those with more than two steps.

Praise learners when they behave well so that you encourage the behaviour you want to see.

Most remedial learners face difficulty in understanding new concepts.

7. Teaching methodology

Ask the learners to turn to pages 215–217 in the Learner's book. Be sure to work through all the examples to ensure that your learners understand the various concepts related to calendars and events. They can complete all the exercises in the Learner's book.

8. Homework

Additional exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on pages 111–113, B4.3.3.3 Exercises 7 and 8.

9. Assessment

Geometrical concepts need time to develop. Encourage learners not to give up but to keep on trying. Do not pressurise learners to perform within a certain time as this can decrease their confidence.

Individual assessment

Use these questions as assessment questions.

1. Complete the table.

	Duration of time	Number of minutes	Number of seconds
a)	Half an hour		
b)	2 hours		
c)	$\frac{1}{4}$ hour		
d)		30 minutes	

2. Study the calendar for February.

February							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1					1	2	3
Week 2	4	5	6	7	8	9	10
Week 3	11	12	13		15	16	17
Week 4	18	19	20	21	22	23	24
Week 5	25	26	27	28			

- The month starts with which day?
- How many Saturdays are there in this month?
- How many weeks are there in February?
- February is the _____ month of the year.
- There are ____ days in February. It is a ____ year.
- Valentine's day is marked with a  on the calendar. Write down the date of Valentine's day:
_____.

2. Write the missing times in the sequence:

a)	06:30	:	08:30	09:30
b)	08:15	08:30	:	09:00
c)	20:30	20:45	:	:
d)	:	12:55	01:00	01:05

Solutions:

- | | |
|-----------------|---------------|
| 1. a) Friday | b) 4 |
| c) 31 | d) 28th March |
| 2. a) 7:30 | b) 8:45 |
| c) 21:00; 21:15 | d) 12:50 |

10. Answers

Exercise 1

(LB page 216)

Learners write the dates of particular events in Ghana.

1. Independence Day: 6 March; 06/03
2. Republic Day: 1 July; 01.07
3. Founders' Day: 5 August; 05/08
4. Farmers' Day: 6 December; 6-Dec
5. Workers' Day: 1 May; 01/05

Exercise 2

(LB page 216)

Learners record the dates of specific events.

Exercise 3

(LB page 217)

Learners work in groups to record their birthdays in a table and then draw them on a timeline.

**Sub-strand 1: Data collection,
organisation, presentation,
interpretation and analysis**

The learner will be able to read, interpret, construct and display pictographs and bar graphs and to solve simple problems and draw conclusions from data presented in pictographs and bar graphs.

Content standard	Indicator
B4.4.1.1 Demonstrate an understanding of many-to-one correspondence in displaying and reading or interpreting graphs	B4.4.1.1.1 Use an understanding of one-to-one correspondence to read and interpret graphs

1. Learning expectations

Learners need to be able to:

- use an understanding of one-to-one correspondence to read graphs.
- use an understanding of one-to-one correspondence to interpret graphs.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

Frequency

4. Resources used in this indicator

- Learner's book
- Craft paper
- Glue

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

Change your teaching approach every 15 minutes.

The average attention span of a learner is between ten and 15 minutes. Use different teaching methods to present the content. In this strand class discussions and interaction can be used to deviate from the normal format. This keeps learners engaged and focused.

Plan fun activities and experiment with different approaches and strategies. The data strand lends itself to researching fun topics. Find topics that are interesting for your learners, you could even allow learners to suggest their own research projects.

Treat your large class like it is a small class. In a small class you can promote the learning process by allowing interaction, discussion and debate. Many teachers avoid this in a large class. This avoidance is justified through concerns about managing and controlling learners. Some teachers are also concerned that a large class may become unruly if learners are allowed to speak. This can be avoided by structuring the interaction activities.

Stay positive. Large classes involve lots of different types of learners who have different experiences and understandings of data. Some learners will be faster than others at understanding the concepts.

Be well prepared. To successfully teach this strand to a large class you need to be extremely well prepared and you need to give clear and specific instructions to the learners. Regularly check for understanding and ask learners to repeat the instructions to avoid misunderstandings. Create a seating plan that strategically places high achieving learners next to struggling learners and ask them to help those who are struggling.

6. Support for learners with special needs

Special-needs learners should get lots of specific praise. Motivate and encourage special-needs learners as low confidence can affect learning ability. Motivated learners have more confidence to succeed in Mathematics and will

therefore do better. Provide specific praising comments that link the activity directly with the recognition; for example, ‘I was particularly pleased by the way in which you recorded the data in the frequency table’.

Special-needs learners need a great deal of encouragement. Most learners want to achieve but feel separated from other learners when they are unable to complete tasks, leading to feelings of intense frustration. Without proper encouragement and reassurance, special-needs learners often see themselves as not fitting in. This can lead to apathy towards school.

Avoid creating anxiety to complete the work. Anxiety makes working memory less effective and thus reduces the ability to understand Mathematics. Rather help learners with strategies for managing fear of failure and anxiety.

All special-needs learners are capable of success. Each learner succeeds according to individual ability, but all can succeed. Keep that constantly in mind when working with special-needs learners. There are different ways to identify which areas learners are struggling with in this strand. Use a systematic intervention strategy. Create a positive and constructive learning atmosphere.

Provide scaffolding. Some learners with special needs face difficulty in understanding new concepts and may need more scaffolding and time to interpret the information. Relate new concepts to previously learnt concepts. This will help learners to pick up the new concepts more quickly. Repeat new concepts regularly to help with the processing of information. Some learners may have difficulty understanding several instructions at once. Use short, concrete sentences.

7. Teaching methodology

Ask the learners to turn to pages 218–220 in the Learner’s book. Work through the explanation and examples with the learners.

They complete all their exercises.

There is additional teaching content given below. Use this to complement your lessons as you work through the data indicators.

Additional content

The steps of the data cycle are to collect data and organise the data before visually displaying it on a pictograph or a bar graph. We can then analyse the pictograph or bar graph to draw conclusions.

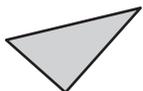
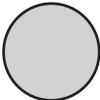
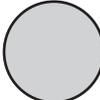
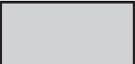
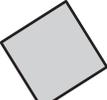
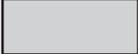
Show the learners different bar graphs and pictographs.

Ask questions and manage the learner responses:

- How will we collect, organise and represent the data?
- What ‘story’ does this data tell us?
- Why do we visually represent data?
- What questions can we answer when looking at a bar graph?
- What are the benefits of representing data in a bar graph?

Show the learners the data cycle. Show learners interesting examples of pictographs and bar graphs for example:

Rebecca asked 15 learners in a class about their favourite shape. The learners could choose from a circle, triangle, rectangle or a square. She recorded the answers in this table.

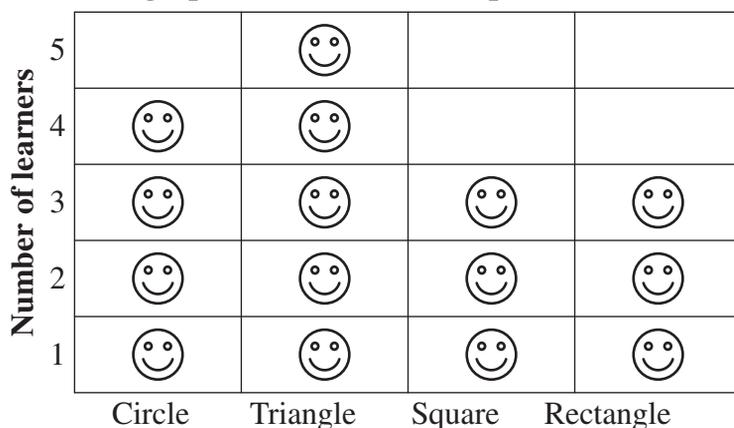
- a) Complete the tally table by organising and counting the shapes:

Tally table of the favourite shapes of learners	
Circle	///
Triangle	###
Square	///
Rectangle	///

b) Use the information to draw a pictograph.

Key: Use ☺ to represent a shape choice.

Pictograph of the favourite shapes of learners



c) Use the pictograph to complete:

Most learners chose the ▲ as their favourite shape.

Work through examples with the class before expecting them to complete a similar exercise on their own.

8. Homework

Exercise 2 may be completed as homework.

9. Assessment

Assessment suggestions are provided at the end of this strand to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

Teacher assessment

Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 220)

This is a class activity. Each learner makes a cut-out picture of their favourite fruit. The class then puts their images together to make a pictogram. Learners answer questions about the data represented on the pictogram.

Exercise 2

(LB page 221)

1. 34 learners
2. chocolate
3. peppermint
4. 6
5. 2

B4.4.1.1.2

Content standard	Indicator
B4.4.1.1 Demonstrate an understanding of many-to-one correspondence in displaying and reading or interpreting graphs	B4.4.1.1.2 Use an understanding of many-to-one correspondence to display or construct graphs

1. Learning expectations

Learners need to be able to:

- use an understanding of many-to-one correspondence to display graphs.
- use an understanding of many-to-one correspondence to construct graphs.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 114–115
- Ruler

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

- Change your teaching approach every 15 minutes.
- Plan fun activities and experiment with different approaches and strategies.
- Treat your large class like it is a small class.
- Stay positive.
- Be well prepared.

6. Support for learners with special needs

For learners with special needs and learning disabilities remember the following guidelines:

- Special-needs learners should get lots of specific praise.
- Special-needs learners need a great deal of encouragement.
- Avoid creating anxiety to complete the work.
- All special-needs learners are capable of success.
- Provide scaffolding.

7. Teaching methodology

Work through all the examples with the learners on pages 223–224.

Ensure that they understand the concepts and what they are expected to do.

The focus here is that you can use one symbol to represent many data items. You may also use part of a symbol to represent a smaller portion of data.

8. Homework

Exercises not completed in class could be used as homework tasks. Further exercises are found in the Workbook on pages 114–115, B4.4.1.1 Exercise 1.

9. Assessment

Assessment suggestions are provided at the end of this strand to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

Teacher assessment

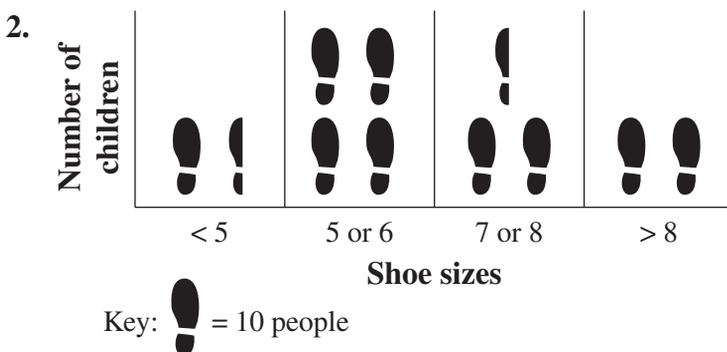
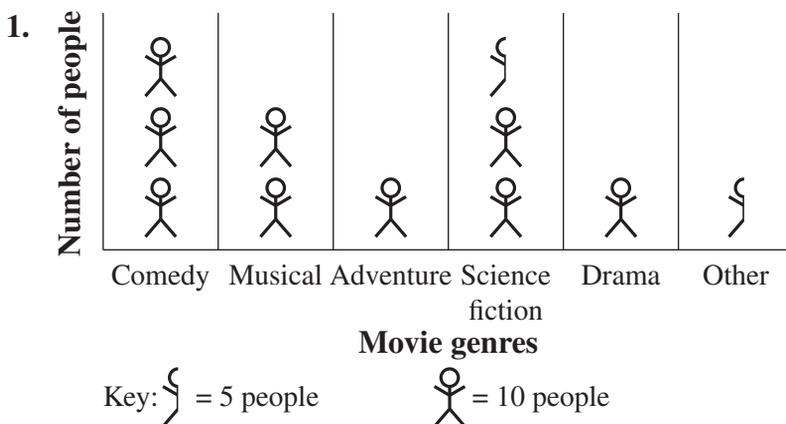
Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 224)

Note: learners may use any image that makes sense in the context.



B4.4.1.1.3

Content standard	Indicator
B4.4.1.1 Demonstrate an understanding of many-to-one correspondence in displaying and reading or interpreting graphs	B4.4.1.1.3 Compare graphs in which the same data has been displayed and explain how they are the same and different

1. Learning expectations

Learners need to be able to:

- compare graphs in which the same data has been displayed.
- explain how graphs of the same data are the same and different.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 115–116
- Different graphs representing the same data

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

- Change your teaching approach every 15 minutes.
- Plan fun activities and experiment with different approaches and strategies.
- Treat your large class like it is a small class.
- Stay positive.
- Be well prepared.

6. Support for learners with special needs

For learners with special needs and learning disabilities remember the following guidelines:

- Special-needs learners should get lots of specific praise.
- Special-needs learners need a great deal of encouragement.
- Avoid creating anxiety to complete the work.
- All special-needs learners are capable of success.
- Provide scaffolding.

7. Teaching methodology

Work through the example with the learners on pages 225–226.

Ensure that they understand the concepts. Plot a number of different data sets in different formats. Present these to the class. You may work as a class or in groups. Encourage debate and critical thinking about what is similar or different in the graphs. Be sure to point out that the graphs are

representing the same data.

8. Homework

Further exercises are found in the Workbook on pages 115–116, B4.4.1.1 Exercise 2.

9. Assessment

Assessment suggestions are provided at the end of this strand to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

10. Answers

Exercise 1

(LB page 226)

This is a class activity to explore different graphs representing the same data.

B4.4.1.1.4

Content standard	Indicator
B4.4.1.1 Demonstrate an understanding of many-to-one correspondence in displaying and reading or interpreting graphs	B4.4.1.1.4 Find examples of graphs in which many-to-one correspondence is used in print and electronic media, such as newspapers, magazines and the Internet, and describe the correspondence used

1. Learning expectations

Learners need to be able to:

- find examples of graphs in which many-to-one correspondence is used.
- describe the correspondence used in examples.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

There are no new words.

4. Resources used in this indicator

- Learner's book
- Variety of pictographs and bar graphs

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

- Change your teaching approach every 15 minutes.
- Plan fun activities and experiment with different approaches and strategies.
- Treat your large class like it is a small class.
- Stay positive.
- Be well prepared.

6. Support for learners with special needs

For learners with special needs and learning disabilities remember the following guidelines:

- Special-needs learners should get lots of specific praise.
- Special-needs learners need a great deal of encouragement.
- Avoid creating anxiety to complete the work.
- All special-needs learners are capable of success.
- Provide scaffolding.

7. Teaching methodology

Work through the exercises with the learners on pages 227–228. Ensure that they understand what is required. Help them to find resources containing data graphs.

You may work as a class or in groups. Encourage learners to investigate and examine every part of the graphs that they have found. Ask them to think of the advantages of using different kinds of representations.

8. Homework

Learners can look out for data graphs in the media.

9. Assessment

Assessment suggestions are provided at the end of this strand to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

10. Answers

Exercise 1

(LB page 227)

Learners do research to find different types of data graphs.

Exercise 2

(LB page 227)

Learners explore the features of the graphs that they found in question 1.

Exercise 3

(LB page 228)

Learners should describe what they understand from the graph. Some of the items they may notice include the following:

Tano has picked up the most cans; he has 6 cans. Ami picked up 2 more cans than Kiki, but 1 less than Jeremiah and Yaaba, and 3 less than Tano. Kiki picked up the least number of cans.

Sub-strand 1: Data collection, organisation, presentation, interpretation and analysis

The learner will be able to read, interpret, construct and display pictographs and bar graphs and to solve simple problems and draw conclusions from data presented in pictographs and bar graphs.

Content standard	Indicator
<p>B4.4.1.2 Construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions.</p>	<p>B4.4.1.2.1 Identify common features of graphs that use many-to-one correspondence and use that understanding to draw bar graphs or pictographs, complete with title, labelled axes, key or legend, to represent data collected (up to 4 categories of data)</p>

1. Learning expectations

Learners need to be able to:

- construct pictographs and bar graphs involving many-to-one correspondence.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 117–119
- Ruler
- Grid paper

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

- Change your teaching approach every 15 minutes.
- Plan fun activities and experiment with different approaches and strategies.
- Treat your large class like it is a small class.
- Stay positive.
- Be well prepared.

6. Support for learners with special needs

For learners with special needs and learning disabilities remember the following guidelines:

- Special-needs learners should get lots of specific praise.
- Special-needs learners need a great deal of encouragement.
- Avoid creating anxiety to complete the work.
- All special-needs learners are capable of success.
- Provide scaffolding.

7. Teaching methodology

Work through the example and exercises with the learners on pages 229–233. Help them to identify common features of graphs. Guide them through the process of constructing a bar graph. Ensure that they understand what is required. Learners must recognise the difference between bar graphs and pictographs. You may work as a class or in groups.

8. Homework

Further exercises are found in the Workbook on pages 117–119, B4.4.1.2 Exercise 1.

9. Assessment

Assessment suggestions are provided at the end of this strand to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

Teacher assessment

Use Section 10. Answers to assess learners' work.

10. Answers

Exercise 1

(LB page 229)

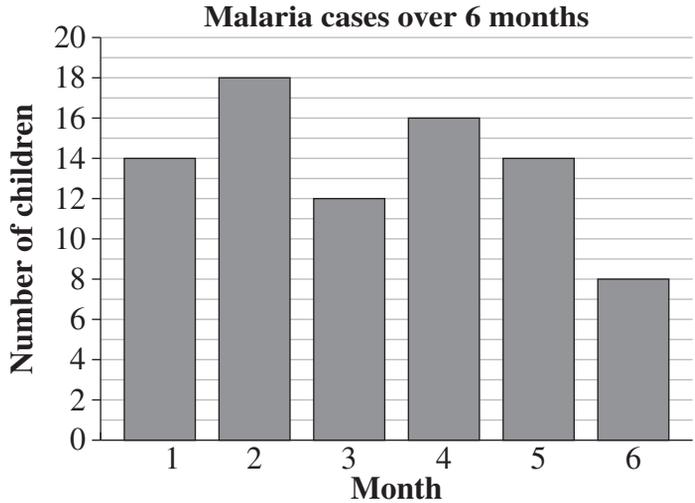
Learners make a list of features common to data graphs such as:

A title; a horizontal axis; a vertical axis; data entries; a label for the horizontal axis; a label for the vertical axis.

Exercise 2

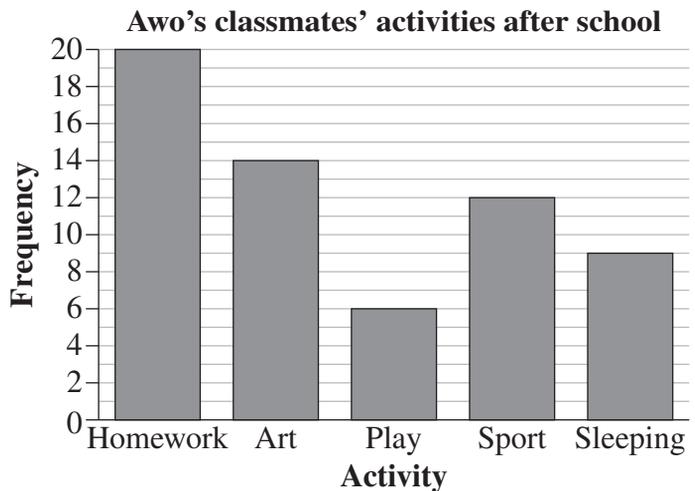
(LB page 232)

1. a) Bar graph showing malaria cases over 6 months



- b) Decreasing c) Month 2 d) Month 6

2. a) Bar graph showing after school activities



- b) 61 c) Homework
d) 8 classmates

B4.4.1.2.2

Content standard	Indicator
B4.4.1.2 Construct and interpret pictographs and bar graphs involving many-to-one correspondence to draw conclusions.	B4.4.1.2.2 Use understanding of many-to-one correspondence to solve simple problems (how many altogether, comparing, or take apart problems) requiring interpretation of many-to one bar graphs (up to 4 categories of data).

1. Learning expectations

Learners need to be able to:

- interpret pictographs and bar graphs involving many-to-one correspondence.
- draw conclusions from pictographs and bar graphs.

2. Essential for learning

Learners have experience with one-to-one correspondence and simple pictographs.

3. New word

There are no new words.

4. Resources used in this indicator

- Learner's book
- Workbook pages 120–124

5. Large class teaching

Teaching a large class can be challenging as some learners can disengage. Follow these guidelines to teach this strand:

- Change your teaching approach every 15 minutes.
- Plan fun activities and experiment with different approaches and strategies.
- Treat your large class like it is a small class.
- Stay positive.
- Be well prepared.

6. Support for learners with special needs

For learners with special needs and learning disabilities remember the following guidelines:

- Special-needs learners should get lots of specific praise.

- Special-needs learners need a great deal of encouragement.
- Avoid creating anxiety to complete the work.
- All special-needs learners are capable of success.
- Provide scaffolding.

7. Teaching methodology

Work through the example and exercises with the learners on pages 234–236. Help them to examine graphs to deduce information. Ensure that they understand what is required. Learners must be able to identify different parts of the graph and interpret the data. Learners may work individually or in pairs.

Refer back to the additional content at the start of this strand to revise the process of the data cycle.

8. Homework

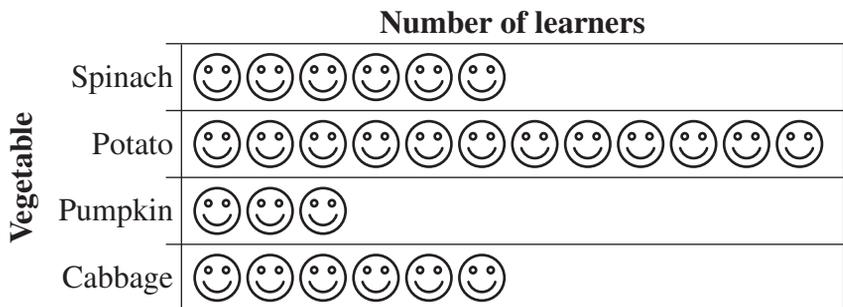
Further exercises are found in the Workbook on pages 120–124, B4.4.1.2 Exercises 2 and 3.

9. Assessment

Use the following assessment to verify the learners' understanding of data collection, organisation, presentation, interpretation and analysis.

Individual assessment

The pictograph shows the Basic 4 learners' favourite vegetables.



Key:  represents one learner

1. What is the most favourite vegetable according to the survey?
2. What is the second most popular vegetable according to the survey?
3. What is the least popular vegetable according to the survey?
4. How many learners choose pumpkin or cabbage as their favourite vegetable?
5. How many learners are there in the Basic 4 class?

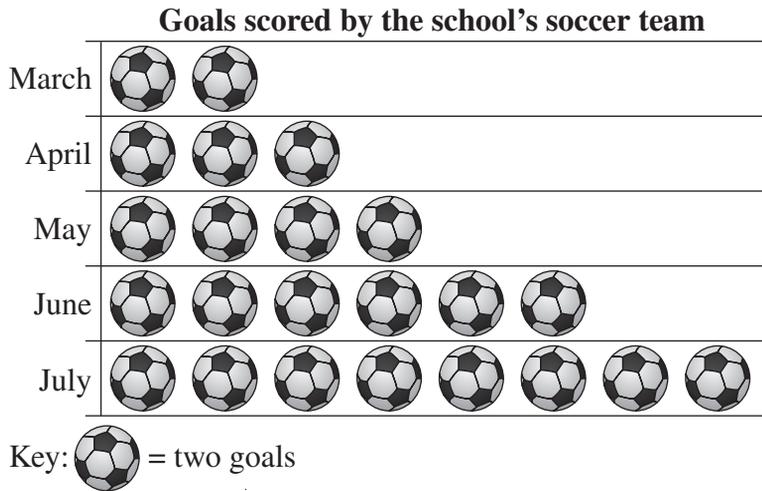
Solutions:

1. Potato
2. Cabbage
3. Pumpkin
4. Nine learners choose pumpkin or cabbage as their favourite vegetable.
5. 26 learners

Diagnostic assessment

You can use this or a similar activity as a diagnostic assessment activity.

Look at the pictograph.



1. In what month did the soccer team score the most goals?
2. In what month did the soccer team score the least goals?
3. How many goals did the soccer team score in June and July?
4. Renaldo stated: "The soccer team is not good and did not learn any skills." Do you agree with Renaldo? Explain.

Solutions:

1. July
2. March
3. 28 goals in June and July
4. The team has scored progressively more goals every month. 16 goals in July is a very good result. I do not agree with Renaldo, the team has clearly improved and are playing well.

Group activity and peer assessment

Let the learners work in groups of three. They do a survey to collect data about the favourite food of learners in the class. Choose any four types of food. Organise the data in a tally table and draw a pictogram and a bar graph. Analyse the data by writing two sentences about the data.

10. Answers

Exercise 1

(LB page 234)

1. Twi: 30 learners passed
History: 25 learners passed
Mathematics: 15 learners passed
English: 25 learners passed
Science: 20 learners passed
2. Mathematics has the lowest number of passes.
3. Twi has the highest number of passes.

Exercise 2

(LB page 235)

1. 320 underfed babies
2. 75 babies aged 6 months
3. 110 babies younger than 6 months
4. No, the graph is for data spread over one year.

Exercise 3

(LB page 236)

1. Animals on a farm
2. (Type of) Animals
3. Number of animals
4. Goats
5. Horses
6. Goats 20; Sheep 16; Pigs 14; Roosters 14; Cows 12; Hens 10; Horses 8.
7. Roosters are birds \therefore there are 14 birds.
8. 12 more goats than horses
9. 94 animals altogether

Revision

- 8,900; 8,910; 8,920; 8,930; 8,940
 - 7,998; 7,999; 8,000; 8,001; 8,002
 - 761; 861; 961; 1,061; 1,161
 - 10,004; 10,014; 10,024; 10,034; 10,044
- 4,526
 - 8,050
 - 94,735
 - 40,007
- two thousand eight hundred and sixteen
 - six thousand nine hundred and ninety-two
 - eighty-one thousand four hundred and thirty-five
- 5,624
 - 3,423
 - 4,437
- $7,000 + 600 + 80 + 7 = 7,687$
 - $9,000 + 400 + 80 + 4 = 9,484$
 - $1,000 + 700 + 50 + 3 = 1,753$
- 1,000
 - 200
 - 50,000
 - 7
- 25
 - 21
- $10,000 + 400 + 80 + 2 = 10,482$
 - $30,000 + 2,000 + 700 + 10 = 32,710$
- 51,442

10.

	HTH	TTH	TH	H	T	O
a)	0	1	0	4	8	2
b)	0	3	2	7	1	0
c)	0	5	1	4	4	2
d)	4	6	7	0	8	2
e)	0	0	9	7	0	4

11. See d) and e) in Question 10. table.

- 60; 65; 70; 75
 - 42; 49; 56; 63
 - 180; 240; 300; 360
 - 33; 40; 47; 54

13. a) 39,805 b) 40,795 c) 39,895
 d) 29,795 e) 39,695 f) 39,785

14. a) 100 b) 1,600 c) 19,500

15. 43,758; 45,678; 46,587; 47,865; 54,678; 56,487

16. a) false b) false c) false d) false

17. a) < b) > c) >

18.

IV	XVI	XXI	XL	L	XC	LXX	CL	MD
4	16	21	40	50	90	70	150	1,500

19. a) (i) 80 (ii) 100
 b) (i) 150 (ii) 100
 c) (i) 5,290 (ii) 5,300
 d) (i) 2,000 (ii) 2,000

20. a) $234 + 129 \approx 230 + 130 = 360$
 Estimate: 360 Actual: 363

- b) $504 - 251 \approx 500 - 250 = 250$
 Estimate: 250 Actual: 253

21. a) 17; 170; 1,700; 17,000 b) 9; 90; 900; 9,000

22. a) 1,502 b) 8,889 c) 4,222

23. a) $\text{GH}\text{C}2,367 + \text{GH}\text{C}1,785 + \text{GH}\text{C}4,157 = \text{GH}\text{C}8,309$
 b) $\text{GH}\text{C}4,157 - \text{GH}\text{C}2,367 = \text{GH}\text{C}1,790$
 c) No. $\text{GH}\text{C}2,367 + \text{GH}\text{C}1,785 = \text{GH}\text{C}4,152 < \text{GH}\text{C}4,157$

24. a) $3 \rightarrow 3; 6; 9; 12; 15; 18; 21$
 $7 \rightarrow 7; 14; 21$
 LCM = 21

- b) $4 \rightarrow 4; 8; 12; 16; 20$
 $10 \rightarrow 10; 20$
 LCM = 20

25. a) $8 \rightarrow 1; 2; 4; 8$
 $12 \rightarrow 1; 2; 3; 4; 6; 12$
 HCF = 4

- b) $14 \rightarrow 1; 2; 7; 14$
 $21 \rightarrow 1; 3; 7; 21$
 HCF = 7

26. a) 480 b) 1,500 c) 1,044 d) 782

27. a) $24 \times 18 = 432$ sweets
b) $15 \times 14 = 210$ books
c) $124 \div 10 = 12$ bunches with 4 flowers remaining
d) $98 \div 7 = 14$ packets
e) $40 \div 6 = 6.67 \therefore 7$ tables are needed

28. a) 119 b) 154 rem 4

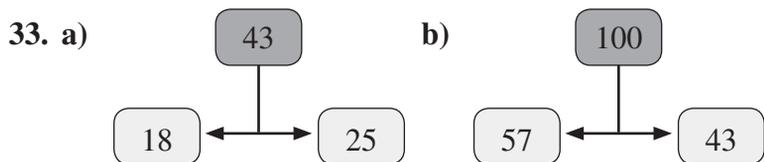
29. a) $9 \times 9 = 9^2 = 81$ b) $10 \times 10 = 10^2 = 100$
c) $12^2 = 12 \times 12 = 144$ d) $15^2 = 15 \times 15 = 225$
e) $20^2 = 20 \times 20 = 400$ f) $11^2 = 11 \times 11 = 121$

30.

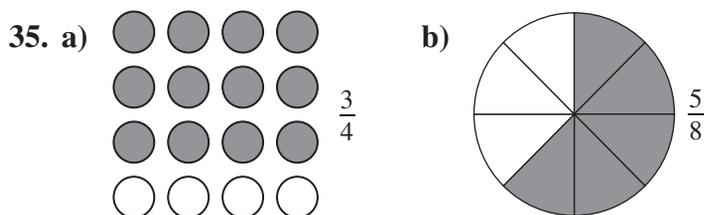
\times	6	7	9	11	12
6	36	42	54	66	72
7	42	49	63	77	84
9	54	63	81	99	108
11	66	77	99	121	132
12	72	84	108	132	144

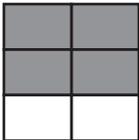
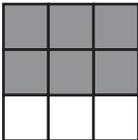
31. a) $10 = (3 \times 3) + 1$
b) $20 = (4 \times 4) + (2 \times 2)$
c) $36 = (5 \times 6) + (3 \times 2)$
d) $125 = (11 \times 11) + (2 \times 2)$

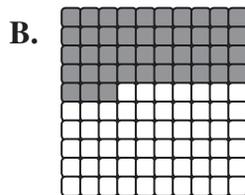
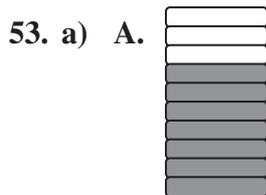
32. a) $64 - 35 = 29$ b) $9 \times 6 = 54$
c) $76 + 18 = 94$ d) $48 \div 6 = 8$



34. a) $27 = 9 + 9 + 9$ b) $2 \times 10 = 18 + 2$
c) $45 \div 5 = 9$ d) $32 - 4 = 4 \times 7$



36. a) $\frac{1}{4}, \frac{4}{12}$ b) $\frac{9}{7}, \frac{101}{100}$ c) $2\frac{2}{3}, 1\frac{6}{8}$
37. a) $2\frac{2}{3}$ b) $2\frac{3}{7}$ c) $6\frac{9}{10}$ d) $6\frac{2}{3}$
38. a) false b) false
39. a) $\frac{2}{3}$ b) $\frac{11}{4}$
40. $10 \times \frac{4}{5} = \frac{40}{5} = 8$ balls of wool
41. a) < b) > c) = d) =
42. $\frac{6}{10} = \frac{36}{60}, \frac{1}{12} = \frac{5}{60}, \frac{9}{10} = \frac{54}{60}, \frac{7}{12} = \frac{35}{60}, -\frac{1}{10} = \frac{6}{60}, \frac{5}{12} = \frac{25}{60}$
 \therefore ascending order: $\frac{1}{12}, \frac{1}{10}, \frac{5}{12}, \frac{7}{12}, \frac{6}{10}, \frac{9}{10}$
43. $\frac{1}{4} > \frac{1}{8} \therefore$ Odom ate more pizza.
44. a) $\frac{2}{5} = \frac{4}{10} = \frac{8}{20} = \frac{16}{40}$ b) $\frac{40}{60} = \frac{4}{6} = \frac{2}{3}$
45. a) A.  B.  C. 
- b) $\frac{2}{3} = \frac{4}{6} = \frac{6}{9}, \frac{1}{3} = \frac{2}{6} = \frac{3}{9}$
46. a) Learners own answers b) Learners own answers
47. a) $\frac{4}{5} + \frac{5}{6} = \frac{24}{30} + \frac{25}{30} = \frac{(24+25)}{30} = \frac{49}{30} = 1\frac{19}{30}$
 b) $\frac{8}{9} - \frac{2}{3} = \frac{8}{9} - \frac{6}{9} = \frac{2}{9}$
 c) $1\frac{3}{4} + \frac{3}{8} = \frac{14}{8} + \frac{3}{8} = \frac{17}{8} = 2\frac{1}{8}$
 d) $3\frac{6}{7} - \frac{2}{3} = \frac{27}{7} - \frac{2}{3} = \frac{81}{21} - \frac{14}{21} = \frac{67}{21} = 3\frac{4}{21}$
48. $\frac{1}{6} + \frac{3}{8} = \frac{4}{24} + \frac{9}{24} = \frac{13}{24}$
49. $\frac{2}{5} - \frac{1}{8} = \frac{16}{40} - \frac{5}{40} = \frac{11}{40}$
50. $1\frac{3}{4} - \frac{3}{6} = \frac{7}{4} - \frac{2}{4} = \frac{5}{4} = 1\frac{1}{4}$ m longer
51. $2\frac{2}{3} \rightarrow \frac{2}{3} \rightarrow 3\frac{1}{3} \rightarrow \frac{2}{3} \rightarrow 4 \rightarrow \frac{2}{3} \rightarrow 4\frac{2}{3}$
52. a) 21.45 b) 12.63



b) $\frac{7}{10} = 0.7$; $\frac{43}{100} = 0.43$ c) 70%; 43%

54. a) $\frac{1}{10} = 0.1$

b) $2\frac{8}{10} = 2.8$

c) $\frac{15}{10} = 1.5$

d) $2.25 = 2\frac{25}{100}$

e) $\frac{135}{100} = 1\frac{35}{100}$

f) $\frac{125}{10} = 12\frac{5}{10}$

55. a) $7.62 + 6.86 \approx 7.6 + 6.9 \approx 14.5$ actual answer = 14.48

b) $5.32 - 3.76 \approx 5.3 - 3.8 \approx 1.5$ actual answer = 1.56

56. a) 3.2 b) 2.2 c) 1.59 d) 3.08

57. a) 19.91 b) 12.16

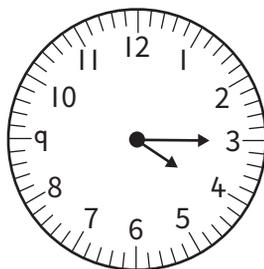
58. a) twenty past three

b) ten to eight or seven fifty

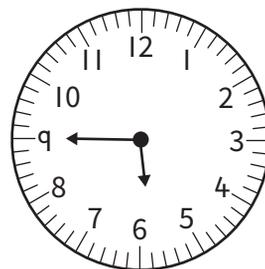
59. a) twenty-five to four; five past eight

b) twenty to four; ten past eight

60. a)



b)



61. a) 7:10 a.m.

b) 2:40 p.m.

c) 11:50 a.m.

d) 10:25 p.m.

62. a) 7 hours 30 minutes

b) 31 hours 30 minutes

63. a) $6 \times 4 = 24 \text{ cm}^2$

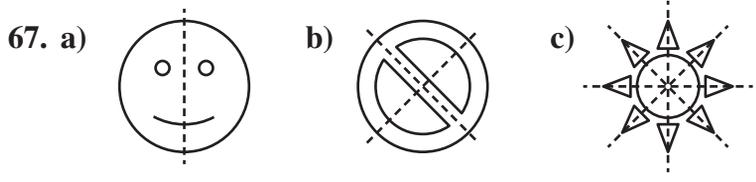
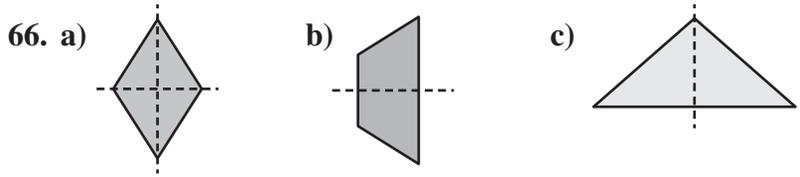
b) $12 \times 6 = 72 \text{ cm}^2$

64. a) $4 \times 1.5 = 6 \text{ m}^2$

b) $9 \times 9 = 81 \text{ m}^2$

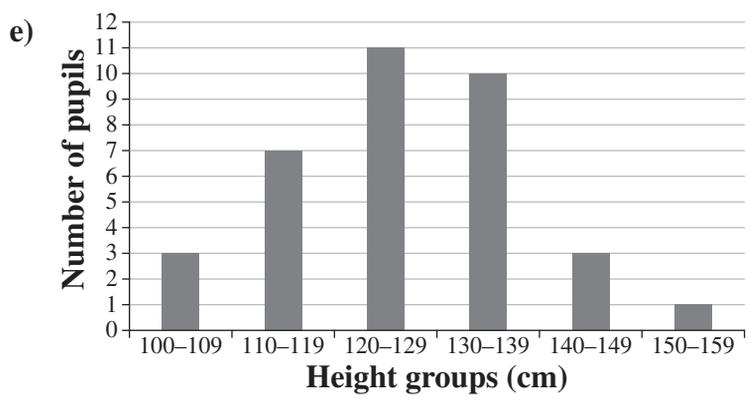
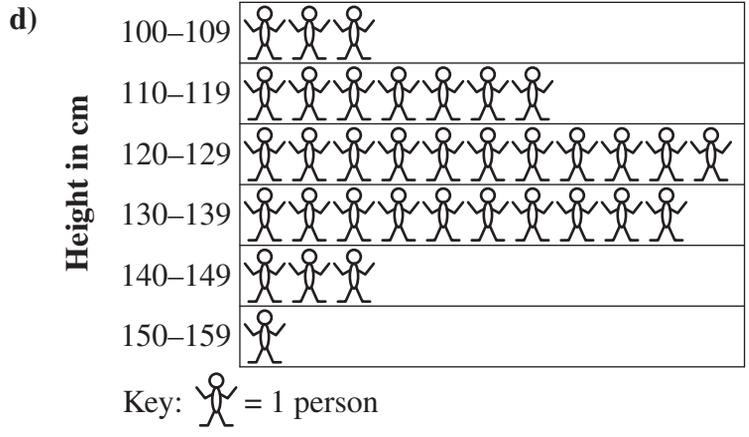
65. a) $4 + 4 + 1.5 + 1.5 = 11 \text{ m}$

b) $4 \times 9 = 36 \text{ m}$



68. a) It is afternoon because the sun is in the west
 b) The cow is east of the house
 c) The house is facing south
 d) C

69. a) 35 b) 150 cm c) 109 cm



Workbook answers

STRAND

1

Number

B4.1.1.1

Exercise 1

(WB page 1)

1.–6. Use the number chart and check learners' answers for correctness. The chart should be marked as shown below.

9,901	9,902	9,903	9,904	9,905	9,906	9,907	9,908	9,909	9,910
9,911	9,912	9,913	9,914	9,915	9,916	9,917	9,918	9,919	9,920
9,921	9,922	9,923	9,924	9,925	9,926	9,927	9,928	9,929	9,930
9,931	9,932	9,933	9,934	9,935	9,936	9,937	9,938	9,939	9,940
9,941	9,942	9,943	9,944	9,945	9,946	9,947	9,948	9,949	9,950
9,951	9,952	9,953	9,954	9,955	9,956	9,957	9,958	9,959	9,960
9,961	9,962	9,963	9,964	9,965	9,966	9,967	9,968	9,969	9,970
9,971	9,972	9,973	9,974	9,975	9,976	9,977	9,978	9,979	9,980
9,981	9,982	9,983	9,984	9,985	9,986	9,987	9,988	9,989	9,990
9,991	9,992	9,993	9,994	9,995	9,996	9,997	9,998	9,999	10,000

Exercise 2

(WB page 2)

1.	18,629	25,001	49,995	70,080	100,000
	18,630	25,002	49,996	70,081	99,999
	18,631	25,003	49,997	70,082	99,998
	18,632	25,004	49,998	70,083	99,997
	18,633	25,005	49,999	70,084	99,996
	18,634	25,006	50,000	70,085	99,995
	18,635	25,007	50,001	70,086	99,994

2. 2,500 glasses

3. 1,700; 1,800; 1,900; 2,000; 2,100; 2,200; 2,300; 2,400; 2,500

Exercise 3

(WB page 3)

1. a) 523 b) 1,582 c) 3,215

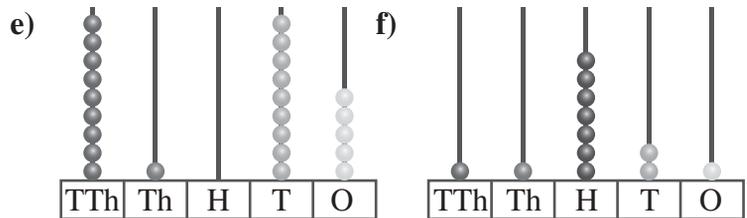
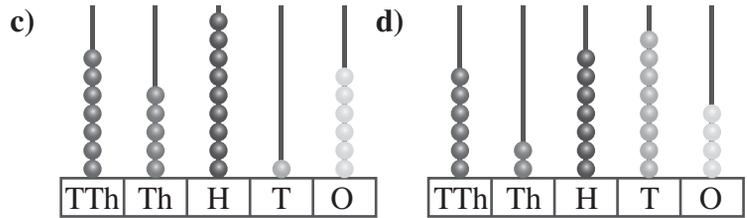
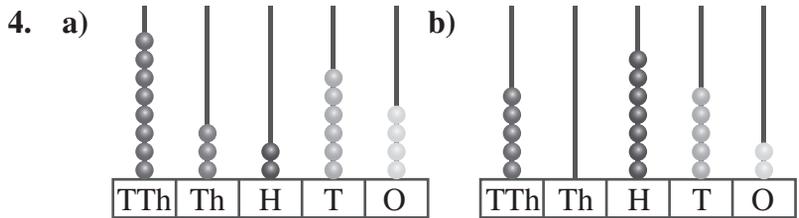
d) 4,091 e) 6,537

2. a) 8,359 b) 12,210 c) 37,965

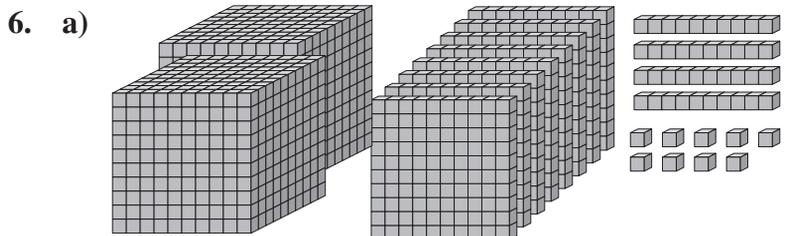
d) 93,461 e) 67,182 f) 85,409

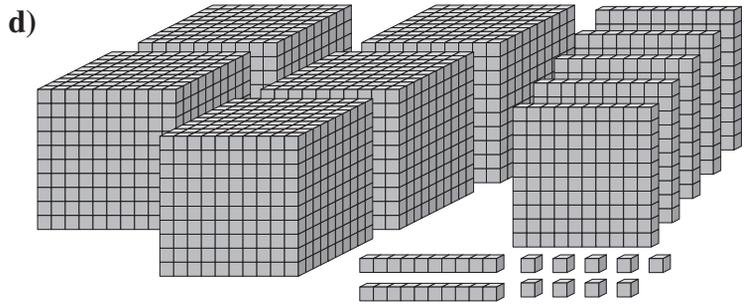
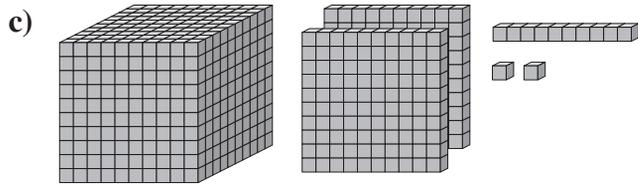
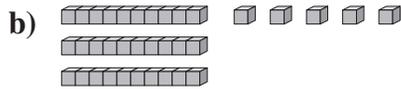
3. a) 1,259 b) 12,678 c) 28,789

d) 35,610 e) 47,395 f) 71,106



5. a) 3,500 b) 13,900 c) 31,200 d) 59,300





Exercise 4

(WB page 9)

1.

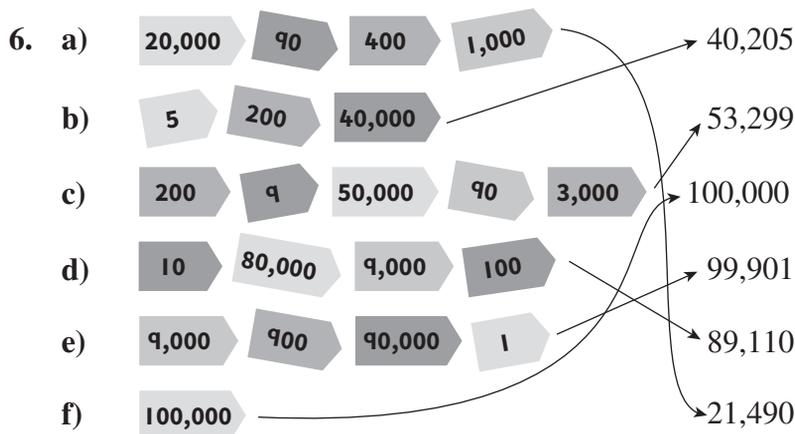
	TTH	TH	H	T	O
28,869	2	8	8	6	9
37,370	3	7	3	7	0
66,015	6	6	0	1	5
45,193	4	5	1	9	3
91,955	9	1	9	5	5

2. a) H b) TTH c) TH
 d) T e) TTH f) TH
 g) TTH h) O i) TTH

3. a) 20,939 b) 56,811 c) 7,322
 d) 30,297 e) 41,545 f) 93,756

4. a) $9,000 + 20$
 b) $10,000 + 1,000 + 300 + 50$
 c) $20,000 + 200 + 20 + 2$
 d) $40,000 + 5,000 + 500 + 90 + 9$
 e) $60,000 + 3,000 + 100 + 10 + 1$
 f) $80,000 + 9,000 + 600 + 40 + 7$

5. a) 4,725 b) 12,398 c) 35,840 d) 99,959
 e) 83,693 f) 49,519 g) 37,070



Exercise 5

(WB page 11)

- Sixty thousand
- Fifty-nine thousand three hundred and eleven
- Twenty-four thousand nine hundred and eighty-four
- Ninety-six thousand one hundred and four
- One hundred thousand
- Eighty thousand and thirty-six
- Twenty-three thousand four hundred
- Ninety-nine thousand and one

Exercise 6

(WB page 12)

- 15,363
- 22,902
- 47,835
- 94,512
- 661
- 1,999

Exercise 7

(WB page 12)

1.	Before	Between	After
	25,296	25,297	25,298
	19,601	19,602	19,603
	42,548	42,549	42,550
	99,998	99,999	100,000
	9,999	10,000	10,001
	59,908	59,909	59,910
	79,998	79,999	80,000

2. a) 5,490 b) 1,210 c) 10,800 d) 15,570
 e) 2,370 f) 17,354 g) 25,621 h) 39,700
3. a) 100,000 b) 82,451 c) 50,120
 d) 36,201 e) 12,001 f) 75,357
4. a) 3,400 b) 25,400 c) 4,926 d) 34,926
 e) 16,357 f) 66,357 g) 9,460 h) 19,460
 i) 13,299 j) 11,299 k) 56,375 l) 73,845

Exercise 8

(WB page 14)

1. a) > b) < c) < d) < e) >
 f) > g) < h) < i) < j) >
2. a) 10,002; 10,020; 10,200
 b) 34,756; 35,467; 35,674; 35,764
 c) 37,598; 79,835; 85,397; 87,953
 d) 46,508; 56,084; 64,805; 86,540
3. a) 10,009 10,090 10,900
 b) 43,289 29,348 38,492
 c) 61,967 96,761 16,679
 d) 15,321 15,123 15,231
4. a) 89,525 98,552 58,925
 b) 66,753 36,576 76,653
 c) 90,894 99,804 89,940
 d) 15,321 15,123 15,231

Exercise 9

(WB page 16)

1. Nile 2. Volga
3. Nile, Amazon, Yangtze 4. Niger, Congo, Nile
5. 2,574 km; 3,530 km; 4,180 km; 4,290 km; 4,700 km;
 5,464 km; 6,270 km; 6,300 km; 6,400 km; 6,690 km

Exercise 10

(WB page 17)

1.	10	
a)	362 → 360 (example)	b) 40
c)	880	d) 340
e)	2,170	f) 4,850

10	
g) 50	h) 4,000
i) 3,760	j) 1,710
k) 1,540	l) 2,490

2.

100	
a) 4,007 → 4,000	b) 75,600
c) 5,700	d) 99,000
e) 8,600	f) 85,200
g) 9,200	h) 68,000
i) 14,600	j) 57,000
k) 36,600	l) 42,700

3.

Round down to nearest 100	Number	Round off to nearest 1,000
5,600	← 5,635 →	6,000
9,100	9,142	9,000
10,400	10,488	10,000
19,600	19,624	20,000
27,300	27,397	27,000
38,900	38,905	39,000
42,300	42,321	42,000

4. a)–c) Answers will vary as learners may estimate different values. Ensure that the counts and differences are correct. Counts: a) 24 b) 36 c) 15

5.

Number sentence	Estimate	Actual answer	Difference
$16 + 35 \approx$	$20 + 30 = 50$	51	1
$24 + 50 \approx$	$20 + 50 = 70$	74	4
$48 + 36 \approx$	$50 + 40 = 90$	84	6
$89 - 63 \approx$	$90 - 60 = 30$	26	4
$226 - 140 \approx$	$230 - 140 = 90$	86	4
$10 \times 12 \approx$	$10 \times 10 = 100$	120	20

6. a) 120 b) 400 c) 600
 d) 400 e) 30 f) 50
7. a) 90 b) 260 c) 150
 d) 480 e) 300 f) 300

Exercise 11

(WB page 20)

1. 130 points
2. a) 30; 36; 42; 48; 54
 b) 300; 360; 420; 480
 c) 35; 42; 49; 56; 63
 d) 350; 420; 490; 560
 e) The numbers in (b) are multiples of 10 of the corresponding numbers in (a). The numbers in (d) are multiples of 10 of the corresponding numbers in (c).
3. a) 7,960; 7,970; 7,980; 7,990
 b) 20,208; 20,210; 20,212; 20,214; 20,216
 c) 918; 924; 930; 936; 942; 948
 d) 30,021; 30,028; 30,035; 30,042; 30,049
 e) 45,500; 45,600; 45,700; 45,800; 45,900
 f) 25,122; 25,127; 25,132; 25,137; 25,142; 25,147
4. 100 sides
5. a) 406; 404; 402; 400
 Count backwards in twos.
 b) 1,012; 1,015; 1,018; 1,021
 Count forwards in threes.

6.

30,000	29,998	29,996	29,994	29,992	29,990
29,988	29,986	29,984	29,982	29,980	29,978
29,976	29,974	29,972	29,970	29,968	29,966

7.

3,600	3,604	3,608	3,612	3,616	3,620
3,624	3,628	3,632	3,636	3,640	3,644

8.

48,006	48,012	48,018	48,024	48,030	48,036
48,042	48,048	48,054	48,060	48,066	48,072
48,078	48,084	48,090	48,096	48,102	48,108

9. a) 29; 36; 43; 50 b) 32; 39; 46; 53
 c) 28; 35; 42; 49 d) 105; 112; 119; 126
10. 120 sides 11. 140 sides
12. a) 400
 b) 650; 700; 750; 800
 c) 3,400; 3,450; 3,500; 3,550
 d) 22,900; 22,950; 23,000; 23,050
13. a) 800
 b) 42,300; 42,400; 42,500; 42,600
 c) 80,500; 80,400; 80,300; 80,200
 d) 79,900; 80,000; 80,100; 80,200
14. a) 4,150 4,200 4,250 ~~4,325~~ 4,350 4,400
 b) 1,113 1,163 ~~1,223~~ 1,263 1,313 1,353
 c) 7,100 7,200 7,030 7,400 ~~7,450~~ 7,600
 d) 8,100 8,200 8,300 ~~9,400~~ 8,500 8,600
 e) 9,050 9,150 9,250 ~~9,355~~ 9,450 9,550

B4.1.1.2

Exercise 1

(WB page 25)

1. a) XII b) IV c) XX
 d) III e) IX f) XIV
 g) XV h) VI i) XI
2. a) 7 b) 30 c) 15 d) 13 e) 28 f) 14
 g) 19 h) 17 i) 26 j) 21 k) 3 l) 23

3.

Number	Sum	Roman numeral
12	10 + 2	XII
16	10 + 6	XVI
25	10 + 10 + 5	XXV
30	10 + 10 + 10	XXX
14	10 + 4	XIV
19	10 + (10 - 1)	XIX
8	5 + 3	VIII
10	10 + 0	X
7	5 + 2	VII

4. a) XXI b) XXX c) XXV
 d) XI e) XVIII f) XXII

Exercise 2

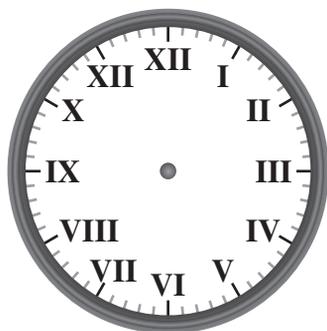
(WB page 26)

1.

1	2	3	4	5	6	7	8	9	10
I	II	III	IV	V	VI	VII	VIII	IX	X
11	12	13	14	15	16	17	18	19	20
XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
21	22	23	24	25	26	27	28	29	30
XXI	XXII	XXIII	XXIV	XXV	XXVI	XXVII	XXVIII	XXIX	XXX

2. a) True b) False c) True
 d) True e) False f) True

3.



4. a) half past 4 b) quarter past 10
 c) 7 o'clock d) quarter to 2
 e) 12 o'clock f) ten to 5

B4.1.1.3

Exercise 1

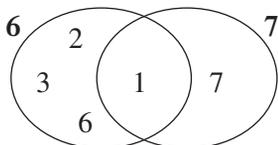
(WB page 29)

1. a)–d)

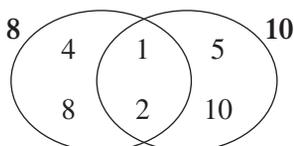
×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48

2. a) 9 Factors = {1; 3; 9}
9 cubes can be divided into 3 groups of 3.
- b) 10 Factors = {1; 2; 5; 10}
10 hearts can be divided into 2 groups of 5, or 5 groups of 2.
- c) 12 Factors = {1; 2; 3; 4; 6; 12}
12 cars can be divided into 2 groups of 6; 3 groups of 4; 4 groups of 3 or 6 groups of 2.
- d) 8 Factors = {1; 2; 4; 8}
8 pencils can be divided into 4 groups of 2 or 2 groups of 4.

3. a) HCF = 1
Factors of 6 = {1; 2; 3; 6}
Factors of 7 = {1; 7}



- b) HCF = 2
Factors of 8 = {1; 2; 4; 8}
Factors of 10 = {1; 2; 5; 10}



4. a) Factors of 10 = {1; 2; 5; 10}

$$\div 10 \div 2 = 5; 10 \div 10 = 1$$

$$\times 2 \times 5 = 10; 1 \times 10 = 10$$

- b) Factors of 18 = {1; 2; 3; 6; 9; 18}

$$\div 18 \div 2 = 9; 18 \div 3 = 6; 18 \div 18 = 1$$

$$\times 2 \times 9 = 18; 3 \times 6 = 18; 1 \times 18 = 18$$

- c) Factors of 24 = {1; 2; 3; 4; 6; 8; 12; 24}

$$\div 24 \div 2 = 12; 24 \div 3 = 8; 24 \div 4 = 6; 24 \div 24 = 1$$

$$\times 2 \times 2 = 24; 8 \times 3 = 24; 6 \times 4 = 24; 1 \times 24 = 24$$

d) Factors of 36 = {1; 2; 3; 4; 6; 9; 12; 18; 36}

$$\begin{array}{l} \div \\ \hline 36 \div 2 = 18; 36 \div 3 = 12; 36 \div 4 = 9; 36 \div 6 = 6; \\ 36 \div 36 = 1 \end{array}$$

$$\begin{array}{l} \times \\ \hline 2 \times 18 = 36; 3 \times 12 = 36; 4 \times 9 = 36; 6 \times 6 = 36; \\ 1 \times 36 = 36 \end{array}$$

Exercise 2

(WB page 32)

1.
 - a) {18; 21; 24; 27; 30; 33; 36}
 - b) {50; 55; 60; 65; 70; 75; 80}
 - c) {42; 49; 56; 63; 70}
 - d) {36; 42; 48; 54; 60}

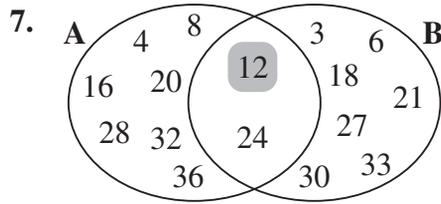
2.
 - a) $4 = \{4; 8; \textcircled{12}; 16; 20; \textcircled{24}; 28; 32; \textcircled{36}; 40\}$
 $6 = \{6; 12; 18; \textcircled{24}; 30; \textcircled{36}; 42; 48; 54; 60\}$
LCM = 12
 - b) $5 = \{5; 10; 15; \textcircled{20}; 25; \textcircled{30}; 35; \textcircled{40}; 45; \textcircled{50}\}$
 $10 = \{10; \textcircled{20}; \textcircled{30}; \textcircled{40}; \textcircled{50}; 60; 70; 80; 90; 100\}$
LCM = 10
 - c) $6 = \{6; 12; 18; \textcircled{24}; 30; 36; 42; \textcircled{48}; 54; 60\}$
 $8 = \{8; 16; \textcircled{24}; 32; 40; \textcircled{48}; 56; 64; 72; 80\}$
LCM = 24
 - d) $7 = \{7; 14; 21; 28; 35; 42; 49; 56; \textcircled{63}; 70\}$
 $9 = \{9; 18; 27; 36; 45; 54; \textcircled{63}; 72; 81; 90\}$
LCM = 63
 - e) $3 = \{3; 6; 9; 12; 15; 18; \textcircled{21}; 24; 27; 30\}$
 $7 = \{7; 14; \textcircled{21}; 28; 35; 42; 49; 56; 63; 70\}$
LCM = 21

3.
 - a) $8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 = 56$; or $8 \times 7 = 56$ tables
 - b) Number of table legs in one row:
 $4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 = 32$; or $4 \times 8 = 32$
Number of table legs in 7 rows:
 $32 + 32 + 32 + 32 + 32 + 32 + 32 = 224$ table legs;
or total number of tables times 4 legs per table:
 $56 \times 4 = 224$ table legs
 - c) Number of chairs in one row:
 $6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 = 48$;
or $6 \times 8 = 48$ chairs in one row
Number of chairs in 7 rows:
 $48 + 48 + 48 + 48 + 48 + 48 + 48 = 336$ chairs;

or total number of chairs in one row times 7 rows:
 $48 \times 7 = 336$ chairs;
or number of tables times 6 chairs per table:
 $56 \times 6 = 336$ chairs

4. $10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 = 150$ books;
or $10 \times 15 = 150$ books
5. a) Multiples of 8 = {8; 16; 24; 32; 40; 48; 56; 64; 72; 80; 88; 96}.
Yes, 96 is a multiple of 8.
or $96 \div 8 = 12$.
Yes, 96 is a multiple of 8.
- b) Multiples of 6 = {6; 12; ...48; 54; 60}.
No, 56 is not a multiple of 6.
or $56 \div 6 = 9$ remainder 2.
No, 56 is not a multiple of 6.
- c) Multiples of 4 = {4; 8; ...48; 56; 64}.
No, 58 is not a multiple of 4.
or $58 \div 4 = 14$ remainder 2.
No, 58 is not a multiple of 4.
- d) Multiples of 9 = {9; 18; ...90; 99; 108; 117}.
No, 109 is not a multiple of 9.
or $109 \div 9 = 12$ remainder 1.
No, 109 is not a multiple of 9.
- e) Multiples of 7 = {7; 14; ...77; 84; 91}.
No, 88 is not a multiple of 7.
or $88 \div 7 = 12$ remainder 4.
No, 88 is not a multiple of 7.
6. a) Multiples of 2 = {2; 4; 6; 8; 10; 12; ...}
Multiples of 8 = {8; 16; 24; 32; ...}; LCM = 8
- b) Multiples of 3 = {3; 6; 9; 12; 15; ...}
Multiples of 6 = {6; 12; 18; 24; ...}; LCM = 6
- c) Multiples of 5 = {5; 10; 15; 20; ...}
Multiples of 10 = {10; 20; 30; 40; ...}; LCM = 10
- d) Multiples of 2 = {2; 4; 6; 8; 10; 12; 14; 16; ...}
Multiples of 7 = {7; 14; 21; 28; ...}; LCM = 14
- e) Multiples of 6 = {6; 12; 18; 24; 30; 36; ...}
Multiples of 10 = {10; 20; 30; 40; ...}; LCM = 30
- f) Multiples of 4 = {4; 8; 12; 16; 20; 24; 28; 32; 36; ...}
Multiples of 9 = {9; 18; 27; 36; 45; ...}; LCM = 36

- g) Multiples of 3 = {3; 6; 9; 12; 15; ...}
 Multiples of 4 = {4; 8; 12; 16; ...}; LCM = 12



Exercise 3

(WB page 35)

1. These answers are given as an example, learners may give other combinations.

Factors	Product	Number	Multiple
4 and 5	$5 \times 4 =$	20	20 is a multiple of 4 and 5
6 and 3	$6 \times 3 =$	18	18 is a multiple of 3 and 6
9 and 4	$9 \times 4 =$	36	36 is a multiple of 9 and 4
5 and 10	$5 \times 10 =$	50	50 is a multiple of 5 and 10
3 and 8	$3 \times 8 =$	24	24 is a multiple of 3 and 8
7 and 8	$7 \times 8 =$	56	56 is a multiple of 7 and 8
5 and 6	$5 \times 6 =$	30	30 is a multiple of 5 and 6
7 and 9	$7 \times 9 =$	63	63 is a multiple of 7 and 9
5 and 8	$5 \times 8 =$	40	40 is a multiple of 5 and 8

2. a) 2 b) 5 c) 3 d) 6 e) 2
 f) 4 g) 3 h) 5 i) 3 j) 6

Exercise 4

(WB page 36)

1.

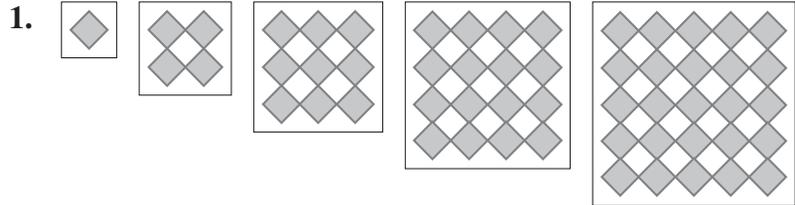
(59)	60	(61)	62	(63)	64	(65)	66	(67)	68
(69)	70	(71)	72	(73)	74	(75)	76	(77)	78
(79)	80	(81)	82	(83)	84	(85)	86	(87)	88
(89)	90	(91)	92	(93)	94	(95)	96	(97)	98

2. a) 7,070; 7,072; 7,074; 7,076; 7,078
 b) 7,093; 7,095; 7,097; 7,099; 7,101
 c) Learners may use any two odd numbers
 e.g. $3 + 7 = 10$. The answer is always even.

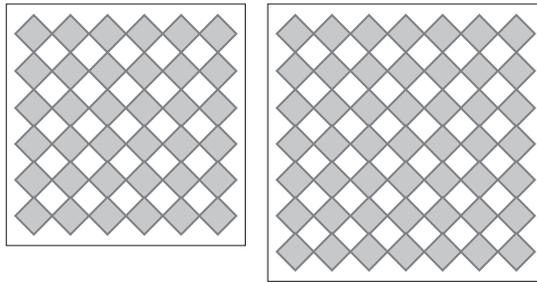
- d) Learners may use any two even numbers
e.g. $4 + 8 = 12$. The answer is always even.
- e) Learners may use any two even numbers
e.g. $8 - 6 = 2$. The answer is always even.
- f) Learners may use any two odd numbers
e.g. $9 - 3 = 6$. The answer is always even.

Exercise 5

(WB page 37)



1 4 9 16 25
 1^2 2^2 3^2 4^2 5^2



36 49
 6^2 7^2

2. a) 9 b) 49 c) 100
 d) 1 e) 16 f) 36
 g) 64 h) 4 i) 81
 j) 25 k) 121 l) 144

3. 1; 4; 9; 16; 25; 36; 49; 64; 81; 100

Exercise 6

(WB page 38)

1. $3 \times 3 = 9 \rightarrow 3^2$ 2. $4 \times 4 = 16 \rightarrow 4^2$
 3. $5 \times 5 = 25 \rightarrow 5^2$ 4. $6 \times 6 = 36 \rightarrow 6^2$
 5. $7 \times 7 = 49 \rightarrow 7^2$ 6. $8 \times 8 = 64 \rightarrow 8^2$
 7. $9 \times 9 = 81 \rightarrow 9^2$ 8. $10 \times 10 = 100 \rightarrow 10^2$

f) Count in 8s

12,000	12,008	12,016	12,024	12,032	12,040	12,048	12,056	12,064	12,072	12,080	12,088
--------	--------	---------------	---------------	--------	---------------	---------------	---------------	---------------	---------------	---------------	---------------

2. a) 1,984

848	1,136
424	568
212	284

$$424 + 568 = 992$$

$$212 + 284 = 496$$

b) 988

468	520
234	260
117	130

$$234 + 260 = 494$$

$$117 + 130 = 247$$

c) 1,300

700	600
350	300
175	150

$$350 + 300 = 650$$

$$175 + 150 = 325$$

3. a) 100; 200; 400
c) 300; 600; 1,200

b) 68; 136; 272

4. a) 56; $56 \div 7 = 8$
c) $9 \times 8 = 72$; 9
e) 96; $96 \div 8 = 12$

b) 63; $63 \div 9 = 7$
d) $9 \times 9 = 81$; 9

5. a) $(30 \times 8) - (3 \times 8) = 240 - 24 = 216$
 b) $(30 \times 9) - (4 \times 9) = 270 - 36 = 234$
 c) $(30 \times 6) - (3 \times 6) = 180 - 18 = 162$
 d) $(30 \times 7) - (2 \times 7) = 210 - 14 = 196$
 e) $(30 \times 5) - (2 \times 5) = 150 - 10 = 140$
 f) $(40 \times 7) - (1 \times 7) = 280 - 7 = 273$
 g) $(40 \times 9) - (2 \times 9) = 360 - 18 = 342$
 h) $(50 \times 6) - (1 \times 6) = 300 - 6 = 294$

B4.1.2.3

Exercise 1

(WB page 47)

1. a)

×	100	30	4
3	300	90	12

$$\begin{aligned}
 134 \times 3 &= (100 \times 3) + (30 \times 3) + (4 \times 3) \\
 &= 300 + 90 + 12 \\
 &= 300 + 102 \\
 &= 402
 \end{aligned}$$

b)

×	200	40	3
4	800	160	12

$$\begin{aligned}
 243 \times 4 &= (200 \times 4) + (40 \times 4) + (3 \times 4) \\
 &= 800 + 160 + 12 \\
 &= 800 + 172 \\
 &= 972
 \end{aligned}$$

c)

×	300	10	9
3	900	30	27

$$\begin{aligned}
 319 \times 3 &= (300 \times 3) + (10 \times 3) + (9 \times 3) \\
 &= 900 + 30 + 27 \\
 &= 900 + 57 \\
 &= 957
 \end{aligned}$$

d)

×	400	40	1
2	800	80	2

$$\begin{aligned}
 441 \times 2 &= (400 \times 2) + (40 \times 2) + (1 \times 2) \\
 &= 800 + 80 + 2 \\
 &= 800 + 82 \\
 &= 882
 \end{aligned}$$

e)

×	100	20	5
5	500	100	25

$$\begin{aligned}
 125 \times 5 &= (100 \times 5) + (20 \times 5) + (5 \times 5) \\
 &= 500 + 100 + 25 \\
 &= 500 + 125 \\
 &= 625
 \end{aligned}$$

f)

×	100	20	5
3	300	60	15

$$\begin{aligned}
 125 \times 3 &= (100 \times 3) + (20 \times 3) + (5 \times 3) \\
 &= 300 + 60 + 15 \\
 &= 300 + 75 \\
 &= 375
 \end{aligned}$$

B4.1.2.4

Exercise 1

(WB page 51)

1.–4.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45	46	47	48

B4.1.2.5

Exercise 1

(WB page 51)

1. a) $25 \div 5 = 5$

$$25 - 5 \rightarrow 20 - 5 \rightarrow 15 - 5 \rightarrow 10 - 5 \rightarrow 5 - 5 \rightarrow 0$$

b) $30 \div 6 = 5$

$$30 - 6 \rightarrow 24 - 6 \rightarrow 18 - 6 \rightarrow 12 - 6 \rightarrow 6 - 6 \rightarrow 0$$

c) $84 \div 2 = 42$

$$\begin{aligned} &84 \rightarrow 82 \rightarrow 80 \rightarrow 78 \rightarrow 76 \rightarrow 74 \rightarrow 72 \rightarrow 70 \rightarrow \\ &68 \rightarrow 66 \rightarrow 64 \rightarrow 62 \rightarrow 60 \rightarrow 58 \rightarrow 56 \rightarrow 54 \rightarrow \\ &52 \rightarrow 50 \rightarrow 48 \rightarrow 46 \rightarrow 44 \rightarrow 42 \rightarrow 40 \rightarrow 38 \rightarrow \\ &36 \rightarrow 34 \rightarrow 32 \rightarrow 30 \rightarrow 28 \rightarrow 26 \rightarrow 24 \rightarrow 22 \rightarrow \\ &20 \rightarrow 18 \rightarrow 16 \rightarrow 14 \rightarrow 12 \rightarrow 10 \rightarrow 8 \rightarrow 6 \rightarrow 4 \rightarrow \\ &2 \rightarrow 0 \end{aligned}$$

d) $63 \div 3 = 21$

$$\begin{aligned} &63 - 3 \rightarrow 60 - 3 \rightarrow 57 - 3 \rightarrow 54 - 3 \rightarrow 51 - 3 \rightarrow \\ &48 - 3 \rightarrow 45 - 3 \rightarrow 42 - 3 \rightarrow 39 - 3 \rightarrow 36 - 3 \rightarrow \\ &33 - 3 \rightarrow 30 - 3 \rightarrow 27 - 3 \rightarrow 24 - 3 \rightarrow 21 - 3 \rightarrow \\ &18 - 3 \rightarrow 15 - 3 \rightarrow 12 - 3 \rightarrow 9 - 3 \rightarrow 6 - 3 \rightarrow 3 - \\ &3 \rightarrow 0 \end{aligned}$$

e) $88 \div 4 = 22$

$$\begin{aligned} &88 - 4 \rightarrow 84 - 4 \rightarrow 80 - 4 \rightarrow 76 - 4 \rightarrow 72 - 4 \rightarrow \\ &68 - 4 \rightarrow 64 - 4 \rightarrow 60 - 4 \rightarrow 56 - 4 \rightarrow 52 - 4 \rightarrow \\ &48 - 4 \rightarrow 44 - 4 \rightarrow 40 - 4 \rightarrow 32 - 4 \rightarrow 28 - 4 \rightarrow \\ &24 - 4 \rightarrow 20 - 4 \rightarrow 16 - 4 \rightarrow 12 - 4 \rightarrow 8 - 4 \rightarrow \\ &4 - 4 \rightarrow 0 \end{aligned}$$

f) $64 \div 8 = 8$

$$64 - 8 \rightarrow 56 - 8 \rightarrow 48 - 8 \rightarrow 40 - 8 \rightarrow 32 - 8 \rightarrow 24 - 8 \rightarrow 16 - 8 \rightarrow 8 - 8 \rightarrow 0$$

2. a) $286 \div 2 = 143$

$$\begin{array}{r} 2 \overline{) 286} \quad 100 \\ - 200 \\ \hline 86 \quad 40 \\ - 80 \\ \hline 6 \quad + 3 \\ - 6 \\ \hline 0 \quad 143 \end{array}$$

b) $480 \div 4 = 120$

$$\begin{array}{r} 4 \overline{) 480} \quad 100 \\ - 400 \\ \hline 80 \quad + 20 \\ - 80 \\ \hline 0 \quad 120 \end{array}$$

c) $639 \div 3 = 213$

$$\begin{array}{r} 3 \overline{) 639} \quad 200 \\ - 600 \\ \hline 39 \quad 10 \\ - 30 \\ \hline 9 \quad + 3 \\ - 9 \\ \hline 0 \quad 213 \end{array}$$

d) $624 \div 2 = 312$

$$\begin{array}{r} 2 \overline{) 624} \quad 300 \\ - 600 \\ \hline 24 \quad 10 \\ - 20 \\ \hline 4 \quad + 2 \\ - 4 \\ \hline 0 \quad 312 \end{array}$$

e) $505 \div 5 = 101$

$$\begin{array}{r} 5 \overline{) 505} \quad 100 \\ - 500 \\ \hline 5 \quad + 1 \\ - 5 \\ \hline 0 \quad 101 \end{array}$$

f) $808 \div 8 = 101$

$$\begin{array}{r} 8 \overline{) 808} \quad 100 \\ - 800 \\ \hline 8 \quad + 1 \\ - 8 \\ \hline 0 \quad 101 \end{array}$$

g) $279 \div 3 = 93$

$$\begin{array}{r} 3 \overline{) 279} \quad 50 \\ - 150 \\ \hline 129 \quad 40 \\ - 120 \\ \hline 9 \quad + 3 \\ - 9 \\ \hline 0 \quad 93 \end{array}$$

h) $575 \div 5 = 115$

$$\begin{array}{r} 5 \overline{) 575} \quad 100 \\ - 500 \\ \hline 75 \quad 10 \\ - 50 \\ \hline 25 \quad + 5 \\ - 25 \\ \hline 0 \quad 115 \end{array}$$

B4.1.2.6

Exercise 1

(WB page 56)

$$\begin{array}{r} 1. \quad 8 \overline{)134} \quad 10 \\ \quad \underline{-80} \\ \quad \quad 54 \\ \quad \quad \underline{-48} \\ \quad \quad \quad 6 \end{array} \quad \begin{array}{l} \\ \\ + 6 \\ \\ \hline 16 \end{array}$$

$$134 \div 8 = 16 \text{ remainder } 6.$$

So, each learner must read 16 books and 6 books will be left over.

Or, 6 learners must read 17 books each and 2 learners must read 16 books each.

$$\begin{array}{r} 2. \quad 7 \overline{)927} \quad 100 \\ \quad \underline{-700} \\ \quad \quad 227 \\ \quad \quad \underline{-210} \\ \quad \quad \quad 17 \\ \quad \quad \quad \underline{-14} \\ \quad \quad \quad \quad 3 \end{array} \quad \begin{array}{l} \\ \\ 30 \\ \\ + 2 \\ \\ \hline 132 \end{array}$$

$$927 \div 7 = 132 \text{ remainder } 3.$$

So, the bricklayer lays 132 bricks per day in 6 days and $132 + 3 = 135$ bricks on the seventh day.

$$3. \quad 878 \div 6 = 146 \text{ remainder } 2.$$

She can fill 146 crates with 6 eggs and she has 2 eggs left over.

$$4. \quad 5 \times 3 = 15 \text{ m}$$

The total length of the shelves will be 15 m.

$$\begin{array}{r} 5. \quad 2,436 \\ \quad \underline{-1,692} \\ \quad \quad 744 \end{array}$$

The difference between 2,436 and 1,692 is 744.

$$\begin{array}{r} 6. \quad 3,229 \\ \quad 4,025 \\ \quad \underline{+ 2,730} \\ \quad 9,984 \end{array}$$

The sum of 3,299; 4,025 and 2,730 is 9,984.

Exercise 2

(WB page 58)

1.

0	2	3	7
7	1	5	
9	4	5	

$$\begin{array}{r} 1,500 \\ - 945 \\ \hline 555 \end{array}$$

$$135 \times 7 = 945$$

Daniel put 945 pieces together in 7 days. 555 pieces are left to finish the puzzle.

2.

325	280
- 310	+ 15
15	295

So, 295 tomatoes were for sale after the delivery in the second week.

3.

3	186	60
-	180	
6	6	+2
-	6	
0	0	62

Each friend received 62 bars of soap. $62 - 30 = 32$.

The friend who is donating some of her soap will have 32 bars of soap left.

4. a) $7 \times 2 = 14$ flights per week.
 $260 \times 14 = 3,640$

0	0	0	1
2	6	0	
0	2	0	4
8	4	0	
6	4	0	

$\therefore 3,640$ passengers travel to Accra every week.

b) $260 \times 2 = 520$

0	1	0	2
4	2	0	
5	2	0	

There are 520 passengers on 2 flights.

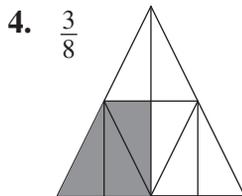
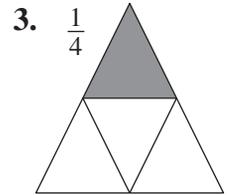
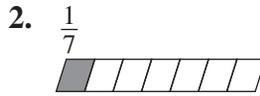
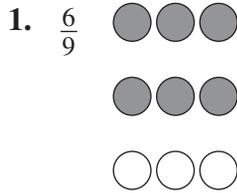
$$3,640 - 520 = 3,120$$

\therefore 3,120 passengers travelled to Accra last week.

B4.1.3.1

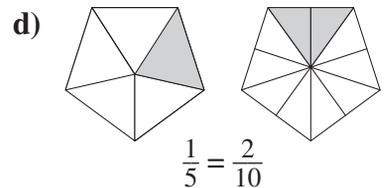
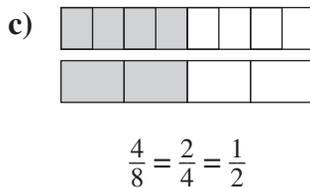
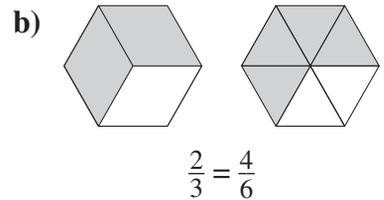
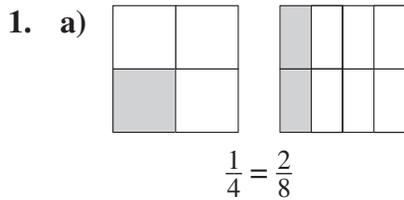
Exercise 1

(WB page 60)



Exercise 2

(WB page 60)

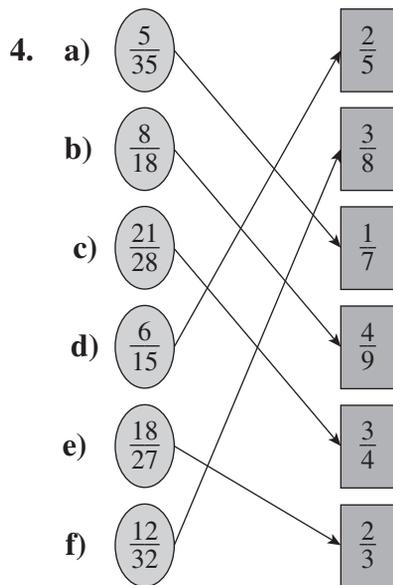


2. a) $\frac{3}{9}, \frac{4}{12}$
 c) $\frac{4}{16}, \frac{1}{32}$

b) $\frac{4}{4}, \frac{5}{5}$
 d) $\frac{4}{6}, \frac{1}{3}$

3. a) 6
 c) 90
 e) 56
 g) 20

- b) 18
 d) 90
 f) 60
 h) 9



5. These answers are given as examples. Learners may use any equivalent fractions.

a) $\frac{2}{8} = \frac{4}{16} = \frac{7}{28}$

b) $\frac{4}{18} = \frac{6}{27} = \frac{10}{45}$

c) $\frac{16}{20} = \frac{24}{30} = \frac{32}{40}$

d) $\frac{21}{33} = \frac{28}{44} = \frac{56}{88}$

e) $\frac{26}{38} = \frac{65}{95} = \frac{130}{190}$

f) $\frac{6}{15} = \frac{10}{25} = \frac{14}{35}$

g) $\frac{16}{26} = \frac{24}{39} = \frac{40}{65}$

h) $\frac{15}{21} = \frac{20}{28} = \frac{35}{49}$

i) $\frac{18}{42} = \frac{36}{84} = \frac{45}{105}$

j) $\frac{14}{30} = \frac{28}{60} = \frac{35}{75}$

Exercise 3

(WB page 63)

1. $\frac{1}{2}$

2. $\frac{3}{4}$

3. $\frac{5}{6}$

4. $\frac{2}{3}$

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

6. $\frac{3}{5}$

7. $\frac{2}{3}$

8. $\frac{5}{6}$

9. $\frac{3}{5}$

Exercise 4

(WB page 63)

1. These answers are given as examples. Learners may use any appropriate fractions.

a) $\frac{4}{9}$; $\frac{1}{26}$; $\frac{3}{20}$; $\frac{6}{19}$; $\frac{2}{7}$

b) $\frac{11}{10}$; $\frac{9}{4}$; $\frac{4}{3}$; $\frac{17}{2}$; $\frac{23}{4}$

c) $6\frac{1}{2}$; $3\frac{3}{8}$; $9\frac{1}{7}$; $8\frac{2}{3}$; $2\frac{8}{9}$

$$\begin{aligned} \text{c)} &= \frac{20}{24} + \frac{9}{24} \\ &= \frac{29}{24} \\ &= 1 \frac{5}{24} \end{aligned}$$

$$\begin{aligned} \text{e)} &= \frac{27}{72} + \frac{56}{72} \\ &= \frac{83}{72} \\ &= 1 \frac{11}{72} \end{aligned}$$

$$\begin{aligned} 2. \text{ a)} &= \frac{8}{5} + \frac{3}{8} \\ &= \frac{64}{40} + \frac{15}{40} \\ &= \frac{79}{40} \\ &= 1 \frac{39}{40} \end{aligned}$$

$$\begin{aligned} \text{c)} &= \frac{3}{2} + \frac{5}{7} \\ &= \frac{21}{14} + \frac{10}{14} \\ &= \frac{31}{14} \\ &= 2 \frac{3}{14} \end{aligned}$$

$$\begin{aligned} \text{e)} &= \frac{7}{8} + \frac{27}{10} \\ &= \frac{35}{40} + \frac{108}{40} \\ &= \frac{143}{40} \\ &= 3 \frac{23}{40} \end{aligned}$$

$$\begin{aligned} \text{d)} &= \frac{5}{40} + \frac{16}{40} \\ &= \frac{21}{40} \end{aligned}$$

$$\begin{aligned} \text{f)} &= \frac{4}{18} + \frac{15}{18} \\ &= \frac{19}{18} \\ &= 1 \frac{1}{18} \end{aligned}$$

$$\begin{aligned} \text{b)} &= \frac{11}{4} + \frac{5}{6} \\ &= \frac{33}{12} + \frac{10}{12} \\ &= \frac{43}{12} \\ &= 3 \frac{7}{12} \end{aligned}$$

$$\begin{aligned} \text{d)} &= \frac{33}{10} + \frac{3}{4} \\ &= \frac{66}{20} + \frac{15}{20} \\ &= \frac{81}{20} \\ &= 4 \frac{1}{20} \end{aligned}$$

$$\begin{aligned} \text{f)} &= \frac{19}{12} + \frac{5}{6} \\ &= \frac{19}{12} + \frac{10}{12} \\ &= \frac{29}{12} \\ &= 2 \frac{5}{12} \end{aligned}$$

Exercise 4

$$\begin{aligned} 1. &= 2 \frac{6}{8} - \frac{5}{8} \\ &= 2 \frac{1}{8} \end{aligned}$$

$$\begin{aligned} 3. &= 5 \frac{7}{10} - \frac{6}{10} \\ &= 5 \frac{1}{10} \end{aligned}$$

$$\begin{aligned} 2. &= 3 \frac{3}{6} - \frac{4}{6} \\ &= \frac{21}{6} - \frac{4}{6} \\ &= \frac{17}{6} \\ &= 2 \frac{5}{6} \end{aligned}$$

$$\begin{aligned} 4. &= 1 \frac{35}{45} - \frac{18}{45} \\ &= 1 \frac{17}{45} \end{aligned}$$

(WB page 68)

$$\begin{aligned} 5. &= 2\frac{33}{36} - \frac{20}{36} \\ &= 2\frac{13}{36} \end{aligned}$$

$$\begin{aligned} 6. &= 61\frac{6}{20} - \frac{7}{20} \\ &= 6\frac{9}{20} \end{aligned}$$

Exercise 5

(WB page 69)

$$1. \quad \frac{9}{10} + \frac{3}{5} = \frac{9}{10} + \frac{6}{10} = \frac{15}{10} = 1\frac{5}{10} = 1\frac{1}{2}$$

Rachel has $1\frac{1}{2}$ buckets of water.

$$2. \quad \frac{2}{5} + \frac{1}{9} = \frac{18}{45} + \frac{5}{45} = \frac{23}{45}$$

Elvis used $\frac{23}{45}$ of his weekend for the two activities.

$$3. \quad 1\frac{2}{6} + \frac{5}{6} = \frac{8}{6} + \frac{5}{6} = \frac{13}{6} = 2\frac{1}{6}$$

Mrs Forson used $2\frac{1}{6}$ bottles of palm oil in two months.

$$4. \quad 1\frac{3}{4} + \frac{2}{3} = \frac{7}{4} + \frac{2}{3} = \frac{21}{12} + \frac{8}{12} = \frac{29}{12} = 2\frac{5}{12}$$

James works $2\frac{5}{12}$ hours during the two days.

$$5. \quad 2\frac{3}{4} - \frac{2}{3} = 2\frac{9}{12} - \frac{8}{12} = 2\frac{1}{12}$$

So, $2\frac{1}{12}$ m of the material is left for the scarf.

$$6. \quad 1\frac{4}{5} - \frac{2}{3} = 1\frac{12}{15} - \frac{10}{15} = 1\frac{2}{15}$$

Other artists sang for $1\frac{2}{15}$ hours in the show.

B4.1.4.1

Exercise 1

(WB page 71)

$$1. \quad \text{a) Fraction: } \frac{5}{10}; \text{ Decimal: } 0.5$$

$$\text{b) Fraction: } \frac{8}{10}; \text{ Decimal: } 0.8$$

$$\text{c) Fraction: } 1\frac{1}{10}; \text{ Decimal: } 1.1$$

$$\text{d) Fraction: } 2\frac{3}{10}; \text{ Decimal: } 2.3$$

$$2. \quad \text{a) } 0.3 \qquad \text{b) } 5\frac{6}{10} = 5.6 \qquad \text{c) } 1.0$$

$$\text{d) } 1\frac{1}{10} = 1.1 \qquad \text{e) } 1.5 \qquad \text{f) } 2.7$$

$$3. \quad \text{a) } 0.01 \qquad \text{b) } 1\frac{23}{100} = 1.23 \qquad \text{c) } 0.09$$

$$\text{d) } 0.20 \qquad \text{e) } 0.99 \qquad \text{f) } 1.02$$

4.	Decimal	Fraction
	2.64	$2\frac{64}{100}$
	5.66...	$5\frac{2}{3}$
	1.7	$\frac{17}{10} = 1\frac{7}{10}$
	3.15	$3\frac{15}{100}$
	1.11	$1\frac{11}{100}$

Exercise 2

(WB page 72)

		to the nearest one	to 1 decimal place	to 2 decimal places
1.	0.94	1	0.9	0.94
2.	1.561	2	1.6	1.56
3.	2.078	2	2.1	2.08
4.	36.92	37	36.9	36.92
5.	20.600	21	20.6	20.60
6.	9.998	10	10.0	10.00

Exercise 3

(WB page 73)

1. a) 2.2 b) 0.13 c) 2.45 d) 22.1
 e) 0.01 f) 10.09 g) 31.4 h) 0.17

2. a) $\approx 124 + 100 \approx 224$
 b) $\approx 81 - 8 \approx 73$
 c) $\approx 678 + 27 \approx 705$

3. a)
$$\begin{array}{r} 123.57 \\ + 99.65 \\ \hline 223.22 \end{array}$$
 b)
$$\begin{array}{r} 81.46 \\ - 7.71 \\ \hline 73.75 \end{array}$$

c)
$$\begin{array}{r} 678.15 \\ + 27.47 \\ \hline 705.62 \end{array}$$

4. a) 1.26 b) 0.99 c) 2.50 d) 50.36
 5. a) 1.67 b) 0.83 c) 2.80 d) 40.24

Exercise 4

(WB page 74)

1.

	→ +		
↓ -	5.6	5.4	11.0
	3.2	4.1	7.3
	2.4	1.3	3.7

2.

	→ +		
↓ -	7.1	8.9	16.0
	3.5	8.9	12.4
	3.6	0	3.6

3.

	→ +		
↓ -	1.8	1.8	3.6
	0.9	0.7	1.6
	0.9	1.1	2.0

4.

	→ +		
↓ -	2.03	2.73	4.76
	1.07	1.57	2.64
	0.96	1.16	2.12

B4.1.5.1

Exercise 1

(WB page 75)

1. a) $\frac{6}{10} = 60\% \quad \dots 2$

b) $\frac{7}{10} = 70\% \quad \dots 3$

c) $\frac{5}{10} = 50\% \quad \dots 1$

2. a) $\frac{6}{10} = 60\% \quad \dots 2$

b) $\frac{7}{10} = 70\% \quad \dots 1$

c) $\frac{5}{10} = 50\% \quad \dots 3$

3. a) $\frac{80}{100} = 80\% \quad \dots 3$

b) $\frac{8}{100} = 8\% \quad \dots 1$

c) $\frac{20}{100} = 20\% \quad \dots 2$

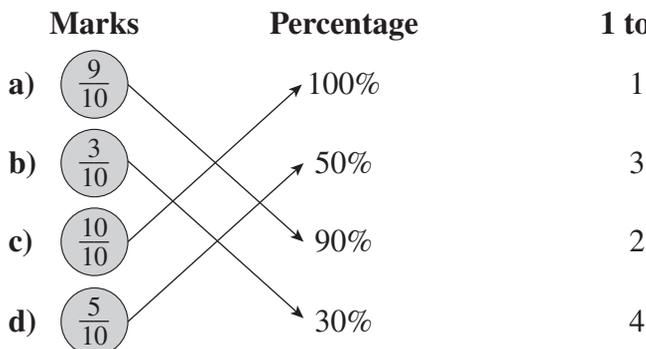
Exercise 2

(WB page 76)

1. a) 1 b) 3 c) 2

d) 4

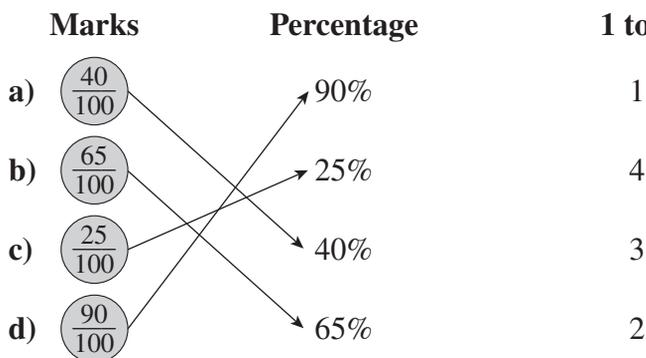
**Order using
1 to 4**



2. a) 1 b) 4 c) 3

d) 2

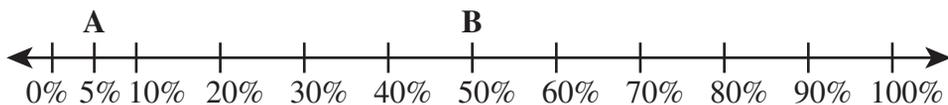
**Order using
1 to 4**



Exercise 3

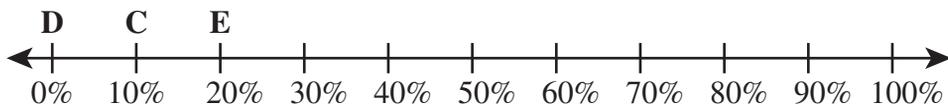
(WB page 77)

1. a)



b) $50\% > 5\%$; or $A > B$

2. a)



b) $D < C$ and $C < E$
 $E > C$ and $E > D$ and $C > D$

B4.2.1.1

Exercise 1

(WB page 78)

1. a)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

b) Number +2 for numbers from 1 to 99.

2. a)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

b) Number -6 for numbers from 96 to 6.

3. a)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

b) Number +10 for numbers from 8 to 98.

Exercise 2

(WB page 81)

- 273; 264; 255; 246
- 1,154; 1,148; 1,142
- 12,061; 12,068; 12,075

Exercise 3

(WB page 81)

1.

12,000	11,998	11,996	11,994	11,992	11,990
11,988	11,986	11,984	11,982	11,980	11,978
11,976	11,974	11,972	11,970	11,968	11,966
11,964	11,962	11,960	11,958	11,956	11,954

2. Truck 3: $18 \times 3 = 54$
 72 wheels: $72 \div 18 = 4$
 90 wheels: $90 \div 18 = 5$

Truck	Wheels
1	18
2	36
3	48 ✕
5 ✕	72
6 ✕	90

B4.2.1.2

Exercise 1

(WB page 82)

- 2; 6; 18; 54; 162
The 5th number is 162.
Number $\times 3$, starting with 2 and ending with 162.
- 4; 20; 100; 500; 2,500; 12,500; 62,500
The 7th number is 62,500.
Number $\times 5$, starting with 4 and ending with 62,500.
- 7; 14; 28; 56; 112
The 5th number is 112.
Number $\times 2$, starting with 7 and ending with 112.

4. Question 1	2	6	18	54	162	486	1,458
Question 2	4	20	100	500	2,500	12,500	62,500
Question 3	6	14	28	56	224	224	448

B4.2.1.3

Exercise 1

(WB page 83)

- ●●● ●●●● ●●●●● ●●●●●● ●●●●●●● ●●●●●●●●

Rule: Start with 2 dots, add one dot each time.

2.	430	450	470	490	510	530
	215	225	235	245	255	265

Rule: Count in 20s starting from 430 to 530, second row is half the first row.

B4.2.2.1

Exercise 1

(WB page 84)

- 8
- 25
- 30
- 9
- 30
- 25
- 33
- 125
- 134
- 18

Exercise 2

(WB page 84)

- 60
- 20
- 9
- 45
- 12
- 175
- 120
- 100
- 45
- 184

B4.2.2.2

Exercise 1

(WB page 85)

Note that learners may use any shape or image to represent the unknown value. For simplicity we have used an answer block \square for each answer.

1. It is given that Susan is on page 327.
The unknown value \square is the number of pages left.
Equation: Pages left = total pages minus pages read
 $\square = 469 - 327$
 $\therefore \square = 142$
So, Susan must still read 142 pages.
2. We know that the number of learners in one row:
 $6 \times 2 = 12$.
The unknown value \square is the total number of learners in the hall.
Equation: Total learners = learners in one row times number of rows
 $\square = 12 \times 14$
 $\therefore \square = 168$
So, there are 168 learners in the hall.
3. The unknown value [square] is the difference between the number of learners who had their teeth polished in March and in April.
Equation: Difference = Number polished in March – Number polished in April
 $\square = 2,963 - 1,732$
 $\therefore \square = 1,231$
So, 1,231 more learners had their teeth polished in March than in April.
4. The unknown value is the number of units used in two weeks.
Equation: Number of units used = Initial reading – end reading
 $857 - 579 = \square$
 $\therefore \square = 298$
So, Mr Arthur used 298 units electricity in two weeks.
5. The unknown value is the number of Basic 4 children who play football every week.

Equation: Number of children playing football = children who play on Tuesday plus children who play on Thursday

$$32 + 39 = \square$$

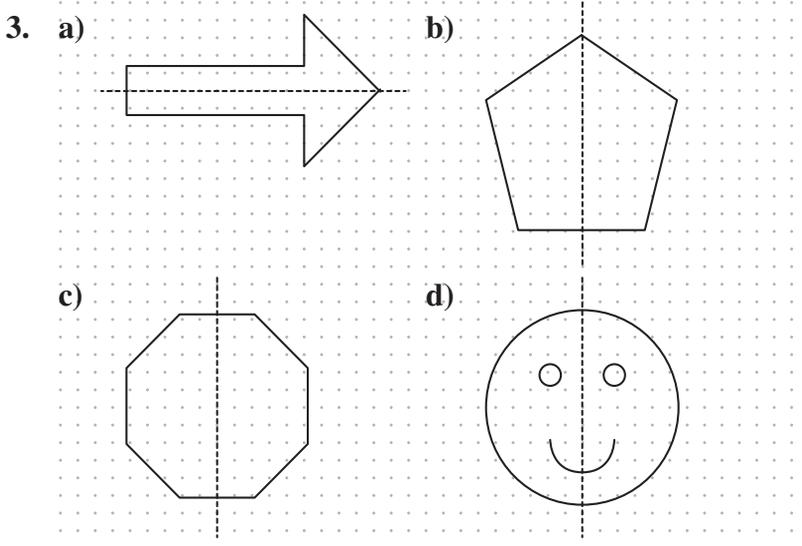
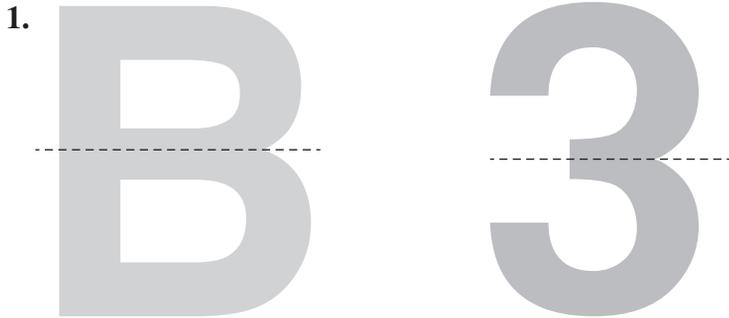
$$\square = 71$$

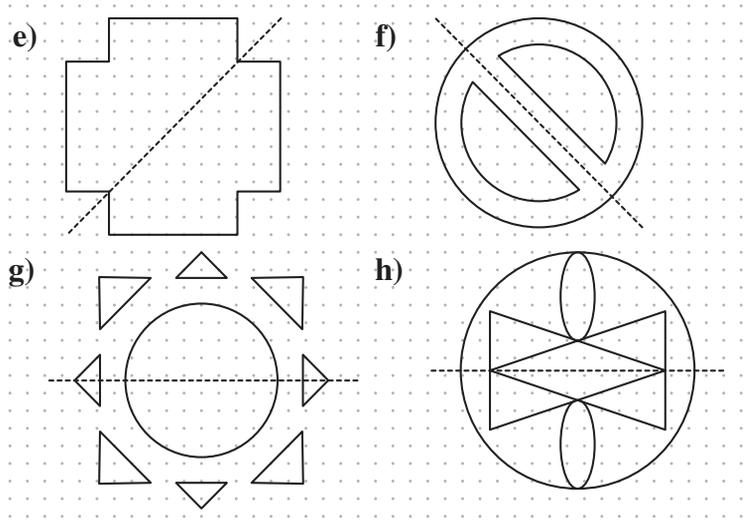
So, 71 children play football every week.

B4.3.1.1

Exercise 1

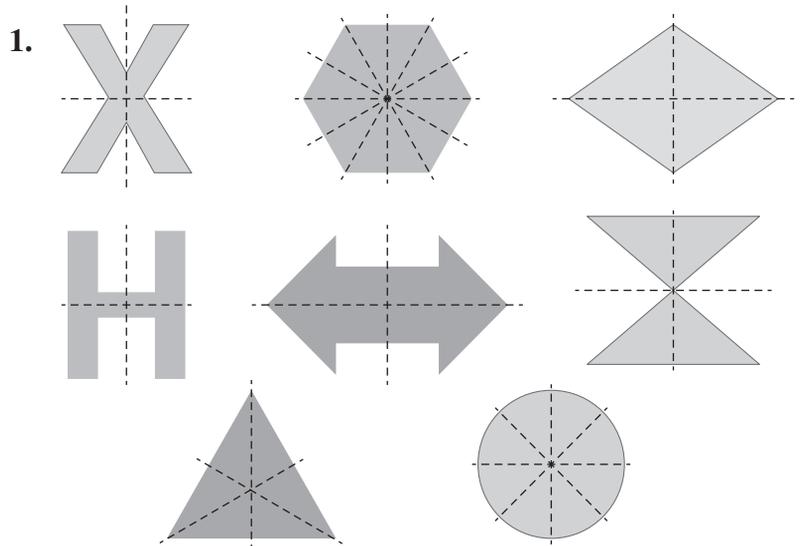
(WB page 88)



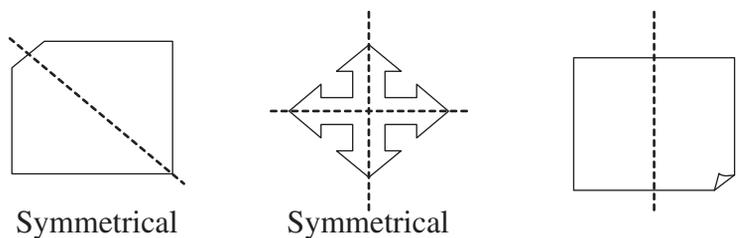


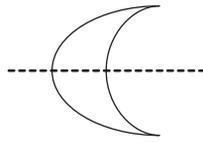
Exercise 2

(WB page 90)

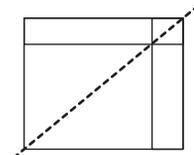


2. Learners should have shaded those shapes indicated as symmetrical.

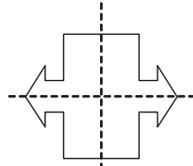




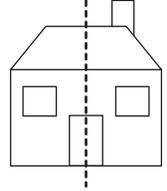
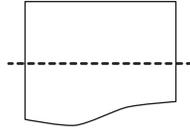
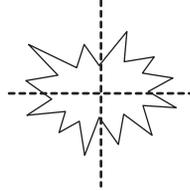
Symmetrical



Symmetrical



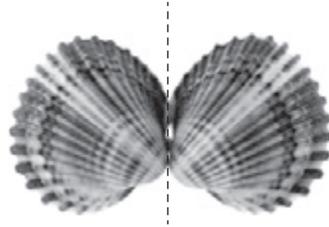
Symmetrical



3.



Dresser



Sea shell



Guitar



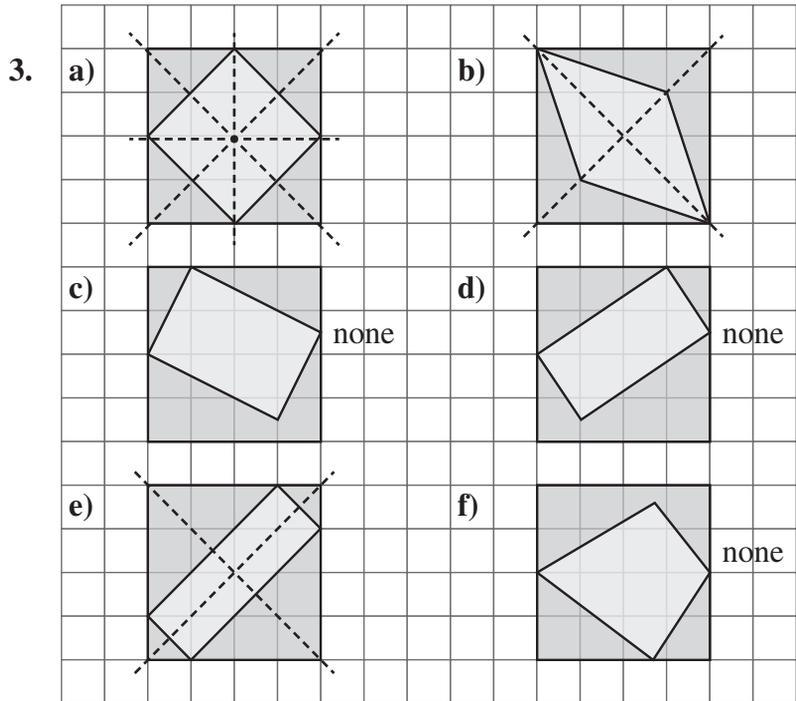
School



Air balloon



Candles



B4.3.2.1

Exercise 1

(WB page 93)

- a) 16 b) 1 c) 7 to 12 d) 1 to 6
- a) east b) south c) south-west
d) west e) south
- north, south, east, west

B4.3.3.1

Exercise 1

(WB page 95)

- Perimeter of square is $4 + 4 + 4 + 4 = 16$ cm;
or $4L = 4 \times 4 = 16$ cm.
- Perimeter of triangle is $8 + 8 + 8 = 24$ cm
- Perimeter of rectangle is $3 + 3 + 7 + 7 = 20$ m
Or $2(L + B) = 2(7 + 3)$
 $= 2 \times 10$
 $= 20$ m
- $6 + 8 + 4 = 18$ cm

5. $3 + 5 + 3 + 5 = 16$ cm; or $2(3 + 5) = 16$ cm

6. $5 + 2 + 2 + 4 + 3 + 6 = 22$ cm

7. $9 + 5 + 6 + 5 + 9 = 34$ cm

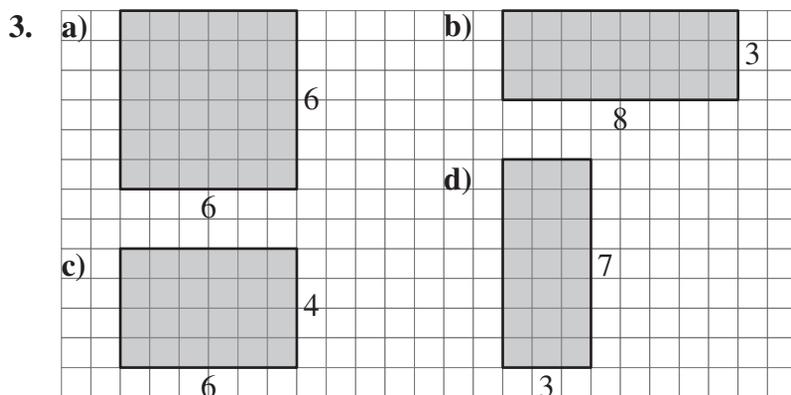
B4.3.3.2

Exercise 1

(WB page 98)

1. a) There are 8 square blocks in the rectangle. The area is 8 cm^2 .
 b) There are 8 square blocks in the rectangle. The area is 8 cm^2 .
 c) There are 12 square blocks in the rectangle. The area is 12 cm^2 .

2. a) 36 b) 24 c) 24 d) 21



Exercise 2

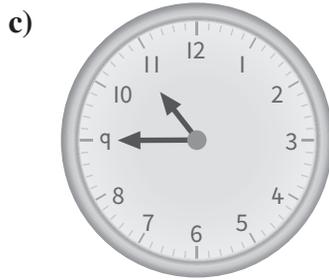
(WB page 99)

1. $4 \text{ cm} \times 10 \text{ cm} = 40 \text{ cm}^2$ 2. $2 \text{ cm} \times 9 \text{ cm} = 18 \text{ cm}^2$
3. $2 \text{ cm} \times 12 \text{ cm} = 24 \text{ cm}^2$ 4. $3 \text{ cm} \times 7 \text{ cm} = 21 \text{ cm}^2$

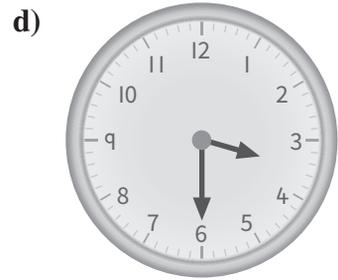
Exercise 3

(WB page 100)

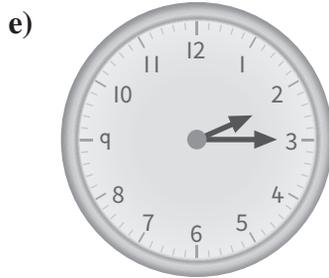
1.	Length	Breadth	Area
a)	10 cm	6 cm	60 cm^2
b)	10 cm	12 cm	120 cm^2
c)	40 cm	3 cm	120 cm^2
d)	3 cm	15 cm	45 cm^2
e)	13 cm	3 cm	39 cm^2



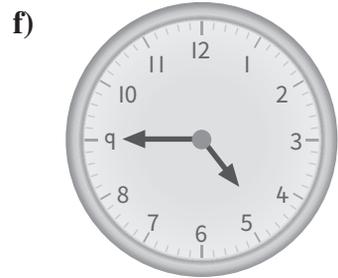
quarter to eleven



half past three



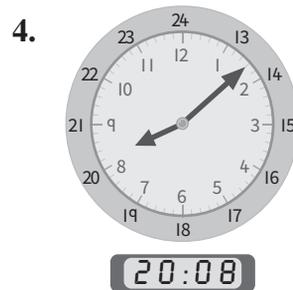
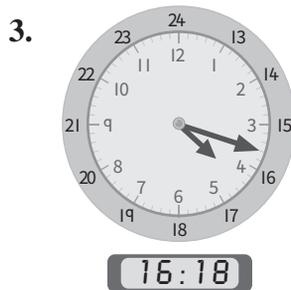
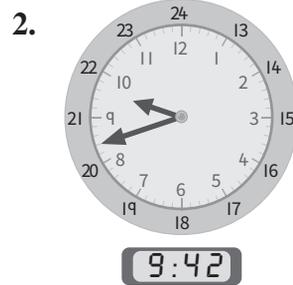
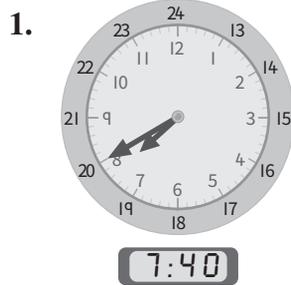
2.15



4.45

Exercise 2

(WB page 105)



Exercise 3

(WB page 105)

1. a)–h) Learners' own work. Check answers for correctness.

2.–4. Learners' own work. Check answers for correctness.

- 5.** a) 7.10 p.m. b) 5.55 a.m.
c) 8.50 p.m. d) 5.05 p.m.
e) 11.40 a.m. f) 12.45 p.m.

- 6.** a) a.m. b) a.m. c) p.m.
d) p.m. e) a.m. f) p.m.

Exercise 4

(WB page 108)

- 1.** a) 5 hours b) 7 hours; 45 minutes
c) 3 hours; 15 minutes d) 9 hours; 30 minutes
e) 9 hours; 45 minutes f) 9 hours; 30 minutes
- 2.** Yaw must leave at 7.20 a.m. and will arrive at the school at 7.30 a.m.
To ensure he will not be late, he should leave home at 7.15 a.m.
- 3.** $12.42 - 7 \text{ min.} = 12.35$
So, Kwodwo's appointment was at 12.35.

Exercise 5

(WB page 109)

- 1.** a) 120 b) 480 c) 300
d) 600 e) 1,200 f) 90
- 2.** a) 1 b) 3 c) 2 d) 4 e) 6 f) $1\frac{1}{2}$
g) 1 minute and 40 seconds = $1\frac{40}{60} = 1\frac{2}{3}$ minutes
h) 10

Exercise 6

(WB page 110)

- 1.** a) 13:00 b) 04.30 c) 21:15 d) 00:45
- 2.** a) 4.00 p.m. b) 11.30 p.m.
c) 7.00 p.m. d) 6.00 a.m.
- 3.** 4.15 a.m.
- 4.** $14:50 + 1\frac{1}{2} \text{ hours} = 16:20$
Mama Mahama finished at 16:20.
- 5.** $20:20 - 19:55 = 25 \text{ minutes}$
- 6.** $\frac{3}{4} \text{ hours} = 45 \text{ minutes}$
 $13:40 + 1:45 = 15:25$
So, the time $1\frac{3}{4}$ hours after 13:40 is 15:25.

7. 90 minutes = $1\frac{1}{2}$ hours = 1:30
 $15:00 + 1:30 = 16:30$
 So, the match finishes at 16:30.
8. 1 hour = 60 minutes; $20 \div 6 = 3\frac{1}{3}$
 So, the train travels $3\frac{1}{3}$ km in 1 minute. $3\frac{1}{3} \times 60 = 200$.
 \therefore the train travels 200 km in 1 hour.

Exercise 7

(WB page 111)

- Learners' own work. In general, learners attend school from September to July.
- Learners attend school for 40 weeks.
- Learners' own work. In general, maize is planted in March and September but this could vary for other crops.
- Learners' own work. This depends on the crop.
- Learners' own work. This depends on the crop.
- 365 days, ensure that it is a valid holiday.
- 366 days
- It takes the Earth approximately $365\frac{1}{4}$ days to orbit the Sun. Since we cannot have a $\frac{1}{4}$ day, every 4 years 1 day ($4 \times \frac{1}{4} = 1$) is added to the end of February.
- Learners' own work. In general, they attend school for 40 weeks and a school week is 5 days. So, they attend school for 200 days and are not at school for 165 days.
- $365 \div 7 = 52$ remainder 1
 So, there are 52 Sundays in a year.
- a) $364\frac{1}{4}$ b) $364\frac{1}{2}$ c) $364\frac{3}{4}$ d) 365

Exercise 8

(WB page 113)

- | | | |
|-----------|-----------|----------|
| 1. 60 | 2. 24 | 3. 1,440 |
| 4. 60 | 5. 86,400 | 6. 365 |
| 7. 10 | 8. 100 | 9. 100 |
| 10. 1,000 | 11. 1,000 | |

B4.4.1.1

Exercise 1

(WB page 114)

Picture to represent 20 trees:



Picture to represent ten trees:



Tree type	Number of trees
Shea	$140 \div 20 = 7$:
Moringa	$50 \div 20 = 2\frac{1}{2}$:
Mahogany	$80 \div 20 = 4$:
Palm	$180 \div 20 = 9$:
Rosewood	$30 \div 20 = 1\frac{1}{2}$:
Others	$220 \div 20 = 11$:

Exercise 2

(WB page 115)

1.	Day	Number of eggs
	Sunday	
	Monday	
	Tuesday	
	Wednesday	
	Thursday	

2. Friday
3. Saturday
4. 100 eggs
5. 415 eggs

B4.4.1.2

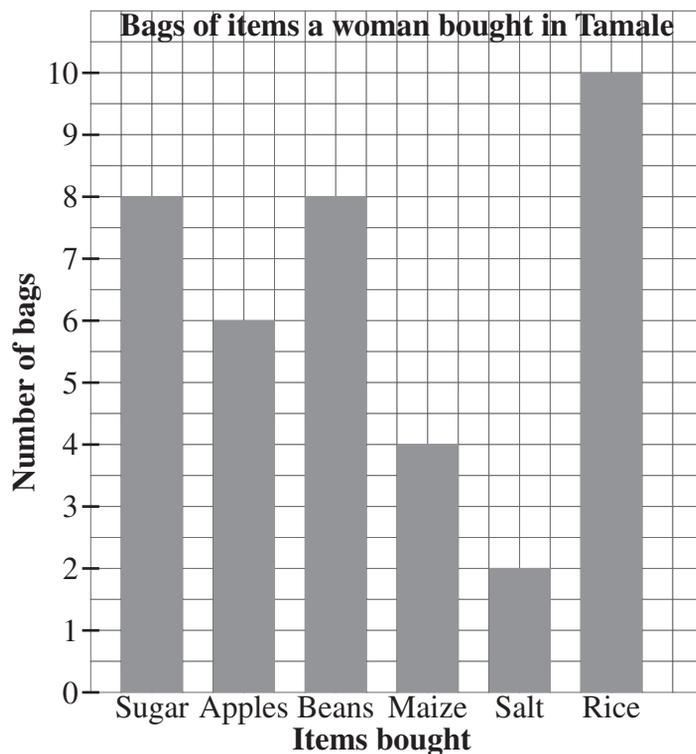
Exercise 1

(WB page 117)

- 30 apples
 - 18 pawpaws
 - $30 - 12 = 18$ fewer mangoes than apples
 - $24 - 15 = 9$ more oranges than lemons
 - apples
 - grapes and mangos
 - 138 fruit
- Learners' own work. This should give true information read from the bar graph. An example is given below.
School A collected 4,000 plastic bottles.
School B collected 3,500 plastic bottles.
School C collected 6,000 plastic bottles.
School D collected 6,500 plastic bottles.
School E collected 2,000 plastic bottles.
School F collected 7,500 plastic bottles.
School F collected the most plastic bottles.
School E collected the least plastic bottles.
The schools collected 29,500 plastic bottles in total.

Exercise 2

(WB page 120)



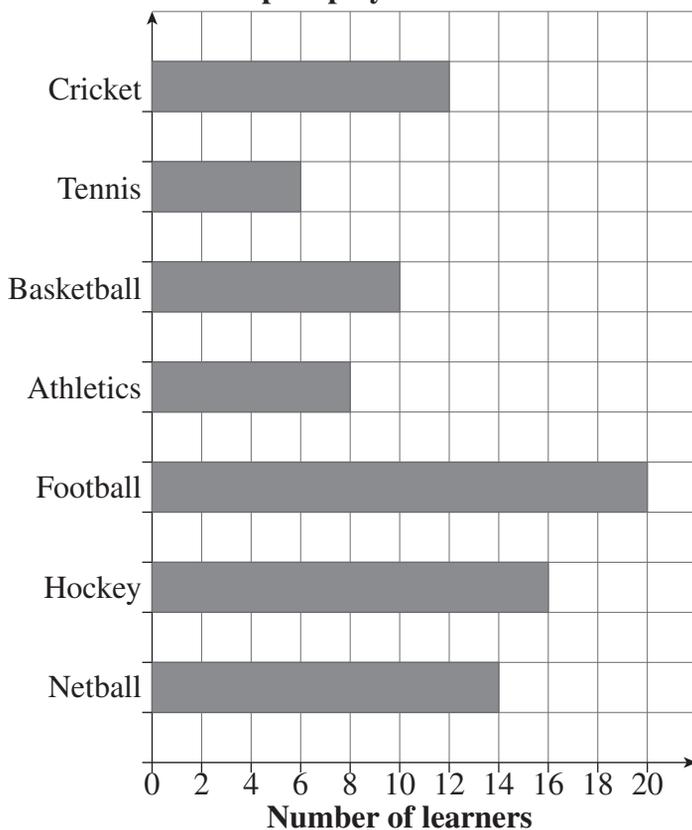
Exercise 3

(WB page 122)

- 10 learners
- football
- tennis
- Tennis; Athletics, Basketball, Cricket, Netball, Hockey, Football
- 5.&6.** Check learners' opinions for understanding. As the table only shows values per learner, there is no distinction between girls and boys. Purely from this table, we cannot tell what girls prefer.
- 7.&8.** We could say that there are 86 learners who like to play sport. However, there may be other learners who do not participate in sport and did not take part in the survey. Check answers for understanding.

9.

Sport played in Basic 4

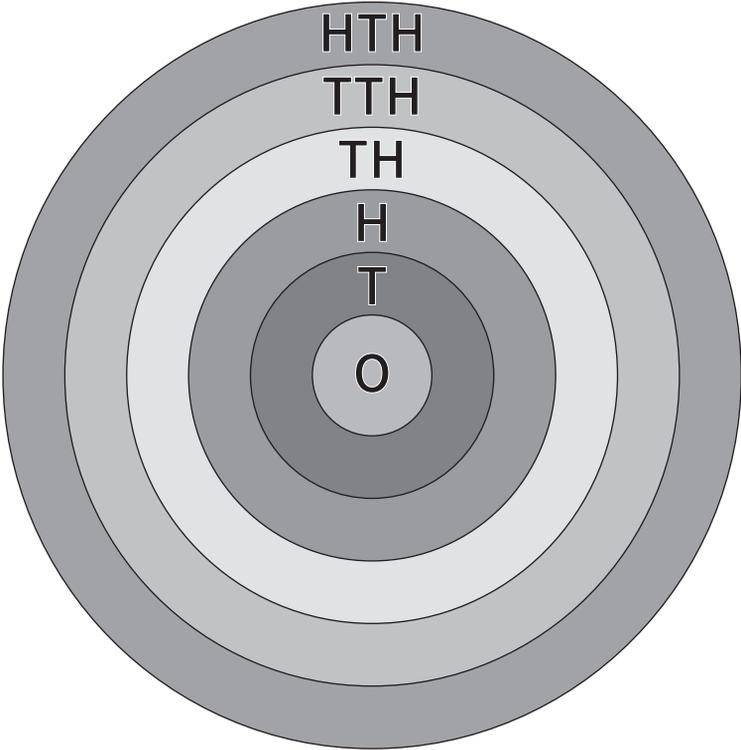


Resources

Number game

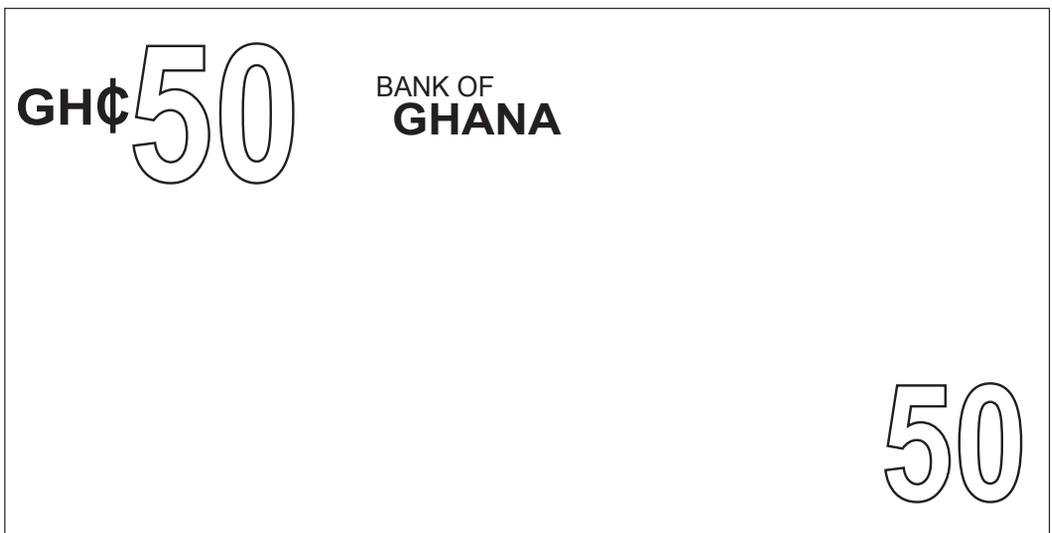
 12,001	12,002	12,003	12,004	12,005	12,006	12,007	12,008	12,009	12,010
12,020	12,019	12,018	12,017	12,016	12,014	12,014	12,013	12,012	 12,011
 12,021	12,022	12,023	12,024	12,025	12,026	12,027	12,028	12,029	12,030
12,040	12,039	12,038	12,037	12,036	12,035	12,034	12,033	12,032	 12,031
 12,041	12,042	12,043	12,044	12,045	12,046	12,047	12,048	12,049	12,050
12,060	12,059	12,058	12,057	12,056	12,055	12,054	12,053	12,052	 12,051
 12,061	12,062	12,063	12,064	12,065	12,066	12,067	12,068	12,069	12,070
12,080	12,079	12,078	12,077	12,076	12,075	12,074	12,073	12,072	 12,071
 12,081	12,082	12,083	12,084	12,085	12,086	12,087	12,088	12,089	12,090
 12,100	12,099	12,098	12,097	12,096	12,095	12,094	12,093	12,092	 12,091

Place value game



Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Paper money templates



12 × 12 multiplication chart

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Grid paper

