MATHEMATICS
Grade 5
TERM 1 2022
Lesson Plans

Contents

Teaching mathematics for Understanding (TMU)

You are participating in the pilot implementation of the Mathematic Framework which calls for *Teaching Mathematics for Understanding*. The Framework proposes five framework dimensions that should be considered to bring about the transformation of mathematics teaching in South Africa.

THE FIVE FRAMEWORK DIMENSIONS

These five dimensions are:

1 CONCEPTUAL UNDERSTANDING

Teachers should strive for **conceptual understanding** to enable learners to comprehend mathematical concepts, operations and relations.

Conceptual understanding assists the learners to see mathematics as a connected web of concepts. Learners need practice explaining the relationships between different concepts and time to make links between concepts and related procedures. Conceptual knowledge enables learners to apply ideas and justify their thinking.

2 PROCEDURAL FLUENCY

Teachers should teach so that learners develop **procedural fluency**. Procedural fluency involves learners developing the skills of carrying out procedures flexibly, accurately, efficiently and appropriately. These are the processes through which mathematics is done.

Learners need sufficient practice in order to perform mathematical procedures accurately and efficiently. They also need to know when to use a particular procedure.

3 STRATEGIC COMPETENCE

Teachers should develop learners' **strategic competence**. Strategic competence is the ability of the learners to formulate, represent and decide on appropriate strategies to solve mathematical problems.

Learners need practice identifying and using appropriate strategies as well as devising their own strategies to solve mathematical problems.

4 REASONING

Teachers should strive to provide multiple and varied opportunities for learners to develop their mathematical **reasoning** skills. Reasoning is the capacity for logical thought, reflection, explanation and justification. It is the critical skill that enables a learner to make use of all other mathematical skills.

With the development of mathematical reasoning, learners start to recognise that mathematics makes sense and can be understood. They learn how to evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognise how those solutions can be applied. Learners should be able to reflect on solutions to problems and determine whether or not they make sense.

5 LEARNING-CENTRED CLASSROOM

Teachers should promote a **learning-centred classroom** in which Framework Dimensions 1 to 4 are enabled.

In a learning-centred classroom, the teacher designs learning experiences to help learners learn mathematics, using whatever teaching and learning strategies s/he thinks are most suitable for the specific lesson that will be taught.

At the beginning of each unit, you are told how the first four framework dimensions are developed in the unit. You are expected to use the four dimensions to create a learning-centred classroom.

The 5 Framework Dimensions are represented on the following diagram:

Conceptual understanding	Procedural fluency
Reasoning	**Strategic competence**

Learning-centred classroom

- Concept development
- Active learning
- Making sense of mathematics
- Problem solving
- Justifying answers
- Applying maths in context
- Practising procedures
- Addressing learners' errors
- Connecting representations
- Purposeful assessment
- Speaking mathematics
- Explaining concepts and procedures
- Addressing gaps in learners' knowledge
- Connecting topics and concepts

NOTE:

The Framework is **not a new curriculum** and does not replace the existing curriculum. Instead, it supports the implementation of the current curriculum through introducing a model to help teachers to change the way in which they teach.

ASSESSMENT FOR LEARNING

Teaching is an engagement with learners that is ongoing. The engagement should be planned so that it can lead to the achievement of learning goals in a meaningful way. Teaching and assessment in the Intermediate Phase should be closely aligned so that teachers draw on knowledge and skills gained through assessment to inform and enrich their classroom activities. This is *assessment for learning*. The TMU pilot has planned assessment activities. Use these activities to find out what has been learned in your class and what you need to do to take this learning further.

The planned lesson activities also provide opportunities for you to listen to your learners while you teach and to think diagnostically about learners' responses in discussions. You can then build on what you have learned through this activity to deepen the learning that takes place in your class.

The teachers' notes in the TMU Lesson Plans indicate daily objectives.

For example, for division:

Mathematics = Methods/Strategies
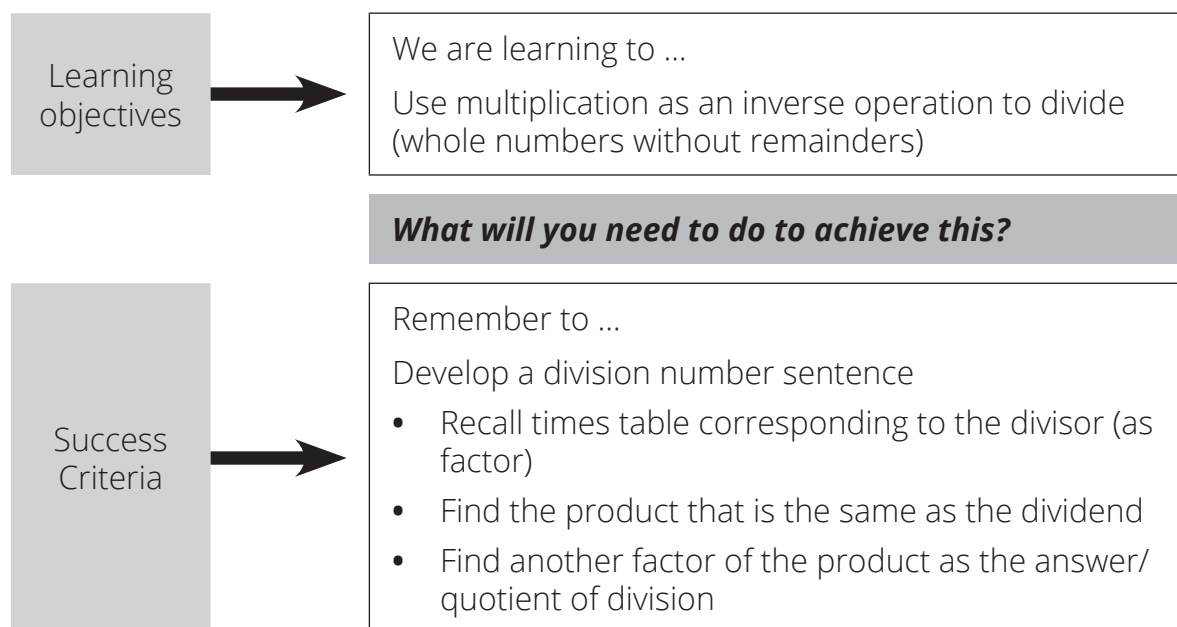
Learning objectives	→	We are learning to … Use multiplication as an inverse operation to divide (whole numbers without remainders)

		What will you need to do to achieve this?

Success Criteria	→	Remember to … Develop a division number sentence • Recall times table corresponding to the divisor (as factor) • Find the product that is the same as the dividend • Find another factor of the product as the answer/ quotient of division

An important thing you can do as a teacher is to focus on classroom activities; in other words, on discussions that make a difference to learning in the classroom.

Your task is to make sense of the TMU Lesson Plans so that you can strive to enact better quality teaching and learning in your classroom. Lesson Plans provide useful information, but you need to make good sense of the Lesson Plans in order to use them well and extend their possibilities.

- The Lesson Plans (LP) and Resources you have been given are part of the Grade 5 Term 1 Teacher Toolkit for the pilot implementation of the mathematics framework.

The other documents in the toolkit are:
- a Learner Activity Book (LAB) and, where necessary, a set of printable resources for the learners to cut out and use
- a Teacher Resource Pack which includes, where necessary, a set of teacher printable resources and A3 Resources.
- a Formal Assessment booklet containing photocopiable masters of the assessment activities as well as marking guidelines.

ABOUT THE LESSON PLANS

The Lesson Plans give detailed information about how to teach a CAPS-aligned lesson every day. By following the Lesson Plans, you will ensure that you cover the content and assessment tasks specified in the curriculum and give your learners the best possible chance of developing the knowledge and skills required for mathematics in Grade 5.

1   CURRICULUM ALIGNMENT

The lessons are sequenced according to a reorganised CAPS unit planner. The content is CAPS-aligned (all topics are covered, and the CAPS weighting has been adhered to), but it covers a slightly different sequence to the regular CAPS. Your school has been given permission by the Minister of Education to follow this resequenced curriculum. Lessons plans show each lesson's links to the CAPS content and skills being focussed on in the lesson.

2   DBE WORKBOOKS

Pilot implementation schools have been given permission **NOT** to use the DBE workbooks. You should use the CAPS- and Lesson Plan-aligned Learner Activity Books (LABs) instead. The LAB has been designed to include activities from the DBE workbook wherever possible. The DBE workbook could be used for extension or additional activities if you have time and wish to do so.

3   BROAD OVERVIEW OF THE CONTENT OF THE LESSON PLANS

Each Lesson Plan provides a set of steps to guide you in delivering the lesson.

In addition, the Lesson Plans contain:
- Mental maths activities
- Whole class activities led by the teacher that will help learners to develop the concepts and skills set for the lesson

- Classwork activities
- Homework activities.
- Reflections and summaries of each lesson.

The answers for the mental maths activities and the classwork and homework activities are included in the Lesson Plans.

The mental maths, classwork and homework activities form the content of the LAB which is provided in workbook format.

4 ASSESSMENT

Assessment opportunities are provided in the Formal Assessment Booklet. This programme of assessment complies with the CAPS. You will need to photocopy the assessment activities for the learners.

5 MANAGING YOUR TEACHING USING THE LESSON PLAN

The formal curriculum for Term 1 of Grade 5 is covered in a set of 46 numbered Lesson Plans, paced to cover a 60-hour teaching term. This includes 39 fully planned lessons, 7 consolidation lessons, 8 assessment lessons and 6 revision lessons.

Each of the lessons is designed to last 60 minutes. If your school's timetable has different period lengths, you will need to adjust the amount of work done in each lesson to accommodate this. Each school should allow six hours for Mathematics each week so it should be possible to fit in all the work for the week, even if the lengths of periods are not the same as in the Lesson Plans.

6 SEQUENCE ADHERENCE AND PACING

Each fully planned lesson and its contents has been carefully sequenced. You should not skip any of these lessons. Should you miss a school day for any reason, rather skip a consolidation lesson near to the lesson that you are teaching. You might choose to speed up the pace of delivery to catch up a missed lesson by covering the lesson concept contents of two consecutive days in one day. To do this, you could cut out or cut back on some of the routine activities like mental mathematics or reflection to save time until you are back on track with the expected delivery of the plans.

7 UNIT PLAN AND OVERVIEW

Each unit is introduced with a description of the unit content. Links to the first four framework dimensions are included in the introduction to the unit. The unit plan and overview give a tabulated summary of the lessons contained in the unit. The lesson

objectives and the resources required for each lesson are included in the table. There is also a column provided for you to use to keep a record of your teaching progress.

It is a good idea to reflect on your teaching. You could write about what went well, or not so well when you taught the lessons and how you would teach the lessons again the next time. Use the space provided at the end of each unit plan and overview to record your thoughts. Some questions are provided to guide your reflection.

PREPARING TO TEACH A LESSON

The Lesson Plans provide a detailed lesson design for you to follow. However, to deliver the lessons successfully **you must do the necessary preparation yourself**.

Before you get started, **study the Grade 5 TMU Time Allocation per Topic**. This will give you an overview of the mathematics content you will cover during the term.

The information below outlines some key aspects of the preparation required before you teach the lessons.

1 **Prepare your lessons:** Your lessons will not succeed if you have not prepared properly ahead of time. Where possible, prepare more than one lesson at a time. Ideally, you should prepare lessons for a whole week or unit so that you have a sound knowledge of what is to be done.

2 **Prepare resources:** The resources needed for each lesson are listed in each lesson plan and in the unit plan and overview. Check what is required for each lesson ahead of time, so that you have all your resources ready for use every day (examples: posters, place value tables, examples of 2-D shapes and 3-D objects).

   If you do not have all the necessary resources readily available, see how best you can improvise. For example, make your own number grids or arrays using pieces of cardboard and a marker pen.

   Start collecting resources well in advance. Collect empty cool drink cans, cereal boxes, washing powder boxes and plastic bottles for use when dealing with 2-D shapes, 3-D objects, and capacity. Use newspapers and magazines to cut out pictures that could be used in your teaching. If you have access to the internet, search for and print out pictures that you may need to use as illustrations in your lessons.

3 **Prepare for the written classwork and homework activities:** When preparing your lessons, check the lesson activity requirements. In some instances, you will need to write information or draw some diagrams on the board for use when you do the interactive whole-class-teaching component of the lesson.

Mark classwork activities immediately after the learners have finished them so that you can give useful feedback to the learners each day and become aware of any difficulties the learners are having as soon as they become apparent.

4   **Prepare to teach the concepts and skills associated with the lesson topic:**

Think carefully about what you will teach your learners in the lesson:
- Be sure that you are familiar with the sequence of activities in the lesson plan.
- Prepare a short introduction to the topic so that you can explain it in simple terms to your learners. This could be the main question of the lesson. For example, if you teach addition, don't say "today we are going to work with addition", rather write a word problem on the board and ask the learners which operation we can use to solve the problem.
- Prepare for the teaching of the new vocabulary and concepts before you teach – you need to be able to explain new mathematics content and skills to the learners.
- Go through the oral teaching activities provided in the Lesson Plans and in the Learner Activity Book (LAB).
- Make sure that you have thought about how to use the resources in the lesson effectively. This preparation needs to be done in advance, so that you do not waste time during the lesson.
- Prepare yourself to assist learners with any questions they might have during the lesson.
- Think about how you will accommodate learners with barriers to learning.

5   **Lesson pace:** Think about how much time you will spend on each activity. Plan how you will manage the pace of the lesson carefully; otherwise, you might not manage to cover all the lesson content. Not all learners work at the same pace. You need to determine the pace – be guided by the average learner and the recommendations in the Lesson Plans. Be careful not to slow down to the pace of the slowest learners as this will disadvantage the other learners.

6   **Organisation of learners:** Think about how you will organise learners when they do the classwork activities. Will they work alone, in pairs or in small groups? How will you organise the pairs or groups if you choose to use them? You need to organise the learners quickly at the beginning of the lesson so that you do not waste too much time on this.

7   **Inclusive education:** Consider the needs of any learners with barriers to learning in your class, and how best you can support them. The DBE has published some excellent materials to support you in working with learners with learning barriers.

Two such publications are:

i Directorate Inclusive Education, Department of Basic Education (2011) *Guidelines for Responding to Learner Diversity in the Classroom Through Curriculum and Assessment Policy Statements.* Pretoria.
www.education.gov.za, www.thutong.doe.gov.za/InclusiveEducation.

ii Directorate Inclusive Education, Department of Basic Education (2010) *Guidelines for Inclusive Teaching and Learning. Education White Paper 6. Special needs education: Building an inclusive education and training system.* Pretoria.
www.education.gov.za, www.thutong.doe.gov.za/InclusiveEducation.

You can make the learning and teaching of mathematics more effective by remembering a few simple DOs and DON'Ts:

- **Always** teach with a SMILE
- **Always** give learners enough time to think/struggle and discover something on their own and keep quiet while they are thinking/working individually. **Do not** explain everything.
- **Always** plan the lesson with enough time to let learners deepen their own thinking and be patient. **Do not** rush learners into saying/doing something by saying *'quick, quick, quick'.*
- **Always** share a variety of answers/thinking with all the learners and let them compare, think and explain which ones are OK/not OK and why. **And always** discuss important errors so that everyone can learn from them. **Do not** erase/remove incorrect answers rather use them to deepen learning.
- **Always** ask the learners 'why did you think so', regardless of whether their answer is correct or incorrect. **And always** assist learners to discover where and why they made mistakes. Use other learners as well to explain why something is not correct. **Do not** say *'No'*, *'Wrong'*, *'Next'*, *'Right'*, *'Yes'*, *'Correct'*, etc. immediately after learners give you their answers.
- **DO NOT** answer or use your phone during the lesson.

NOTE:

The four terms in a year are not always the same length, or you might not have the planned number of teaching and learning weeks available.

You will need to adjust the pace at which you work to complete the work in the time available or make other plans to stay on track.

LESSON PLAN OUTLINE

Each lesson plan has several components. Information about each component is discussed below. This information tells you how to use each of the components of the Lesson Plan and how they fit together to create a well-paced and properly scaffolded mathematics lesson each day.

Read this outline as you prepare each lesson until you are fully familiar with the general Lesson Plan components, pace and structure.

TEACHER'S NOTES

a Teacher's notes include information for the teacher about the **CAPS content** to be covered in the lesson and the learning objective for the lesson.

b A list of the **lesson vocabulary** is included in the teacher's notes. This list indicates the important mathematical vocabulary used in the lesson. The vocabulary, with explanations and diagrams, is also provided at the beginning of each unit. Go through the lesson vocabulary each day as you prepare for the lesson. These terms are important as they are the language of mathematics that each learner needs to learn and understand in order to build a solid foundation and understanding of this subject. It is important that your learners understand and use them correctly. If you have learners in your class who are not yet comfortable in the Language of Learning and Teaching (LoLT), try to explain the word with mathematical examples in a language they understand. Use gestures, pictures or enlist the help of another learner who is familiar with the home language of the learner who is struggling with a language barrier.

c The **resources** that you should prepare for the day's lesson are listed. Check which resources you need in advance for each lesson so that you are ready to teach the lesson each day.

1   MENTAL MATHEMATICS (ABOUT 5 MINUTES)

This is the first active component of the lesson, and the time allocation is indicated according to the volume of activity.

Mental mathematics can be both an **oral** or a **written** activity that consists of a set of questions which drill number facts and basic mathematical strategies that are either linked directly to the day's lesson or are a consolidation of the basics. TMU recommends a written activity for mental mathematics as it can be marked and then the results recorded.

The mental mathematics activities for each day are given both in the Lesson Plans and in the Learner Activity Book, but they could also be written on the board by the teacher. The answers to the mental mathematics questions are given in the Lesson Plans.

We suggest that the learners see the answers written down so they can reflect where they made a mistake, and can see how many they got right and how many they got wrong.

- Observe which learners struggle with mental maths activities. Make sure to spend time later to help them reach the required level of competence by offering remediation activities, which may involve using concrete or pictorial aids. Mental maths is not meant to be an activity using concrete material to scaffold the learning, but, if there are learners who need concrete aids to complete the mental maths activities, allow them to do so.
- Try to complete all of each day's mental maths questions, but if you find that your learners struggle to finish these in five minutes, reduce the number of questions.

2 LINK TO PREVIOUS LESSON (5 MINUTES)

This part of the lesson provides an opportunity to quickly revise the main concepts dealt with in the previous lesson. It provides an opportunity for you to informally assess the learners' understanding of the concepts and the level of achievement of the objectives of the previous lesson.

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

Work through the homework from the previous lesson. This will provide you and the learners an opportunity to gauge the learners' knowledge and skills.

Take a minute or two to reflect on the homework with the learners. You might get the learners to read the answers out in turn, allowing learners/peers to mark the work. Try to check the homework yourself as often as you can. If you notice a question that many learners struggled with, especially if it is important for today's lesson, you could work through it in full with the whole class. Allow learners the opportunity to write corrections as needed.

4 LESSON CONTENT – CONCEPT DEVELOPMENT, CORRECT CLASSWORK ACTIVITIES (40 MINUTES)

This is the body of the lesson. Activities on the content that you will teach with worked examples and suggested explanations are provided. These activities have been carefully sequenced and scaffolded so that they support the teaching of the concepts for that day. You should work through each of these with your class.

The Activities that the learners should do are provided in in their Learner Activity Books (LABs). They work on the Activities, either on their own, with a partner, or with their group.

Note that individual work is important. Sometimes, in group work, only one or very few learners lead the group: they do all the work and present it to the class for the group.

Group work does not guarantee every learner's learning and understanding. Some of the group members may have been left behind without knowing exactly what has been done. Learners should first work individually and then discuss what they have done with the rest of the group, based on what they have in their classwork books or worksheets.

Manage the pace of the lesson carefully; otherwise, you might not manage to cover all the lesson content. Once you have introduced the new concept, work through Activity 1 of the lesson with the whole class (or with learners in groups). Then, immediately move on to the next activity, and provide a reasonable time for the learners to complete Activity 2.

Do not wait for the last learner to finish before proceeding. If there are further activities, continue pacing yourself in this way, so that you work through all of the activities in each lesson. Correcting the activities is very important. It should be done with the whole class so that there is time to discuss the work with all the learners in order to deepen their understanding and reasoning. You might need to write the questions on the board and work together where many of your learners show uncertainty.

5   HOMEWORK ACTIVITY (5 MINUTES)

Take about five minutes to tell the learners about the homework each day.

Homework consolidates the content that you have taught each day. Homework also promotes learner writing and the development of their mathematical knowledge.

The daily homework activities are provided in the LAB.

As part of their homework, the learners should complete classwork activities if needed.

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Wrap up each day's lesson by focussing learners on the content covered and the concepts they should have learned.

Grade 5 Time Allocation per Topic

GRADE 5 TMU TIME ALLOCATION PER TOPIC

GRADE 5							
TERM 1		**TERM 2**		**TERM 3**		**TERM 4**	
Topic	**Time**	**Topic**	**Time**	**Topic**	**Time**	**Topic**	**Time**
Whole Numbers and Decimal Fractions	**12 h**	**2-D Shapes**	**7 h**	**Multiples and Factors**	**12 h**	**Capacity/ Volume**	**11 h**
Number Sentences	**8 h**	**Angles**	**10 h**	**Common Fractions**	**16 h**	**Average**	**9 h**
Circles and spheres	**7 h**	**Multiplication**	**16 h**	**Construction of quadrilaterals**	**16 h**	**Quantity per unit quantity**	**5 h**
Broken Line Graphs	**9 h**	**Division**	**9 h**				
Patterns	**10 h**						
Revision	**8 h**	Revision	**7 h**	Revision	**8 h**	Revision	**5 h**
Assessment	**6 h**	Assessment	**5 h**	Assessment	**3 h**	Assessment	**6 h**
		Exams	**6 h**	Project	**5 h**	Exams	**12 h**
TOTAL: 60 HOURS		**TOTAL: 60 HOURS**		**TOTAL: 60 HOURS**		**TOTAL: 48 HOURS**	

GRADE 5 CAPS TIME ALLOCATION PER TOPIC

GRADE 5 (page 34 in CAPS)							
TERM 1		**TERM 2**		**TERM 3**		**TERM 4**	
Topic	**Time**	**Topic**	**Time**	**Topic**	**Time**	**Topic**	**Time**
Mental Mathematics (10 minutes daily)	**8 h**	Mental Mathematics (10 minutes daily)	**7 h**	Mental Mathematics (10 minutes daily)	**8 h**	Mental Mathematics (10 minutes daily)	**7 h**
Whole Numbers: Counting, ordering, comparing, representing and place value (4-digit numbers)	**2 h**	Whole Numbers: Counting, ordering, comparing, representing and place value (6-digit numbers)	**1 h**	Common Fractions	**5 h**	Whole Numbers: Counting, ordering, comparing, representing and place value (6-digit numbers)	**1 h**
Number sentences	**3 h**	Whole Numbers: Addition and Subtraction (5-digit numbers)	**5 h**	Mass	**5 h**	Whole Numbers: Addition and Subtraction (5-digit numbers)	**5 h**
Whole Numbers: Addition and Subtraction (5-digit numbers)	**5 h**	Common Fractions	**5 h**	Whole Numbers: Counting, ordering, comparing, representing and place value (6-digit numbers)	**1 h**	Properties of 3-D objects	**5 h**
Numeric patterns	**4 h**	Length	**6 h**	Whole Numbers: Addition and Subtraction	**5 h**	Common Fractions	**5 h**
Whole Numbers: Multiplication (2-digit by 2-digit) and Division (3-digit by 1 digit)	**6 h**	Whole Numbers: Multiplication (3-digits by 2 digits)	**7 h**	Viewing objects	**3 h**	Whole Numbers: Division (3-digit by 2 digits)	**7 h**
Time	**6 h**	Properties of 3D objects	**6 h**	Properties of 2-D shapes	**4 h**	Perimeter, Area & Volume	**7 h**
Data handling	**10 h**	Geometric patterns	**4 h**	Transformations	**3 h**	Position and Movement	**2 h**
Properties of 2-D shapes	**7 h**	Symmetry	**2 h**	Temperature	**2 h**	Transformations	**4 h**
Capacity/Volume	**5 h**	Whole Numbers: Division (4-digit by 2 digit)	**4 h**	Data Handling	**9 h**	Geometric patterns	**2 h**
			4 h	Numeric Patterns	**5 h**	Number Sentences	**3 h**
				Whole Numbers: Multiplication (3-digit by 2-digit)	**7 h**	Probability	**2 h**
Revision	**4 h**	Revision	**3 h**	Revision	**3 h**	Revision	**4 h**
		Assessment (all subjects)	**6 h**			Assessment (all subjects)	**6 h**
TOTAL: 60 HOURS		**TOTAL: 60 HOURS**		**TOTAL: 60 HOURS**		**TOTAL: 60 HOURS**	

Problem solving: Word problems by problem type

- These problem types are given here to guide the teacher. Learners do not need to know the names of the problem types, nor do they need to be able to identify the problem type.

- There are different problem types for addition, subtraction, multiplication, and division word problems. Since Grade 1, learners have been exposed to word problems involving a variety of problem types. It is important for you, the teacher, to be aware of the different problem types and to present these repeatedly so that learners become familiar with all of them and are able to work with all of them.

- It is important that learners learn to solve all these different types of problems as being able to do so will assist them acquire a full understanding of the meaning of all four operations.

- All problem types discussed below are addressed in the Grade 5 Lesson Plans and Learner Activity Books.

TYPES OF ADDITION AND SUBTRACTION WORD PROBLEMS

There are three quantities involved in Addition and Subtraction word problems:

- **Amount A**
- **Amount B**
- The **total** amount.

Amount A	Amount B
Total	

COMBINE WORD PROBLEMS

Any of these three quantities can be the unknown in a problem.

a **The Total is the unknown**
Zandile has 18 books.
Justice has 24 books.
How many books do they have altogether?

Zandile: 18 books	Justice: 24 books
? books	

$$18 + 24 = ?$$

b   Amount B is the unknown
Zandile has 18 books.
Justice has some books as well.
They have 42 books in total.
How many books does Justice have?

Zandile: 18 books	Justice: ? books
42 books	

18 + ? = 42 or 42 − 18 = ?
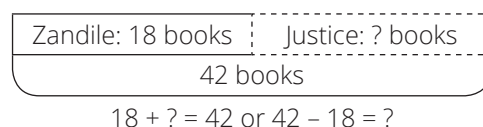
c   Amount A is the unknown
Zandile has some books.
Justice has 24 books.
They have 42 books altogether.
How many books does Zandile have?

Zandile: ? books	Justice: 24 books
42 books	

? + 24 = 42 or 42 − 24 = ?
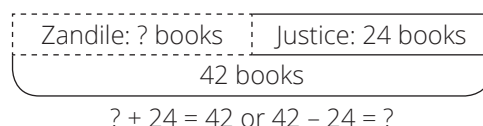
CHANGE WORD PROBLEMS

The change amount is added to, taken away or separated

Again, there are three quantities involved:

- The starting **amount**.
- A **change amount** (the amount being removed from the total or being added to the starting amount)
- The **total** amount after the change takes place.

Amount	Change
Total	

Any of these three quantities can be the unknown in a problem.

a   Total is the unknown
Zandile had 24 books.
Justice gave 18 books to Zandile.
How many books does Zandile have now?

Zandile: 24 books	Justice: 18 books
? books	

24 + 18 = ?
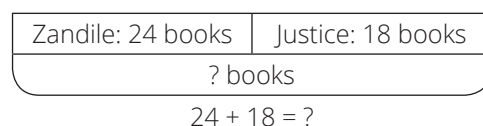
b   Change is the unknown
Zandile had 42 books.
She has 24 books left after she gave some books to Justice.
How many books did Zandile give to Justice?

Zandile: 24 books	Justice: ? books
42 books	

24 + ? = 42 or 42 − 24 = ?
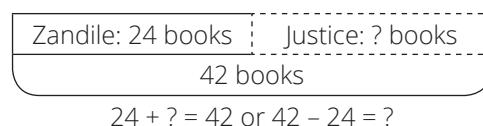
c   Amount is the unknown
Zandile had some books.
Justice gave her 18 books.
Now Zandile has 42 books.
How many books did Zandile have in the beginning?

Zandile: ? books	Justice: 18 books
42 books	

? + 18 = 42 or 42 − 18 = ?
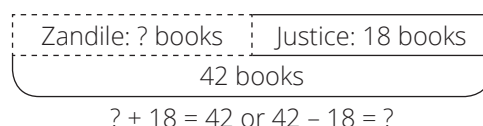
COMPARE WORD PROBLEMS

These involve the comparison of two quantities. The third amount is the difference between the two parts.

There are three quantities involved:

- The **larger amount**
- The **smaller amount**
- The **difference**

Larger amount	
Smaller amount	Difference
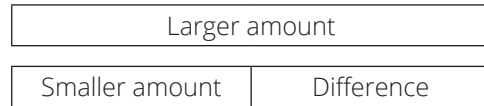
Any of these three quantities can be the unknown in a problem.

a   Larger amount is the unknown
Justice has 18 books.
He has 24 less books than Zandile.
How many books does Zandile have?

Zandile: ? books	
Justice: 18 books	24 less than Zandile

18 + 24 = ?
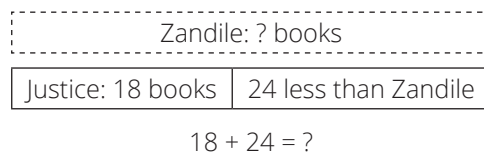
b   Difference is the unknown
Zandile has 42 books.
Justice has 18 books.
How many more books does Zandile have than Justice?

Zandile: 42 books	
Justice: 18 books	? more

18 + ? = 42 or 42 – 18 = ?
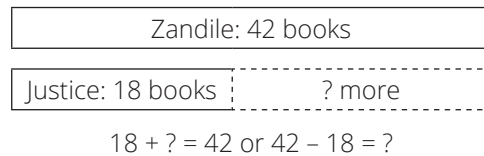
c   Smaller amount is the unknown
Zandile has 42 books.
She has 24 more books than Justice.
How many books does Justice have?

Zandile: 42 books	
Justice: ? books	24 more than Justice

? + 24 = 42 or 42 – 24 = ?
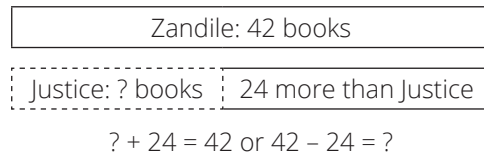
WHEN "MORE" DOES NOT MEAN "ADD"

When solving word problems, some teachers ask learners to look for verbal cues (key words) to determine the operation they need to use. TMU does not recommend looking for key words as 'more' does not always mean addition and 'less' does not always mean subtraction.

For example:

a   Smangi has 35 books which is 12 more than Yvonne. How many books does Yvonne have?

The operation to be used here is *subtraction*. The calculation is 35 – 12 = 23.

b   There are 158 Grade 6 learners. This is 24 less than the number of Grade 5 learners. How many learners are there in Grade 5?

The operation to be used here is *addition*. The calculation is 158 + 24 = 182.

TYPES OF MULTIPLICATION AND DIVISION WORD PROBLEMS

In multiplication and division problems:
* one number or *factor* counts **how many groups** or parts of equal size are involved
* the other factor tells the **size of each group** or part
* the third number in each of these two structures is the **total** of all of the parts.

MULTIPLICATION AND DIVISION WORD PROBLEMS

There are three quantities involved:

* The **number of groups**
* The **group size**
* The **total**

```
Total
┌─────────────┐
│ Group size  │ . . . . . . . . .
└─────────────┘
     Number of groups
```
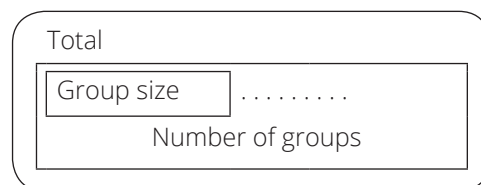
Any of these three quantities can be the unknown in a problem.

a   Total is unknown
Patience has 14 packets of bananas.
There are 8 bananas in each packet.
How many bananas does Patience have?

```
Total: ? bananas
┌─────────────┐
│ 8 bananas   │ . . . . . . . . .
└─────────────┘
     14 packets
```
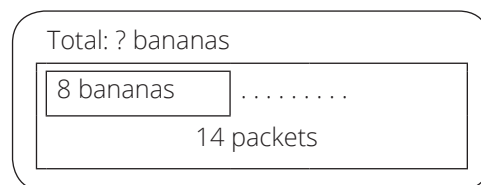
$14 \times 8 = ?$

b   Number of groups is unknown
Patience has 112 bananas.
She puts them in packets with 8 bananas in each packet.
How many packets did she use?
(Grouping)

```
Total: 112 bananas
┌─────────────┐
│ 8 bananas   │ . . . . . . . . .
└─────────────┘
 ? packets
```
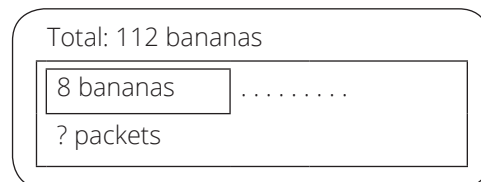
$? \times 8 = 112$ or $112 \div 8 = ?$

c   Group size is unknown
Patience has 112 bananas.
She wants to make 14 packets with an equal number of bananas in each.
How many bananas will there be in each packet?
(Sharing)

```
Total: 112 bananas
┌─────────────┐
│ ? bananas   │ . . . . . . . . .
└─────────────┘
 14 packets
```
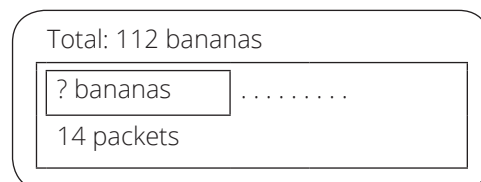
$14 \times ? = 112$ or $112 \div 14 = ?$

COMPARISON WORD PROBLEMS

Comparison problems involve the comparison of two quantities where one quantity is described in terms of how many times larger it is than the other. Larger can also mean longer, wider, taller or faster.

There are three quantities involved:

- The **multiplier** which tells you **how many times** bigger Quantity B is than Quantity A.
- **Quantity A**
- **Quantity B**

Quantity A	how many times
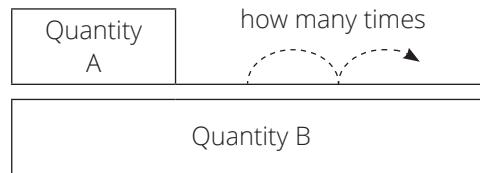
| Quantity B | |

Any of these three quantities can be the unknown in a problem.

a **Quantity B is unknown**
Sipho picked 9 mangoes.
Siza picked 15 times as many mangoes as Sipho.
How many mangoes did Siza pick?

Sipho: 9 mangoes — 15 times

Siza: ? mangoes

$15 \times 9 = ?$
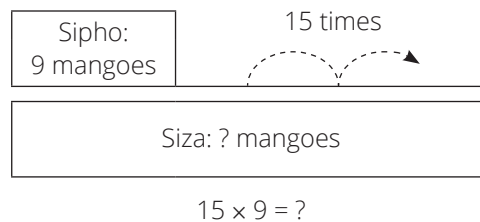
b **Quantity A is unknown**
Siza picked 135 mangoes.
Siza picked 15 times as many mangoes as Sipho.
How many mangoes did Sipho pick?

Sipho: ? mangoes — 15 times

Siza: 135 mangoes

$15 \times ? = 135$ or $135 \div 15 = ?$
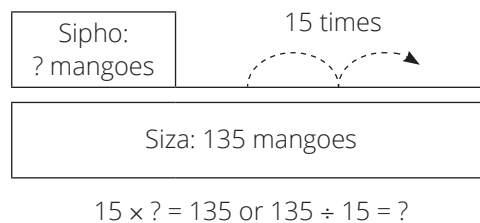
c **Multiplier is unknown**
Sipho picked 9 mangoes.
Siza picked 135 mangoes.
How many times more mangoes did Siza pick than Sipho?

Sipho: 9 mangoes — how many times?

Siza: 135 mangoes

$? \times 9 = 135$ or $135 \div 9 = ?$
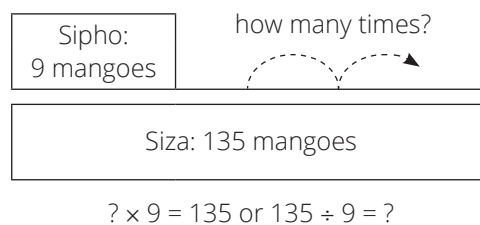
GENERAL PROCEDURE TO FOLLOW WHEN SOLVING WORD PROBLEMS

- *The hardest part of any word problem is deciding which operation to use. There can be many details included in a word problem that the question being asked gets lost in the whole situation.*

- *The learners must understand the situation correctly to identify what is important, and what is asked.*

Following this procedure will help the learners understand what is required of them:

Step 1: Understand the problem 1 Write the word problem on the chalkboard 2 Read the problem several times to the learners. 3 Let learners read the problem until they read it fluently. 4 Underline the numbers. 5 Underline the question with a wavy line. 6 Let learners reproduce the story with manipulatives or diagrams in their classwork books.	**For example:** Thoko has ran <u>1 273</u> metres. Silo ran <u>432</u> metres further (more) than Thoko. <u>How far did Silo run?</u> **Solution:**
Step 2: Devise a plan 1 Determine the operation. (+; −; ×; ÷) 2 Write a number sentence.	We have to add. 1 273 + 432 = ☐
Step 3: Carry out the plan 1 Do the calculation 2 Write the answer to the question	1 273 + 432 = 1 705 Silo ran 1 705 metres.
Step 4: Look back 1 Compare learners' solutions. 2 Do the corrections. 3 Let learners record the work in their books.	
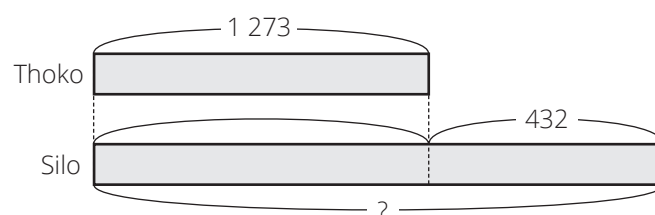
Glossary of important terms used in the TMU lesson plans

The following terms are used in the TMU Lesson Plans for Grade 5. Some of the terms also appear in CAPS.

Calculation Terms

ADDITION AND SUBTRACTION WITH REGROUPING

In math, regrouping can be defined as the process of making groups of tens when carrying out operations like addition and subtraction with two-digit numbers or larger.

To regroup means to rearrange groups to carry out an operation. The term 'carrying' is sometimes used in the Lesson Plans instead of regrouping as the terminology is familiar to teachers.

We use regrouping in addition when the sum of two digits in a place value column is greater than nine. We use regrouping with the following examples: 197 + 4; 157 +149; 10 984 + 19 499.

We use regrouping in subtraction when digits in the first number are smaller than the digits in the same place in the second number. We use regrouping with the following examples: 526 – 137; 423 – 397 and 10 204 – 9 429.

The same technique is needed when you do multiplication in columns as well as with long division.

BASE-TEN NUMBER SYSTEM

The base-ten number system is the most commonly used number system across the world. The base-ten number system uses a base of ten which means that it involves grouping in tens.

Examples: There are 10 hundredths in 1 tenth, 10 tenths in 1, 10 ones in 1 ten, 10 tens in 1 hundred, 10 hundreds in 1 thousand, 10 thousands in 1 ten thousand and 10 ten thousands in 1 hundred thousand.

Each digit in a number has a value according to its position in the number. The only digits we need to represent a number of any size are the digits 0 to 9.

One focus of the TMU framework is to move from mathematics based on counting methods to methods governed by the base-ten number system.

COLUMN OR VERTICAL METHOD

The column method is a calculation technique used in addition, subtraction, multiplication and division that helps to reinforce number concept or number sense. The column method is also known as the vertical algorithm or vertical method. This structured method consolidates learners' understanding of place value and the base-ten number system.

EXPANDED NOTATION

Expanded notation is a representation of a number made by writing it out using place value. 'Expanded notation' and 'building up and breaking down of numbers' are used interchangeably in CAPS. By the end of Grade 5, learners should be able to write a number using expanded notation in order to show the place value of each of the digits in a number up to 1 000 000.

Example:

943,567 is written in expanded notation as:
943,567 = 900 + 40 + 3 + 0,5 + 0,06 + 0,007
OR
943,567 = 9 hundreds + 4 tens + 3 ones + 5 tenths + 6 hundredths + 7 thousandths
OR
943,567 = 9 H + 4 T + 3 O + 5 t + 6 h + 7 th

JUMPING STRATEGIES ON A NUMBER LINE

When we solve addition or subtraction with a line, we use 'jump' strategies. This strategy builds on learners' knowledge of numbers and can also help reinforce number concept or number sense.

There are many ways in which 'jumps' can be made on a line, but efficient jumps (such as jumping to the next ten or jumping in tens, hundreds or thousands) make calculation easier.

Choosing these 'efficient jumps' develops learners' number sense.

Representation Terms

CONCRETE-PICTORIAL-ABSTRACT (CPA) APPROACH (ALSO KNOWN AS THE CRA APPROACH)

The Concrete-Pictorial-Abstract (CPA) approach helps learners develop the concepts of numbers. The CPA approach uses several different representations for the concept of the numbers 1, 10 and 100.

- **Concrete** objects are any materials that can be touched. In TMU, bottle tops are recommended as concrete objects.
- **Pictorial** representations are drawings that represent concrete objects.
- **Abstract** representations consist of number symbols such as 1, 2 and 3; and symbols such as ' + ', '–', '×', '÷'.

PLACE VALUE TABLE

A place value table is diagram that helps us to find and compare the place value of the digits in numbers. The place value of a digit in the place value chart increases by ten times as we shift to the left and decreases by ten times as we shift to the right.

The number 5 137 469,602 is shown in a place value table:

M	HTh	TTh	Th	H	T	O	,	t	h	th
5	1	3	7	4	6	9	,	6	0	2

PLACE VALUE CARDS

Place Value Cards (also called Flard Cards) are a set of cards which learners can use to 'build' numbers. The cards for each place value are different lengths, with the highest place value being the longest card.

The diagram below shows how the number 467 is built using Place Value Cards.
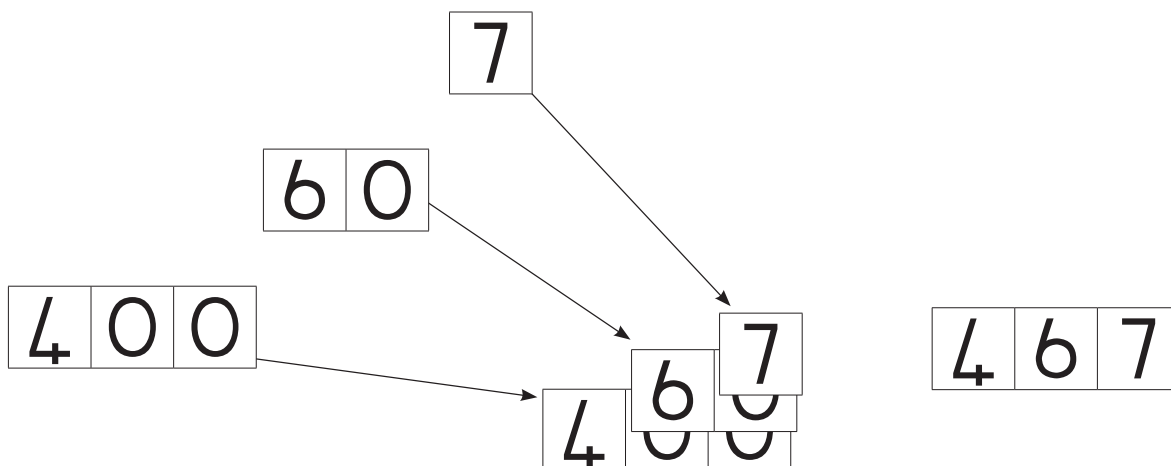
Place Value Cards are particularly useful for building the concept of place value, as well as for expanded notation. The way in which learners use their Place Value Cards also provides valuable feedback for the teacher.

For example, a learner who represents the number 467 using the ones cards only may not understand the concept of place value.

To find whether this learner understands the concept of place value, you could ask the learner to SAY the number to you or ask them to tell you what each digit in the number represents.

4 6 7

The following are examples of Place Value Cards for millions and hundred thousands.

9 0 0 0 0 0 0

Nine million

2 0 0 0 0 0

Two hundred thousand

It is also possible to use Place Value cards when building the concept of decimal fractions. The following are examples of Place Value cards for tenths and hundredths.

0,6

Six tenths

0,09

Nine hundredths

NUMBER LINES

A number line is a straight line divided into sections, called intervals. The numbering can start and end at any number and the size of the intervals can vary from one number line to another. The numbers on a number line increase as you move to the right, and decrease as you move to the left.

The mid-line between the marked intervals helps the learners to avoid counting all the small intervals to read a number. If the mid-line is 5, we could find 7 by adding 2 onto 5 (5 + 2 = 7); we could find 4 by subtracting 1 from 5 (5 – 1 = 4).

In this number line, the big intervals are 10 000 and the small intervals are 1 000.

50 000   60 000   70 000   80 000   90 000

Midway between 50 000 and 60 000 is 55 000 and midway between 80 000 and 90 000 is 85 000.

ARRAY DIAGRAM (GR 2, 3, 4)

The following is the array diagram of 2 groups of 4 or 2 × 4. The order of multiplication is important when showing it in an array.

● ● ● ●
● ● ● ●

MULTIPLICATION TABLES

Multiplication tables show the multiples of numbers – the answers to the multiplication of several 1-digit multiplications, depending on the number of the multiplication table.

For example, the 5 times table is $\square \times 5$ and will show all the multiples of 5 by substituting $\square$ with the numbers 1, 2, 3, 4, ….

Learners must memorise the multiplication tables, because once learners master the multiplication tables, they will be able to use their knowledge of multiplication to do division.

ILLUSTRATIVE DIAGRAM

A diagram representing the relationships of numbers in word problems.

The following is an example of an illustrative diagram showing addition (combining).

927 boys | 635 girls
? children altogether
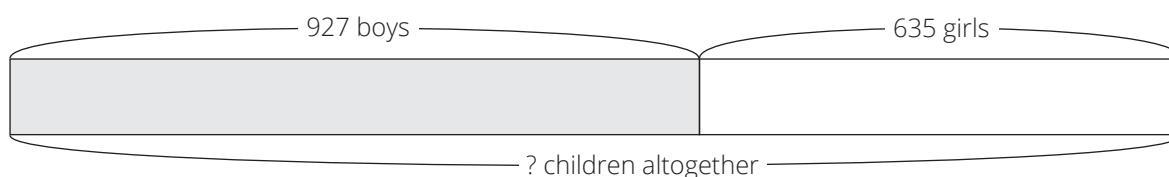
Unit 1: Whole numbers and decimal fractions

INTRODUCTION

This unit focuses on, revises, and consolidates whole numbers and decimal fractions. Whole numbers and decimal numbers are both part of the bast ten number system. Decimal fractions are another way of writing fractions, or parts of a whole.

An understanding of the place value system is important in the higher grades when learners move from using numbers only, to being introduced to algebra and more abstract thinking.

As always, it is important that you work from the known to the unknown. You can do this by drawing on learners' knowledge of place value, common fractions, and number lines. The unit is designed to extend place values to tenths, hundredths and thousandths, and to help learners to connect common fraction representations with decimal fraction representations. As our metric measurement and money systems are based on the decimal system, decimals are relevant in our everyday lives.

This unit also extends the learners knowledge of whole numbers with at least seven digits.

In this unit, we focus on the four framework dimensions in the following ways:

Framework dimension	How the framework dimension is developed in this unit
Conceptual understanding	Use number lines and common fraction representations to develop learners' concept of decimal fractions.
Procedural fluency	Learners practice using the column method so that they can add and subtract whole numbers and decimal fractions accurately and efficiently.
Strategic competence	Learners are able to say whether 3,01 or 0,6 is bigger and say how they found their answer. Strategies used could be comparing numbers by using number lines, working out how many 0,1s, 0,01s and 0,001s in a number and converting decimal fractions to common fractions.
Reasoning	Learners explain their ideas and strategies regarding how they answered the question: How many 0,1s make 2,4?

In this unit, we build a **learning centred classroom** by paying attention to:

		Examples
Concept development	✓	Done in every lesson
Speaking mathematics	✓	Learners discuss with their partner how to use the column method to add and subtract decimal fractions
Justifying answers	✓	Learners justify why they would rather have 0,6 of a cake than $\frac{3}{10}$ of a cake
Connecting representations	✓	Learners connect common fraction representations with decimal fraction representations
Applying maths in context	✓	Decimal fractions are commonly found in measurement and money contexts.

Mathematical vocabulary for this unit

Be sure to teach and use the following vocabulary at the appropriate place in the unit. It is a good idea to make flashcards of words and their meanings and to display these in the classroom at appropriate times.

Term	Explanation / diagram
approximately	estimated, 'about'
billion	one thousand million
carry	take to another place value column
column method	way of calculating in which numbers are arranged vertically
combined	put together, added
common fraction	fraction (part of a whole) where the numerator indicates the number of equal parts being considered and the denominator indicates the number of equal parts the whole has been divided into
decimal comma	symbol used to separate whole numbers from the fractions in a decimal number
decimal fraction	fraction whose denominator (the bottom number) is some power of ten, usually indicated by a decimal comma placed before the numerator, such as 0,4 = $\frac{4}{10}$; 0,126 = $\frac{126}{1000}$; 8,34 = $\frac{835}{100}$.
decimal place	position to the right of (after) the decimal comma
denominator	the bottom number of a common fraction
	the denominator tells you how many equal parts the quantity or shape has been divided into
difference	the amount that one quantity is greater than or less than another
	You find the difference by subtracting the smaller number from the larger one

Term	Explanation / diagram
digit	numbers consist of digits Example: The number 2,438 is made up of four digits: 2, 4,3 and 8
exchange	swap
hundredth ($\frac{1}{100}$ or 0,01)	a fraction which is one part of one hundred equal parts
interval	the gap between things For example: a time interval or an interval in numbers
millimetre	a unit of length; 1 mm is equal to $\frac{1}{10}$ of 1 cm and $\frac{1}{1000}$ of 1 m
minus	take away, subtract
multiple	a number made by multiplying together two other numbers. Example: 10 is a multiple of 2 since 10 = 2 × 5.
number line	line on which numbers can be placed according to their value The gaps on the number line are called intervals.
numeral	Any symbol or word for a number Example: 3; three and ||| are all numerals
tenth ($\frac{1}{10}$ or 0,1)	fraction which is one part of ten equal parts
thousandth ($\frac{1}{1000}$ or 0,001)	fraction which is one part of one thousand equal parts

What the learners should know already about the topics in this unit:

In Grade 4 Term 1, the learners worked with base ten numbers from 0 up to 1 000 000.
In this unit they:
- Revised numbers up to 1 000.
- Worked with numbers of more than 1 000 000.
- Counted backwards and forwards in 100s, 1 000s, and 25s.
- Worked with even and odd numbers up to 1 000 000.
- Ordered, compared and represented numbers up to 6 digits.
- Added and subtracted 5-digit and 6-digit numbers.
- Looked at the relationship between 'multiplying by 10', 'multiplying by 100', and 'multiplying by 1 000'.
- Looked at the relationship between 'dividing by 10', 'dividing by 100', and 'dividing by 1 000'.

In Grade 4 Terms 3 and 4, the learners worked with base ten numbers that are less than 0, also called decimal fractions.

In these units, they:

- Discovered the relationships between common fractions (tenths) and decimal fractions.
- Found decimal fractions on number lines to at least one decimal place.
- Counted forwards and backwards on a number line in decimal fractions to at least one decimal place.
- Sequenced, compared and ordered decimal fractions at least one decimal place.
- Worked with the place value of digits to at least one decimal place.
- Compared decimals and common fractions on number lines.
- Added and subtracted decimal fractions to at least one decimal place.

Further practice for learners

This table references other sources (including Grade 5 textbooks) if you need additional activities for whole numbers.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	18-23	8-14	10-16	1-7	1-7	3-12	1-20	2-6	2-7
	35-41	106-110	90-103	14-17	75-86	21-44	86-93	85-86	68-74
	96-101	200-208	173-102	56-61	148-152	115-128	256-262	90-91	139-145
	165-172	256-259	234-242	114-118	197-202	218-232		192-194	191-198
	214-220			156-160		283-291		258-263	
TG	14-17	25-26	38-41	3-5	2-5	3-13	1-15	2-8	6-16
	70-76	105-112	45-50	13-16	10-14	23-47	68-73	90-98	41-44
	126-127	199-208	91-101	47-53	51-61	123-139	151-158	185-194	74-76
	129-133	250-259	148-154	95-101	99-105	238-54	213-220	258-265	99-103
	173-177		186-192	130-135	133-139	311-325			

If you want other sources for decimal fractions, you will need to refer to Grade 6 textbooks. Don't forget that you have the Grade 4, 5 and 6 Sasol Inzalo textbooks which you should have got for free.

UNIT PLAN AND OVERVIEW FOR UNIT 1:
Whole numbers and decimal fractions

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
1	write numbers as decimal fractions and common fractions, and will be able to work with decimals in the context of measurement.	Teacher: Flashcards: decimal fractions; decimal comma; whole number; A3 Poster: *Tenths and Hundredths*; Prestik/Bostik	
2	read and write decimal fractions and work with thousandths in the context of measurement.	Teacher: A3 Poster: *Thousandths*; A3 poster: *Place value table (1)*; Prestik/Bostik	
3	recognise and write equivalent representations of decimal fractions; read decimal fractions on a number line; order and compare decimals; and write decimal fractions in expanded notation.	Teacher: A3 poster: *Decimal fractions on a number line*; Prestik/Bostik	
4	multiply and divide by 10 and 100 and describe the shift of digits when multiplying or dividing by 10 or 100.	Teacher: A3 poster: *Decimal Fractions*; Prestik/Bostik	
5	multiply and divide decimal fractions by 10, 100 and 1 000.	Teacher: None	
6	Consolidation lesson: - write numbers as both decimal fractions and common fractions; - order and compare decimal fractions; - multiply and divide decimal fractions by 10, 100 and 1 000.	Teacher: Learner textbooks and teacher guides if necessary.	
7	read, write and round off whole numbers up to 1 billion.	Teacher: A3 poster: *Total population of the provinces of South Africa in 2019*; A3 poster: *Place value table*; Prestik/ Bostik	
8	work with big numbers (up to 11 digits); to multiply and divide by 10 and 100, and to compare big numbers.	Teacher: A3 poster: *The number 1 485 627*; Place value cards (cut these out as advance preparation for lesson); Prestik/Bostik Learner: Place value cards up to 1 billion*, pairs of scissors * Learners should cut out and store the place value cards before the lesson	
9	use the column method to add whole numbers.	Teacher: A3 poster: *Total population of the provinces of South Africa in 2019*; Prestik/ Bostik	

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
10	use the column method to subtract numbers up to 7 digits.	Teacher and learner: None	
11	add and subtract decimal numbers up to three decimal places.	Teacher and learners: None	
12	Consolidation - reading, writing and rounding whole numbers and decimal fractions - working with big numbers (up to 11 digits) - multiplying and dividing by 10, 100 and 1000 - comparing big numbers - using the column method to add or subtract whole numbers - using the column method to add or subtract decimal numbers.	Teacher: Grade 5 and Grade 6 Learner textbooks and teacher guides if necessary	

Assessment for learning
Use the template provided at the beginning of this guide to think deeply about at least one of the lessons in this unit.

Reflection
Think about and make a note of: *What went well? What did not go well? What did the learners find difficult or easy to understand or do? What will you do to support or extend learners? Did you complete all the work set for the unit? If not, how will you get back on track?*

What will you change next time? Why?

Lesson 1: Tenths and hundredths

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objective: Learners will be able to write numbers as decimal fractions and as common fractions and will be able to work with decimal fractions in the context of measurement.
Lesson Vocabulary: common fraction, decimal fraction, tenth, hundredth, decimal comma
Teacher Resources: Flashcards: decimal fractions; decimal comma; whole number; A3 Poster: *Tenths and Hundredths*; Prestik/Bostik
Learner Resources: nothing

Date:	Week	Day

1 MENTAL MATHS (10 MINUTES)

EXAMPLE: Count forwards in 0,1s between 1,1 and 1,7. You can use the number line to help you. Answer: 1,2; 1,3; 1,4; 1,5; 1,6

```
          0,5                    1,5                    2,5                    3,5
   ◄──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──┼──►
      0,2  0,4  0,6  0,8     1,2  1,4  1,6  1,8     2,2  2,4  2,6  2,8     3,2  3,4  3,6  3,8
   0                    1                    2                    3                    4
```
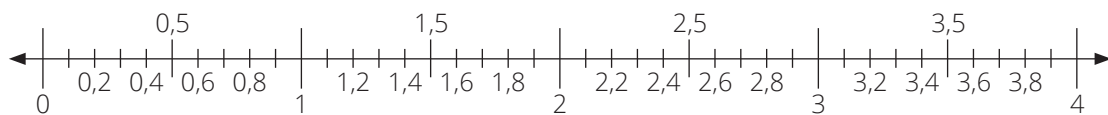
1 Count forwards in 0,1s
   a Between 0,3 and 0,8 (0,4; 0,5; 0,6; 0,7)
   b Between 2,8 and 3,4 (2,9; 3; 3,1; 3,2; 3,3)
   c From 1,6 to 2,1 (1,6; 1,7; 1,8; 1,9; 2; 2,1)

2 Count backwards in tenths
   a From 2,9 to 2,2 (2,9; 2,8; 2,7; 2,6; 2,5; 2,4; 2,3; 2,2)
   b Between 1,4 and 0,8 (1,3; 1,2; 1,1; 1; 0,9)
   c From 2,1 to 1,6 (2,1; 2; 1,9; 1,8; 1,7; 1,6)

3 Count forwards in 0,5s
   a From 1 to 3 (1; 1,5; 2; 2,5; 3)
   b Between 0,5 and 4 (1; 1,5; 2; 2,5; 3; 3,5)
   c From 1,6 to 2,1 (1,6; 1,7; 1,8; 1,9; 2; 2,1)

4 Count backwards in 0,5s
   a From 3 to 0 (3; 2,5; 2; 1,5; 1; 0,5; 0)
   b Between 2,5 and 1 (2; 1,5)

2   LINK TO TERM PREVIOUS LESSON

This is the first lesson in this unit. There are no direct links to the previous lesson.

3   CORRECT HOMEWORK ACTIVITY

This is the first lesson in this unit. There is no homework to correct.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

> NOTE TO THE TEACHER:
>
> This is the first of twelve lessons on whole numbers and decimal numbers.
>
> In this lesson. learners:
> - Revise the concept of decimal fractions as studied in Grade 4.
> - Work with the concepts of place value; they connect common fraction representations with decimal fraction representations; they convert between measurements; and they work with tenths and hundredths.
>
> Learners should continue to use the terminology of decimal fractions they started in Grade 4.
> - Use the following terminology carefully and deliberately:
>   - **Tens** (written with upper case T) is a **whole number**.
>   - **tenths** (written with lower case t) is a **decimal fraction** which is equivalent to $\frac{1}{10}$.
>   - **Hundreds** (written with upper case H) is a **whole number**.
>   - **hundredths** (written with lower case h) is a decimal fraction which is equivalent to $\frac{1}{100}$.
> - When talking about a number such as 0,18, we say zero comma one eight, NOT zero comma eighteen.

- Say: **Today we are revising decimal fractions.**

Activity 1: Whole class activity with the learners working in pairs

You will need the A3 poster: *Tenths and Hundredths*; the flashcards "decimal fractions", "decimal comma", "whole numbers" and "fractions or parts of a whole" and Prestik/Bostik.

- Place the A3 poster: *Tenths and Hundredths* on the board and leave it on the board for the whole lesson.

Tenths and Hundredths
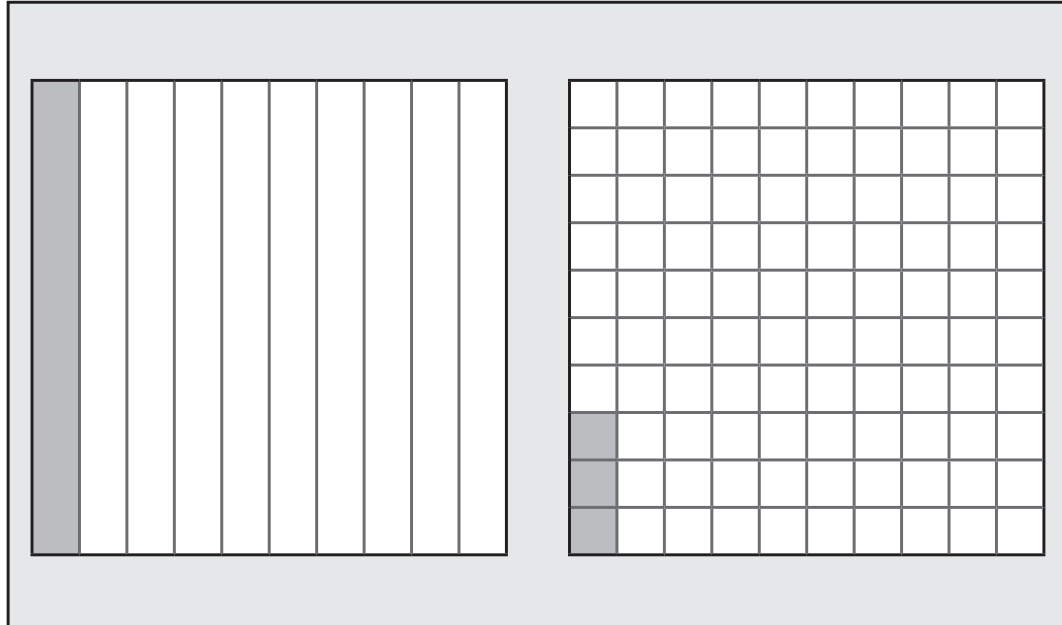
- Tell the learners to look at the large square on the left of the poster (the one showing tenths).
  Ask the following:
  - **Into how many parts has the whole been divided?** (10)
  - **What fraction of the whole has been shaded?** ($\frac{1}{10}$)
  - **How do we write this fraction as a decimal fraction?** (0,1)
  - **What fraction of the whole has NOT been shaded?** ($\frac{9}{10}$)
  - **How do we write this fraction as a decimal fraction?** (0,9)

- Say: **Turn to Activity 1 in your LAB.**

- Work through Activity 1 step-by-step **with** the learners.
- Check learners' answers as you go along so that they can receive immediate feedback.
- Answers are given in brackets.

Work with a partner and the rest of your class.

1 Draw a line to show $\frac{7}{10}$ ℓ on the measuring jug.
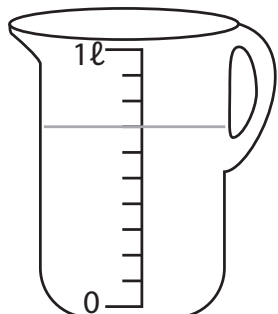
2 Draw a line to show $\frac{4}{10}$ ℓ on the measuring jug.
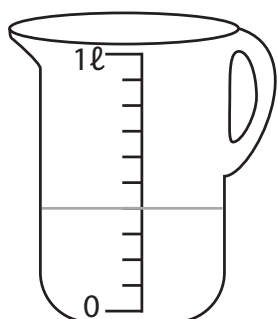
3 Draw a line to show $1\frac{6}{10}$ ℓ on the measuring jug.

4 Write the three common fractions in the place value table.

	FRACTIONS	PLACE VALUE TABLE		
		O	,	tenths
a	$\frac{7}{10}$	0	,	(7)
b	$\frac{4}{10}$	(0)	,	(4)
c	$1\frac{6}{10}$	(1)	,	(6)

• Have the flashcards and Prestik/Bostik ready. Put up the appropriate flashcard when the learners answer the following questions correctly.

- Ask:
  - What are numbers as such as 0,7; 0,4 or 1,6 called? (decimal fractions).
  - What is the comma called? (a decimal comma).
  - What are the digits on the left-hand side of decimal comma called? (whole numbers).

- Leave the flashcards on the board for the rest of the lesson.

Activity 2: Whole class activity and then learners work in pairs

Tenths and Hundredths

- Tell the learners to look at the square on the RIGHT of the poster (the one showing hundredths).
  Ask the following and write the answer on the board as the learners answer the questions:
  - **Into how many parts has the whole been divided into?** (100)
  - **What fraction of the whole has been shaded?** ($\frac{3}{100}$)
  - **How do we write this fraction as a decimal fraction?** (0,03)
  - **What fraction of the whole has NOT been shaded?** ($\frac{97}{100}$)
  - **How do we write this fraction as a decimal fraction?** (0,97)

- Write 0,01 on the board and say: **We say the decimal fraction 0,01 as "one hundredth" or "zero comma zero one".**

- Write 0,12 on the board and ask: **How do we say the decimal fraction 0,12?** (We say "twelve hundredths" or "zero comma one two".)

- Write 0,85 on the board and ask: **How do we say the decimal fraction 0,85?** (We say "eighty-five hundredths" or "zero comma eight five".)

- Say: **Turn to Activity 2 in your LAB.**

- The learners work with their partner.
- Check learners' answers as you go along so that they can receive immediate feedback.
- Answers are given in brackets.

Work with a partner

Study these number lines.
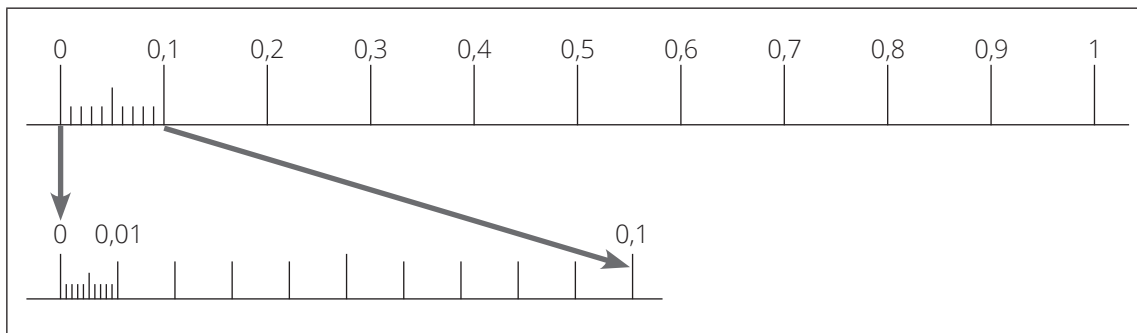
1 Look at the top number line. Use it to answer these questions. Explain how you got your answer.
  a How many 0,1s make up 1? (10, because we get 0,1 by dividing 1 into 10 equal parts. Each part is $\frac{1}{10}$ of 1)
  b How many 0,1s make up 0,5? (5, because 0,5 is half of 1)
  c How many 0,1s make up 0,3? (3, because 1 is divided into 10 equal parts, and we are taking 3 of these parts.)
  d How many 0,1s make up 0,9? (9, because 1 is divided into 10 equal parts, and we are taking 9 of these parts.)

2 Now answer these. Explain how you got your answer.
  a How many 0,1s make up 2? (20, because there are ten 0,1s in 1, so there must be twenty 0,1s in 2.)
  b How many 0,1s make up 3? (30, because there are ten 0,1s in 1, so there must be thirty 0,1s in 3.)
  c How many 0,1s make up 5? (50, because there are ten 0,1s in 1, so there must be fifty 0,1s in 5.)
  d How many 0,1s make up 1,5? (15, because there are ten 0,1s in 1, and there are 5 in 0,5. So, we have 10 + 5 = 15)
  e How many 0,1s make up 3,8? (38, because there are ten 0,1s in 1, so there must be thirty 0,1s in 3, and we also have eight 0,1s in 0,8. So, 30 + 8 = 38)

3   Look at both number lines. Use them to answer these questions. Explain how you got your answer.
    a   How many 0,01s make up 0,1? (10, because 0,1 is divided into 10 equal parts.)
    b   How many 0,01s make up 0,5? (50, because there are ten 0,01s in 0,1, so there must be fifty 0,01s in 0,5.)
    c   How many 0,01s make up 0,14? (14, because there are ten 0,01s in 0,1, and another four 0,01s in 0,04.)

4   Now answer these, explaining your answer:
    a   How many 0,01s make up 1? (100, because 0,01 is $\frac{1}{100}$ of 1)
    b   How many 0,01s make up 1,96? (196)
    c   How many 0,01s make up 2? (200)
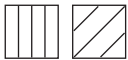
5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

Look at the Ndebele wall painting. It is drawn on a wall with 100 squares.
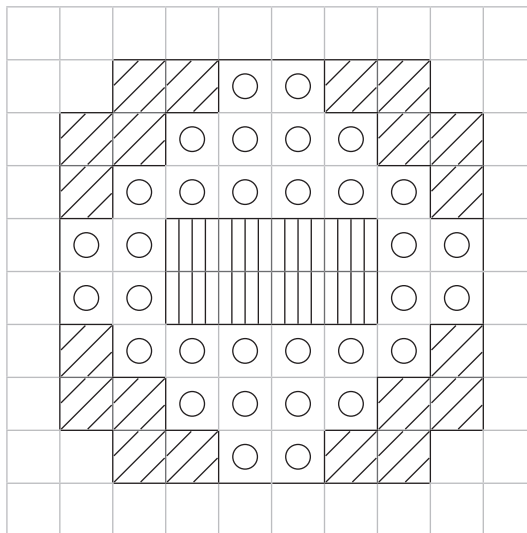
Complete the table. An example has been done for you.

	Pattern in square	No. of squares in this pattern	Written as a common fraction	Written as a decimal fraction	Written in words
Example		8	$\frac{8}{100}$	0,08	zero comma zero eight
1		(32)	$(\frac{32}{100})$	(0,32)	(zero comma three two)
2		(20)	$(\frac{20}{100})$	(0,20)	(zero comma two or zero comma two zero)
3		(28)	$(\frac{28}{100})$	(0,28)	(Zero comma two eight)
4		(40)	$(\frac{40}{100})$	(0,40)	(zero comma four or zero comma four zero)
5		(40)	$(\frac{40}{100})$	(0,40)	(zero comma four or zero comma four zero)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **that one tenth ($\frac{1}{10}$) or zero comma one (0,1) is one part of a whole that has been divided into ten equal parts**
- **that one hundredth ($\frac{1}{100}$) or zero comma zero one (0,01) is one part of a whole that has been divided into one hundred equal parts**
- **how to work out that there are five 0,1s in 0,5 and fifty 0,01s in 0,5.**

Lesson 2: Divide and solve problems

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objective: Learners will be able to read and write decimal fractions and work with thousandths in the context of measurement.
Lesson Vocabulary: thousandth
Teacher Resources: A3 Poster: *Thousandths*; A3 Poster: *Place value table (1)*; Prestik/Bostik
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

EXAMPLE: Count forwards in 0,1s between 21,1 and 21,6. Answer: 21,2; 21,3; 21,4; 21,5

1   Count forwards in 0,1s between 21,8 to 22,3 (21,9; 22; 22,1; 22,2)
2   Count backwards in 0,1s from 22,5 to 21,9 (22,5; 22,4; 22,3; 22,2; 22,1; 22; 21,9)
3   Count forwards in 0,5s between 21,5 and 22,5 (22)
4   Count forwards in 0,01s from 21,81 to 21,86 (21,81; 21,82; 21,83; 21,84; 21,85; 21,86)
5   Count forwards in 0,05s between 21,50 and 21,75 (21,55; 21,60; 21,65; 21,70)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

Mother used a measuring jug to measure the amount of water in a kettle.
She found that there was 1,4 litres of water in the kettle.

Draw lines on the two measuring jugs to show 1,4 litres:
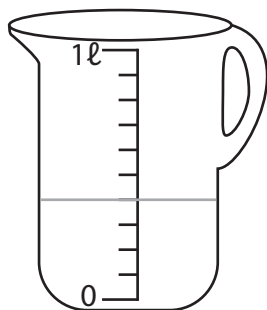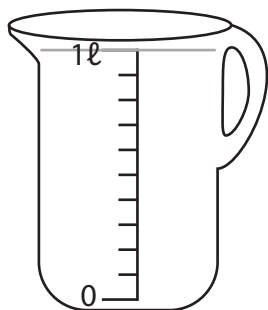
3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 1 are provided in Lesson 1.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)
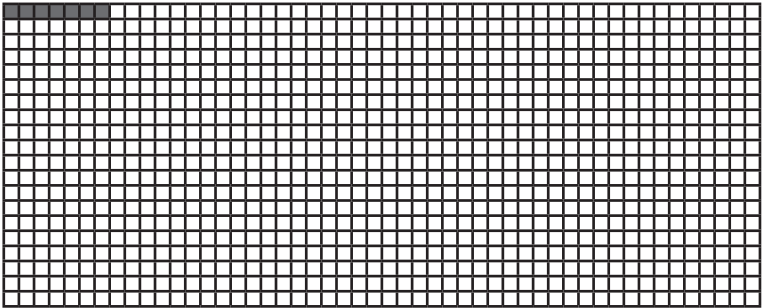
> NOTE TO THE TEACHER:
> - In the previous lesson the learners revised tenths and were introduced to hundredths. In this lesson the learners are introduced to thousandths.
> - It is important that the system of decimal numbers be developed within the framework of place value. The learners need to know that tenths, hundredths and thousandths represent one-, two- and three-decimal places.
> - During this unit of work, the learners should revise that the place value of a digit in the place value chart increases by ten times as we shift to the left and decreases by ten times as we shift to the right.
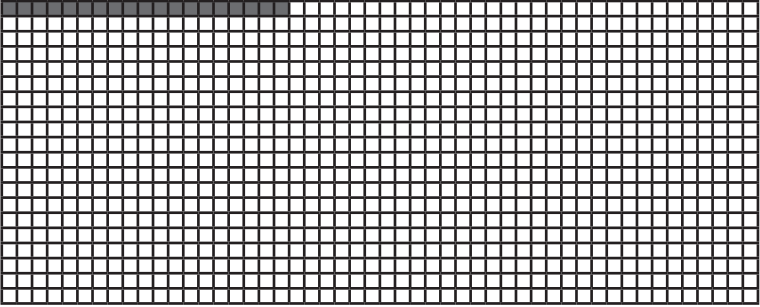
Say: **Today we are learning more about reading and writing decimal factions.**

Activity 1: Whole class activity and learners work in pairs
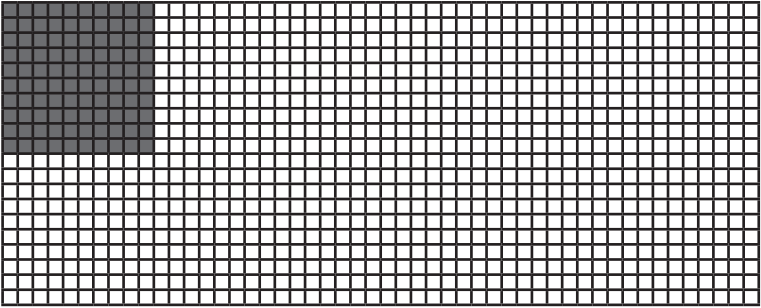
You will need the A3 poster: *Thousandths*, the A3 poster: *Place value table (1)* and Prestik/Bostik.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Place the A3 poster: *Thousandths* on the board and tell the learners to turn to Activity 1 in their LAB.	Work on **1**, **2** and **3** with your teacher and the whole class Work on **4** and **5** with your partner
Work through **1**, **2** and **3** with the learners. Discuss the questions with the learners and make sure they write down the correct answers.	**1** Look at this rectangle:

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	a How many small squares are there in the length or longer side of this rectangle (50) **b** How many small squares are there in the breadth or shorter side of this rectangle? (20) **c** Into how many small squares has the whole rectangle been divided into? (50 × 20 = 1 000) **d** How many thousandths make up 1 unit? (1 000 thousandths = 1 unit) **2** Look at the rectangle again. **a** How many small squares of the rectangle have been shaded? (7) **b** What fraction of the whole has been shaded? (seven thousandths or $\frac{7}{1000}$)
Say: • **We want to write this common fraction as a decimal fraction.** • **To help us we use the Place value table.** Place the A3 poster: *Place value table (1)* on the board. Say: **A place value table is a diagram that helps us to find and compare the place value of the digits in numbers.** Remind the learners: • **we write "Tens" as "T" and "tenths" as "t"** • **we write "Hundreds" as "H" and "hundredths" as "h"** Say: **In the same way, we write "thousands" as "Th" and "thousandths" as "th".**	

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Make sure the learners write the digits in the correct columns.	**3** This is a place value table:

Thousands	Hundred	Tens	Ones	,	tenths	hundredths	thousandths
Th	H	T	O	,	t	h	th
			(0	,	0	0	7)
			(0	,	9	9	3)

a Write seven thousandths ($\frac{7}{1000}$) in the place value table. (Answer is given on the place value table)

b What fraction of the whole has NOT been shaded? ($\frac{993}{1000}$)

c How do we say this in words? (Nine hundred and ninety-three thousandths)

d Write this fraction on your place value table. (Answer is given on the place value table)

The learners should do **4** and **5** with their partner.

Walk around the class to provide support as necessary.

Discuss and correct answers to questions **4** and **5**.

4 Look at this rectangle:

a How many small squares of the rectangle have been shaded? (19)

b What fraction of the whole has been shaded? ($\frac{19}{1000}$)

c What fraction of the whole has not been shaded? ($\frac{981}{1000}$)

d Write these two fractions on this place value table.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

Thousands	Hundred	Tens	Ones		tenths	hundredths	thousandths
Th	H	T	O	,	t	h	th
			(0	,	0	1	9)
			(0	,	9	8	1)

5   Look at this rectangle:

    a   How many small squares of the rectangle have been shaded? (100)

    b   What fraction of the whole has been shaded? ($\frac{100}{1000}$)

    c   What fraction of the whole has not been shaded? ($\frac{900}{1000}$)

    d   Write these two fractions on this place value table.

Thousands	Hundred	Tens	Ones		tenths	hundredths	thousandths
Th	H	T	O	,	t	h	th
			(0	,	1	0	0)
			(0	,	9	0	0)

Activity 2: Learners work in pairs

Say: **We are going to work together with questions 1, 2 and 3 in Activity 2. You will do questions 4, 5 and 6 with your partner.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Read the information about Mafadi to the learners.	Work on **1**, **2** and **3** with your teacher and the whole class Work on **4**, **5** and **6** with your partner This is *Mafadi* (which means Mother of Fadi in Sotho). It is the highest mountain in South Africa. It is on the border of South Africa and Lesotho, and it is 3 451 metres above sea level.
Read question 1 to the learners. Allow them time to discuss their answers. (Answers will vary but must include ideas on how to write a fraction with 3 decimal places.)	**1** Think about how you can write 3 451 metres in kilometres. Write your answer here.
Say: **Let's work together to make a clue card for writing metres in kilometres.** • Start off by asking how many metres there are in 1 km. (1 000 m = 1 km). Ask the learners to write the answer in.	**2** Make a clue card for writing metres in kilometres.
	Writing metres in kilometres

Metres	Kilometres (as a fraction and then as a decimal)
1 000 m	$\frac{1\,000}{1\,000}$ km = (1) km

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Tell the learners that we now want to find out how many kilometres there are in 100 m. Say that 100 m is one part when you divide 1 000 m (1 km) into 10 equal parts. Ask the learners to write this as a common fraction and a decimal fraction.	**100 m** $\frac{(100)}{(1\,000)}$ km = $\frac{(1)}{(10)}$ km = (0,1) km
• Tell the learners that we now want to find out how many kilometres there are in 10 m. Say that 10 m is one part when you divide 1 000 m (1 km) into 100 equal parts. Ask the learners to write this as a common fraction and a decimal fraction.	**10 m** $\frac{(10)}{(1\,000)}$ km = (0,01) km
• Tell the learners that we now want to find out how many kilometres there are in 1 m. Say that 1 m is one part when you divide 1 000 m (1 km) into 1 000 equal parts. Ask the learners to write this as a common fraction and a decimal fraction.	**1 m** $\frac{(1)}{(1\,000)}$ km = (0,001) km
Say: **Let's work together to answer 3.**	**3** Use the place value table to write 3 451 m in km. 3 451 m = 3 000 m + 400 m + 50 m + 1 m. 3 000 m = 3 × 1 000 m = 3 × 1 km 400 m = 4 × 100 m = 4 × 0,1 km = (0,4) km 50 m = 5 × 10 m = 5 × 0,01 km = (0,05) km 1 m = (0,001) km

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)						

			Ones		tenths	hundredths	thousandths	
			O	,	t	h	th	
3 000 m	=		(3)					km
400 m	=		0	,	(4)			km
50 m	=		(0	,	0	5)		km
1 m	=		(0	,	0	0	1)	km
3 451 m	=		(3	,	4	5	1)	km

Answer: 3 451 m = (3,451) km

Say: **Now work on 4, 5 and 6 with your partner.**

Walk around to provide support as necessary. The answers are given in brackets.

4 A long-distance swimmer swam a distance of 8 259 m.

Write 8 259 m in kilometres (8,259 km).

5 The mass of a baby is 3 735 g.

Write the mass in kilograms (3,735 kg).

6 Do the following conversions:
   a (1 039) g = 1,039 kg
   b 250 mℓ = (0,25) ℓ
   c (4 075) mℓ = 4,075 ℓ
   d 800 m = (0,8) km

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given below.

HINT: If you find that the learners struggle to find the answers by counting forwards in 0,01, suggest that they can change the decimal fractions to common fractions like this:
$$\frac{95}{100}; \frac{96}{100}; \frac{97}{100}; \frac{98}{100}; \frac{99}{100}; \frac{100}{100}; \frac{101}{100}; \frac{102}{100}$$

Write an answer in each box:

0,95 —+0,01→ 0,96 —+0,01→ (0,97) —+0,01→ 0,98

0,98 ↓ +0,01 → (0,99)

(1,02) ←+0,01— (1,01) ←+0,01— (1,00) ←+0,01— (0,99)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **to use decimal fractions to read and write mℓ as ℓ**
- **to use decimal fractions to read and write m as km**
- **to use decimal fractions to read and write g as kg**
- **about three decimal places and how to read decimal fractions.**

Lesson 3: Comparing decimal fractions

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objective: Learners will be able to recognise and write equivalent representations of decimal fractions; read decimal fractions on a number line; order and compare decimals; and write decimal fractions in expanded notation.
Lesson Vocabulary: interval, number line
Teacher Resources: A3 poster: *Decimal fractions on a number line*; Prestik/Bostik
Learner Resources: None
Date: Week   Day

1 MENTAL MATHS (5 MINUTES)

> **1** Count forwards in 0,001s
>   **a** From 1,002 to 1,006 (1,002; 1,003; 1,004; 1,005; 1,006)
>   **b** Between 1,202 and 1,206 (1,203; 1,204; 1,205)
>   **c** Between 1,008 and 1,012 (1,009; 1,01; 1,011)
>
> **2** Count backwards in 0,001s
>   **a** From 1,498 to 1,494 (1,498; 1,497; 1,496; 1,495; 1,494)
>   **b** Between 1,307 and 1,303 (1,306; 1,305; 1,304)
>   **c** From 1,293 to 1,289 (1,293; 1,292; 1,291; 1,290; 1,289)

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Ask learners to do the activity in the LAB.

> **1** **a** How many 0,1s are there in 1? (10)
>   **b** Explain how you got your answer.
>   (When we divide 1 into 10 equal parts, each part is 0,1. So we need ten 'lots' of 0,1 to make up 1.)
>
> **2** **a** How many 0,01s are there in 0,1? (10)
>   **b** Explain how you got your answer.
>   (When we divide 0,1 into 10 equal parts, each part is 0,01. So we need ten 'lots' of 0,01 to make up 0,1.)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 2 are provided in Lesson 2.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

NOTE TO THE TEACHER:

- Equivalent decimals are two decimal numbers that are equivalent. They represent the same value or amount. For example, $\frac{6}{10}$ and $\frac{60}{100}$ are equivalent common fractions and 0,6 and 0,60 are equivalent decimal fractions.

- In this lesson learners are presented with area representations so that they can discover equivalent decimals for themselves.

- Learners are given many opportunities to find decimal fractions on a number line. This is an important skill as it is used when reading analogue measuring instruments.

- Grade 5 learners should be familiar with ordering and comparing whole numbers. In this lesson, learners use the same principles to order and compare decimal fractions. They need a sound concept of place value in order to do this. They then use the values in the place value table to write decimal fractions in expanded notation.

Say: **Today we are learning to write equivalent forms of decimal fractions, to find decimal fractions on a number line, to order and compare decimal fractions, and to write decimal fractions in expanded notation.**

Activity 1: Learners work in pairs

- Say: **Work with a partner to do Activity 1 in the LAB. Remember to talk about the questions and the answers.**
- Provide support as required but be sure to give learners time to think and talk.

Work with a partner.

1 Look at the diagrams and then answer the questions.
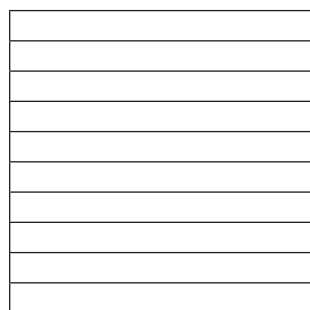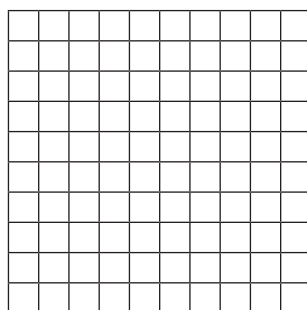
Diagram A   **Diagram B**

a How many equal parts has Diagram A been divided into? (10)

b How many equal parts has Diagram B been divided into? (100)

2 **a** Shade $\frac{1}{10}$ of Diagram A.

  b Shade $\frac{10}{100}$ of Diagram B.
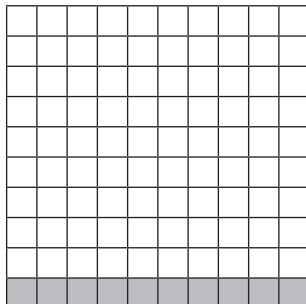
Diagram A   **Diagram B**

3 **a** Write the part of the whole that has been shaded in Diagram A as a decimal fraction. (0,1)

  b Write the part of the whole that has been shaded in Diagram B as a decimal fraction. (0,10)

4 Compare the amount of shading in Diagram A and Diagram B. What do you notice? (The same amount has been shaded in each diagram).

5 Complete the number sentence to make it true. Use <, > or =.

  0,1 (=) 0,10.

6 Is 0,1 = 0,10 = 0,100? Why?

  (Yes, because 0,1 is $\frac{1}{10}$; 0,10 is $\frac{10}{100}$; and 0,100 is $\frac{100}{1\,000}$.)

7 Shade the diagrams to show that 0,5 and 0,50 are equal.
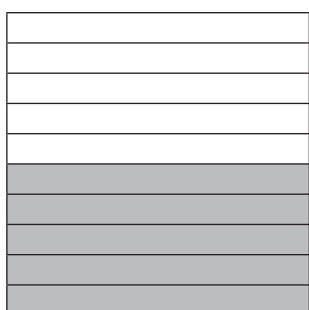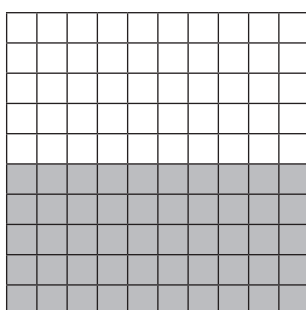
Diagram A   **Diagram B**

Activity 2: Whole class activity and then learners work in pairs

You will need: A3 poster: *Decimal fractions on a number line*.

- Say: **Today we are going to practice reading number lines. This is important because we often do this in our everyday lives, for example, when we read mass on a bathroom scale.**

- Stick the A3 poster on the board.

Decimal fractions on a number line

MATHEMATICS GRADE 5 TEACHER'S A3 RESOURCE PACK 2022 TERM 1

```
0                    1                    2
        (a)      (b)     (c)        (d)    (e)
```
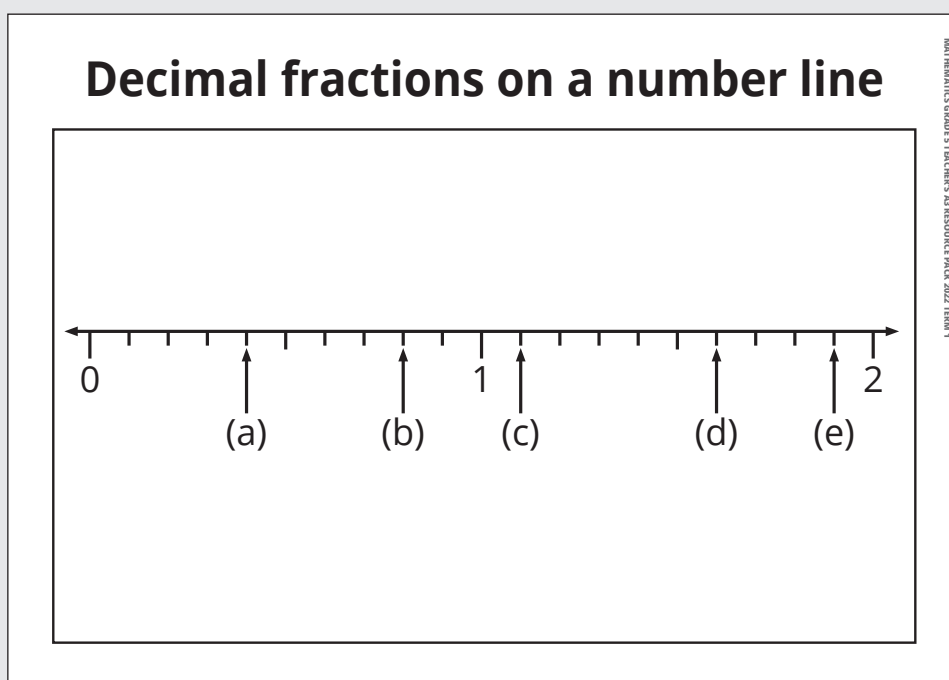
- Say: **We want to find out what each mark on the number line represents. Who will show us how to work out this out?**
  (Each mark on the number line represents 0,1. Don't count 0. Count the number of marks up to and including 1. There are ten marks. One divided by ten is one tenth, or 0,1.)

- Ask: **What decimal fraction is shown at (a) on the number line?**
  - Say: **Please write it on the board for us.** (0,4)
  - Ask: **How do we say this number?** (zero-comma-four)

- Repeat these questions for (b), (c), (d) and (e).
  (Answers: (b) 0,8, (c) 1,1, (d) 1,6 and (e) 1,9).

- Say: **Work with a partner to do Activity 2 in the LAB. Remember to talk about the questions and the answers.**

Work with a partner.

1   Use the number line to answer the questions.
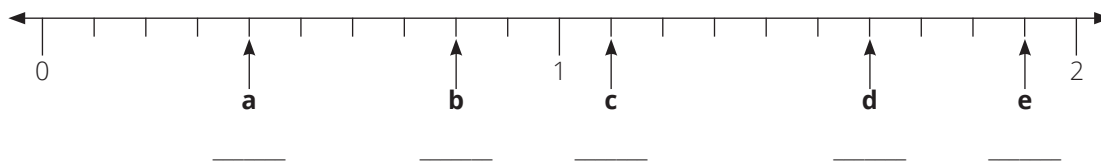
What decimal fraction does each mark on the number line show? (0,1)

Write the decimal fraction shown by the arrows on each number line.

a   (0,4)
b   (0,8)
c   (1,1)
d   (1,6)
e   (1,9)

2   Use the number line to answer the questions.
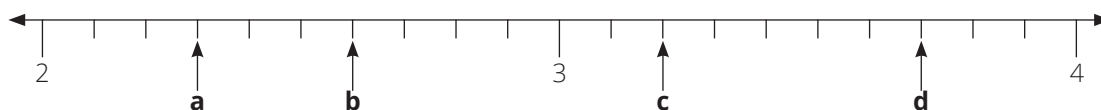
What decimal fraction does each mark on the number line show? (0,1)

Write the decimal fraction shown by the arrows on each number line.

a   (2,3)
b   (2,6)
c   (3,2)
d   (3,7)

Activity 3: Whole class activity and then learners work in pairs

• Say: **When we compare numbers, we say whether one number is greater than, smaller than or equal to another number.**

• Say to the class: **Turn to Activity 3 in your LAB.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Read the information in the table to the learners. • Say: **Write down whether you think the winner will be the person with the lowest time or the highest time.** (It will be the person with the lowest or smallest time.) • Note that with running races, the person with the lowest time will be the winner. With the long jump and high jump, the person who jumps the greatest distance will be the winner. • Say: **Write down how to find out who the winner is.** (Compare the times or compare the decimal fractions.) • Say: **When we compare decimal fractions, we start comparing from the biggest place.**	Work on **1**, **2** and **3** with your teacher and the whole class Work on **4** with your partner. **1** Study the table and then answer the question.

1 Study the table and then answer the question.

Results of the Boys Under 19 100 m sprint		
	Name	**Time in seconds**
A	Keletso Letele	11,4
B	Karabo Malatje	11,59
C	Puleng Manganya	11,53
D	Blessing Mmola	11,23
E	Thato Tau	12,01
F	Khutlo Tshose	11,9

a. Will the winner be the person with the lowest time or the highest time?
(The person with the lowest time because the fastest runner runs in shortest time.)

b. How do we know who the winner is?
(Compare the times,)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Say: **Write the times of each of the boys in the place value table.** • Say: **The first one has been done for you.** • Once the learners have completed the table, discuss with them how to compare the times. • Say: **Looking at Tens place, there is no difference.** • Say: **Now compare the digits in the One's place. What is the largest value?** (2 is the biggest) Say: **This means that runner E is the slowest runner.** Say: **Write E in the 6th place, with the time 12,01 seconds.** • Say: **Now compare the digits in the tenth's place. What is the largest value?** (9 is the largest) Say: **Write F in the 5th place, with the time 11,9 seconds.** • Say: **Of the four times that are left, which one has the smallest value in the tenth's column?** (D's time of 11,23) Say: **This means that D is first. Write D and D's time in the first place.** • Say: **Of the three times that are left, which one has the smallest value in the tenth's column?** (A's time of 11,4)	**2** Write the times of each of the boys in the place value table. The first one has been done for you.

Table for question 2:

Name	Tens (T)	Ones (O)	,	tenths (t)	hundredths (h)	
A: 11,4	1	1	,	4		seconds
B: 11,59	(1)	(1)	,	(5)	(9)	seconds
C: 11,53	(1)	(1)	,	(5)	(3)	seconds
D: 11,23	(1)	(1)	,	(2)	(3)	seconds
E: 12,01	(1)	(2)	,	(0)	(1)	seconds
F: 11,9	(1)	(1)	,	(9)		seconds

3. Use the place value table to arrange the names in order, starting with the winner.

	Boy	Time
1st	(D)	(11,23) seconds
2nd	(A)	(11,4) seconds
3rd	(C)	(11,53) seconds
4th	(B)	(11,59) seconds
5th	(F)	(11,9) seconds
6th	(E)	(12,01) seconds

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Say: **This means that A is second. Write A and A's time in the second place.**	
• Say: **The times of both C and D have a 5 in the tenths place. To work out which time is faster, we look at the digit in the hundredths' column.**	
• Say: **9 is bigger than 3, so B must be fourth and C is the third. Complete the table.**	

WHAT YOU DO

• Remind the learners that we write 653 in expanded notation as:

653 = 600 + 50 + 3
$= (6 \times 100) + (5 \times 10) + (3 \times 1)$

• Say and write on the board:

$15,68 = 10 + 5 + 0,6 + 0,08$
$= 10 + (5 \times 1) + (6 \times 0,1) +$
$(8 \times 0,01)$

WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

4 Now use the place value table to write each of the times in expanded notation.

Example:

$15,68 = 10 + 5 + 0,6 + 0,08$
$= 10 + (5 \times 1) + (6 \times 0,1) + (8 \times 0,01)$

a A: $11,4 = 10 + (1) + (0,4)$
$= 10 + (1) + ((4) \times 0,1)$

b B: $11,59 = 10 + 1 + (0,5 + 0,09)$
$= 10 + 1 + ((5 \times 0,1) + (9 \times 0,01))$

c C: $11,53 = (10 + 1 + 0,5 + 0,03)$
$= (10 + 1 + (5 \times 0,1) + (3 \times 0,01))$

d D: $11,23 = (10 + 1 + 0,2 + 0,03)$
$= (10 + 1 + (2 \times 0,1) + (3 \times 0,01))$

e E: $12,01 (10 + 2 + 0,01)$
$= (10 + (2 \times 1) + 0,01)$

f F: $11,9 = (10 + 1 + 0,9)$
$= (10 + 1 + (9 \times 0,1))$

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given below.

1 What decimal fraction does each small line on the number line represent? (0,1)

2 Write the decimal fraction shown by the arrows on the number line.

   a (0,2)

   b (0,9)

   c (1,5)

   d (1,8)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**

- **that 0,1 (zero comma one); 0,10 (zero comma one zero) and 0,100 (zero comma one zero zero) are equivalent numbers**
- **how to work out the interval on a number line**
- **how to find decimal fractions on a number line**
- **how to compare and order decimal fractions**
- **how to write decimal fractions as expanded notation.**

Lesson 4: Multiplying and dividing decimal fractions by 10, 100 and 1 000

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objective: Learners will be able to multiply and divide by 10 and 100 and describe the shift of digits when multiplying or dividing by 10 or 100.
Lesson Vocabulary: digit
Teacher Resources: A3 poster: *Decimal Fractions*; Prestik/Bostik
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Fill in the missing numbers

1   Count forwards in 0,001
   a   0,500; 0,501; 0,502; _____; _____; _____   (0,503; 0,504; 0505)
   b   0,721; 0,722; 0,723; _____; _____; _____   (0,724; 0,725; 0,726)
   c   0,675; 0,676; 0,677; _____; _____; _____   (0,678; 0,679; 0,680)

2   Count backwards in 0,001s
   a   0,921; 0,92; 0,919; _____; _____; _____   (0,918; 0,917; 0,916)
   b   0,505; 0,504; 0,503; _____; _____; _____   (0,502; 0,501; 0,500 or 0,5)
   c   0,759; 0,758; 0,757; _____; _____; _____   (0,756; 0,755; 0,754)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

1   Compare the numbers 37,421 and 37,42.

   a   Write each number in the correct place value columns:

H	O	,	t	h	th
(3	7	,	4	2	1)
(3	7	,	4	2)	

   b   Which number is bigger? (37,421)

   c   Give a reason for your answer. (37,421 has 1 thousandths but 37,42 has 0 in thousandths place. 1 is bigger than 0, so 37,421 is bigger than 37,42.)

2   Expand the number 37,421.

   $37,421 = (3) \times 10 + (7) \times 1 + (4) \times 0,1 + (2) \times 0,01 + (1) \times 0,001$

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 3 are provided in Lesson 3.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

## 4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:

- Remember that numbers consist of digits. The number 2,438 is made up of four digits: 2, 4, 3 and 8. Each of the four digits in a number has a fixed column in the place value table.

- A common misconception, when teaching multiplication or division, is to talk about the movement of the comma. For example: *Some say when we multiply by 10, we move the comma one place to the right, so 61,24 × 10 = 612,4. We should be careful not to say this because **the decimal comma does not move**. The decimal comma is always between the ones (whole numbers) and then tenths (fractions). It is the digits that shift position when multiplying or dividing by 10, 100 or 1 000.

Say: **Today we are going to multiply and divide decimal fractions by 10 and 100.**

Activity 1: Whole class activity

You will need the A3 Poster: *Decimal Fractions* and Prestik/Bostik.

- Stick the A3 poster on the board.
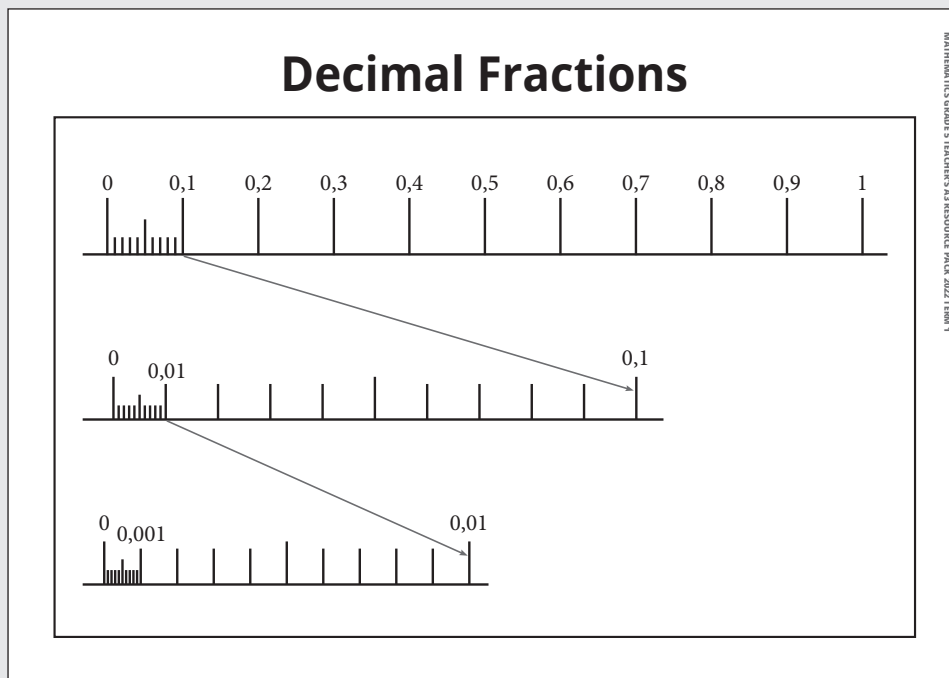
- Say: **We are going to start off by multiplying decimal fractions by 10 and 100.**

- Say: **Turn to Activity 1 in your LAB. We are going to work together to answer the questions.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

Say: **Look at the poster.**
Say: **Use the poster to answer 1a, b, and c.**
Discuss the answers with the learners.
	Work on the questions with your teacher and the whole class.
	
	1 Study the poster.
	  a How many 0,1s are there in 1? (10)
	  b How many 0,01s are there in 0,1? (10)
	  c How many 0,001s are there in 0,01? (10)

Let the learners complete the sentences. Discuss the answers with the learners, making sure that they all understand.	2 Complete the sentences.
	  a $10 \times 0,1 = (1)$
	  b $10 \times 0,01 = (0,1)$
	  c $10 \times 0,001 = (0,01)$

Tell the learners that we are going to repeat the multiplication, but this time we are going to do it on a place value table. Tell them to answer questions **3a**, **3b** and **3c** on the given place value tables. Once they have completed all three multiplications, ask them what they notice about the movement of the digit 1 in each of the tables. (Each time the 1 moves one place to the left.) Ask: **What makes the 1 move one place to the left.** (Multiplying by 10).	3 Complete the place value tables: **a** |	H	T	O	,	t	h	th | |---|---|---|---|---|---|---|---| | 10 × | | | 0 | , | 1 | | | | = | | | (1) | , | | | | **b** |	H	T	O	,	t	h	th | |---|---|---|---|---|---|---|---| | 10 × | | | 0 | , | 0 | 1 | | | = | | | (0) | , | (1) | | | **c** |	H	T	O	,	t	h	th | |---|---|---|---|---|---|---|---| | 10 × | | | 0 | , | 0 | 0 | 1 | | = | | | (0) | , | (0) | (1) | |

Discuss the answers to **4** with the learners.	4 Study the poster again.
	  a How many 0,01s are there in 1? (100)
	  b How many 0,001s are there in 0,1? (100)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Tell the learners that we are, once again, going to do the multiplication on a place value table. Once they have completed the tables, ask them what they notice about the movement of the digit 1 in each of the tables. (Each time the 1 moves two places to the left.) Ask what makes the 1 move one place to the left. (Multiplying by 100)	*(see below)*

5 Complete the following place value tables:

a

	H	T	O	,	t	h	th
100 ×			0	,	0	1	
=			(1)	,			

b

	H	T	O	,	t	h	th
100 ×			0	,	0	0	1
=			(0)	,	(1)		

6 Complete the following:
    a When we multiply a number by 10, the digits move (one) place to the left.
    b When we multiply a number by 100, the digits move (two) place to the left.

7 Use the place value tables to work out the answers.

    a $10 \times 0{,}3 = (3)$

	H	T	O	,	t	h	th
10 ×			0	,	3		
=			(3)	,			

    b $10 \times 4{,}5 = (45)$

	H	T	O	,	t	h	th
10 ×			4	,	5		
=		(4	5)	,			

    c $100 \times 0{,}86 = (86)$

	H	T	O	,	t	h	th
100 ×			0	,	8	6	
=		(8	6)	,			

    d $100 \times 6{,}027 = (602{,}7)$

	H	T	O	,	t	h	th
100 ×			6	,	0	2	7
=	(6	0	2	,	7)		

Activity 2: Whole class activity

- Say: **Now we are going to divide decimal fractions by 10 and 100.**

- Say: **Turn to Activity 2 in your LAB. We are going to work together to answer the questions.**

- Walk around the classroom to provide support as necessary. Activities like this provide an opportunity for those learners who can, to work independently, and for you to provide extra support to learners who need it.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Tell the learners that they should remember how to divide whole numbers by 10 and to answer question **1**. Check that the learners get the two answers right.	Work on the questions with your teacher and the whole class. **1** Fill in the answers: **a** 400 ÷ 10 = (40) **b** 40 ÷ 10 = (4)
Tell the learners to repeat the two division examples, but this time on a place value table. Check that they fill in the place value tables correctly.	**2** Complete the place value tables: **a** **b**
Ask what happens when we divide a number by 10.	**3** Complete the following: When we divide a number by 10, the digits move (one) place to the left.
Now let the learners use the place value table to investigate dividing decimal fractions by 10. Mark question **4** before they move onto question **5**. Confirm with the learners that the digits all moved one decimal place to the right.	**4** Now complete these place value tables: **a** **b**

Question 2a:

	H	T	O	,	t	h	th
	4	0	0	,			
÷ 10 =		(4)	(0)	,			

Question 2b:

	H	T	O	,	t	h	th
		4	0	,			
÷ 10 =			(4)	,			

Question 4a:

	H	T	O	,	t	h	th
			4	,			
÷ 10 =			(0)	,	(4)		

Question 4b:

	H	T	O	,	t	h	th
			0	,	4		
÷ 10 =			(0)	,	(0)	(4)	

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

c

	H	T	O	,	t	h	th
			0	,	0	4	
÷ 10 =			(0)	,	(0)	(0)	(4)

Tell the learners that they should remember how to divide whole numbers by 100 and to answer question **5**. Check that the learners get the two answers right.

5 Fill in the answers:
a 400 ÷ 100 = (4)
b 4 000 ÷ 100 = (40)

Tell the learners to repeat the two division examples, but this time on a place value table.

Check that they fill in the place value tables correctly.

6 Now complete these place value tables:

a

	Th	H	T	O	,	t	h	th
			4	0	0	,		
÷ 100 =					(4)	,		

b

	Th	H	T	O	,	t	h	th
			4	0	0	0	,	
÷ 100 =				(4)	(0)	,		

Ask what happens when we divide a number by 100.

7 Complete the following:

When we divide a number by 100, the digits move (two) place to the left.

Mark question **8** before they move onto question **9**.

Confirm with the learners that the digits all moved two decimal places to the right.

8 Complete the place value tables:

a

	H	T	O	,	t	h	th
			4	,			
÷ 100 =			(0)	,	(0)	(4)	

b

	H	T	O	,	t	h	th
			0	,	4		
÷ 100 =			(0)	,	(0)	(0)	(4)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
In question 9 the learners practise dividing by 10 and by 100.	**9** Use the place value tables to work out the answers.

a $31,9 \div 10 = (3)$

		H	T	O	,	t	h	th
			3	1	,	9		
÷ 10 =				(3)	,	(1)	(9)	

b $0,5 \div 100 = (0,05)$

		H	T	O	,	t	h	th
				0	,	4		
÷ 100 =				(0)	,	(0)	(0)	(4)

c $80,6 \div 100 = (0,806)$

		H	T	O	,	t	h	th
			8	0	,	6		
÷ 100 =				(0)	,	(8)	(0)	(6)

d $0,04 \div 10 = (0,004)$

		H	T	O	,	t	h	th
				0	,	0	4	
÷ 10 =				(0)	,	(0)	(0)	(4)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

Answer these questions:

1 $5,3 \times 10 = (53)$
2 $5,3 \div 10 = (0,53)$
3 $0,92 \times 10 = (9,2)$
4 $0,92 \div 10 = (0,092)$
5 $4,6 \times 100 = (460)$
6 $4,6 \div 100 = (0,046)$

---

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **when we multiply by 10, the digits move one place to the left**
- **when we multiply by 100, the digits move two places to the left**
- **when we divide by 10, the digits move one place to the right**
- **when we divide by 100, the digits move two places to the right.**

Lesson 5: Multiplying and dividing decimal fractions by 10, 100, and 1 000 (2)

Teacher's notes			
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.			
CAPS topics: 1.1 Whole numbers in the Grade 5 CAPS; 1.3 Decimal fractions in the Grade 6 CAPS.			
Lesson Objective: Learners will be able to multiply and divide decimal fractions by 10, 100 and 1 000.			
Lesson Vocabulary: None			
Teacher Resources: None			
Learner Resources: None			
Date:	Week		Day

1 MENTAL MATHS (5 MINUTES)

	First number	Count forwards in 0,001s	Last number
Example	0,1	0,101; 0,102; 0,103	0,104
1	5,987	(5,988; 5,989; 5,990)	5,991
2	3,219	(3,22; 3,221; 3,222)	3,223
3	0,001	(0,002; 0,003; 0,004)	0,005
		Count forwards in 0,001s	
4	1, 009	(1,008; 1,007; 1,006)	1,005
5	2,093	(2,092; 2,091; 2,09)	2,089
6	6,003	(6,002; 6,001; 6)	5,999

2 LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in LAB.

---

1 **a** $10 \times 0,25 = (2,5)$
    b $100 \times 0,25 = (25)$

2 **a** $2,5 \div 10 = (0,25)$
    b $2,5 \div 100 = (0,025)$

---

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 4 are provided in Lesson 4.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:

- In the previous lesson the learners worked with multiplying and dividing decimal fractions by 10 and 100. In this lesson the learners work with multiplying and dividing decimal fractions by 1 000 and consolidate what they have learned in Lesson 4.

- By giving learners word problems to solve, we show them the relevance of their learning in everyday life.

Say: **Today we are practicing multiplying and dividing by 10, 100 and 1 000. We also use our knowledge to solve everyday problems.**

Activity 1: Learners work in pairs

- Say: **In Grade 4 you multiplied whole numbers by 1 000.
  Let's revise what you know and then apply what you know to decimal fractions.**

- Say: **Work with your partner to answer the questions in Activity 1 in your LAB.**

- Support the learners as they work through the Activity. The answers are given in brackets.

Work on the questions with your partner.

1   Fill in the answers:
   a   1 000 × 4 = (4 000)
   b   1 000 × 40 = (40 000)

2   Use the place value tables to check that your answers in question 1 are correct.
   a   1 000 × 4

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					4	,			
		(4)	(0)	(0)	(0)	,			

   So, 1 000 × 4 = (4 000)

   b   1 000 × 40

	TTh	Th	H	T	O	,	t	h	th
1 000 ×				4	0	,			
	(4)	(0)	(0)	(0)	(0)	,			

   So, 1 000 × 40 = (40 000)

3. Use your answers to questions 1 and 2 to complete the following:
When we multiply a whole number by 1 000, the digits move (three) place to the (left).

4. Now use these place value tables to investigate the multiplication of decimal fractions by 1 000:

a 1 000 × 0,4

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					0	,	4		
			(4)	(0)	(0)	,			

So, 1 000 × 0,4 = (400)

b 1 000 × 0,04

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					0	,	0	4	
				(4)	(0)	,			

So, 1 000 × 0,04 = (40)

c 1 000 × 0,004

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					0	,	0	0	4
					(4)	,			

So, 1 000 × 0,004 = (4)

5. Use your answers to question 4 to complete the following:
When we multiply a decimal fraction by 1 000, the digits move (three) place to the (left).

6. Use what you have found in questions 1 to 5 to find answers to the following:

a 1 000 × 0,3

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					0	,	3		
			(3)	(0)	(0)	,			

So, 1 000 × 0,3 = (300)

b 1 000 × 4,5

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					4	,	5		
			(4)	(5	(0)	(0)	,		

So, 1 000 × 4,5 = (4 500)

c $1\,000 \times 0{,}89$

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					0	,	8	9	
			(8)	(9)	(0)	,			

So, $1\,000 \times 0{,}89 = (890)$

d $1\,000 \times 6{,}027$

	TTh	Th	H	T	O	,	t	h	th
1 000 ×					6	,	0	2	7
		(6)	(0)	(2)	(7)	,			

So, $1\,000 \times 6{,}027 = (6\,027)$

Activity 2: Learners work in pairs

- Say: **In Grade 4 you divided whole numbers by 1 000.**
  Let's revise what you know and then apply what you know to more examples.

- Say: **Work with your partner to answer the questions in Activity 2 in your LAB.**

- Support the learners as they work through the Activity. The answers are given
  in brackets.

Work on the questions with your partner.

1 Fill in the answers:
   a $4\,000 \div 1\,000 = (4)$
   b $40\,000 \div 1\,000 = (40)$

2 Use the place value tables to check that your answers in question 1 are correct.
   a $4\,000 \div 1\,000$

	TTh	Th	H	T	O	,	t	h	th
		4	0	0	0	,			
÷ 1 000					(4)	,			

So, $4\,000 \div 1\,000 = (4)$

a   40 000 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
	4	0	0	0	0	,			
÷ 1 000				(4)	(0)	,			

So, 40 000 ÷ 1 000 = (40)

3. Use your answers to questions 1 and 2 to complete the following:
    When we divide a whole number by 1 000, the digits move (three) place to the (right).

4. Now use these place value tables to investigate the division of more whole
    numbers by 1 000:

a   400 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
			4	0	0	,			
÷ 1 000					(0)	,	(4)		

So, 400 ÷ 1 000 = (0,4)

b   40 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
				4	0	,			
÷ 1 000					(0)	,	(0)	(4)	

So, 400 ÷ 1 000 = (0,04)

c   4 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
					4	,			
÷ 1 000					(0)	,	(0)	(0)	(4)

So, 4 ÷ 1 000 = (0,004)

5   Use your answers to question 4 to complete the following:
    When we divide a number by 1 000, the digits move (three) place to the (right).

6 Use what you have found in questions 1 to 5 to find answers to the following:

a 9 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
					9	,			
÷ 1 000					(0)	,	(0)	(0)	(9)

So, 9 ÷ 1 000 = (0,009)

b 31 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th
				3	1	,			
÷ 1 000					(0)	,	(0)	(3)	(1)

So, 31 ÷ 1 000 = (0,031)

c Challenge: 41 235

	TTh	Th	H	T	O	,	t	h	th
	4	1	2	3	5	,			
÷ 1 000				(4)	(1)	,	(2)	(3)	(5)

So, 41 235 ÷ 1 000 = (41,235)

d Challenge: 0,5 ÷ 1 000

	TTh	Th	H	T	O	,	t	h	th	?
					0	,	5			
÷ 1 000					(0)	,	(0)	(0)	(0)	(5)

So, 0,5 ÷ 1 000 = (0,0005)

NOTE TO THE TEACHER:
You choose whether to get the learners to do (d). You may decide to leave this to
higher grades.

Activity 3: Learners work on their own

• Say: **Use what you have revised and learned in Activity 1 and 2 to work through some
practical examples.**

• Say: **Work with on your own to answer the questions in Activity 3 in your LAB.**

- Support the learners as they work through the Activity. The answers are given in brackets.

Work on your own

1 The distance run in a standard marathon is 49,195 km. Sam has run 10 standard marathons in the last five years.

    a How many kilometres has Sam run altogether in the 10 marathons?
    $(49{,}195 \times 10 = 491{,}95 \text{ km})$

    b How many metres has Sam run?
    (491 950 m)

2 An Aid organisation has 1 520 kg of mealie meal to distribute.

    a How much would each family receive if they distributed the mealie meal to 100 families?
    $(1\,520 \div 100 = 15{,}2 \text{ kg})$

    b How much would each family receive if they distributed the mealie meal to 1 000 families?
    $(1\,520 \div 1\,000 = 1{,}52 \text{ kg})$

    c Write each of the two answers in grams.
    (15,2 kg = 15 200g, and
     1,52 kg = 1 520 g)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

Complete:
1. $1\,065 \div 1\,000 = (1{,}065)$
2. $13{,}471 \times 1\,000 = (13\,471)$
3. $341 \div 1\,000 = (0{,}341)$
4. $84{,}231 \times 1\,000 = (84\,231)$
5. $90\,040 \div 1\,000 = (90{,}04)$
6. $12{,}005 \times 1\,000 = (12\,005)$

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **the digits in any number move when we multiply or divide by 10, 100 or 1 000**
- **when we multiply any number by 1 000, the digits move three places to the right**
- **when we divide any number by 1 000, the digits move three places to the left.**

Lesson 6: Consolidation

Teacher's notes

This lesson allows for consolidation of the first five lessons in this unit.

CAPS topics: 1.1 Whole numbers in the Grade 5 CAPS; 1.3 Decimal fractions in the Grade 6 CAPS.

Lesson Objectives: Learners will have revised:

- write numbers as both decimal fractions and common fractions
- order and compare decimal fractions
- multiply and divide decimal fractions by 10, 100 and 1 000.

Lesson Vocabulary: decimal comma, tenth, hundredth, thousandth

Resources: Learner textbooks and teacher guides if necessary.

Date:	Week	Day

1   NOTES FOR THE TEACHER RELATING TO THE WORK DONE THUS FAR IN UNIT 1

The main topic in this unit was decimal fractions.

2   POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

- Some learners take time to understand the difference between 'hundreds', for example: 100, 200, 300 and 'hundredths', for example: $\frac{1}{100}$, $\frac{2}{100}$ and $\frac{3}{100}$. Be sure to stress the last sounds of each number.

- When there are fewer than 10 hundredths, learners sometimes make the mistake of leaving out the '0' that is necessary as place holder to write the number in the correct column. Be sure to discuss examples like this: 4,7 is 4 ones and 7 tenths, while 4,007 is 4 ones and 7 thousandths.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 5 are provided in Lesson 5.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

Additional activities for consolidation

Refer to the table. Select additional activities from the Grade 5 textbook/s you have.
Use the answers given in the Teacher's Guide to correct the work.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	18-23	8-14	10-16	1-7	1-7	3-12	1-20	2-6	2-7
	35-41	106-110	90-103	14-17	75-86	21-44	86-93	85-86	68-74
	96-101	200-208	173-102	56-61	148-152	115-128	256-262	90-91	139-145
	165-172	256-259	234-242	114-118	197-202	218-232		192-194	191-198
	214-220			156-160		283-291		258-263	
TG	14-17	25-26	38-41	3-5	2-5	3-13	1-15	2-8	6-16
	70-76	105-112	45-50	13-16	10-14	23-47	68-73	90-98	41-44
	126-127	199-208	91-101	47-53	51-61	123-139	151-158	185-194	74-76
	129-133	250-259	148-154	95-101	99-105	238-54	213-220	258-265	99-103
	173-177		186-192	130-135	133-139	311-325			

You will find decimal fraction resources in Grade 6 textbooks. Don't forget the Grade 4, 5 and 6 Sasol Inzalo textbooks which you should have got for free.
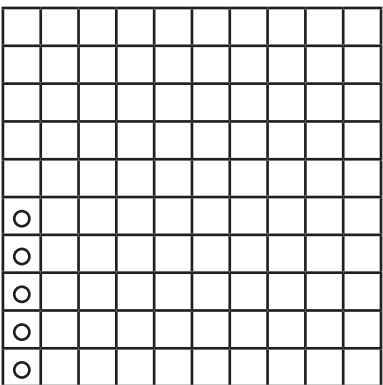
OR, learners could complete the Consolidation Activity in their LAB.

- Read the questions in the LAB with learners. Make sure all the learners understand what to do
- The answers are given in brackets.

Consolidation Activity

Work on your own

1   Study the diagrams and then complete the table. An example has been done for you.

		Marked blocks as a common fraction	Marked blocks as a decimal fraction
Example:		$\frac{5}{100}$	0,05

		Marked blocks as a common fraction	Marked blocks as a decimal fraction
a		$\left(\frac{51}{100}\right)$	0,51
b		$\left(\frac{10}{100}\right)$	(0,1 or 0,10)
c		$\left(\frac{96}{100}\right)$	(0,96)

2   Show these numbers on the number line below.

a   6,07   **b**   6,72   **c**   7,05   **d**   7,16

3 In each case, use the place value tables to help you say which decimal fraction is bigger and why.

a 0,9 or 0,09

H	T	O	,	t	h	th
		(0)	,	(9)		
		(0)	,	(0)	(9)	

(0,9) is bigger than (0,09) because (both numbers have zero ones. When we look at the tenths column, 0,9 has nine tenths and 0,09 has only got zero tenths)

b 3,579 or 3,6

H	T	O	,	t	h	th
		(3)	,	(5)	(7)	(9)
		(3)	,	(6)		

(3,6) is bigger than (3,579) because (both numbers have three ones. When we look at the tenths column, 3,6 has six tenths and 3,579 has only got five tenths)

c 0,23 or 0,3

H	T	O	,	t	h	th
		(0)	,	(2)	(3)	
		(0)	,	(3)		

(0,3) is bigger than (0,23) because (both numbers have zero ones. When we look at the tenths column, 0,3 has three tenths and 0,23 has only got two tenths)

d 0,5 or 0,50 (They are equal because five tenths is the same as fifty hundredths $\frac{50}{100}$)

H	T	O	,	t	h	th
		(0)	,	(5)		
		(0)	,	(5)	(0)	

(They are equal because both numbers have zero ones and five tenths and zero hundredths)

4. Complete the number sentences:
   a 39,2 × 100 = (3 920)
   b 39,2 × 1 000 = (39 200)
   c 39,2 ÷ 10 = (3,92)
   d 39,2 ÷ 100 = (0,392)

5. Complete:

a. 2 046 ÷ 1 000 = (2,046)

b. 49,321 × 1 000 = (49 321)

c. 649 ÷ 1 000 = (0,649)

d. 4,001 × 1 000 = (4 001)

e. 10 004 ÷1 000 = (10,004)

f. 2,3 × 1 000 = (2 300)

5 REFLECTION AND SUMMARY OF LESSON

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised how to:**
- **write numbers as decimal fractions and common fractions**
- **order and compare decimal fractions**
- **multiply and divide decimal numbers by 10, 100 and 1 000.**

Lesson 7: Very big numbers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.1 Whole numbers
Lesson Objective: Learners will be able to read, write and round off whole numbers up to 1 billion.
Lesson Vocabulary: billion
Teacher Resources: A3 poster: *Total population of the provinces of South Africa in 2019*; A3 poster: *Place value table (2)*; Prestik/Bostik
Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

	First number	Multiples of 10 between the first number and the last number	Last number
Example	340	350; 360; 370; 380; 390	400
1	670	(680; 690; 700)	710
2	780	(790; 800; 810)	820
3	390	(400; 410; 420; 430; 440)	450
4	960	(970; 980; 990)	1 000
Draw a circle around the numbers that are multiples of 10			
5	42; (60;) 139; (670;) (200)		
6	167; (670;) (380;) 0; (220;) 547		
7	231; (20;) (250;) 298; (700;) 7		

2 LINK TO TERM PREVIOUS LESSON

This is the first lesson in this topic. There are no direct links to the previous lesson.

3 CORRECT HOMEWORK ACTIVITY

This is the first lesson in this topic. There is no homework to correct.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (50 MINUTES)

NOTE TO THE TEACHER:

- The numeration system we use is called the **Hindu-Arabic numeration system**. It uses *place value*, which means that the value of a digit varies according to its position in a number.
  For example: the value of the 3 in the number 3 465 897 is 3 million, the value of the 3 in the number 5 687 321 is 3 hundred.
- This lesson is designed to help learners see the HTO structure of numbers. If they are able to recognise this, they should be able to read numbers larger than a million.

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
					5	9	3	3	0	0	0

  - Two numbers that are next each in the place value table have the relationship that the left-hand place value is ten times more than the place value to the right of it.
  - And also, the right-hand side place value is $\frac{1}{10}$ or 0,1 of the left-hand side place value.
- In this lesson the learners also spend time rounding off large numbers.
  Many teachers give rules for the learners to follow when rounding off. In TMU we aim to teach *maths for understanding*. We avoid teaching rules in Grade 5 as rules do not help learners to understand the meaning of rounding. In this lesson we focus on the place value of the digits to help us with the rounding off.
- When comparing big numbers, write the numbers as 1 billion or 1 B and 7 million or 7 M instead of writing many '0's. That assists learners to see the relationship between two numbers.

- Say: **Today we are learning more about our system of numbers. We will read, write and round off whole numbers up to 1 billion.**

Activity 1: Whole class activity and then learners work in pairs

Place the A3 poster: *Total population of the provinces of South Africa in 2019* and the A3 poster: *Place value table (2)* on the chalkboard.

Total population of the provinces of South Africa in 2019
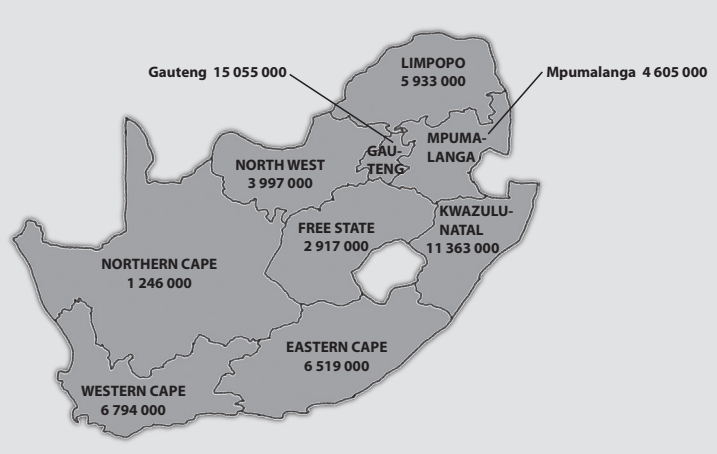
Gauteng 15 055 000

LIMPOPO
5 933 000

Mpumalanga 4 605 000

MPUMA-
LANGA

GAU-
TENG

NORTH WEST
3 997 000

KWAZULU-
NATAL
11 363 000

FREE STATE
2 917 000

NORTHERN CAPE
1 246 000

EASTERN CAPE
6 519 000

WESTERN CAPE
6 794 000

MATHEMATICS GRADE 5 TEACHER'S A3 RESOURCE PACK 2022 TERM 1

Place value table

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
					5	9	3	3	0	0	0

MATHEMATICS GRADE 5 TEACHER'S A3 RESOURCE PACK 2022 TERM 1

- Say, as you point to the map: **Today we are going to use this map which shows the nine provinces of South Africa and the population of each province.**
  - Say, as you point on the map to the Northern Cape: **This is the province of Northern Cape.**
  - Ask: **Who can show us the province we live in?** (Answers will vary)

- Say, as you point to the number 5 933 000 in Limpopo: **This number tells us how many people were living in Limpopo in 2019.**
- Ask: **Who can say this number out loud for us?** (five million, nine hundred and thirty-three thousand)

- Say: **Work with a partner to complete Activity 1 in your LAB.**

- Walk around the classroom to support the learners as necessary. Listen carefully to how learners say the numbers as this gives an indication of whether they understand the HTO structure of our place value system.

- Activities like this provide an opportunity for those learners who can, to work independently, and for you to provide extra support to learners who need it.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)											
Say: **It can sometimes help us to write big numbers in a place value table before we read the number and say it out loud.**	**Activity 1** Work on the questions with your partner and with the whole class. **1** Write the number 5 933 000 on the place value table.											

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
					5	9	3	3	0	0	0

2 Look at 5 933 000 in the place value table:
  a How many millions are there? (5)
  b How many thousands are there? (933)
  c How many ones are there? (0)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Say: **Look at the way in which the numbers are grouped into threes on the table: HTO, which is hundreds, tens and ones.** Let the learners do questions **1** and **2w** with their partner and then mark the work with the class. Let the learners work on question **3** with their partner.	**3** Write the population of each province in the place value table:

PROVINCE	BILLIONS			MILLIONS			THOUSANDS			ONES		
	H	T	0	H	T	O	H	T	O	H	T	O
	HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
Eastern Cape						6	5	1	9	0	0	0
Free State						2	9	1	7	0	0	0
Gauteng					1	5	0	5	5	0	0	0
KwaZulu-Natal					1	1	3	6	3	0	0	0
Limpopo						5	9	3	3	0	0	0
Mpumalanga						4	6	0	5	0	0	0
Northern Cape						1	2	4	6	0	0	0
Western Cape						6	7	9	4	0	0	0

4 Take turns with your partner to practice saying the population of each province out loud.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

Work on questions **5** and **6** with the whole class.

Say: **We say this number as 7 billion, 794 million, 798 thousand and 739.**

Select a few different learners in the class and ask them to say the number out loud to the rest of the class.

Tell the learners to each say the number to their partner.

Say: **The diagram in question 6 shows the place values from one billion to one.**

Tell the learners to fill in the answers in the spaces.

5 The total world population in June 2020 was 7 794 798 739.

a Write this number in the place value table.

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
		7	7	9	4	7	9	8	7	3	9

b Read the number to your partner.

6 This diagram shows the place values from 1 000 000 000 to 1.

a Fill in the missing names on this diagram.

$10 \times$	1 000 000 000 $\div 10$	One billion
$10 \times$	100 000 000 $\div 10$	(Hundred million)
$10 \times$	10 000 000 $\div 10$	(Ten million)
$10 \times$	1 000 000 $\div 10$	(One million)
$10 \times$	100 000 $\div 10$	(Hundred thousand)
$10 \times$	10 000 $\div 10$	(Ten thousand)
$10 \times$	1 000 $\div 10$	(One thousand)
$10 \times$	100 $\div 10$	(Hundred)
$10 \times$	10 $\div 10$	(Ten)
	1	(One)

b What do we do to move from a place value to the next larger place value? (Multiply by 10)

c What do we do to move from a place value to the next smaller place value? (Divide by 10)

Activity 2: Whole class activity

- Say: **Turn to Activity 2 in your LAB. We are going to work together to answer the questions.**

- Walk around the classroom to provide support as necessary. Activities like this provide an opportunity for those learners who can, to work independently, and for you to provide extra support to learners who need it.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Activity 2 Work on the questions with your teacher and the whole class.
Tell the learners to look at the map of the provinces of South Africa and the population of each province in 2019.	**1** Look at the map of South Africa and at the number of people in each province in 2019.
Read question **1** to the learners and ask them to write down the answers in their LAB.	Gauteng 15 055 000 · LIMPOPO 5 933 000 · Mpumalanga 4 605 000 · GAUTENG · MPUMA-LANGA · NORTH WEST 3 997 000 · KWAZULU-NATAL 11 363 000 · FREE STATE 2 917 000 · NORTHERN CAPE 1 246 000 · EASTERN CAPE 6 519 000 · WESTERN CAPE 6 794 000
Once they have had time to answer the question, let the learners share their answers with the class.	What do you notice about the digits in the Hundred's place, in the Ten's place and in the One's place? (All nine provinces have a '0' in the Hundred's place, a '0' in the Ten's place and a '0' in the One's place?)
Ask: **Do you think that it is possible for all nine provinces to have zero Hs, zero Ts and zero Os?** (The answers will vary. But it isn't possible that the populations of all 9 provinces do not have any hundreds, tens and ones.)	

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Ask: **Why do you think that these populations are written with 0 Hs, 0 Ts and 0 Os?** (The numbers were rounded off.) Ask: **To what number are the populations rounded off to?** (To the nearest multiples of a thousand) Say: **When we deal with very big numbers, we often approximate the numbers by rounding them off.** Read through question **2** with the learners and let them try rounding off the total population of the world to the nearest multiple of a thousand. Discuss the method they used to do the rounding off.	(content continues in right column)

2 Remember that the total world population in June 2020 was 7 794 798 739. This number is written in the place value table.

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
		7	7	9	4	7	9	8	7	3	9

a Round this off to the nearest multiple of a thousand. (7 794 799 000)

b When you rounded the number off, which digit in which place did you focus on? (Focus on the 8 in the Th place and the 7 in H place. The 7 in the H place tells us that the 8 in the Th column must be rounded up.)

3 a Round the populations of the Northern Cape and the Eastern Cape to the nearest multiple of a million.

	MILLIONS			THOUSANDS			ONES		
	H	T	O	H	T	O	H	T	O
	HM	TM	M	HTh	TTh	Th	H	T	O
Eastern Cape			6	5	1	0	0	0	0
Northern Cape			1	2	4	6	0	0	0

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Eastern Cape (7 000 000)
	Northern Cape (1 000 000)
	b What digit in which place did you focus on? (6 M and 5 HTh in the Eastern Cape and 1 M and 2 HTh in the Northern Cape. I rounded down for the Northern Cape and rounded up for the Eastern Cape.)
	c How many times more is the population of the Eastern Cape than the Northern Cape? (The population of the Eastern Cape is nearly 7 times more than the population of the Northern Cape.)
	4 a Round the population of the Free State and Limpopo to the nearest multiple of a million.

	MILLIONS			THOUSANDS			ONES		
	H	T	O	H	T	O	H	T	O
	HM	TM	M	HTh	TTh	Th	H	T	O
Free State			2	9	1	7	0	0	0
Limpopo			5	9	3	3	0	0	0

Free State (3 000 000)

Limpopo (6 000 000)

b. How many times more is the population of Limpopo than the Free State? (The population of the Limpopo is nearly 2 times more than (or double) the population of the Free State.)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

1 The population of India in June 2021 was 1 393 409 038.

    a Write the number in the place value table.

Country	BILLIONS			MILLIONS			THOUSANDS			ONES		
	H	T	0	H	T	O	H	T	O	H	T	O
	HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
India			(1	3	9	3	4	0	9	0	3	8)
China			(1	4	4	4	4	9	4	1	4	2)

    b Write the population of India in words.
    (One billion, three hundred and ninety-three million, four hundred and nine thousand, and thirty-eight)

2 The population of China in June 2021 was 1 444 494 142.

    a Write the number in the place value table.

    b Write the population of China in words.
    (One billion, four hundred and forty-four million, four hundred and ninety-four thousand, one hundred and forty-two)

3 Which country has the higher population? Give a reason for your answer.
(China. The reasons will vary. But learners should recall how to compare the numbers. In this case, two numbers are already in the place value table, so learners compare digits from the highest place. In billion both countries have 1. In hundred million, China has 4 while India has 3. At this place, you can say that China has the higher population.)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **that there is an HTO structure in our place value system**
- **how to read and write whole numbers up to 1 billion**
- **that one billion is $10 \times 10 \times 10$ times (or 1 000 times) bigger than 1 million**
- **that in a place value table**
  - **multiplying the digit in one column by 10 moves the digit one column to the left**
  - **dividing the digit in one column by 10 moves the digit one column to the right.**
- **how to round off numbers.**

Lesson 8: Composition of numbers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.1 Whole numbers
Lesson Objective: Learners will be able to work with big numbers (up to 11 digits); to multiply and divide by 10 and 100, and to compare big numbers.
Lesson Vocabulary: number line
Teacher Resources: A3 poster: *The number 1 485 627*; Place value cards (cut these out as advance preparation for lesson); Prestik/Bostik.
Learner Resources: Place value cards up to 1 billion*, pairs of scissors * Learners should cut out and store the place value cards before the lesson.
Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

	List the multiples of 100 between	Answer
Example	1 245 and 1 660	1 300; 1400; 1500 1 600
1	69 and 590	100; 200; 300; 400; 500
2	4 400 and 4 800	4 500; 4 600; 4 700
3	99 660 and 1 000 078	99 700; 99 800; 99 900; 1 000 000
4	181 960 and 182 301	182 000; 182 100; 182 200; 182 300
	List the multiples of 1 000 between	Answer
5	137 000 and 138 101	138 000
6	18 090 and 22 056	19 000; 20 000; 21 000; 22 000

2   LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

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1   The population of Russia in June 2021 was 145 992 723.

   a   Write this number in the place value table:

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
			(1	4	5	9	9	2	7	2	3)

> **b** Write this number in words.
> (One hundred and forty-five million, nine hundred and ninety-two thousand, seven hundred and twenty-three)
>
> **2** Round the number to the nearest multiple of a thousand.
> (145 993 000 or 145 993 thousand or 145 993 Th)
>
> **3** Round the number to the nearest multiple of a million.
> (146 000 000 or 146 million or 146 M)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 7 are provided in Lesson 7.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

You and the learners need place value cards.

> NOTE TO THE TEACHER:
> If some learners struggle to write expanded notation, let them write numbers in the place value table or using place value cards to understand the structure of the number.

- Write 1 485 627 on the chalkboard.

- Say: **Use your place cards to build the number 1 485 627.**

- Walk around the classroom to provide support as needed. It is important that place value cards are used correctly. Learners must select the correct place value cards to show the numbers, and the card with the biggest place value is placed at the bottom of the pile.

- Stick the poster A3: *The number 1 485 627* on the board, and use your place value cards on the board as follows for the learners to check their work:

The number 1 485 627

The number **1 485 627** is made up of the following parts:

$$1\ 000\ 000 + 400\ 000 + 80\ 000 + 5\ 000 + 600 + 20 + 7$$

1 4 8 5 6 2 7

1 4 8 5 6 2 7
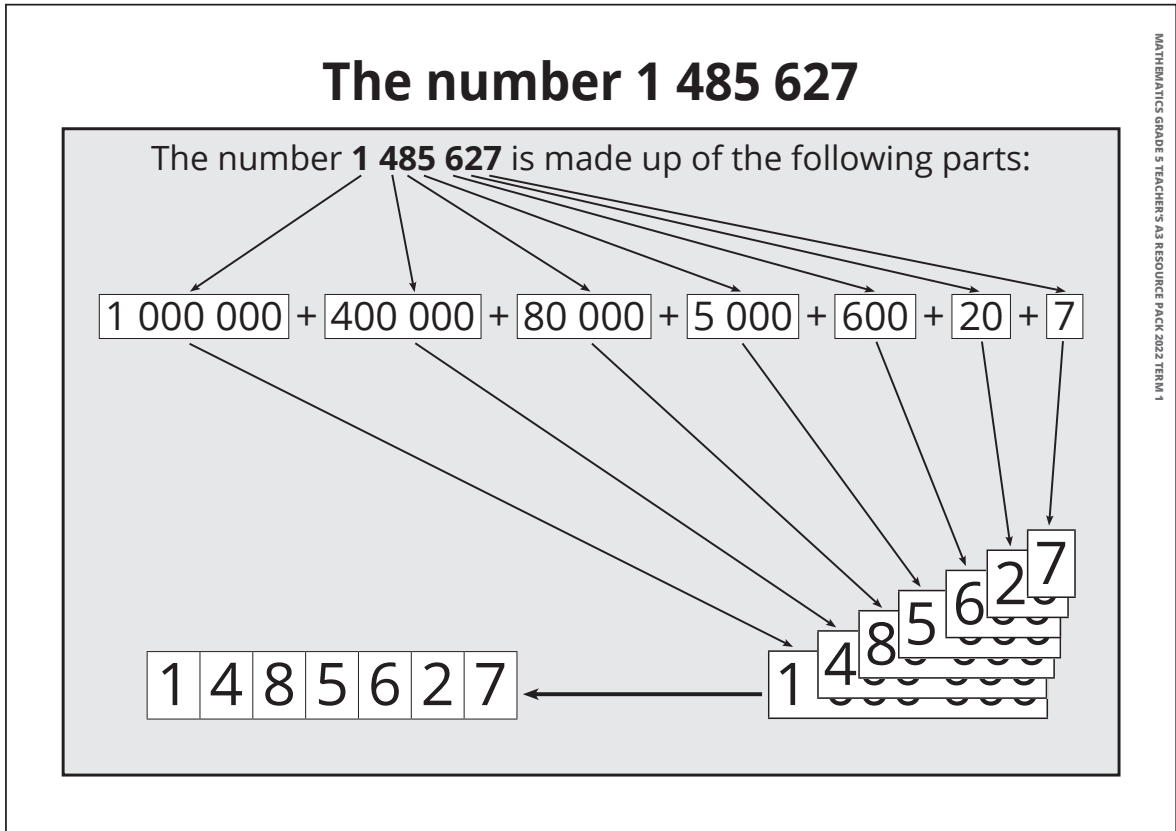
- Say: **Turn to Activity 1 in your LAB. Work with your partner to finish the activity.**

- Walk around the classroom to provide support as necessary. Activities like this provide an opportunity for those learners who can, to work independently, and for you to provide extra support to learners who need it. Answers are given below.

Activity 1: Whole class activity and then the learners work in pairs

Work with a partner

1 a Write the number 8 432 678 551 in the place value table.

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
		(8	4	3	2	6	7	8	5	5	1)

b. Write the number 8 432 678 551 in words. (Eight billion, four hundred and thirty-two million, six hundred and seventy-eight thousand, five hundred and fifty-one)

    c Use your place value cards to show the number 8 432 678 551.

    d What is the value of the 7 in the number 8 432 678 551? (7 ten thousands)

    e What is the value of the 4 in the number 8 432 678 551? (4 hundred million)

2 What numbers are shown at A, B, C and D on the number line:

9 million   **B**   **A**   **C**   **D**   11 million

9 000 000   11 000 000

    A (10 million OR 10 000 000)

    B (9 million 500 thousand OR 9 500 000)

    C (10 million 200 thousand OR 10 200 000)

    D (10 million 800 thousand OR 10 800 000)

3 Write numbers B to D in expanded notation:

    B (9 500 000 = 9 000 000 + 500 000 or 9 M + 5 HTh)

    C (10 200 000 = 10 000 000 + 200 000 or 10 M + 2 HTh)

    D (10 800 000 = 10 000 000 + 800 000 or 10 M + 8 HTh)

Activity 2: The teacher works with the class with question 1 and then the learners do questions 2, 3, 4 and 5 on their own

- In this activity the learners work with the composition of large numbers. The learners should also begin to realise that we can make any big numbers with the digits 0 to 9.

- Say: **Turn to Activity 2 in your LAB.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Say: **We need to work out how many millions there are in 58 billion.** Give the learners a few minutes to work out the answer, and then discuss the answer with the learners.	Work on your own. **1** We want to find out how many millions there are in 58 billion or 58 000 000 000. **a** To help you work out the answer, write the number 58 000 000 000 in the place value table:

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
	(5	8	0	0	0	0	0	0	0	0	0)

    b How many millions are there in 58 billion? (There are 58 000 millions in 58 billion.)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Point out that it helps to draw a thick vertical line at the end of millions. The learners work on **2**, **3**, **4** and **5** on their own.	**2** Use the place value tables to answer the following. **a** How many thousands in 6 million? Write the answer in digits and in words. (6 000; six thousand)

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
					(6	0	0	0	0	0	0)

b How many ten millions in 13 billion? Write the answer in digits and in words. (1 300; one thousand three hundred)

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
	(1	3	0	0	0	0	0	0	0	0	0)

c Write down a number that has 52 ten millions. Write the answer in digits and in words. (520 000 000; five hundred and twenty million)

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
			(5	2	0	0	0	0	0	0	0)

d Write down the number that has 40 hundred millions and 79 hundreds in digits and in words. (4 000 007 900; four billion seven thousand, nine hundred)

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
		(4	0	0	0	0	0	7	9	0	0)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

3 We often see numbers like 7,1 M (seven comma one million)

a Write 7,1 M in the place value table.

BILLIONS			MILLIONS			THOUSANDS			ONES		
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O
					(7,	1)					
					(7	1	0	0	0	0	0)

b Use the place value table to write 7,1 M in full without the comma. (7 100 000)

4 Use the place value table to write each of these numbers in full without the comma.

a 9,5 M (9 500 000)

b 10,2 M (10 200 000)

c 210,8 M (210 800 000)

		MILLIONS			THOUSANDS			ONES		
		HM	TM	M	HTh	TTh	Th	H	T	O
a 9,5 M				(9,	5)					
				(9	5	0	0	0	0	0)
b 10,2 M			(1	0,	2)					
			(1	0	2	0	0	0	0	0)
c 210,8 M		(2	1	0,	8)					
		(2	1	0	8	0	0	0	0	0)

5 You have learned that a digit:
- will move one column to the left when we multiply by 10
- will move one column to the right when we divide by 10.

Th	H	T	O
5	0	0	0
	5	0	0
		5	0

10 ×
÷10

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Fill in the blocks to show: • the number that is 10 times bigger than the given number. • the number that is 10 times smaller than the given number. **a** (3 000 000) / 300 000 / (30 000) — 10 × / ÷10 **b** (600 million) / 60 million / (6 million) — 10 × / ÷10 **c** (10 billion) / 1 billion / (100 million) — 10 × / ÷10

5 HOMEWORK ACTIVITY (5 MINUTES)

• Explain what learners need to do for homework.
• Read the question in the LAB with learners. Make sure all the learners understand what to do.
• Answers are given in brackets.

BILLIONS			MILLIONS			THOUSANDS			ONES		
H	T	O	H	T	O	H	T	O	H	T	O
HB	TB	B	HM	TM	M	HTh	TTh	Th	H	T	O

Complete the following:

1 10 × 900 000 = (9 000 000)   **4** 900 000 ÷ 10 = (90 000)

2 10 × 4 million = (40 million)   **5** 4 million ÷ 10 = (400 000)

3 10 × 10 000 = (100 000)   **6** 10 000 ÷ 10 = (1 000)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
• **to work with the structure of big numbers (up to 11 digits)**
• **that multiplying and dividing by 10 moves the digits one place to the left or right.**

Lesson 9: Adding big numbers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.1 Whole numbers
Lesson Objective: Learners will be able to use the column method to add whole numbers.
Lesson Vocabulary: column method, approximately, carry, exchange
Teacher Resources: A3 poster: *Total population of the provinces of South Africa in 2019*; Prestik/Bostik
Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	4 + 9	13	**6**	8 + 9	17
2	5 + 5	10	**7**	7 + 8	15
3	9 + 2	11	**8**	9 + 7	16
4	8 + 8	16	**9**	8 + 5	13
5	7 + 7	14	**10**	6 + 8	14

2 LINK TO PREVIOUS LESSON (5 MINUTES)

Refer the learners to the activity in the LAB.

1 Write two different 11-digit numbers in the blocks.
(Answers will vary)

1st number

2nd number

2 Compare the numbers by saying which number is bigger. (Answers will vary)

3 Give a reason for the answer you gave in question **2**. (Answers will vary but must state that the bigger number is the one with the highest digit in the highest place value column)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 8 are provided in Lesson 8.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

> NOTE TO THE TEACHER:
> - In this lesson learners use the column method (vertical algorithm) to add whole numbers of at least 6-digits.
> - Adding 6-digit numbers using the column method is a consolidation of Grade 4 work. The learners build on knowledge and skills from Grade 4, in the process realising that the column method is useful for the addition of any numbers, either small or big.
> - One of the challenges learners face when using the column method is to keep the digits in the correct place value/vertical column. If necessary, learners should use place value tables to get the digits in correct place value.
> - Learners also practice the steps to follow when solving word problems. This will help to develop their procedural fluency when solving daily life problems.
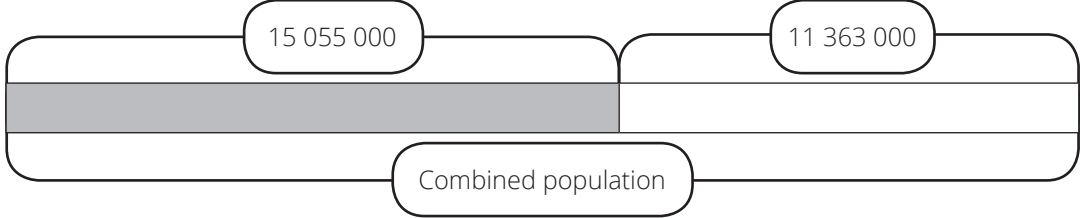
Say: **Today we will revise how to use the column method when calculating with whole numbers.**

Activity 1: Whole class activity

Stick the A3 poster: *Total population of the provinces of South Africa in 2019* on the board.

- Say: **Turn to Activity 1 in your LAB. We are all going to work together on this activity.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
These are the steps that you should encourage the learners to go through when they solve a problem like this. These steps should not be new as they should have used them in Grade 4. Please use these steps to help the learners understand the problem and then solve the problem. Understanding the problem: **i)** Read the problem with the learners.	Work with your whole class. **1** In 2019, Gauteng and KwaZulu-Natal were the two provinces with the largest population in South Africa. • The population of Gauteng was approximately 15 055 000. • The population of KwaZulu-Natal was approximately 11 363 000. What is the combined population of Gauteng and KwaZulu-Natal? **a** Draw a diagram here to show what you need to do with the numbers.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
ii) Let learners take it in turns to read the problem to their partner until they read it fluently. **iii)** Tell the learners to underline the relevant numbers **iv)** Tell the learners to then underline the question with a wavy line. **v)** Let learners show the story in a diagram. (The diagram below is an illustration of the type of diagram that can be drawn.)	

15 055 000   11 363 000

Combined population

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS
vi) Let one or two learners present their diagram on the board. **vii)** Let learners determine the operation. (To combine we must add) **viii)** Let learners write the number sentence in their classwork books. **ix)** Let a learner write the number sentence on the board so that learners can correct theirs if necessary.	**b** Write a number sentence to show the calculation. (15 055 000 + 11 363 000 = $\square$)

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Say: **Today we are going to use the column method again.** Draw the place value table on the board. You will need 7 columns – from 0 to TM. Let the learners write the numbers in the place value table in their LAB, and then do the calculation. Then ask: • **In which place value column do we start the calculation?** (One's column, 0 + 0 = 0). • **What about the tens and hundred's column?** We do the same (0 + 0 = 0) • **What do we do in the thousand's column?** (5 Th + 3 Th = 8 Th). • **And in the ten thousands (TTh) column?** (5 TTh + 6 TTh = 11TTh). • **What we do now?** (Because we cannot write 11 in TTh column, we exchange 10 ten thousands for 1 hundred thousand and carry the 1 hundred thousand to the hundred thousand column. We write the 1 hundred thousand in the top line of the hundred thousand column). • **What's next?** (We add the digits in the hundred thousands column, the digits in the millions column and the digits in the ten millions column to get 4 HTh, 6 M and 2 TM).	**2** Use the column method to find the answer to the number sentence. **a** Fill the numbers into the place value table. Don't forget to write the operation you are using on the left-hand side of the calculation. **b** Do the calculation.

b Do the calculation.

	TM	M	HTh	TTh	Th	H	T	O
				1				
	1	5	0	5	5	0	0	0
+	1	1	3	6	3	0	0	0
	2	6	4	1	8	0	0	0

c Complete the following:
15 055 000 + 11 363 000 = (26 418 000)
The combined population of Gauteng and KwaZulu Natal is (26 418 000)

Activity 2: Learners work with their partner

- Say: **Turn to Activity 2 in your LAB. Work with your partner on this activity.**

- Walk around the class as the learners work. Make sure they add in columns correctly.
- Correct the activity with learners so that they can receive immediate feedback.
  The answers are given below.

Work with a partner.

								SOLUTIONS						

1 Calculate: 4 629 521+ 3 673 338

	M	HTh	TTh	Th	H	T	O
+							

4 629 521 + 3 673 338 = _____

Solution:

	M	HTh	TTh	Th	H	T	O
		1	1	1			
	4	6	2	9	5	2	1
+	3	6	7	3	3	3	8
	8	3	0	2	8	5	9

4 629 521 + 3 673 338 = (8 302 859)

2 An Aid Organisation collects money for charity. Last year it collected R6 415 832, and this year it collected R592 308. How much money did it collect altogether?

a Write the number sentence here.:
_____

a 6 415 832 + 592 308 = ☐

b Do the calculation here:

	M	HTh	TTh	Th	H	T	O
+							

b

	M	HTh	TTh	Th	H	T	O
		1	1		1		1
	6	4	1	5	8	3	2
+		5	9	2	3	0	8
	7	0	0	8	1	4	0

c Write the answer as a sentence:
The aid organisation collected
_____

c The aid organisation collected
(R7 008 140)

Activity 3: Learners work on their own

- Say: **Turn to Activity 3 in your LAB. Work on your own on this activity.**

- Walk around the class as the learners work. Make sure they are adding in columns correctly.
- Correct the activity with learners so that they can receive immediate feedback. The answers are given below.

Work on your own.

	SOLUTIONS
1 Calculate: 9 214 395 + 4 928 417 = □	

SOLUTIONS

1

TM	M	HTh	TTh	Th	H	T	O
	1		1		1	1	
	9	2	1	4	3	9	5
+		4	9	2	8	4	1	7
1	4	1	4	2	8	1	2

9 214 395 + 4 928 417 = (14 142 812)

2 Calculate: 16 703 345 + 88 219 = □

TM	M	HTh	TTh	Th	H	T	O
			1			1	
1	6	7	0	3	3	4	5
+			8	8	2	1	9
1	6	7	9	1	5	6	4

16 703 345 + 88 219 = (16 791 564)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what the learners need to do for homework.
- Read the questions in the LAB with the learners. Make sure all the learners understand what to do.
- The answers are given below.

	SOLUTIONS
1 Calculate: 4 365 204 + 9 632 839 = ☐	

1 Calculate: 4 365 204 + 9 632 839 = ☐

	TM	M	HTh	TTh	Th	H	T	O
+								

	TM	M	HTh	TTh	Th	H	T	O
	1				1		1	
		4	3	6	5	2	0	4
+		9	6	3	2	8	3	9
	1	3	9	9	8	0	4	3

4 365 204 + 9 632 839 = (13 998 043)

2 Calculate: 1 794 368 + 3 253 452 = ☐

	TM	M	HTh	TTh	Th	H	T	O
+								

	TM	M	HTh	TTh	Th	H	T	O
		1	1			1	1	
		1	7	9	4	3	6	8
+		3	2	5	3	4	5	2
		5	0	4	7	8	2	0

1 794 368 + 3 253 452 = (5 047 820)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised using the column method to add using big numbers.**

   We must remember:
   - **to work carefully to keep the digits in the correct columns.**
   - **that we need to exchange and carry if the answer in any column is bigger than 9.**

Lesson 10: Subtracting big numbers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.1 Whole numbers
Lesson Objective: Learners will be able to use the column method to subtract numbers up to 7 digits.
Lesson Vocabulary: exchange
Teacher and Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

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

2 LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

1 3 568 294 + 5 442 321 = ☐

3 568 294 + 5 442 321 = (9 010 615)

	M	HTh	TTh	Th	H	T	O
	1	1	1		1		
	3	5	6	8	2	9	4
+	5	4	4	2	3	2	1
	9	0	1	0	6	1	5

2 2 349 642 + 3 507 = ☐

2 349 642 + 3 507 = (2 353 149)

	M	HTh	TTh	Th	H	T	O
				1	1		
	2	3	4	9	6	4	2
+				3	5	0	7
	2	3	5	3	1	4	9

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 10 are provided in Lesson 10. Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.
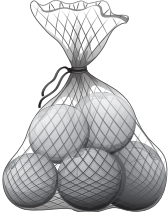
4 LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)
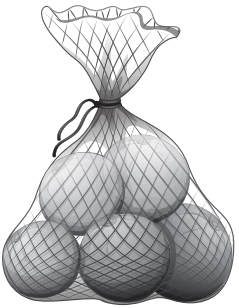
> NOTE TO THE TEACHER:
> - Learners use the column method to subtract numbers up to 7 digits.
> - Some calculations involve borrowing/exchanging once or twice, and borrowing/exchanging from a place value column that is not immediately left of the column they are working in.
> - It is important for learners to understand the concept of 'borrowing/exchanging' which is actually decomposing a number from a higher place value column.
> - Many learners struggle with this concept, so the place value table and some pictorial representation would assist learners to understand the concept.

Say: **Today we will practice calculations in columns again.**

Activity 1: Whole class activity

Say: **Turn to Activity 1 in your LAB. We are all going to work together on this activity.**

WHAT YOU DO	**WHAT THE LEARNERS HAVE IN THEIR LABS** **(Answers are given in brackets)**
Please use these steps to help the learners understand the problem and then solve the problem. ***Understanding the problem:*** **i** Read the problem with the learners. **ii** Let learners take it in turns to read the problem to their partner until they read it fluently. **iii** Tell the learners to underline the relevant numbers (see on the right), **iv** Tell the learners to then underline the question with a wavy line (see on the right). **v** Let learners show the story in a diagram. (The diagram below is an illustration of the type of diagram that can be drawn.)	Work with your whole class. **1.** The farm workers picked <u>188 786 kg</u> of oranges. <u>169 341 kg</u> of oranges were sent to the market. <u>How many kg of oranges are left?</u> **a** Draw a diagram here to show the story and what you need to do with the numbers.

188 786 kg picked

169 341 kg sent to market

How many kg left?

vi Let one or two learners present their diagram on the board. **vii** Let learners determine the operation. (subtraction; we subtract; …) **viii** Let learners write the number sentence in their classwork books. **ix** Let a learner write the number sentence on the board and say it out loud so that learners can correct if necessary.	**b** Write a number sentence to show the calculation. (188 786 – 169 341 = ☐)

UNIT 1

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Say: **Today we are going to use the column method again.**	**2** Use the column method to find the answer to the number sentence.

Draw the place value table on the board. You will need 6 columns — from 0 to HTh.

Let the learners write the numbers in the place value table in their LAB, and then do the calculation on their own.

a Fill the numbers into the place value column. Don't forget to write the operation you are using on the left-hand side of the calculation.

b Do the calculation.

	HTh	TTh	Th	H	T	O
		7				
	1	$\cancel{8}$	¹8	7	8	6
−	1	6	9	3	4	1
		1	9	4	4	5

One they have had time to finish, ask:
- **In which place value column do we start the calculation?** (One's column, 6 O – 1 O = 5 O).

- **What about the tens and hundred's column?** We do the same (8 T – 4 T = 4 T and 7 H – 3 H = 4 H)

- **What do we do in the thousand's column?**

  In the thousands column: We know that 1 TTh = 10 Th. We exchange 1 TTh for 10 Th. We now have 7 TTh and 18 Th. We subtract 9 Th from 18 Th. We are left with 9 Th. (18 Th – 9 Th = 9 Th)

- **And in the ten thousands (TTh) column?** (7 TTh – 6 TTh = 1 TTh).

- **And in the HTh column?** (1 HTh – 1 HTh = 0 HTh)

c Complete the following:

188 786 – 169 341 = (19 445)

There are (19 445) kg of oranges are left.

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Activity 2: Leareners work on their own

NOTE TO THE TEACHER:
- Subtracting numbers that are 7 digits long is new in this lesson. However, the process of working in columns, subtracting, and exchanging where necessary remains the same as with smaller numbers. Learners who have developed procedural fluency should not find this difficult.
- In question 2, learners need to exchange from ten thousands to subtract hundreds. Check the process of exchanging 1 ten thousand for 10 thousands, and then exchanging 1 ten thousand for 10 hundreds.
- Walk around and support learners where necessary.
- Go through the calculations when learners have completed the activity. Discuss any problems they might have had.

Work on your own.

	SOLUTIONS
1 Calculate: 6 432 697 − 3 241 256 = ☐	

	M	HTh	TTh	Th	H	T	O
			³				
	6	4	¹3	2	6	9	7
−	3	2	4	1	2	5	6
	3	1	9	1	4	4	1

6 432 697 − 3 241 256 = (3 191 441)

2 Solve: 3 840 637 − 2 234 724 = ☐	

	M	HTh	TTh	Th	H	T	O
			³	⁹			
	3	8	4̷	¹0̷	¹6	3	7
+	2	2	3	4	7	2	4
	1	6	0	5	9	1	3

3 840 637 − 2 234 724 = (1 605 913)
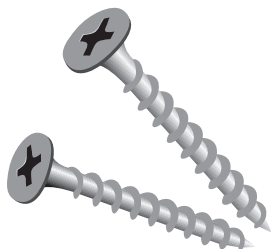
Activity 3: Learners work on their own

Say: **Work on your own to do Activity 3 in your LAB.**

- Check that learners are able to deal with 7-digit subtract 6-digit calculations. Learners sometimes forget to fill in the M column in such calculations.
- Mark the work once the learners have finished the Activity and discuss any problems they may have had.

Work on your own.

	SOLUTIONS
1 Calculate: 4 021 741 – 95 346 = ☐	(see working below)

1 Solution:

M	HTh	TTh	Th	H	T	O
3	9	11		6	13	
4̶	⁺0̶	2̶	¹1	7̶	4̶	¹1
–		9	5	3	4	6
3	9	2	6	3	9	5

4 021 741 – 95 346 = (3 926 395)

2 A big factory manufactured screws. They made 3 496 218 screws and sold 964 537 of them. How many did they have left?

a Write the number sentence here:

_____

a 3 496 218 – 964 537 = ☐

b Do the calculation here:

b

M	HTh	TTh	Th	H	T	O
2			5	11		
3̶	¹4̶	9	6̶	7̶	¹1	8
+	9	6	4	5	3	7
2	5	3	1	6	8	1

c Write the answer as a sentence:

_____

_____

c They had 2 531 681 screws left.

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the questions in the LAB with the learners. Make sure all the learners understand what to do.
- Answers are given below.

<table>
<tr><td></td><td colspan="7">SOLUTIONS</td></tr>
<tr><td>1 7 320 284 – 6 403 653 = ☐</td><td colspan="7">1 7 320 284 – 6 403 653 = ☐</td></tr>
</table>

1 7 320 284 – 6 403 653 = ☐

1 7 320 284 – 6 403 653 = ☐

	M	HTh	TTh	Th	H	T	O
	6		1	9			
	7̸	¹3	2̸	¹0̸	¹2	8	4
–	6	4	0	3	6	5	3
		9	1	6	6	3	1

Answer: 7 320 284 – 6 403 653 = (916 631)

2 4 159 600 – 1 235 216 = ☐

2 4 159 600 – 1 235 216 = ☐

	M	HTh	TTh	Th	H	T	O
	3				5	9	
	4̸	¹1	5	9	6̸	⁺0̸	¹0
–	1	2	3	5	2	1	6
	2	9	2	4	3	8	4

Answer: 4 159 600 – 1 235 216 = (2 924 384)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to subtract big numbers. We have also practised when and how to exchange numbers to help with the subtraction.**

Lesson 11: Adding and subtracting decimal numbers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objective: Learners will be able to add and subtract decimal fractions up to three decimal places.
Lesson Vocabulary: tenth, hundredth, minus, difference, combined
Teacher Resources and Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	6 + 8	14	**6**	16 – 8	8
2	8 + 9	17	**7**	11 – 7	4
3	6 + 6	12	**8**	17 – 8	9
4	8 + 5	13	**9**	13 – 9	4
5	7 + 6	13	**10**	15 – 6	9

2   LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

Calculate

6 094 731 −193 652= □

Solution

M	HTh	TTh	Th	H	T	O
$^5\!\!\not{6}$	^{10}	9	4	$^6\!\!\not{7}$	$^{12}\!\!\not{3}$	$^{11}1$
–	1	9	3	6	5	2
5	9	0	1	0	7	9

Answer: (5 901 079)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 10 are provided in Lesson 10.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)
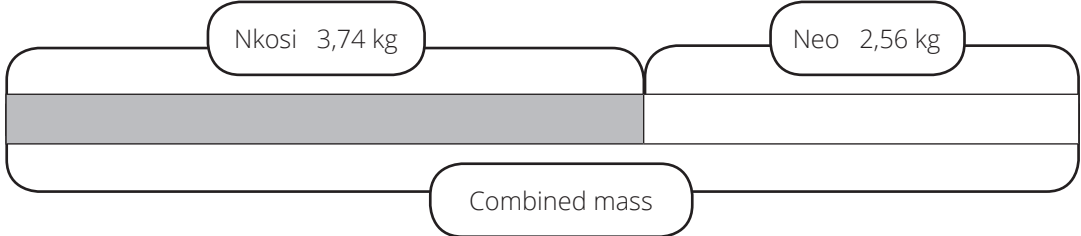
> NOTE TO THE TEACHER:
> - This lesson is designed to apply the procedural fluency they developed when adding and subtracting whole numbers to the addition and subtraction of decimal numbers.
> - This is possible because of the 'sameness' of calculation techniques that are used when adding and subtracting whole numbers and when adding and subtracting decimal numbers.

Say: **Today we are learning to use the column method to add and subtract decimals.**

Activity 1: Whole class activity and then learners work on their own

- Say: **Turn to Activity 1 in your LAB. We are all going to work together on question 1 and then you are going to work on your own on question 2.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
Please use these steps to help the learners understand the problem and then solve the problem. *__Understanding the problem:__* **i** Read the problem with the learners. **ii** Let learners take it in turns to read the problem to their partner until they read it fluently. **iii** Tell the learners to underline the relevant numbers (see on the right), **iv** Tell the learners to then underline the question with a wavy line (see on the right).	Work with the class on **1** and on your own on **2**. **1** Nkosi and Neo are twins. Nkosi's mass was <u>3,74 kg</u> when he was born. Neo's mass was <u>2,56 kg</u> when she was born. <u>What is Nkosi and Neo's mass in total?</u> **a** Draw a diagram here to show the story and what you need to do with the numbers.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)

Nkosi   3,74 kg

Neo   2,56 kg

Combined mass

vi Let one or two learners present their diagram on the board.

vii Let learners determine the operation. (to combine we must add)

viii Let learners write the number sentence in their classwork books.

ix Let a learner write the number sentence on the board and say it out loud so that learners can correct if necessary.

Say: **Today we are going to use the column method again.**

Draw the place value table on the board. You will need 3 columns – from ones (O) to hundredths (h).

Let the learners write the numbers in the place value table in their LAB, and then do the calculation on their own.

Once they have had time to finish, ask:
• **In which place value column do we start the calculation?** (The hundredth's column)
• **What do we do in the *th* column?** (Add 4 h and 6 h to get 10 h. We know that 10 h = 1 t. Exchange 10 h for 1 t. 0 h remain.)
• **Now what do we do?** (Write 0 in the h column and 1 in the t column. 1 t + 7 t + 5 t = 13 t.)

b Write a number sentence to show the calculation.
(3,74 + 2,56 = ☐)

2 Use the column method to find the answer to the number sentence.

a Fill the numbers into the place value column. Don't forget to write the operation you are using on the left-hand side of the calculation.

b Do the calculation.

	O	,	t	h
			1	1
	3	,	7	4
+	2	,	5	6
	6	,	3	0

c Complete the following:
3,74 + 2,56 = (6,3 kg)
The combined mass of Nkosi and Neo is (6,3) kg.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• **And then what to we do**? (We know that 10 t is 1 O (whole). Exchange 13 t for 1 O. 3 t remain. Write 3 in the t column and 1 in the O column.) • **What is next?** (We write the decimal comma between the ones and the tenths and add the digits in the O column. 1 O + 3 O + 2 O = 6 O. Write 6 O in the O column.) Remind them that it is not necessary to write the zero hundredths.	

Activity 2: Learners work on their own

• Say: **Turn to Activity 2 in your LAB.**

• Walk around and support the learners where necessary.
• Go through the calculations when the learners have completed the activity. Discuss any problems they might have had.

Work on your own

This map shows the population of the provinces in South Africa in 2019.
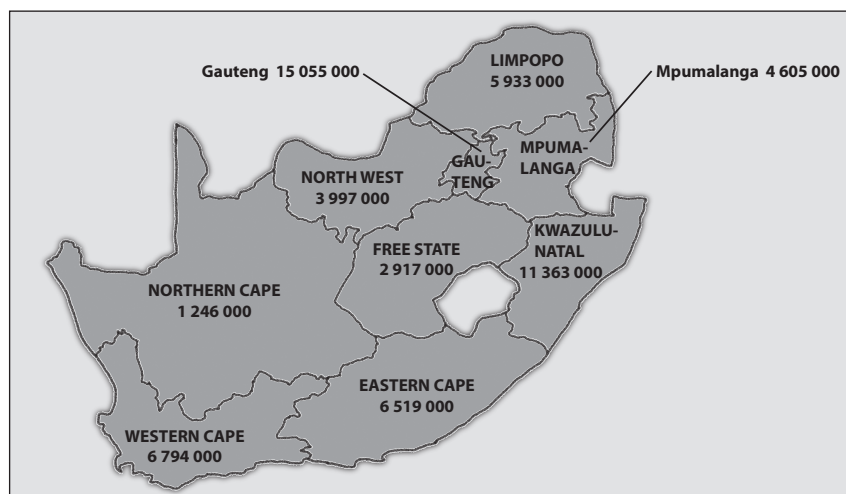
1 The population of the Eastern Cape is 6 519 000.
If we write this population in millions only, correct to 2 decimal places,
6 519 000 is approximately equal to 6,52 million or 6,52 M.

The population of the Free State is 2 917 000.
If we write this population in millions only, correct to 2 decimal places,
2 917 000 is approximately equal to 2,92 million or 2,92 M.

Which two columns do you have to look at to round these numbers to two decimal places?
(The ten thousands (TTh) and thousands (Th) columns)

2 Write the populations of the rest of the provinces in millions only, correct to two decimal places.

Province	MILLIONS			THOUSANDS			ONES			Populations in millions, correct to 2 decimal places
	HM	TM	M	HTh	TTh	Th	H	T	O	
Eastern Cape			6	5	1	9	0	0	0	6,52 M
Free State			2	9	1	7	0	0	0	2,92 M
Gauteng		1	5	0	5	5	0	0	0	(15,06 M)
KwaZulu-Natal		1	1	3	6	3	0	0	0	(11,36 M)
Limpopo			5	9	3	3	0	0	0	(5,93 M)
Mpumalanga			4	6	0	5	0	0	0	(4,61 M)
Northern Cape			1	2	4	6	0	0	0	(1,25 M)
Western Cape			6	7	9	4	0	0	0	(6,79 M)

3 Use the answers in 2 to answer the following in millions, correct to 2 decimal places.

a Find the total population of Limpopo and Western Cape in millions.

Number sentence: Total population of Limpopo and Western Cape
= (5,93 M + 6,79 M) = ☐

	SOLUTIONS
T O , t h	T O , t h
	1 1 1
	5 , 9 3
	+ 6 , 7 9
	1 2 , 7 2

The total population of Limpopo and Western Cape is (12,72 million or 12,72 M)

b What is the difference in population between the Free State and Mpumalanga?

Number sentence: Difference in population of the Free State and Mpumalanga = (4,61 M – 2,92 M) = ☐

							SOLUTIONS					
T	**O**	**,**	**t**	**h**			**T**	**O**	**,**	**t**	**h**	
								³		¹⁵		
							4	,	6̸	¹1		
							–	2	,	9	2	
								1	,	6	9	

The difference in the population of the Free State and Mpumalanga is (1,69 million or 1,69 M)

Activity 3: Learners work on their own

- Say: **Turn to Activity 3 in your LAB.**

- Say: **The frog needs to move from the Start, marked 0 to the Finish, marked 5,382 by hopping on the stones.**

- Say: **Some of the stones have 1 marked on them.**
  - Ask: **What numbers do the other stones have marked on them?**
    (0,1; 0,01 and 0,001)
  - Say: **The stones that the frog lands on have to add up to 5,382.**

- Read through the instructions with the learners.
- Once they have finished the activity, discuss the answers with the class. Some solutions are given below.

Work on your own

Help the frog hop from the start to the finish, adding the numbers on the stones as he goes.
Colour the stones that the frog hops on.

Which stones did your frog hop on?
(There are many different paths that can be followed to get to the 5,382 finish, but we always need: 5 lots of 1, 3 lots of 0,1, 8 lots of 0,01 and 2 lots of 0,001.
If learners write $5,382 = 5 \times 1 + 3 \times 0,1 + 8 \times 0,01 + 2 \times 0,001$, that is wonderful.)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given.

1 **a** 5,72 + 2,54

Answer

T	O	,	t	h
	1			
	5	,	7	2
+	2	,	5	4
	8	,	2	6

(Answer: 8,26)

b 6,05 + 2,08

Answer

T	O	,	t	h
			1	
	6	,	0	5
+	2	,	0	8
	8	,	1	3

(Answer: 8,13)

c 3,06 + 0,87

Answer

T	O	,	t	h
			1	
	3	,	0	6
+	0	,	8	7
	3	,	9	3

(Answer: 3,93)

2 **a** 10,49 – 0,85

Answer

T	O	,	t	h
	9			
1	$^1\cancel{0}$	,	$^1 4$	9
–	0	,	8	5
	9	,	6	4

(Answer: 9,64)

b 6,56 – 2,59

Answer

T	O	,	t	h
			14	
	$^5\cancel{6}$	,	$\cancel{5}$	$^1 6$
–	2	,	5	9
	3	,	9	7

(Answer: 3,97)

c 5,04 – 4,86

Answer

T	O	,	t	h
	9			
	$^4\cancel{5}$	,	$^1\cancel{0}$	$^1 4$
–	4	,	8	6
	0	,	1	8

(Answer: 0,18)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to add and subtract decimal fractions.**

We know that:
- **the steps to follow when adding or subtracting decimal fractions are the same as the steps when adding or subtracting whole numbers**
- **we must keep the digits in the correct place value columns**
- **the decimal comma must always be between the ones and the tenths.**

Lesson 12: Consolidation

Teacher's notes
This lesson allows for consolidation of the lesson of this unit.
CAPS topics: 1.1 Whole numbers in the Grade 5 CAPS and 1.3 Decimal fractions in the Grade 6 CAPS.
Lesson Objectives: Learners will practice: • reading, writing and rounding whole numbers and decimal fractions • working with big numbers (up to 11 digits) • multiplying and dividing by 10, 100 and 1 000 • comparing big numbers • using the column method to add or subtract whole numbers • using the column method to add or subtract decimal numbers
Lesson Vocabulary: decimal fraction, column method
Resources: Grade 5 and 6 textbooks and teacher's guides as available
Date: Week   Day

1   NOTES FOR THE TEACHER RELATING TO WORK DONE IN THIS TOPIC

The main topics were the composition of numbers; whole numbers up to 11 digits and decimal fractions.

2   POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

- Learners often underperform when they do word problems because they do not try to understand the described situation before deciding what calculation to do, what operation to use and/or writing a number sentence. Encourage learners to spend time reading the description of the situation and trying to understand it before rushing to find the answer.
- Some learners struggle to add or subtract decimal numbers when some digits are 'missing'.
  For example: 6 – 5,43. Remind learners that 6 can be written as 6,00.
- For the sake of speed, it is important that learners learn to calculate with as little writing as possible. They should learn to:
  - do some calculations mentally, without writing
  - do calculations with multi-digit numbers with as little writing as possible, for example by using the column method when adding and subtracting.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 11 are provided in Lesson 11.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

Say: **Today we are going over what we have learned in this Unit. We will practice working with big numbers and with decimal fractions.**

- You could use this time for learners to complete classwork or homework activities as necessary.
- You could use the Additional Activities from textbooks that you have, or use the Consolidation Activity given.
- Refer to Grade 5 textbooks for additional activities on whole numbers, and Grade 6 textbooks for additional activities on decimal fractions.

Additional activities for consolidation

Refer to the table. Select additional activities from the Grade 5 textbook/s you have.
Use the answers given in the Teacher's Guide to correct the work.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	18-23	8-14	10-16	1-7	1-7	3-12	1-20	2-6	2-7
	35-41	106-110	90-103	14-17	75-86	21-44	86-93	85-86	68-74
	96-101	200-208	173-102	56-61	148-152	115-128	256-262	90-91	139-145
	165-172	256-259	234-242	114-118	197-202	218-232		192-194	191-198
	214-220			156-160		283-291		258-263	
TG	14-17	25-26	38-41	3-5	2-5	3-13	1-15	2-8	6-16
	70-76	105-112	45-50	13-16	10-14	23-47	68-73	90-98	41-44
	126-127	199-208	91-101	47-53	51-61	123-139	151-158	185-194	74-76
	129-133	250-259	148-154	95-101	99-105	238-54	213-220	258-265	99-103
	173-177		186-192	130-135	133-139	311-325			

- Note: The references in Grade 5 textbooks provide additional activities on whole numbers only. You will find decimal fraction resources in Grade 6 textbooks. Don't forget the Grade 4, 5 and 6 Sasol Inzalo textbooks which you should have got for free.

OR, learners could complete the Consolidation Activity in their LAB.

- Read the questions in the LAB with learners. Make sure all the learners understand what to do.
- The answers are given in in brackets.

Consolidation Activity
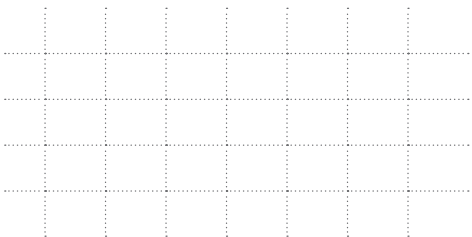
Work on your own

1   Round to the nearest 100:
    a   4 438 239 (4 438 200)
    b   632 973 (633 000)
    c   649,92 (600)

2   Round to the nearest 1 000:
    a   341 204 (341 000)
    b   4 689 009 (4 689 000)
    c   299 999 (300 000)

3   Round to the nearest whole number:
    a   3,09 (3)
    b   4,96 (5)
    c   0,59 (1)

4   **a**   Draw a circle around the bigger number.

13 499 602 794   13 499 711 000

    b   Give a reason for your answer. (7 HTh is more than 6 HTh)

5   Write the correct numbers at **a**, **b** and **c**.
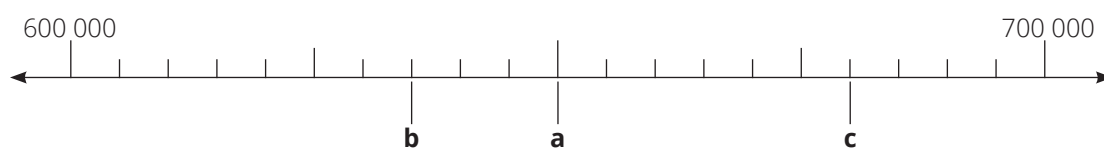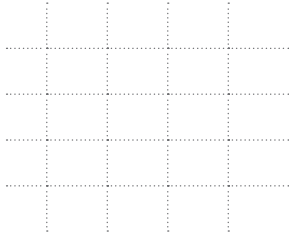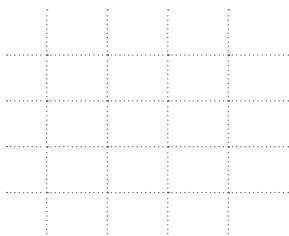
    a   (650 000)
    b   (635 000)
    c   (680 000)
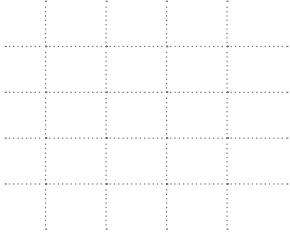
6. Calculate:

	SOLUTIONS
a 3 962 621 + 651 379 = ☐	

	M	HTh	TTh	Th	H	T	O
		1	1		1	1	1
	3	9	6	2	6	2	1
+		6	5	1	3	7	9
	4	6	1	4	0	0	0

3 962 621 + 651 379 = (4 614 000)

b 2 761 406 – 1 739 129 = ☐	

	M	HTh	TTh	Th	H	T	O
						9	
	2	7	⁵6̷	¹¹1	³4̷	⁴0̷	¹6
–	1	7	3	9	1	2	9
	1	0	2	2	2	7	7

2 761 406 – 1 739 129 = (1 022 277)

7 Calculate:

	SOLUTIONS
a 4,63 + 3,57 = ☐	

	O	,	t	h
	1		1	
	4	,	6	3
+	3	,	5	7
	8	,	2	0

4,63 + 3,57 = (8,20 or 8,2)

b 2,98 + 3,64 = ☐	

	O	,	t	h
	1		1	
	2	,	9	8
+	3	,	6	4
	6	,	6	2

2,98 + 3,64 = (6,62)

8 Calculate:

	SOLUTIONS
a $4,15 - 2,48 = \square$	<table><tr><td>**o**</td><td>**,**</td><td>**t**</td><td>**h**</td></tr><tr><td>$\overset{3}{\cancel{4}}$</td><td>,</td><td>$\overset{10}{\cancel{1}}$</td><td>$^{1}5$</td></tr><tr><td>− 2</td><td>,</td><td>4</td><td>8</td></tr><tr><td>1</td><td>,</td><td>6</td><td>7</td></tr></table> $4,15 - 2,48 = (1,67)$
b $6 - 5,69 = \square$	<table><tr><td>**o**</td><td>**,**</td><td>**t**</td><td>**h**</td></tr><tr><td>$\overset{5}{\cancel{6}}$</td><td>,</td><td>$\overset{9}{^{1}\cancel{0}}$</td><td>$^{1}0$</td></tr><tr><td>− 5</td><td>,</td><td>6</td><td>9</td></tr><tr><td>0</td><td>,</td><td>3</td><td>1</td></tr></table> $6 - 5,69 = (0,31)$

5 REFLECTION AND SUMMARY OF LESSON

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised working with big numbers and with decimal fractions.**

Unit 2: Number sentences

INTRODUCTION

This unit focuses on number sentences which, according to CAPS, can be seen as *'a way of preparing learners to write algebraic equations'*. (CAPS Intermediate Phase p 127). It is important that firm foundations are laid because an understanding of number sentences plays an important role in the development of mathematical thinking. Number sentences can be used to describe problem situations; as an equivalent form of expression to flow diagrams and tables; and as a way of showing equivalence.

In the Intermediate Phase learners sometimes work with number sentences in isolation. However, it is more common for learners to work with number sentences when working with problems in words and numbers and with calculations represented in diagrams (including flow diagrams). Number sentences should be included at appropriate times throughout the year.

In this unit, we focus on the four framework dimensions in the following ways:

Framework dimension	How the dimension is developed in this unit
Conceptual understanding	Learners develop number sentences from word problems. Through these activities, learners use the number sentences to express their thoughts when solving problems.
Procedural fluency	Learners do calculations and then compare answers in order to develop an understanding of the rules and order of calculation.
Strategic competence	Learners decide which grouping of numbers will result in the easiest and quickest calculation.
Reasoning	Learners draw or complete pictures to show their thinking behind number sentences they have written.

In this unit, we build a **learning centred classroom** by paying attention to:

		Examples
Concept development	✓	Done in every lesson.
Making sense of mathematics	✓	Learners draw or complete pictures to show their thinking behind number sentences they have written.
Practising procedures	✓	Learners practise the procedure for dealing with problems with and without brackets
Problem solving	✓	Learners write number sentences in order to solve word problems.

Connecting topics and concepts; Addressing gaps in learners' knowledge; Addressing learners' errors	✓	Link to previous lesson, correction of classwork and homework activities, as well as consolidation activities are designed to address gaps and learners' activities
Applying maths in context	✓	Learners solve word problems describing situations encountered in everyday life.

Mathematical vocabulary for this unit

Be sure to teach and use the following vocabulary at the appropriate place in the unit. It is a good idea to make flashcards of words and their meanings and to display these in the classroom at appropriate times.

Term	Explanation / diagram
associative law	The associative law says that, when you add three or more numbers or multiply three or more numbers, it doesn't matter how we group the numbers (i.e. which we calculate first). You can group the numbers using brackets. Examples $(4 + 3) + 2 = 9$ and $4 + (3 + 2) = 9$ $(4 × 3) × 2 = 24$ and $4 × (3 × 2) = 24$
brackets ( )	Symbols that are used to create groups or indicate order of operations. These symbols ( ) are brackets
calculate	Find the answer. Work out the solution
commutative law	The commutative law says that, when we add or multiply two numbers, we can swap numbers and still get the same answer. Examples: $8 + 15 = 23$ and $15 + 8 = 23$ $4 × 7 = 28$ and $7 × 4 = 28$
distributive law	The distributive law says that if a number is multiplied by the sum or difference of two or more numbers, it is equal to the sum or difference of that number multiplied by each of the numbers separately. Examples $3 × (2 + 4) = 3 × 6 = 18$ and $(3 × 2) + (3 × 4) = 6 + 12 = 18$ $5 × (12 – 8) = 5 × 4 = 20$ and $(5 × 12) – (5 × 8) = 60 – 40 = 20$

Term	Explanation / diagram
flow chart	A flow chart is a drawing intended to make clear the order in which operations have to be done so as to produce a result. $\times 3$ 8 24 $\div 3$
inverse operation	The operation that reverses the effect of another operation. Examples: Addition and subtraction are inverse operations Multiplication and division are inverse operations
number sentence	A number sentence is used to describe a problem. It tells us which numbers to work with and what to do with those numbers. It has a left-hand side and a right-hand side and an equals sign between the LHS and RHS.
operation	+; −; × and ÷ are the basic operations used in Grade 5.
placeholder	Symbol used in mathematics in the place of a numeral. Often □ is used.
sum	The answer you get when you add Example: The sum of 5 and 8 is 13
total	The full amount or value The sum of numbers

Prior knowledge for this unit

Concepts in this unit are not entirely new for learners. They have dealt with some of the topics before.

They have:

- used number sentences to solve word problems
- used number sentences for all four operations
- found a missing value in a number sentence
- used inverse operations (+ and − ; × and ÷), particularly in flow charts
- learnt how to apply the commutative, associative and distributive properties in simple calculations.

Further practice for learners

This table references other Grade 5 sources (including textbooks) if you need additional activities.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	25-34	15-26	17-21	8-13	8-12	13-20	1-12	9-18	2-6
	254-255	320-322	287-290	198-201	233-234	342-345	306-309	315-318	242-244
TG	18-23	1-19	42-52	8-12	15-19	14-22	1-10	32-48	6-9
	198-199	320-322	218-222	63-165	160-161	383-387	257-259	326-332	122-125

UNIT PLAN AND OVERVIEW FOR UNIT 2: Number sentences

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
13	develop simple maths sentences in words and numbers, and will use brackets to apply the correct order of operations	Teacher: Flashcards (amount paid; cost; charge; total cost; −; +; =)	
14	develop a number sentence to solve a word problem and will use brackets correctly in a calculation	Teacher: None	
15	use the correct order of operations when solving problems that involve single and mixed operations	Teacher: A3 poster: *Order of operations (1)*	
16	find the answers to number sentences with and without brackets and will be able to use the order of operations correctly	Teacher: A3 poster: *Order of operations (2)*	
17	recognise and use the commutative and distributive properties of whole numbers (Learners are not required to know these terms)	Teacher: A3 poster: *Properties of operations*	
18	apply the properties of operations, including inverse operations	Teacher: A3 poster: *Properties of operations*	
19	link diagrams and number sentences in order to understand the number sentences and the order of operations.	Teacher: None	
20	consolidate their knowledge of number sentences, properties of operations and rules for the order of operations	Teacher and Learner: Grade 5 Learner Books and Teacher's Guides as available	

Assessment for learning
Use the template provided at the beginning of this guide to think deeply about at least one of the lessons in this unit.

Reflection
Think about and make a note of: *What went well? What did not go well? What did the learners find difficult or easy to understand or do? What will you do to support or extend learners? Did you complete all the work set for this unit? If not, how will you get back on track?*

What will you change next time? Why?

Lesson 13: Maths sentences and the order of operations

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127–129 and p 207)
Lesson Objective: Learners will be able to develop simple maths sentences in words and numbers, and use brackets to apply the correct order of operations.
Lesson Vocabulary: number sentence, brackets
Teacher Resources: Flashcards (amount paid; cost; charge; total cost; –; +; =); Prestik/Bostik
Learner Resources: None
Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

1. Complete the flow chart	2. Complete the flow chart
9 → **× 2** → (18) 5 → → (10) 2 → → (4) 0 → → (0) 7 → → (14)	3 → **× 5** → (15) 8 → → (40) 10 → → (50) 6 → → (30) 4 → → (20)

2   LINK TO PREVIOUS LESSON

This is the first lesson in this unit. There are no direct links to the previous lesson.

3   CORRECT HOMEWORK ACTIVITY

This is the first lesson in this unit. There is no homework to correct.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (50 MINUTES)

> NOTE TO THE TEACHER:
> • This is the first of eight lessons (including the Consolidation lesson) on number sentences
> • In the Intermediate Phase, number sentences are used as an introduction to the writing of algebraic equations in higher grades.
> • In this lesson, learners start by developing a maths sentence in words, then they change the words to numbers. They also start to do examples in which they need to think about the order of calculation, and how brackets are used in a number sentence to indicate the order of operations.
> • **Guard against using any acronyms, for example, BODMAS when teaching order of calculation or operation.**

Say: **Today we are learning to write maths sentences and number sentences**

Activity 1: Whole class activity and learners work in pairs

Stick all the Flashcards (Amount paid; Cost; Total Cost; Change; –; +; =) on the board.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Tell the learners to turn to Activity 1 in their LAB. Read the problem three times with the learners. Make sure they understand what is being asked. Say: **Underline the numbers in your LAB with a straight line and underline the question asked with a wavy line.** Write the problem on the board: Ask: **Who will come to the board to underline the number and the question? Remember to use a wavy line for the question.** Ask: **How much is a hamburger?**	Work on **1** with your teacher and the whole class Work on **2** with your partner **1** Sankie bought a hamburger. She paid with a <u>R50</u> note. How much change should Sankie get? **Jabu's FAST FOODS** PRICE LIST Hamburger .... R26 Hot chips .... R18 Fried fish .... R17 Russian sausage .... R9 Cold drink .... R14 **a** Underline the number in the problem with a straight line. **b** Underline the question using a wavy line. **c** How much does the hamburger cost? [R26]

WHAT YOU DO	**WHAT THE LEARNERS HAVE IN THEIR LABS** **(Answers are given in square brackets)**
Say: **Who will come to the board to use the flashcards to make a word sentence we could use to find the answer?** Answer: [Amount paid] [−] [Cost] [=] [Change]	
Say: **Copy the word sentence in your LAB.** Say: **Work with your partner and write a number sentence that you can use to find the answer. Then write down the answer.** Correct the work with the whole class. Learners can use a variety of strategies to do the subtraction. Hopefully, they will do so mentally.	**d** Write the word sentence here: [Amount paid – Cost = Change] **e** Write the number sentence and the answer here: [R50 – R26 = R24] **f** Write the answer in words. [Sankie should get R24 change]
Say: **Now work with your partner to answer 2.** One the learners have finished with **2**, correct the work with the whole class.	**2** Manto uses a R20 note to buy a Russian sausage. How much change should she get? **a** Underline the number in the problem with a straight line. **b** Underline the question using a wavy line. **c** How much does a Russian sausage cost? [R9] **d** Write the word sentence here: [Amount paid – Cost = Change] **e** Write the number sentence and the answer here: [R20 – R9 = R11] **f** Write the answer in words. [Manto should get R11 change]

Activity 2: Learners work with in pairs

You are going to need all the flash cards and Prestik/Bostik.

Say: **Work with a partner to do Activity 2 in the LAB.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Read the problem three times with the learners. Make sure they understand what is being asked. Say: **Underline the numbers in your LAB with a straight line and underline the question asked with a wavy line.** Ask: **How much is the fried fish and how much are the hot chips?** [R17 and R18] Note: Writing number sentences is the most important activity of the lesson. You need to give the learners enough time to discuss and manipulate the words.	Work with your partner **1** You buy fried fish and hot chips. You use a R50 note. How much change should you get? **Jabu's FAST FOODS** PRICE LIST Hamburger .... R26 Hot chips .... R18 Fried fish .... R17 Russian sausage .... R9 Cold drink .... R14 **a** Look at the flashcards on the board. Use the words on the flashcards to write a number sentence or number sentences that you can use to work out the answer.
Ask the learners to come to the board and to use the flash cards to stick their maths sentences on the board. If all the pairs have the same sentences, ask the class if there is another way to find the answer. (When we start talking about using brackets, Possibility B is important.)	[Possibility A: Amount Paid – Cost – Cost = Change Possibility B: Cost + Cost = Total Cost Amount Paid – Total Cost = Change]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Once learners have had time to answer the questions, discuss the answers and provide feedback.	**b** Write number sentences that you can use to work out the answer. [A: R50 – R17 – R18 = R15 B: R17 + R18 = R35 R50 – R35 = R15] **c** What is the answer? [I get R15 change] **2** Duxie bakes and sells scones. She packs the scones into a box like this: <u>3</u> scones in a row, <u>2</u> rows in a box How many boxes will she need to hold 60 scones? **a** Underline the numbers with a straight line and underline the question with a wavy line.
Give the learners time to discuss their answers. If they are struggling, work through this simpler example with them. Write on the board: **There are 20 oranges.** **If you make a box of 4 oranges, how many boxes you can make?** Ask: **What is the number sentence for this problem, and what is the answer?** [20 ÷ 4 = 5, 5 bags]	**b** Discuss with your partner how you can write a maths sentence that you can use to find out how many boxes Duxie needs. Write the sentence here: [Total numbers of scones ÷ number of scones in a box = number of boxes]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Say: **20 is 'total numbers of oranges', 4 is 'number of oranges in a box', the answer 5 which is 'number of boxes' you can make.** Write this on the board, and say: **So, your maths sentence will be:** **Total numbers of oranges ÷ number of oranges in a box = number of boxes.** Use this sentence involving oranges to assist the learners write down a sentence for the total number of scones.	**c** Write a single number sentence. You can use a bracket if it is necessary. [60 ÷ (3 × 2) = ☐]
Learners are expected to do this calculation mentally.	**d** Calculate the answer. [10 boxes] will be needed.

Activity 3: Learners work on their own

- Say: **Work on your own to do Activity 3 in the LAB.**

- Walk around the class and assist the learners who need help. The answers are given in square brackets below.

Work on your own

On a bus, there are two seats on one side of the aisle and three seats on the other side like this:

How many rows of seats are needed to seat 50 people?
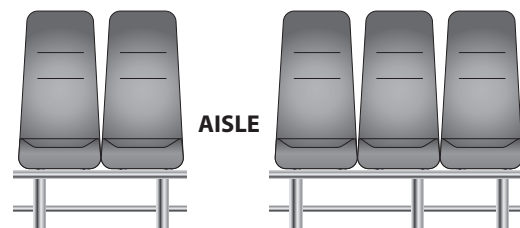
AISLE

1 Underline the numbers with a straight line and underline the question with a wavy line.

---

2 Write a single number sentence you could use to find the answer.

> Remember:
> We can use brackets to show which calculation to do first

Answer: $[50 ÷ (2 + 3) = \square]$

3 Use your number sentence to work out the answer.
Answer: $[50 ÷ 5 = 10]$

4 Write your answer in words:
[10 rows of seats are needed.]

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with the learners. Make sure they all understand what to do.
- Remind the learners that brackets show us which calculation must be done first.
- Answers are given below in square brackets.

A pencil which costs R6 and a ruler which costs R9 are sold as a set.

How many pencil-ruler sets can a teacher buy if she has R150?
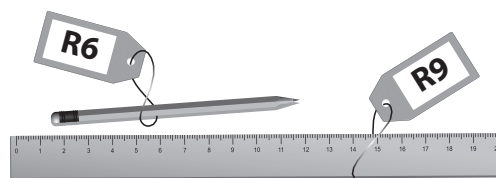
1 Underline the numbers with a straight line and the question with a wavy line.

2 Write a single number sentence you could use to find the answer.
Number sentence: $[150 ÷ (6 + 9) = \square]$

3 Use your number sentence to calculate the answer.
Answer: $[150 ÷ (6 + 9) = 150 ÷ 15 = 10]$

4 Write the answer in words:
Answer: [She can buy 10 pencil-ruler sets]

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **that we can write maths sentences and number sentences to solve word problems**
- **that brackets show which calculations we should do first.**

Lesson 14: Using brackets

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127 – 129 and p 207)
Lesson Objective: Learners will be able to develop a number sentence to solve a word problem and use brackets correctly in a calculation.
Lesson Vocabulary: brackets
Teacher and Learner Resources: None
Date: Week Day

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	6 × 3	18	**6**	7 × 3	21
2	2 × 3	6	**7**	1 × 3	3
3	0 × 3	0	**8**	5 × 3	15
4	8 × 3	24	**9**	9 × 3	27
5	10 × 3	30	**10**	4 × 3	12

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer the learners to the activity in the LAB.

Sam buys two bottles of cooking oil which cost R32 and R48 each.

He pays with a R100 note.

How much change should he get?

1   Underline the numbers with a straight line and underline the question with a wavy line.
2   Write a number sentence: [100 – (32 + 48) = ☐]
3   Find the answer: [100 – 80 = 20]
4   Write the answer with the correct unit: [Sam will get R20 change.]

---

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 13 are provided in Lesson 13.

Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

> NOTE TO THE TEACHER:
> - In this lesson, learners continue to develop number sentences in order to solve word problems.
> - They also gain more practice with working with brackets which tell them that the calculation in brackets should be done first.
> - We build on concepts developed in Lesson 13 but have added the operations of multiplication and division.

Say: **Today we are going to be solving more word problems.**

Activity 1: Whole class activity

- Say: **Let's work together to do Activity 1.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Work through the activity step-by-step with learners. Remind learners of the process to follow when solving word problems by saying: **i.** Read the word problem three times. Make sure you understand the words and what you are asked to do. **ii.** Use a solid line. Underline the numbers. **iii.** Use a wavy line. Underline the question.	Work with the whole class A tin of coffee costs R30 and a bag of sugar costs R20. Four of your neighbours ask you to buy them a tin of coffee and a bag of sugar. How much will this cost? **1** Underline the numbers using a straight line and underline the question using a wavy line. **2** Write a word sentence you could use to find the answer. [Four lots of thirty rand plus twenty rand]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Say: **This calculation involves multiplication and addition. Think about how you are going to use brackets to show the order of calculation.**	**3** Write a number sentence you could use to find the answer. $[4 \times (30 + 20) = \square]$
	4 Use your number sentence to find the answer. $[4 \times (30 + 20)$ $= 4 \times 50$ $= 200]$
	5 Write the answer in words. The coffee and sugar for four people will cost [R200]

Activity 2: Learners work in pairs

- Say: **Work with a partner to do Activity 2 in the LAB.**

- Walk around the classroom to assist as required.
- Once the learners have completed the activity, work through it with them so that they can receive immediate feedback.
- The answers are given in square brackets below.

Work with your partner to answer the following:

Martha and Martin are saving to buy a present for their father.
Martha saves R6 per week and Martin saves R4 per week.
For how many weeks will they need to save to get R100?

1 Underline the numbers with a straight line and draw a wavy line under the question.

2 What you know from the problem
Savings per week: Martha [R6], Martin [R4]
The goal amount = [R100]

3 Write a maths word sentence you could use to find the answer.
[The goal amount ÷ the savings per week = number of weeks needed]

4 Write a number sentence to find the answer.
[100 ÷ (6 + 4) = ☐]

5 Find the answer.
[100 ÷ (6 + 4)
= 100 ÷ 10
= 10]

6 Write the answer in words:
[It will take 10 weeks to save the money.]

Activity 3: Learners work on their own

- Say: **Work on your own to do Activity 3 in your LAB.**

- Remind learners: **When you see brackets in a number sentence, you must work out the calculation in the brackets first.**
- Walk around the classroom to assist as required.
- Once learners have completed the activity, work through it with them so that they can receive immediate feedback.
- The answers are given in square brackets below.

Work on your own to do the following calculations:

1 6 × (4 + 13)
= [6 × 17]
= [102]

2 100 − (65 − 30)
= [100 − 35]
= [65]

3 140 ÷ (4 + 10)
= [140 ÷ 14]
= [10]

4 (97 − 43) ÷ 3
= [54 ÷ 3]
= [18]

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in square brackets.

Calculate:

1   75 – (12 + 13)
   = [75 – 25]
   = [50]

2   980 + (300 – 180)
   = [980 + 120]
   = [1 100]

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **to solve word problems by writing a single number sentence**
- **to use brackets in calculations in there is more than one step.**

Lesson 15: Order of operations (1)

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127 - 129 and 207)
Lesson Objective: Learners will be able to use the correct order of operations when solving problems that involve single and mixed operations.
Lesson Vocabulary: brackets, operations
Teacher Resources: A3 poster: *Order of operations (1)*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Complete the flow chart

3 →		→	(12)
5 →		→	(20)
10 →		→	(40)
0 →		→	(0)
6 →	**× 4**	→	(24)
9 →		→	(36)
2 →		→	(8)
8 →		→	(32)
4 →		→	(16)
7 →		→	(28)
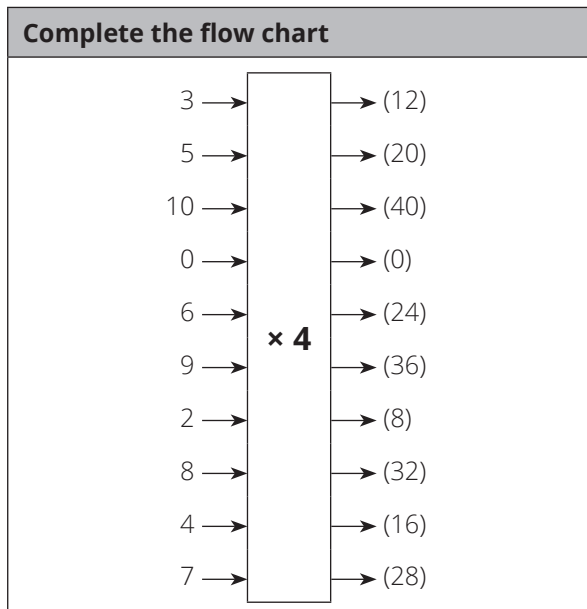
2   LINK TO PREVIOUS LESSON (5 MINUTES)

• Refer learners to the activity in the LAB.

Add brackets to make the number sentence true.

		Answers
1	$4 \times 3 + 12 = 60$	**1** $4 \times (3 + 12) = 60$
2	$84 \div 6 - 3 = 28$	**2** $84 \div (6 - 3) = 28$
3	$72 - 9 - 3 = 6$	**3** $72 - (9 - 3) = 66$

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 14 are provided in Lesson 14.

Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

> NOTE TO THE TEACHER:
> - Number sentences are used when solving word problems.
> - Grade 5 learners should be familiar with working with number sentences with more than one operation (e.g. 13 – 4 + 6 = 15).
> - What is new in Grade 5 is that mixed operation number sentences that need to be done in a specific order. This is the main concept covered in this lesson.

Say: **Today we are learning more about the correct order of calculation when doing mixed operation calculations**

Activity 1: Learners work on question 1 on their own followed by a whole class activity

Stick the A4 poster: *Order of operations (1)* on the board.

- Say: **Turn to Activity 1 in your LAB.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Once the learners have completed **1**, mark **1** with them and only then go onto **2** and **3**.	Work on **1** on your own. Work on **2** and **3** with your class. 1 Write a single number sentence for each problem and then solve the problem. **a** Sam buys 3 bottles of cooking oil which cost R32,00 each. Sam pays with a R100 note. How much change should he get? Number sentence: [R 100 – (3 × R32) = R100 – R96 = R4] Answer in words: Sam should get [R4] change.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)

	b Mary buys a pair of scissors which costs R50,00 and half a dozen pencils which cost R 70,00 per dozen. What is the total price that Mary must pay?
	
	Number sentence:
	[R50 + (R70 ÷ 2) = R50 + R35
	                              = R85]
	
	Answer in words:
	Mary must pay [R85]
	
	c Siya buys 4 bags of potatoes that cost R15 each and 5 bags of carrots that cost R20 each. What is the total price that Siya must pay?
	
	Number sentence:
	[(4 × R15) + (5 × R20) = R60 + R100
	                                    = R160]
	
	Answer in words
	Siya must pay [R160]

Read the information on the A4 poster: *Order of Operations (1)* with the learners. The learners can follow in their LAB while you say this. Write **2 a**, **b** and **c** on the board, and work through each one with the class. Ask learners to come to the board and write what they think the answer is. Ask the rest of the learners if answer is correct.	In mathematics, multiplication and division in the same number sentence must be done before addition and subtraction. **2.** Find the answers to the following calculations: **a** R 100 – 3 × R32 = [R100 – R96] = [R4] **b** R50 + R70 ÷ 2 = [R50 + R35] = [R85]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)

Learners then complete **2** and then **3** in their LAB.
 	
Discuss the answers with the learners.
	c $4 \times R15 + 5 \times R8$
	   $= [R60 + R40]$
	   $= [R100]$
	
	3 Fill in the missing words in this sentence:
	
	If you don't see any brackets in a number sentence with mixed operations, you always do [multiplication] and [division] first.

Activity 2: Learners work on their own

Say: **Turn to Activity 2 in your LAB.**

- Walk around the classroom and support the learners as necessary.
- Answers are given in square brackets.

Work on your own.

Solve:
1 $700 - 6 \times 90 = [700 - 540] = [160]$
2 $60 + 240 \div 2 - 80 = [60 + 120 - 80] = [100]$
3 $3 \times 12 + 50 \div 2 = [36 + 25] = [61]$
4 $90 + 72 \div 6 = [90 + 12] = [102]$
5 $1\,000 - 4 \times 200 = [1\,000 - 800] = [200]$

Activity 3: Learners work in pairs

Say: **Turn to Activity 3 in your LAB and work on the questions with your partner.**

- Walk around the classroom and support the learners as necessary.
- Answers are given in square brackets.

Work with a partner

Remember:

In mathematics, multiplication and division in the same number sentence must be done before addition and subtraction.

1   What is the total cost if you buy 1 packet of mealie meal for R16 and 5 small cabbages which cost R10 each?

   a   Pulane and Monga both worked out the answer.
       Who is correct, Pulane or Monga? Use calculations to support your answer.

Pulane got an answer of R66	Monga got an answer of R210

   [Pulane is correct. He used the rule for order of calculations correctly. He multiplied to get the cost of the cabbages before he added the cost of the mealie meal: $16 + 5 \times 10 = 16 + 50 = 66$]

   b   Write the answer in words:
       The total cost is R[66]

2   You use a R50 note to buy 4 notebooks which cost R8 each.
    What change will you get?

   a   Write a number sentence that you can use to solve this problem.
       Number sentence: [$50 - (4 \times 8) = \square$ or $50 - 4 \times 8 = \square$]

   b   Work out your answer here:
       [$50 - (4 \times 8) = 50 - 32 = 18$]
       OR
       [$50 - 4 \times 8 = 50 - 32 = 18$]

   c   Write the answer in words.
       The change is R[18]

3.   State whether true or false:

    We only need to insert brackets when we need the order of calculation to be different from the rule. [True]

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in square brackets.

Calculate.

Use the rules for the order of operations to find the answers to these:

1 $30 - 6 \times 3$
= [30 − 18 = 12]

2 $25 + 20 \div 5$
= [25 + 4 = 29]

3 $6 \times 5 - 15 \div 5$
= [30 − 3 = 27]

4 $(6 + 4) \times 7$
= [10 × 7 = 70]

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6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **when a number sentence has brackets, do the operations inside the brackets first.**
- **we must follow the rules for order of operations when you have addition and/or subtraction AND multiplication and/or division in the same number sentence. If there are no brackets, do the multiplication and/or division first.**

Lesson 16: Order of operations (2)

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127 – 129 and p 207)
Lesson Objective: Learners will be able to find the answers to number sentences with and without brackets; and will be able to use the order of operations correctly.
Lesson Vocabulary: brackets, calculate
Teacher Resources: A3 poster: *Order of Operations (2)*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Question		Answer	Question		Answer
1	7×6	42	**6**	2×6	12
2	1×6	6	**7**	6×6	36
3	9×6	54	**8**	3×6	18
4	4×6	24	**9**	8×6	48
5	10×6	60	**10**	5×6	30

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

What is the total cost if you buy 6 soccer balls at R90 each and 5 netballs at R60 each?

R90   **R60**

1   Write a number sentence and then calculate
    the answer.
    [Total cost = (6 × 90) + (5 × 60)
                = 540 + 300
                = 840]

2   Write the answer in words. Don't forget to include the unit.
    [The total cost is R840]

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 15 are provided in Lesson 15.
Use this time to purposefully address gaps in learners' knowledge and to identify and
address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:
- The calculation rules for number sentences involving mixed operations state:
    - If there are BRACKETS, we do the calculation inside the brackets first;
    - If there are no brackets and there is addition and subtraction AND multiplication
      and division in the same number sentence, we DO THE MULIPLICATION and
      DIVISION FIRST, before the addition and subtraction.
- Teachers sometimes teach learners to follow the acronym BODMAS or BOMDAS or
  other variations. We suggest that it is better not to use acronyms with the learners but
  to rather develop the four pillars of the TMU framework, which are:
    - Conceptual understanding
    - Procedural fluency
    - Strategic competence
    - Reasoning.

Say: **Today we practise working with the rules for the order of operations.**

Activity 1: Whole class activity

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Place the A3 poster: *Order of Operations (2)* on the board and tell the learners to turn to Activity 1 in their LAB.	Work with your class.
Say: **Let's practise our calculation rules.**	
Tell the learners to try **1** in their LAB. Give them a few minutes, and then ask: **How did you calculate your answer?**	**1** Use the order of operation rules to find the answer to $20 - 10 + 2 = \square$ Answer: [12]
[I subtracted 10 from 20 first and then added 2. OR I added 2 to 20 and subtracted 10.]	
Before you give the learners an opportunity to work out the answer to **2**, ask: **What do you do first?** [10 ÷ 2].	**2** Now calculate $20 - 10 \div 2 = \square$ Answer: [$20 - 10 \div 2 = 20 - 5 = 15$]
Ask: **Why?** [Because, if there are no brackets, we have to calculate multiplication and division before we do the addition and subtraction.]	
Say: **Find the answer to 2.**	

Activity 2: Learners work on their own

Say: **Remember, when we have a calculation with more than one step, we must decide which calculation should be done first.**

- Walk around the classroom to support learners as necessary.
- When learners have had time to work through the activity, go through the steps and the answers in order to provide immediate feedback.
- Answers are given below.

Work on your own.

ORDER OF OPERATION RULES
- Calculate inside the brackets first.
- Calculate multiplication or division before addition and subtraction.

---

1 Find the answer showing the order that you did the calculation and explain your reason for the order you chose.

a $12 - 6 + 2$

6

8

[= 6 + 2
 = 8]
Reason: [There is no bracket, so I calculate from left to right]

b $12 - (6 + 2)$

8

4

[= 12 − 8
 = 4]
Reason: [There is a bracket, so I calculate inside the brackets first]

c $12 \div 6 \times 2$

2

4

[= 2 × 2
 = 4]
Reason: [There is no bracket, so I calculate from left to right]

d $12 \div (6 \times 2)$

12

1

[= 12 ÷ 12
 = 1]
Reason: [There is a bracket, so I calculate inside the brackets first]

e $12 + 6 \div 2$

$$3$$

$$15$$

[= 12 + 3

= 15]

Reason: [There is no bracket, so I do the division before I do the addition]

f $(12 + 6) \div 2$

$$18$$

$$9$$

[= 18 ÷ 2

= 9]

Reason: [There is a bracket, so I calculate inside the brackets first]

2 State whether true or false:

a If there are brackets, we always do the calculation inside the brackets first. [True]

b If there are no brackets, addition or subtraction are done before multiplication or division. [False]

c If a number sentence only has multiplication or division, we calculate from left to right. [True]

Activity 3: Learners work on their own and then with their partner

- Say: **Work with your partner to do Activity 3 in the LAB.**

- Walk around the classroom to support the learners as necessary.
- When learners have had time to work through the activity, go through the steps and the

Work on your own first and then share your order of operations and the answer with your partner.

Find the answer showing the order of operations you used and explain the reason for getting the answer you did.

1 $5 \times 8 - 6 \div 2$

$$403$$

$$37$$

[= 40 − 3

= 37]

Reason: [Calculate multiplication and division before subtraction]

2 $5 \times (8 - 6 \div 2)$

25

$[= 5 \times (8 - 3)$
$\quad = 5 \times 5$
$\quad = 25]$

Reason: [Bracket first then and then division first in the bracket]

3 $5 \times (8 - 6) \div 2$

5

$[= 5 \times 2 \div 2$
$\quad = 10 \div 2$
$\quad = 5]$

Reason: [Bracket first and then from left to right]

4 $(5 \times 8 - 6) \div 2$

$[= (40 - 6) \div 2$
$\quad = 34 \div 2$
$\quad = 17]$

Reason: [Bracket first and then multiplication first in the bracket]

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Remind learners that they follow the rules for the order of calculations.
- The answers are given in square brackets.

Choose the correct calculation order rule and then find the answer.

1 $16 - 2 + 2 = \square$

Rule: [Calculate from left to right]

Calculation: $16 - 2 + 2 = [14 + 2 = 16]$

2 $16 - (2 + 2) = \square$

Rule: [Calculate inside the bracket first]

Calculation: $16 - (2 + 2) = [16 - 4 = 12]$

3 $16 \div 2 \times 2 = \square$

Rule: [Calculate from left to right]

Calculation: $16 \div 2 \times 2 = [8 \times 2 = 16]$

4 $16 \div (2 \times 2) = \square$

Rule: [Calculate inside the bracket first]

Calculation: $16 \div (2 \times 2) = [16 \div 4 = 4]$

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have practised the order of operations.**

We know that we:
- **Usually calculate from left to right**
- **Should calculate inside the brackets first**
- **Should do the multiplication and division first before doing the addition and subtraction in the same number sentence.**

Lesson 17: Properties of operations

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127–129 and p 207)
Lesson Objective: Learners will be able to recognise and use the commutative and distributive properties of whole numbers. (Learners are not required to know the names of these properties).
Lesson Vocabulary: brackets, calculate
Teacher Resources: A3 poster: *Properties of operations*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Complete the flow chart

	× 7	
4 →		→ (28)
0 →		→ (0)
6 →		→ (42)
8 →		→ (56)
2 →		→ (14)
9 →		→ (63)
7 →		→ (49)
3 →		→ (21)
5 →		→ (35)
10 →		→ (70)
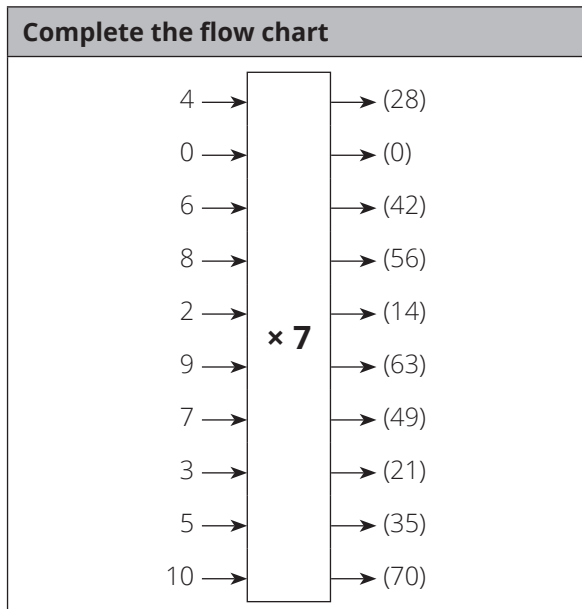
2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Robert and Busi calculated $3 \times 10 + 5 \times 2$. They were surprised to find that they got different answers.

Robert's answer was 70 and Busi's answer was 40.

Explain how each of them got their answers.
[Busi calculated the two multiplications before addition: $3 \times 10 + 5 \times 2 = 30 + 10 = 40$]
[Robert worked from left to right: $3 \times 10 + 5 \times 2 = 30 + 5 \times 2 = 35 \times 2 = 70$]

Who is correct? [Busi]
Why? [He used the correct order of operations]

---

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 16 are provided in Lesson 16.
Utilise this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:
- In this lesson the learners consolidate their understanding of the commutative and distributive properties of whole numbers. As with Grade 4, the learners are not expected to know the names of the properties.
- In Grade 5 learners need to know how to recognise and use the properties to make calculations easier or to make a number sentence true.
- The approach in this lesson is to carefully select problems to provide opportunities for learners to consolidate their understanding of these properties.
- When discussing whether the commutative property holds for subtraction, learners cannot complete and compare number sentences because one answer will be a negative number and learners have not yet done negative numbers. CAPS (p 42) recommends the use of number sentences with True and False.
  Examples: True or false? $49 - 13 = 13 - 49$; True or false? $297 - 36 = 36 - 297$

Say: **Today we are learning more about the properties of operations.**

Activity 1: Whole class activity and learners work with their partner

Stick the A3 poster: *Properties of operations* up on the board.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Tell the learners to turn to Activity 1 in their LAB. Work through the questions with the learners. Discuss the questions with them and make sure they write down the correct answers. Tell the learners to work out the answers to **1**. • Ask: **What do you notice?** [We get the same answer '18' whether we add 8 and 10 or 10 and 8.] • Say: **We can write this as 8 + 10 = 10 + 8 because the two answers are the same.**	Work on the questions with your teacher and the whole class **1 a** Calculate the answers to the following: 8 + 10 = [18] 10 + 8 = [18] **b** What do you notice about the two answers? [They are the same.]
Tell the learners to work out the answers to **2**. • Give the pairs time to try with several pairs of numbers. Let the pairs share their results with the class. Their choices of numbers will vary. e.g. 90 + 20 = 20 + 90 = 110 45 + 76 = 76 + 45 = 121 1 + 100 = 100 + 1 = 101 7 300 + 1 000 = 1 000 + 7 300 = 8 300 (If learners choose 1-digit or 2-digit numbers only, encourage them to try large numbers as well.)	**2** Look at ▲ + ● = ● + ▲ where ▲ and ● represent any numbers. **a** Do you think we can put any numbers in the place of the ▲ and ● in ▲ + ● = ● + ▲? [Yes, we can.] **b** Try some numbers with your partner.
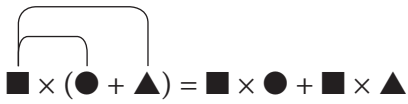
WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)

• Ask: **What do you notice?** (We can swap the order when adding two numbers.)
 	
• Say: **When we add two numbers, the order in which we calculate does not matter.**
 	
Say: **Let's check whether you can swap the order when you subtract two numbers.**
 	
• Tell the learners to look at **3 a** and **b** in their LAB and decide whether the mathematics sentences are true or false.
 	
• Do not get into a discussion on negative numbers or learners may say we cannot subtract 49 from 13, or 13 is smaller than 49, so that we cannot subtract, etc. It is enough for them to say false.
 	
• Ask: **What do you notice?** [We cannot swap the order of numbers in subtraction.]
 	
• Say: **Calculation order DOES matter when we subtract.**
	3 Are these sentences true or false?
	
	   a 49 – 13 = 13 – 49 [False.]
	
	   b 297 – 36 = 36 – 297 [False]

Say: Let's check whether calculation order matters when we multiply.
 	
• Tell the learners to look at **4 a** and **b** in their LAB and decide whether the mathematics sentences are true or false.
	4 Are these sentences true or false?
	
	   a $5 \times 3 = 3 \times 5$ [True]
	
	   b $12 \times 10 = 10 \times 12$ [True]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Tell the learners to work out the answers to **5**. • Give the pairs time to try with several pairs of numbers. Let the pairs share their results with the class. • Let pairs to share their results with the class. Their choices of numbers will vary. e.g. $8 \times 9 = 9 \times 8 = 72$ $3 \times 25 = 25 \times 3 = 75$ $50 \times 100 = 100 \times 50 = 5\ 000$ (If learners choose 1-digit or 2-digit numbers only, encourage them to try large numbers as well.) • Ask: **What do you notice?** [We can swap the order when we multiply two numbers.] • Say: **When we multiply two numbers, the order in which we calculate does not matter.**	**5** Look at $\blacktriangle \times \bullet = \bullet \times \blacktriangle$ where $\blacktriangle$ and $\bullet$ represent any numbers. **a)** Do you think we can put any numbers in the place of the $\blacktriangle$ and $\bullet$ in $\blacktriangle \times \bullet = \bullet \times \blacktriangle$? [Yes, we can.] **b)** Try some numbers with your partner.
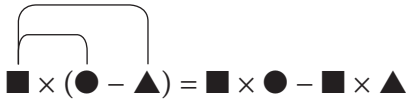
Activity 2: Whole class activity

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Tell the learners to turn to Activity 2 in their LAB. Work through the questions with the learners. Discuss the questions with them and make sure they write down the correct answers.	Work on this activity with your teacher and the whole class

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)

Remind the learners of the procedure to follow when solving word problems:
 i   Read through the problem 3 times. Make sure you understand what you are being asked to do.
 ii Use a straight line to underline the numbers.
 iii Use a wavy line to underline the question.
 iv Use the words and numbers to write a number sentence.
 	
 Work through the questions with the learners.
 	
 Allow the learners time to answer the question.
 Then discuss the question and their answers with them and give them time to correct their answer if they got it wrong.
	Gugu has a spaza shop.
	 She bought 5 bags of mealie meal at R70 each and 5 bags of rice at R30 each to sell in her shop.
	
	 R70,00
	 R30,00
	
	 1 How much did Gugu spend altogether?
	
	    a Write a single number sentence that you can use to solve the problem.
	      $[5 \times R70 + 5 \times R30$ or $5 \times (R70 + R30)]$
	
	    b Nomsa used the number sentence $5 \times R70 + 5 \times R30$ to calculate her answer.
	
	      Use Nomsa's number sentence to work out the answer.
	      $5 \times R70 + 5 \times R30$
	      $= [R350 + R150]$
	      $= [R500]$
	
	      Explain why Nomsa used this number sentence.
	
	      [There are 5 bags of mealie meal and 5 bags of rice. She found the total price of the mealie meal and the total price of rice and added both total prices together.]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
	c Esther used the number sentence 5 × (R70 + R30) to calculate her answer. Use Esther's number sentence to work out the answer. 5 × (R70 + R30) = [5 × R100] = [R500] Explain why Esther used this number sentence. [She added the price of a bag of mealie meal and the price of a bag of rice together. There are 5 bags of mealie meal and 5 bags of rice, so she then multiplied the total price by 5.] **d** Nomsa and Esther used different number sentences. Did they get the same answer? [Yes, they both got the same answer] We can write what we found out like this: **NUMBER SENTENCE 1** We found that we can combine both number sentences as: 5 × (R70 + R30) = 5 × R70 + 5 × R30 OR ■ × (● + ▲) = ■ × ● + ■ × ▲

UNIT 2

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
Remind the learners of the procedure to follow when solving word problems: **i** Read through the problem 3 times. Make sure you understand what you are being asked to do. **ii** Use a straight line to underline the numbers. **iii** Use a wavy line to underline the question. **iv** Use the words and numbers to write a number sentence. Work through the questions with the learners. Allow the learners time to answer the question. Then discuss the question and their answers with them and give them time to correct their answer if they got it wrong.	**2** Remember that Gugu bought <u>5</u> bags of mealie meal at R<u>70</u> each and <u>5</u> bags of rice at R<u>30</u> each to sell in her shop. R70,00 R30,00 She now wants to find the difference in the total cost of the mealie meal and the total cost of the rice. **a** Gugu used the number sentence 5 × R70 − 5 × R30 to calculate her answer. Use Gugu's number sentence to work out the answer. 5 × R70 − 5 × R30 = [R350 − R150] = [R200] So, she said that the difference in the total cost of the mealie meal and the total cost of the rice was [R200] **b** Could Gugu have used the number sentence 5 × (R70 − R30) to calculate her answer? Use Gugu's second number sentence to work out the answer. 5 × (R70 − R30) = [5 × R40] = [R200]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
	c What do you notice about the answers in **2a** and **2b**. [They are the same / we get the same answer with both number sentences.] We can write what we found out like this: **NUMBER SENTENCE 2** We found that we can combine both number sentences as: $5 \times (R70 - R30) = 5 \times R70 - 5 \times R30$ OR $\blacksquare \times (\bullet - \blacktriangle) = \blacksquare \times \bullet - \blacksquare \times \blacktriangle$
Allow the learners time to answer questions 3, 4 and 5. Then discuss the question and their answers with them and give them time to correct their answer if they got it wrong.	**3** Look at these two number sentences: What is the difference between them? $\blacksquare \times (\bullet + \blacktriangle) = \blacksquare \times \bullet + \blacksquare \times \blacktriangle$ $\blacksquare \times (\bullet - \blacktriangle) = \blacksquare \times \bullet - \blacksquare \times \blacktriangle$ [Answer: The first one uses addition and the second one uses subtraction] **4** Now let's try some numbers instead of the $\blacksquare$, the $\bullet$ and the $\blacktriangle$. Suppose $\blacksquare = 5$, $\bullet = 4$, and $\blacktriangle = 3$. Check whether the first number sentence is true by writing numbers instead of symbols. So, $\blacksquare \times (\bullet + \blacktriangle)$ $= [5 \times (4 + 3) = 5 \times 7 = 35]$ And $\blacksquare \times \bullet + \blacksquare \times \blacktriangle$ $= [5 \times 4 + 5 \times 3 = 20 + 15 = 35]$ So, is $\blacksquare \times (\bullet + \blacktriangle) = \blacksquare \times \bullet + \blacksquare \times \blacktriangle$ always true? [Yes, it is.]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
	5 Instead of the ■, the ● and the ▲, write ■ = 10, ● = 18, and ▲ = 8. Check whether the second number sentence is true by writing numbers instead of the symbols. So, ■ × (● − ▲) = [10 × (18 − 8) = 10 × 10 = 100] And ■ × ● − ■ × ▲ = [10 × 18 − 10 × 8 = 180 − 80 = 100] So, is ■ × (● − ▲) = ■ × ● − ■ × ▲ always true? [Yes, it is.]

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers provided below in square brackets.

---

1 Complete the number sentences.
   a 6 + 5 = [5] + 6 = [11]
   b 15 = 6 + [9] = [9] + 6
   c [10] × 9 = 9 × [10] = 90
   d 13 × 7 = [91] and 7 × 13 = [91]

2 State whether true or false. Explain.
   a 13 + 6 = 6 + 13 [True. Calculation order does not matter when we add.]
   b 27 − 15 = 15 − 27 [False. Calculation order does matter when we subtract. We cannot change the order.]

---

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt the following properties of operations:**

- ● + ▲ = ▲ + ●
- ▲ × ● = ● × ▲
- ■ × (● + ▲) = ■ × ● + ■ × ▲
- ■ × (● − ▲) = ■ × ● − ■ × ▲

Lesson 18: Relationships between calculations

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127 – 129 and p 207)
Lesson Objective: Learners will be able to apply the properties of operations, including inverse operations.
Lesson Vocabulary: operation, inverse operation, placeholder, flowchart
Teacher Resources: A3 Poster: *Properties of operations*.
Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	5 × 8	40	**6**	1 × 8	8
2	9 × 8	72	**7**	6 × 8	48
3	7 × 8	56	**8**	0 × 8	0
4	3 × 8	24	**9**	4 × 8	32
5	10 × 8	80	**10**	8 × 8	64

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer the learners to the activity in the LAB.

> **1** Use the numbers ■ = 10; ● = 8 and ▲ = 5 to work out the answers.
>   **a** ■ × (● − ▲) = 10 × (8 − 5) = [10 × 3 = 30]
>   **b** ■ × ● − ■ × ▲ = [10 × 8 − 10 × 5 = 80 − 50 = 30]
>
> **2** Can we say that ■ × (● − ▲) = ■ × ● − ■ × ▲ is always true?
>   (Yes, we can.)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 17 are provided in Lesson 17.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:
- This lesson provides opportunities for learners to practise the properties of operations and inverse operations.
- None of these concepts are new to the learners. Learners have revised the commutative and distributive properties in the previous lesson, and since Grade 3 learners have been using inverse operations to check solutions.

Say: **Today we are learning more about applying the properties of operations.**

Activity 1: Whole class activity and then learners work in pairs

Stick up the A3 poster: *Properties of operations* on the board.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Work on **1** with your teacher and the whole class Work on **2**, **3** and **4** with your partner
• Ask: **Explain to the class what Properties 1 and 2 are telling us.** (With addition and multiplication, the order of calculation doesn't matter, so we can swap the position of numbers.) • Say: **We are going to look at more properties of operations.** • Ask: **What do you notice about the operations in Properties 3, 4, 5 and 6?** (There are properties where there are three numbers and addition, subtraction, multiplication and division.)	**Properties of Operations** 1 $\bullet + \blacktriangle = \blacktriangle + \bullet$ 2 $\blacktriangle \times \bullet = \bullet \times \blacktriangle$ 3 $\blacksquare \times (\bullet + \blacktriangle) = \blacksquare \times \bullet + \blacksquare \times \blacktriangle$ 4 $\blacksquare \times (\bullet - \blacktriangle) = \blacksquare \times \bullet - \blacksquare \times \blacktriangle$ 5 $(\blacksquare + \bullet) + \blacktriangle = \blacksquare + (\bullet + \blacktriangle)$ 6 $(\blacksquare \times \bullet) \times \blacktriangle = \blacksquare \times (\bullet \times \blacktriangle)$

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Allow the learners time to answer **1**. • When they have finished, write the number sentence on the board: $31 + 26 + 14 = \square$ And ask: **How did you calculate the answer?** Invite the learners to write their method on the board, explaining as they write. If they don't give different solutions (especially the second solution), explain the method to the learners. • Point to the poster and ask: **Which one of the properties did we use to find the answer to the calculation?** [Property 5] • Say: **We can group numbers to add in any way. We should always try to group the numbers in a way that will make the calculation as easy as possible.**	**1** Find the answer to $31 + 26 + 14 = \square$ [One solution: I calculated from left to right: $31 + 26 = 57$; $57 + 14 = 71$] [A second solution: I calculated $26 + 14 = 40$ first because 6 and 4 make a ten and I can do it mentally. Then I calculated $31 + 40 = 71$. I did all the calculations mentally.]
Learners work on **2**, **3** and **4** with their partners. • Encourage learners to discuss what they are doing. This helps them to clarify their thinking. • Walk around to support the learners as necessary. • The answers are given in square brackets.	**2** Each calculation shows two different ways of grouping the numbers to add. Draw a circle around the grouping you think will be easier and then find the answer. **a** $23 + (17 + 29)$ $\boxed{(23 + 17)} + 29$ Answer: $[(23 + 17) + 29 = 40 + 29 = 69]$ **b** $(39 + 17) + 83$ $39 + \boxed{(17 + 83)}$ Answer: $[39 + (17 + 83) = 39 + 100 = 139]$

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in square brackets)
	3 Insert brackets to show how you would group the numbers to make them easier to work out. Then find the answer. **a** $57 + 19 + 31$ $[= 57 + (19 + 31)$ $= 57 + 50$ $= 107]$ **b** $46 + 14 + 23$ $[= (46 + 14) + 23$ $= 60 + 23$ $= 83]$ **4** Insert brackets to show how you would group the numbers to make them easier to work out. Then find the answer. **a** $57 \times 25 \times 4$ $[= 57 \times (25 \times 4)$ $= 57 \times 100$ $= 5\ 700]$ **b** $8 \times 35 \times 2$ $[= 8 \times (35 \times 2)$ $= 8 \times 70$ $= 560]$

Activity 2: Learners work in pairs

- Note: this is revision of what learners have practiced since Grade 3.

- Say: **Now we are going to revise inverse operations.**

- Say: **What is an operation?** $(+; -; \times; \div)$

- Say: **What is an inverse operation?** (An inverse operation reverses an operation.)

- Ask: **What is the inverse of addition?** (subtraction); **of subtraction?** (addition); **of multiplication** (division); **and of division?** (multiplication).

- Say: **We use the symbol □ to represent the number we are trying to find out. It stands for a missing number and is called a** *place holder*.

- Say: **Work with a partner to complete Activity 2 in the LAB.**

- Walk around to support learners as necessary.
- The answers are given below.
- Discuss the activity with the learners once they have finished it. Make sure they understand inverse operations and flow charts by the end of the activity.

Work with a partner.

1 Mother baked 24 scones.
Mother made 4 packets of scones with the same number of scones in each packet.
She wants to know how many scones there are in each packet.
Sizwe used a multiplication number sentence to work out the answer.
He used $\square$ to represent the number of scones in a packet.
He wrote: $4 \times \square = 24$

a Sizwe then used a flow chart to show $4 \times \square = 24$.
He used the flow chart to change the order of the number sentence.
What should he write in the box? [÷4]

$\times 4$

24

$[\div 4]$
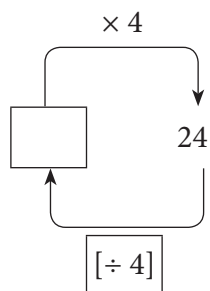
b Use the inverse number sentence to calculate the number of scones in each packet.

$[\square = 24 \div 4 = 6]$

Answer: [6 scones in each packet]

2 The teacher divided a box of crayons amongst 5 learners.
Each learner got 6 crayons.
How many crayons were there in the box?

a Write a number sentence to represent the problem.
Use $\square$ to represent the number of crayons in the box.

Answer: $\square \div 6 = 5$

b Use this flow chart to change the order of the number sentence.

$\div 6$

$\square$ → 5

$[\times 6]$
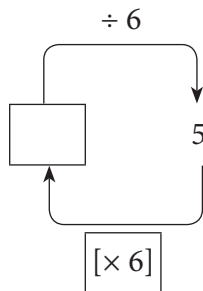
c Use the inverse operation to find the answer.

$[\square = 5 \times 6 = 30]$

There were [30] crayons in the box.

Activity 3: Learners work on their own

- Say: **Work on your own to complete Activity 3 in your LAB.**

- Walk around the classroom to provide support as required.
- Once learners have completed the activity, work through the questions with them in order to provide immediate feedback.
- Answers are given below.

Work on your own.

For each question, work out the value of $\square$.

	Answers
1 $\square + 132 = 250$	$\square = 250 - 132$ $= 118$
2 $\square - 690 = 63$	$\square = 63 + 690$ $= 753$
3 $753 - \square = 63$	$\square = 753 - 63$ $= 690$
4 $8 \times \square = 4\ 800$	$\square = 4\ 800 \div 8$ $= 600$
5 $\square \div 8 = 125$	$\square = 125 \times 8$ $= 1\ 000$

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Remind learners that we often use the inverse operation to find the answer.
- Answers are given below.

For each question, work out the value of $\square$.	
	Answers
1) $\square \times 6 = 54$	$\square = 54 \div 6$ $= 9$
2) $\square + 15 = 47$	$\square = 47 - 15$ $= 32$
3) $\square - 75 = 325$	$\square = 325 + 75$ $= 400$
4) $\square \div 8 = 450$	$\square = 8 \times 450$ $= 3\ 600$

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **more about the properties of operations**
- **to use inverse operations to find a missing number.**

UNIT 2

Lesson 19: How to read number sentences

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2.1 Number sentences (pp 127 – 129 and p 207)
Lesson Objective: Learners will be able to link diagrams and number sentences in order to understand the number sentences and the order of operations.
Lesson Vocabulary: number sentence, total, sum
Teacher Resources: None
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	6 × 9	54	6	4 × 9	36
2	0 × 9	0	7	10 × 9	90
3	9 × 9	81	8	2 × 9	18
4	5 × 9	45	9	7 × 9	63
5	8 × 9	72	10	3 × 9	27

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Use inverse operations to find the missing number.	
	Answers
1 $\square$ × 9 = 54	$\square$ = 54 ÷ 9 = 6
2 $\square$ + 100 = 301	$\square$ = 301 − 100 = 201
3 $\square$ − 8 = 54	$\square$ = 54 + 8 = 62
4 $\square$ ÷ 9 = 7	$\square$ = 7 × 9 = 63

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 18 are provided in Lesson 18.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)
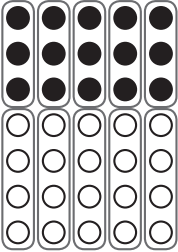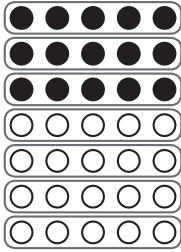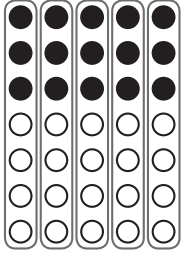
NOTE TO THE TEACHER:
- In order to build learners' understanding of the distributive law, they interpret different ways of grouping counters.
- They also read and explain what kind of thinking is represented in number sentences and draw pictures showing how to group things to lead to the number sentences given.
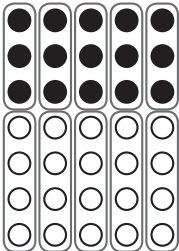
Say: **Today we are learning to read number sentences.**

Activity 1: Whole class activity and then the learners work on their own

- Say: **Let's work together to do Activity 1 in the LAB.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Work with the whole class and then on your own.
Work through **1** with the learners. Discuss the questions with the learners and make sure they write down the correct answers.	**1** Look at these counters.
	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○
The counters are an example of using concrete materials to help build a concept.	Three learners developed different number sentences to find the total number of counters as follows:
Total means 'all' or 'the combined number'.	Learner 1: $3 \times 5 + 4 \times 5 = 15 + 20 = 35$
	Learner 2: $5 \times (3 + 4) = 5 \times 7 = 35$
	Learner 3: $5 \times 3 + 5 \times 4 = 15 + 20 = 35$

WHAT YOU DO	**WHAT THE LEARNERS HAVE IN THEIR LABS** (Answers are given in brackets)
	Match each picture with one of the learners' number sentences Learner (3) Learner (1) Learner (2)
Let the learners work on **2** on their own and then discuss the answers with the whole class when they have finished the question. Getting learners to talk about the number sentences and what the number sentences show helps the learners to clarify their thinking.	**2** Explain how the diagrams can help you work out the answer to each of the number sentences. **a** $3 \times 5 + 4 \times 5 = \square$ Are the counters grouped horizontally or vertically? [Horizontally] What do the coloured counters and groupings show? [They show three groups of 5 black counters and four groups of 5 white counters.] Work out the answer: $3 \times 5 + 4 \times 5 = [15 + 20 = 35]$ **b** $5 \times (3 + 4)$ Are the counters grouped horizontally or vertically? [Vertically]

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	What do the coloured counters and groupings show? [They show five groups of counters. In each group there are 3 black counters and 4 white counters.]
Let the learners work on **2** on their own and then discuss the answers with the whole class when they have finished the question.

Getting learners to talk about the number sentences and what the number sentences show helps the learners to clarify their thinking. | Work out the answer: $5 \times (3 + 4) = [5 \times 7 = 35]$

c $5 \times 3 + 5 \times 4 = 15 + 20 = 35$

Are the counters grouped horizontally or vertically? [Vertically]

What do the coloured counters and groupings show? [They show five groups of 3 black counters, and five groups of 4 white counters.]

Work out the answer: $5 \times 3 + 5 \times 4 = [15 + 20 = 35]$ |

Activity 2: Learners work in pairs

Say: **Work with a partner to do Activity 2 in the LAB.**

- Walk around the classroom to assist learners as necessary.
- The answers are given below.

Work with a partner

- This picture shows **two big boxes**.

- Inside each big box are **three small boxes**.

- Inside each small box are **four sweets**.
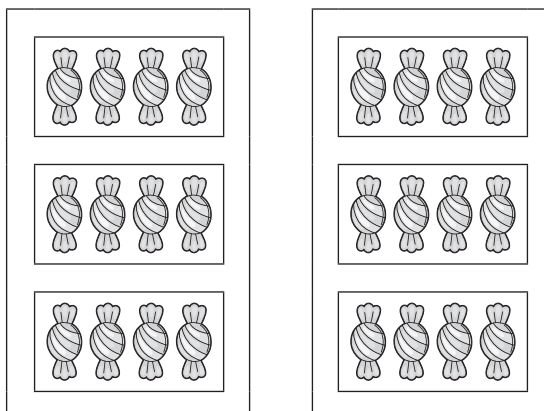
We can use two different number sentences to work out the total number of sweets in the picture.
Explain how each number sentence is used to find the total number of sweets.

1 $2 \times (3 \times 4)$

[First, find how many sweets in one big box: there are 3 small boxes of 4 sweets, which we write 3×4.
There are 2 big boxes, so we multiply the answer to 3×4 by 2 to get the total number of sweets]
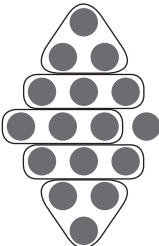
2 $(2 \times 3) \times 4$
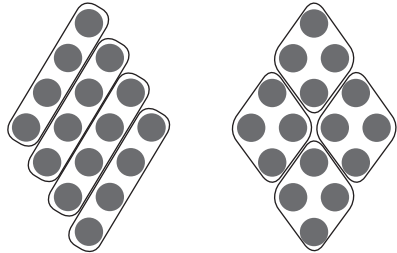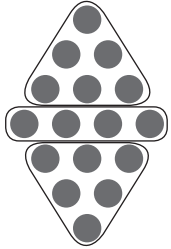
[First, find how many small boxes there are: there are 3 small boxes in each of the 2 big boxes, which we write 2×3.
There are 4 sweets in each small box, so we multiply the number of small boxes by 4 to get the total number of sweets]

Activity 3: Whole class activity and then learners work on their own

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS
First discuss the pattern of the shape in the LAB with the learners.	Work with the whole class and then on your own.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS
Say: **Please describe the pattern in 1 in your LAB to the class.** Example of a description: It is a diamond shape: • 2 rows with one counter (top and bottom) • 2 rows with two counters (2nd top and 2nd bottom) • 2 rows with three counters (3rd top and 3rd bottom) • 1 row of 4 counters (middle row of pattern) Work through **1** with the learners. Give the learners time to draw loops around the counters on the diagram and to then explain to the rest of the class what they did. Answers will vary. Example: There are 5 groups of 3 and 1 extra counter • Say: **5 × 3 means 5 groups of 3** • Say: **Draw loops to show 5 groups of 3 on the pattern.** • Say: **Can you see that there is one counter left over.**	**1** Siya wrote 5 × 3 + 1 = 16 for working out the total number of counters on this diagram. Draw loops around the counters on the diagram to explain Siya's number sentence.

UNIT 2
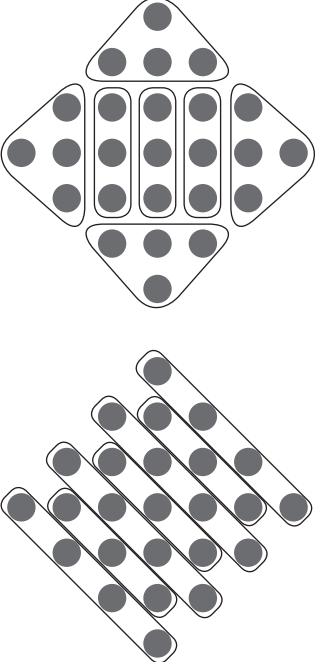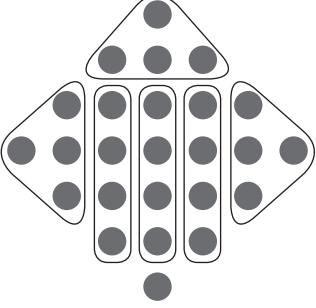
WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS
Let the learners work on **2** on their own and, once they have finished, get them to discuss the number sentence and picture. Answers will vary. These two examples each show four groups of 4 counters 	**2** Thule wrote $4 \times 4 = 16$ for working out the total number of counters on the diagram. Draw loops around the counters on the diagram to explain Thule's number sentence.
Let the learners work on **3** on their own and, once they have finished, get them to discuss the number sentence and picture. Answers will vary. This example shows two groups of 6 counters and one group of 4 counters. 	**3** Makhosi wrote $2 \times 6 + 4 = 16$ for working out the total number of counters on the diagram. Draw loops around the counters on the diagram to explain Makhosi's number sentence.

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given below.

Number sentences can be used to work out the number of counters in a pattern.

		Answers
1	Use the picture of counters to explain this number sentence. $4 \times 4 + 3 \times 3 = 25$	The learners need to show 4 groups of 4 plus 3 groups of 3. Possible answers:
2	Use the picture of counters to explain this number sentence. $6 \times 4 + 1 = 25$	The learners need to show 6 groups of 4 plus 1 group of 1. Possible answer:

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to use pictures of counters to show how to work out number sentences.**

Lesson 20: Consolidation

Teacher's notes
This lesson allows for consolidation of the lessons in this unit.
CAPS topics: 2.1 Number sentences (pp 127 – 129 and p 207)
Lesson Objective: Learners will consolidate their knowledge of number sentences, properties of operations and rules for the order of operations.
Lesson Vocabulary: number sentence, inverse operation, bracket
Resources: Grade 5 learner books and teacher's guides as available.
Date: Week Day

1   NOTES FOR THE TEACHER RELATING TO THIS UNIT'S WORK

The main topics in this unit were number sentences, properties of operations, order of calculation and inverse operations.

2   POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

- A poor understanding of the meaning of brackets can cause confusion and misconceptions.
- It is important that the learners remember that:
  - Operations inside brackets are simplified first.
  - If there are no brackets, multiplication and division are dealt with next, from left to right; addition and subtraction are dealt with next, also from left to right. If the learners use acronyms like BODMAS or BOMDAS, there is a high possibility that they will make errors when simplifying expressions.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 19 are provided in Lesson 19.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

Today we are going over what we learned in this unit. We will practise the order of operations; properties of operations; inverse operations; and how to use them to solve word problems.

- You could use this time for learners to complete classwork or homework activities as necessary.
- You could use the Additional Activities from textbooks that you have or use the Consolidation Activity given.

Additional activities for consolidation

Refer to the following table. Select additional activities from the textbook/s you have.

Use the answers given in the Teacher's Guides to mark the work.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	25-34	15-26	17-21	8-13	8-12	13-20	1-12	9-18	2-6
	254-255	320-322	287-290	198-201	233-234	342-345	306-309	315-318	242-244
TG	18-23	1-19	42-52	8-12	15-19	14-22	1-10	32-48	6-9
	198-199	320-322	218-222	63-165	160-161	383-387	257-259	326-332	122-125

OR, learners could complete the Consolidation Activity in their LAB.

Consolidation Activity

1 Find the missing number

    a $\square \times 8 = 48$ Answer: $48 \div 8 = 6$

    b $\square + 30 = 95$ Answer: $95 - 30 = 65$

    c $\square - 12 = 24$ Answer: $24 + 12 = 36$

    d $\square \div 9 = 5$ Answer: $5 \times 9 = 45$

2   **a**   Complete the table by writing the answer in the placeholder.

a	$2 \times 5 \times 3 = [30]$	$(2 \times 5) \times 3 = [30]$	$2 \times (5 \times 3) = [30]$
b	$2 \times 4 \times 6 = [48]$	$(2 \times 4) \times 6 = [48]$	$2 \times (4 \times 6) = [48]$

    b   Answer Yes or No.
        When we multiply three or more numbers, does it matter how we group the numbers. [No]
        Depending on how we group the numbers, will the answer always be the same? [Yes]

UNIT 2

3 Mpumi owns <u>12</u> trucks.
<u>10</u> of the trucks have <u>18</u> wheels,
while <u>2</u> of the trucks have <u>6</u> wheels.
How many wheels altogether?

Answer:
$[(10 \times 18) + (2 \times 6)$
$= 180 + 12$
$= 192$ wheels altogether]

4 It is <u>1 750</u> km from Cape Town to Polokwane.
Abie takes three days to travel from Cape Town to Polokwane.
On day 1 he travels <u>580</u> km.
On day 2 he travels <u>620</u> km.
How many kilometres must he travel on day 3?

Answer:
$[1\ 750 - (580 + 620) = 1\ 750 - 1\ 200 = 550$
Albie must travel 550 km on day 3.]

5 Draw a circle around the correct number sentence. Think carefully about order of calculation.

   a The answer is 24.

       $\boxed{9 \times 3 - 3}$ $9 \times (3 - 3)$ $9 + 3 \times 3$

   b The answer is 37.

       $8 \times (4 + 5)$ $8 + 4 \times 5$ $\boxed{8 \times 4 + 5}$

6 Explain how this diagram can help you work out the answer to the number sentence, $3 \times 3 + 4 \times 2$.

ANSWER:

$3 \times 3 + 4 \times 2$ means 3 groups of 3 plus 4 groups of 2

Possible diagram:
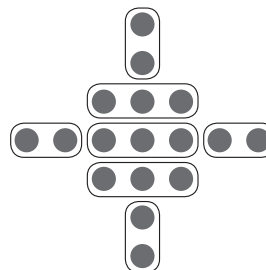
5   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised number sentences, properties of operations and the rules for the order of operations.**

Unit 3: Circles and spheres

INTRODUCTION

This unit focuses on circles, which are 2-D shapes; and spheres, which are 3-D objects. Learners do practical activities to discover the properties of a circle. Learners use different equipment, including a pair of compasses, to draw circles. Learners practice using a pair of compasses by drawing circle patterns.

In this unit, we focus on the four framework dimensions in the following ways:

Framework dimension	How the framework dimension is developed in this unit
Conceptual understanding	Use of practical activities to build the concept of a circle as a 2-D shape and a sphere as a 3-D object.
Procedural fluency	Learners practice drawing circles using a pair of compasses.
Strategic competence	Learners devise their own strategies to draw a circle when given different equipment.
Reasoning	Learners explain why the spokes of a bicycle wheel all need to be the same length.

In this unit, we build a **learning centred classroom** by paying attention to:

		Examples
Concept development	✓	Done in every lesson
Making sense of mathematics	✓	Learners do structured practical activities in order to discover the properties of a circle themselves
Practising procedures	✓	Learners practise how to use a pair of compasses to draw a circle.
Problem solving	✓	Learners find ways of drawing a circle (other than using a pair of compasses).
Connecting topics and concepts	✓	Links to previous lessons, correction of classwork and homework activities, as well as consolidation activities are designed to address gaps and learners' activities
Addressing gaps in learners' knowledge		
Addressing learners' errors		
Active learning	✓	Learners do structured practical activities in order to discover the properties of a circle themselves

Mathematical vocabulary for this unit

Be sure to teach and use the following vocabulary at the appropriate place in the unit. It is a good idea to make flashcards of words and their meanings and to display these in the classroom at appropriate times.

Refer to the bilingual dictionary where necessary.

Term	Explanation / diagram
2-D shape	A flat shape that has length and breadth (width) but no thickness (height)
3-D object	Object that has length, breadth and height
centre (of a circle)	middle or central point
circle	2-D shape that is perfectly round It is also a flat, closed curve made up of points that are an equal distance from the centre and is a round shape drawn using a pair of compasses
diameter	straight line that goes from any point on a circle, through the centre to any other point on the opposite side of the circle
pair of compasses (also called a compass)	instrument (tool) for drawing a perfect circle
radius	straight line drawn from the centre of the circle to any point on the circle
radii	this is the plural of 'radius'
sphere	shape like a ball that looks like a circle when viewed from any angle
straight line	line without curves Example: This is a straight line: _____

Further practice for learners

This table references other sources (including textbooks) if you need additional activities.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	67-68 121-127 176-178	86-92 149-158 214-219	70-79 130-136 189-194	42-47 82-87 122-127	54-58 107-113 156-159	91-103 167-175 236-241	58-66 123-131 198-204	72-74 135-142 201-202	51-57 99-104 152-155
TG	45-49 91-93 135-137	87-93 151-159 213-217	80-83 119-122 157-159	35-38 68-71 104-107	38-40 74-77 107-109	98-111 181-190 259-265	45-52 98-102 162-170	72-80 135-142 199-202	50-57 97-102 149-153

UNIT PLAN AND OVERVIEW FOR UNIT 3
Circles and spheres

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs writing materials and scissors for all lessons	Date completed
21	identify a circle and the radius and centre of a circle	Teacher: A large spinning top (see Lesson 21 for details), pin/thin nail/ toothpick; A3 poster: *What shape do the dots on the spinning top make?*; A4 poster: *Sheet of circles*; A4 poster: *Circles*; A3 poster: *Find the centre of the circle by folding paper*; Flashcards: circle, radius, centre Learner: one sheet of scrap paper per learner, a pair of scissors, a pencil, a toothpick, one paper circle for each learner, ruler, pencil, glue	
22	draw a circle in different ways, including using a pair of compasses	Teacher: The large circle used in the previous lesson; Prestik/Bostik; A3 poster: *Using a pin and a piece of string to draw a circle*; A3 poster: *Using two pencils and a ruler to draw a circle*; large pair of chalkboard compasses; A3 poster: *Using a pair of compasses to draw a circle* Learner: pin and piece of string about 8 cm long; a ruler with 2 holes drilled in ; a pair of compasses.	
23	know that all radii of the same circle are the same length	Teacher: A pair of chalkboard compasses Learner: A pair of compasses; a short pencil; a ruler	
24	know that the diameter is double the radius and that it is the longest line you can draw in a circle; use a pair of compasses to draw circles and circle patterns	Teacher: A3 poster: *Parts of a circle* Learner: A pair of compasses, a sharp pencil; a ruler	
25	use a pair of compasses to measure and compare distances	Teacher: Pair of chalkboard compasses (if available), A3 poster: *Using a pair of compasses to measure distance* Learner: A pair of compasses, a sharp pencil and a ruler	

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs writing materials and scissors for all lessons	Date completed
26	identify a sphere as a 3-D object with a curved surface, and to identify the centre, radius and diameter	Teacher: A large round ball (e.g. soccer ball or netball); a ball made out of clay, plasticine or Prestik/Bostik; something to cut this ball; A3 poster: *Parts of a circle*; strips of paper and Prestik/Bostik; A3 poster: *Parts of a sphere* Learner: A pair of compasses; a piece of clay, plasticine or Prestik/Bostik and something to cut it.	
27	name some properties of circles and spheres, and will be able to use a pair of compasses to draw a circle	Teacher and learner: Grade 5 learner's books and teacher's guides (if available)	

Assessment for learning
Use the template provided at the beginning of this guide to think deeply about at least one of the lessons in this unit.

Reflection
Think about and make a note of: *What went well? What did not go well? What did the learners find difficult or easy to understand or do? What will you do to support or extend learners? Did you complete all the work set for the unit? If not, how will you get back on track?*

What will you change next time? Why?

UNIT 3

Lesson 21: Circles

Teacher's notes

This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.

CAPS topics: 3.1 2-D shapes (pages 147, 184)

Lesson Objective: Learners will be able to identify a circle and the radius and centre of a circle.

Lesson Vocabulary: 2-D shape; circle, radius, centre

Teacher Resources:

ACTIVITY 1:

1   A spinning top make from one of these:
   • a large circle cut out of cardboard (such as a large cereal (Post Toasties) box)
   • an old CD
   • a paper plate
   • a pin or thin nail or toothpick or a sharpened pencil.
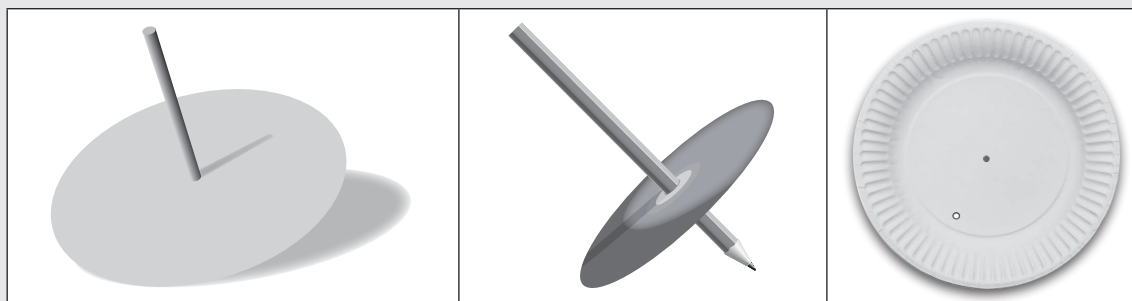
NB: Make your spinning top before the lesson and make sure it works.

2   A3 Poster: *What shapes do the dots on the spinning top make?*
3   Prestik/Bostik.
4   One sheet of scrap paper per learner.

ACTIVITY 2:

1   A4 Sheet: *Sheet of Circles.* Cut out enough circles so that each learner gets one circle.
2   A4 Sheet: *Circle.* Cut out one circle to use during Activity 2 and Lesson 22.
3   A3 poster: *Find the centre of a circle by folding paper*
Flashcards: circle, radius, centre

Learner Resources:

ACTIVITY 1: One sheet of paper per learner, a pair of scissors, pencil, a toothpick, glue

ACTIVITY 2: One paper circle for each learner, ruler, pencil, glue

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	20 ÷ 2	(10)	**6**	30 ÷ 5	(6)
2	Half of 18	(9)	**7**	35 ÷ 5	(7)
3	16 ÷ 2	(8)	**8**	40 ÷ 5	(8)
4	Half of 12	(6)	**9**	20 ÷ 5	(4)
5	14 ÷ 2	(7)	**10**	45 ÷5	(9)

2   LINK TO PREVIOUS LESSON

This is the first lesson in this unit.

> NOTE TO THE TEACHER:
> In Grade 4, learners classified 2-D shapes as follows:
> - Closed shapes with curved sides only
> - Closed shapes with curved and straight sides
> - Closed shapes with straight sides only.

- Refer learners to the activity in the LAB.

> Use a coloured pencil.
> Colour in the circle.
>
>
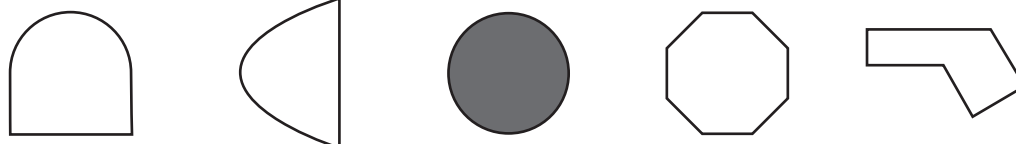
3   CORRECT HOMEWORK ACTIVITY

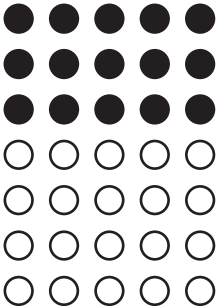This is the first lesson in this unit. There is no homework to correct.

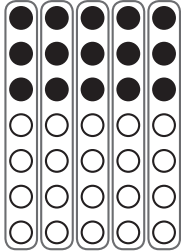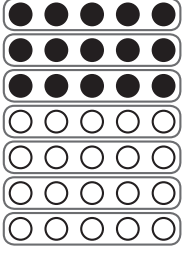## 4   LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

> NOTES TO THE TEACHER:
> This is the first of five lessons on circles and one on spheres. In this lesson:
> - The learners make their own spinning tops and investigate the pattern made by dots drawn on the top of spinning tops.
> - They then discover and name the centre of the circle and the radius of the circle.
>
> Learners learn more from doing activities than from watching the teacher do the activities. This means that you, the teacher, need to spend time before the lesson preparing the equipment that you and the learners need in this lesson.

Say: **Today we are learning about circles and different parts of a circle.**

Activity 1: Whole class activity and then learners work in pairs

You will need the spinning top that you made from cardboard or an old CD or a paper plate, and the A3 poster: *What shapes do the dots on the spinning top make?* You will also need Prestik/Bostik, and one sheet of scrap paper per learner.

- Show your top to the learners and ask: What is this? (A spinning top)
- Ask: How do we use it? (Allow some learners to demonstrate how to spin the top around the pin. Give learners a chance to show their skill.)

- Say: **You are going to make your own spinning tops. Work with a partner to complete Activity 1 in the LAB.**
- Say: **You will use a sheet of paper, a pair of scissors, a pencil / pin / thin nail / toothpick and glue for this activity. Be careful as you use these sharp objects.**

Work with a partner to make your own three spinning tops.
You will need a sheet of paper, a pair of scissors, pencil, a toothpick, glue.

1. Cut out three different shapes from the paper. These could be a square, a circle, a triangle or even a shape with no name. These will be your three tops.

2. Find the centre of each top.
   Draw three dots of different colours anywhere you like on each top.
   Make some dots close to the centre. Make some dots far from the centre.

   Three different tops are shown below:

Top 1	Top 2	Top 3
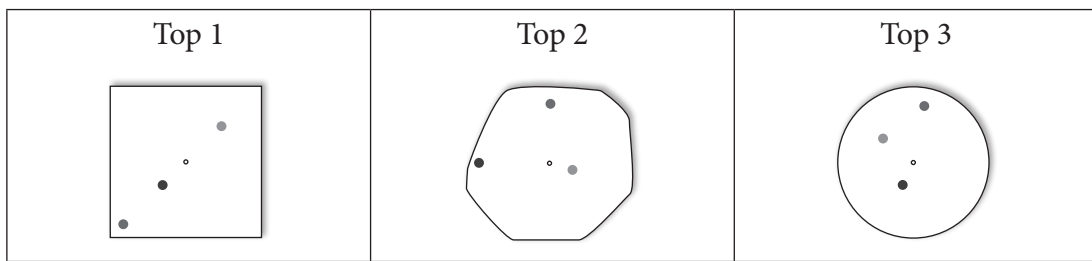
3. Push the toothpick or pencil through the centre of your first top.

4. Spin your first top.
   What shape do the dots make when you spin each top? (Circles)
   Draw the shapes made by each spinning top here: (Each time a circle is drawn)
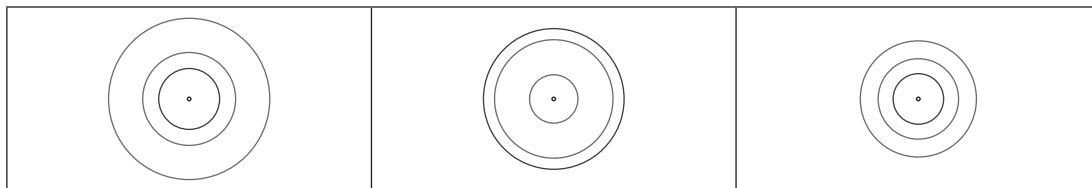
- Give learners time to make their own spinning tops out of the sheet of scrap paper, and to work out what shape the dots on the spinning top draw when they spin the top. Note: they can simply draw the tops free-hand and find the approximate position of the centre. Do not use pair of the compasses in this activity.

- Once the learners have finished Activity 1, put up the A3 poster: *What shape do the dots on the spinning top make?* on the board. Discuss with the learners the shapes they made when they spun each top.

Activity 2: Whole class activity and learners work on their own

Each learner will need a circle already cut out from the A4 *Sheet of Circles*.
You will need the large circle cut out from the A4 *Circle* in the Teacher Resources Pack.

Say: **Work with a partner to complete Activity 2 in the LAB.**

- Say: **You are going to investigate some of the parts of the circle. Work with the teacher to complete Activity 2 in the LAB.**
- Say: **For this Activity you will use a circle, a ruler and a pencil or pen.**
- Each learner works on their own but with you, to complete the activity.
- Suggestions to help you are given.

- Once learners have had time to discuss what they need to do, and to fill in the answers, go through the activity with them.

Work on your own with the teacher.
Your teacher will give you a paper circle.
You will also need a ruler, a pencil and glue

WHAT THE TEACHER NEEDS TO DO

- Demonstrate how to find the centre of the circle using the A3 poster *'Find the centre of a circle by folding paper'*.

1 Find the centre of a circle.
2 Label the centre of your circle.

New word
The central point, or middle, of a circle is called the **centre of the circle**.

- Read through the description of the new words "centre of the circle" with the learners and make sure they understand the description.

WHAT THE TEACHER NEEDS TO DO

- Use your large circle. Explain how to find the radius by folding the large circle and following the instructions on the poster. (Keep this circle for the next lesson.)

3   Draw and label a radius on your circle.
4   Draw some more radii and measure their length.

What do you notice?

- Confirm with the class that all the radii of a circle are the same size.
  (One radius, two or more radii)

Note: There is another activity in Lesson 23 to learn the characteristics of the radius of the same circle. In this lesson learners are given the sense of radius only.

New word

A straight line drawn from the centre to any point on the circle is called the **radius**.

- Read through the description of the new word "radius" with the learners and make sure they understand the description.
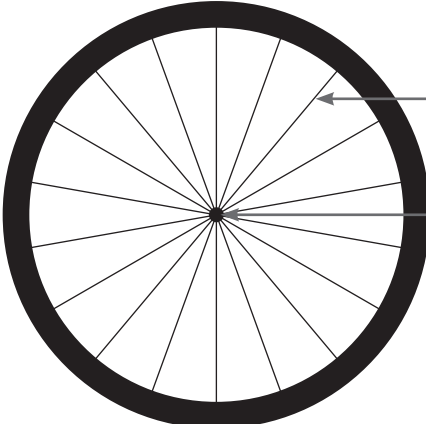
5   Paste your labelled circle in the box:
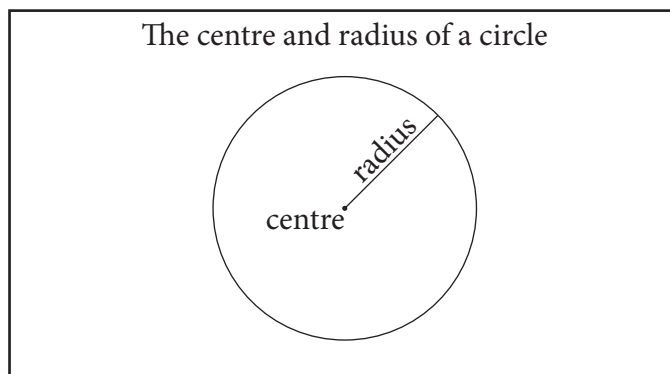
The centre and radius of a circle

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given below.

Label the centre and radius on this bicycle wheel:

(radius – note: any of the spokes can be labelled the radius)

(centre)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **the middle of a circle is called the centre**
- **a straight line drawn from the centre of the circle to any point on the circle is called the radius.**

Lesson 22: Drawing circles

Teacher's notes

This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.

CAPS topics: 3.1 2-D shapes (pages 147, 184)

Lesson Objective: Learners will be able to draw a circle in different ways, including using a pair of compasses.

Lesson Vocabulary: circle, centre, radius, pair of compasses

Teacher Resources:

ACTIVITY 1:

1. The large circle you used in the previous lesson; Bostik/Prestik.
2. A3 poster: *Using a pin and a piece of string to draw a circle.*

ACTIVITY 2:

1. A3 poster: *Using two pencils and a ruler to draw a circle.*

ACTIVITY 3:

1. Large pair of chalkboard compasses (if available). If you don't have a pair of chalkboard compasses, use a small pair, but be sure to move around the class so that all learners can see it.
2. A3 poster: *Using a pair of compasses to draw a circle.*

Learner Resources:

ACTIVITY 1:

1. A pin or drawing pin and a piece of string about 8 cm long.

ACTIVITY 2:

1. A ruler with two holes drilled in it and two pencils.
   Note: the rulers need to have at least two holes in them. The holes need to be made as part of your advance preparation. You can use drill bit (will work even if you don't have a drill).

ACTIVITY 3:

1. A pair of compasses. The drawing of circles is usually covered in Grade 6, so ask the Grade 6 teacher if you may use the pairs of compasses they have.

Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	12 ÷ 3	(4)	**6**	24 ÷ 3	(8)
2	21 ÷ 3	(7)	**7**	6 ÷ 3	(2)
3	3 ÷ 3	(1)	**8**	18 ÷ 3	(6)
4	30 ÷ 3	(10)	**9**	27 ÷ 3	(9)
5	15 ÷ 3	(5)	**10**	9 ÷ 3	(3)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Label the centre and radius of this circle.

(radius – note: any of the lines (or spokes) can be labelled the radius)

(centre)
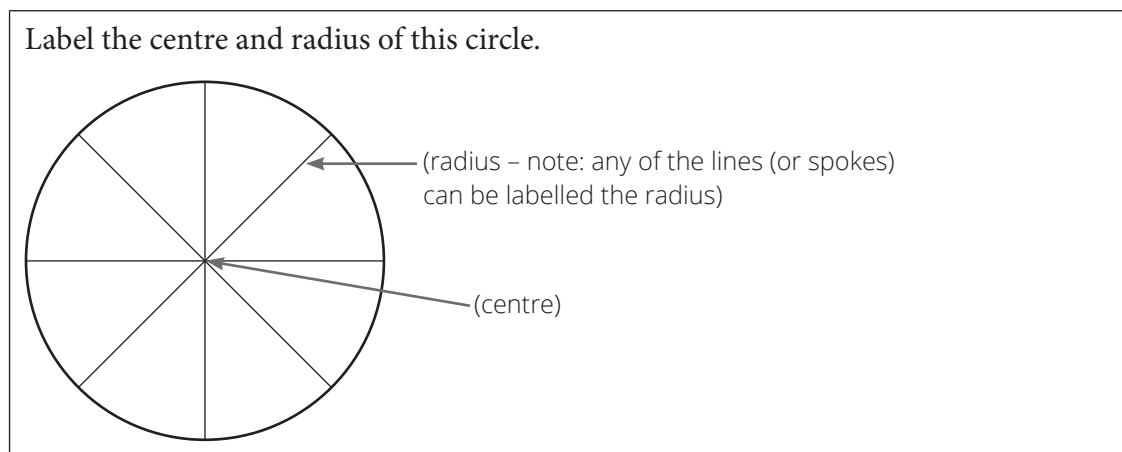
3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 21 are provided in Lesson 21.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER:
This is the second of five lessons on circles and one on spheres. In this lesson:
- The learners use a pin or drawing pin and a piece of string to draw a circle.
- The learners use a ruler with two holes drilled in it and two pencils to draw a circle.
- The learners use a pair of compasses to draw a circle.

The main concept to be developed is that whatever equipment is used, (pencil and ruler, pin and string, pair of compasses), the function of the equipment is to create a series of points that are all an equal distance from the centre of the circle.

The learners will need time to practice using a pair of compasses as some will struggle with the fine motor coordination required.

Say: **In today's lesson we are going to be using different methods and equipment to draw circles.**

Activity 1: Whole class activity and then learners work in pairs

Stick the circle you used in the previous lesson on the board.
Make sure that each pair of learners gets the necessary equipment: a pin or drawing pin and a piece of string about 8 cm long.

- Point to the circle and say: **You have already learned that a circle is a 2-D shape that is perfectly round.**
- Say: **Today we are going to use different pieces of equipment to draw circles.**
- Say: **You are going to start by drawing a circle with a pin or drawing pin and a piece of string.**

- Say: **Work with a partner to complete Activity 1 in the LAB.**
  Do not show the learners the poster at this stage. Give them time to discuss how they can use the string and pin to draw a circle.

Work with your partner.
You will need a pin or drawing pin and a piece of string.

1 Talk with your partner about how you can use the pin or drawing pin and piece of string to draw a circle.
(Note: in Foundation Phase, learners have drawn circles in the playground with a stick/pole and rope.)

2 Draw a circle in the space below:
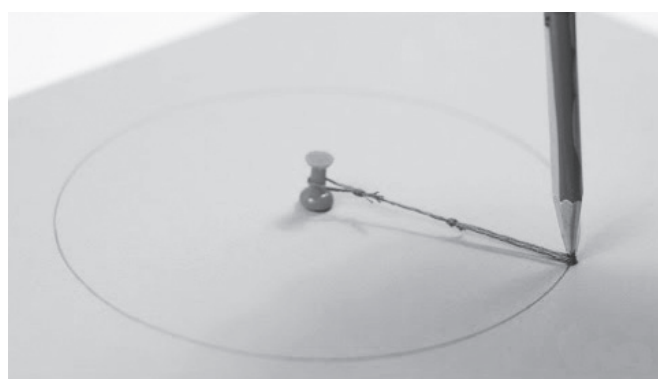
(This is how the learners should be drawing the circle)

3 What part of the circle does the pin represent? (centre)

4 What part of the circle does the piece of string represent? (radius)

5 What shape does the pencil draw? (circle)

- Show A3 poster: *Using a pin and a piece of string to draw a circle* and use it to revise what they have done in the activity.
- Ask: **Was it easy to draw a circle like this? Was it fun?**
- Then ask: **What difficulties did you have when you drew the circle like this? How did you solve your problems?**

Activity 2: Learners work in pairs

Make sure that each pair of learners gets the necessary equipment: a ruler with two holes drilled in it and two pencils.

- Say: **Now we are going to use different pieces of equipment to draw circles.**

- Say: **Work with a partner to complete Activity 2 in the LAB.**
  Do not show the learners the poster at this stage. Give them time to discuss how they can use the ruler with two holes in it and two pencils to draw a circle.

Work with your partner.
You will need a ruler with two holes in it, and two pencils.

1. Talk with your partner about how you can use the ruler and two pencils to draw a circle.

2. Draw a circle in the space below,
   Hint: Think about how you could use the holes in the ruler
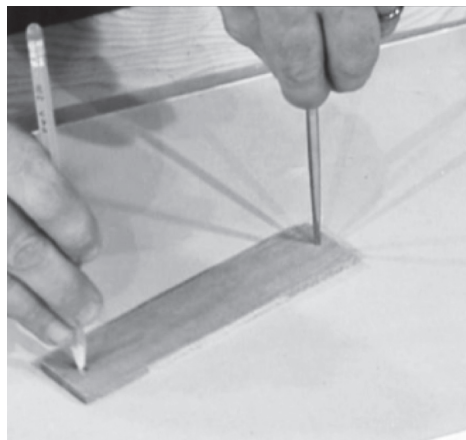
(This is how the learners should draw the circle)

3. What part of the circle does the pencil in the middle represent? (centre)

4. What part of the circle does the ruler represent? (radius)

5. What shape does the pencil draw? (circle)

- Show A3 poster: *Using two pencils and a ruler to draw a circle* and use it to revise what they have done in the activity.
- Ask: **Was it easy to draw a circle like this? Was it fun?**
- Then ask: **What difficulties did you have when you drew the circle like this? How did you solve your problems?**

Activity 3: Learners work in pairs

You will need: a pair of chalkboard compasses (if available). If you don't have a pair of chalkboard compasses, use a small pair, but be sure to move around the class so that all learners can see it.

Make sure that each pair of learners has a pair of compasses to work with. The drawing of circles is usually covered in Grade 6, so ask the Grade 6 teacher if you may use the pairs of compasses.

> NOTE TO THE TEACHER:
> There is a difference between a "compass" and a "pair of compasses"
>
>
>
> A COMPASS
>
> Used to find direction
> (North, West, South, East)
>
> A PAIR OF COMPASSES
>
> Used to draw circles of different sizes and for measuring length or distance.
>
> The word "pair" comes from the fact that there are two legs. We say pair of compasses like we say pair of scissors.

To be correct, the term "pair of compasses" should be used. But, in everyday life, we tend to call the thing we use to draw circles, "a compass".

This is the first-time learners are using a pair of compasses in a maths class.

For this unit, the learners have to draw many circles, some having the legs of the pair of compasses closer together and others with the legs further apart. From this they should realise that the wider the pair of compasses is held open, the larger the circle they can draw.

- Say, as you hold up your pair of compasses: **We use this tool to draw a perfect circle. It is called a *pair of compasses*, but sometimes we just call it a compass.**

- Demonstrate how to use the pair of compasses to draw a circle on the board.
  NOTE: Before you draw your circle on the board, draw a dot on the board and then put the compass point on this dot when you draw your circle. Learners should learn from this how important the centre is and should also learn not to move the compass point from the dot/centre.

- Say: **Work with a partner to complete Activity 3 in the LAB. Be careful of the sharp point of the pair of compasses.**
  - Do not show the learners the poster at this stage. Give them time to discuss how they can use the pair of compasses to draw a circle.
  - Walk around and assist learners as they draw the circles. Make sure that they are holding the pair of compasses, not the pencil when they draw the circles. Encourage them to rotate the pair of compasses in large, smooth movements so that they get a neat circle.

Work with your partner
You will need a pair of compasses and a sharp pencil. A short pencil works best.

Use the pair of compasses to draw as many different sized circles as possible in the space below.

This picture shows you how to hold the pair of compasses.

Hold here to position

Hold here to draw
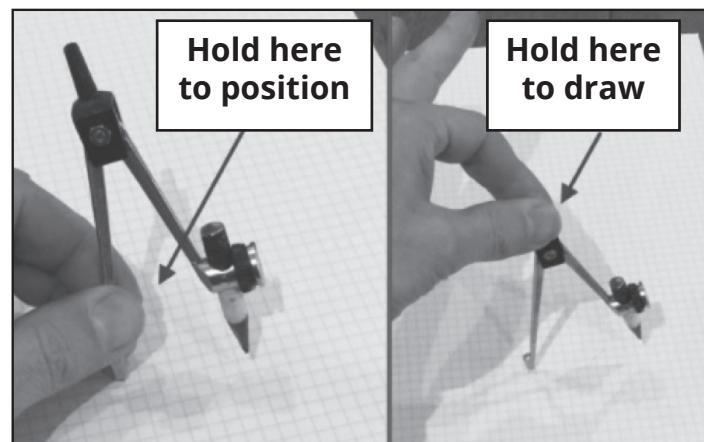
- Show the A3 poster: *Using a pair of compasses to draw a circle*, and use it to revise what they have done in the activity.

- Ask: **"Was it easy to draw a circle like this? Was it fun?"**

- Then ask: **"What difficulties did you have when you drew the circle like this? How did you solve your problems?"**

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

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1   Use anything you can find at home to draw 2 circles of different sizes in the space below as accurately as you can.

2   Label the circle, the centre and the radius of each circle.

circle

radius

centre
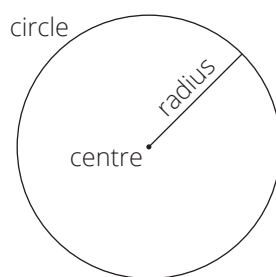
(Circles will vary. Get learners to mark each other's work)

---

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt:**
- **how to draw a circle using different tools**
- **that we can draw a perfect circle using a pair of compasses.**

Lesson 23: The radius of a circle

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2-D shapes (pages 147, 184)
Lesson Objective: Learners will know that all radii of the same circle are the same length.
Lesson Vocabulary: radius, radii, circle, centre, straight line
Teacher Resources: A pair of chalkboard compasses.
Learner Resources: A pair of compasses, a short pencil, a ruler.

Date:	Week	Day

UNIT 3

1   MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	16 ÷ 4	(4)	**6**	24 ÷ 4	(6)
2	40 ÷ 4	(10)	**7**	4 ÷ 4	(1)
3	8 ÷ 4	(2)	**8**	28 ÷ 4	(7)
4	32 ÷ 4	(8)	**9**	12 ÷ 4	(3)
5	20 ÷ 4	(5)	**10**	36 ÷ 4	(9)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

---

1   Use your pair of compasses to draw two different-sized circles with the same centre.
2   Mark the centre of the two circles with a dot.
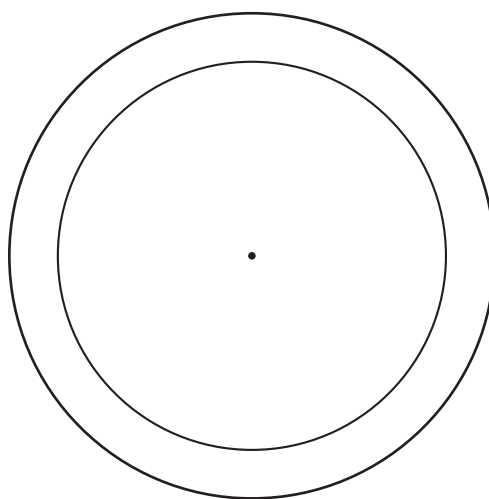
(The circles should look something like this)

---

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 22 are provided in Lesson 22.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

This is the third lesson of five lessons on circles and one on spheres. In this lesson the learners draw many circles and discover one of the properties of the radii.

NOTE TO THE TEACHER:
We say, "one radius" but more than one "radii".
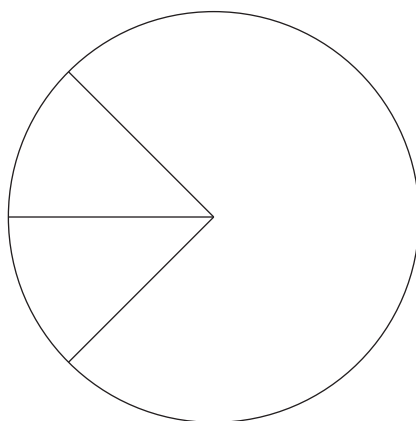
This circle has 3 radii.

Say: **Today we are learning about the radius of a circle.**

Activity 1: Whole class activity and then the learners work on their own

- Draw a circle on the chalkboard using your pair of chalkboard compasses.
  NOTE: Before you draw your circle on the board, draw a dot on the board and then put the compass point on this dot when you draw your circle. Learners should learn from this how important the centre is and should also learn not to move the compass point from the dot/centre.

- Ask: **Who will come to the board and draw a radius of this circle?**
  (Learner should draw a straight line from the centre to any point on the circle)

- Label the centre of the circle and the radius. Leave this on the board for the rest of the lesson as this will give learners the vocabulary they need as they work through activities 1 and 2.
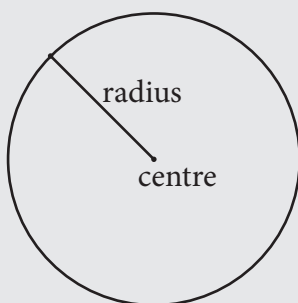
- Say: **Work with your partner to complete Activity 1 in your LAB.**

- Walk around and assist learners as they draw the circles. Make sure that they are holding the pair of compasses, not the pencil, when they draw the circles. Encourage them to rotate the pair of compasses in large, smooth movements so that they get a neat circle.

Work on your own.
You will need: pair of compasses, a sharp pencil and a ruler.

1 Measure 4 cm using your ruler and your pair of compasses.
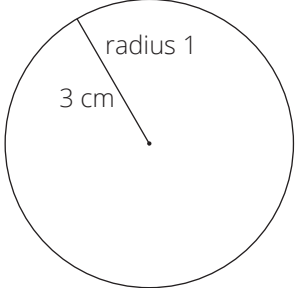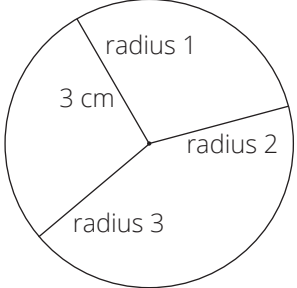
  a Draw a circle with a radius of 4 cm.
      Use these pictures to help you draw the circle.
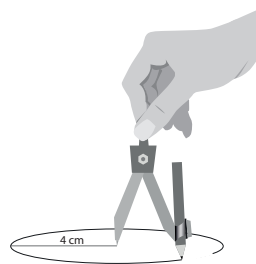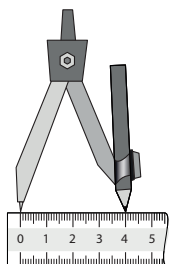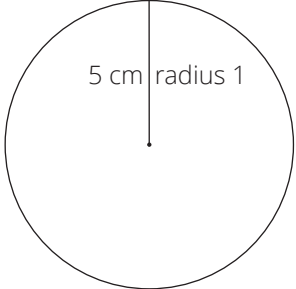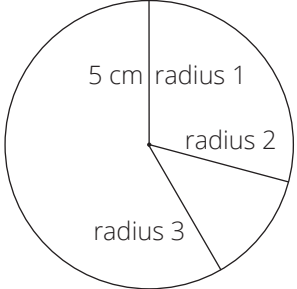
  b Label the centre of the circle.

  c Draw one radius. Write 4 cm on the radius.

Activity 1 Answer	Activity 2 Answer
	(Length of radius 1 = 4 cm Length of radius 2 = 4 cm Length of radius 3 = 4 cm)

2 Measure 3 cm using your ruler and your pair of compasses.
    a Draw a circle with a radius of 3 cm.
    b Label the centre of the circle.
    c Draw one radius. Write 3 cm on the radius.

Activity 1 Answer	Activity 2 Answer
	(Length of radius 1 = 3 cm Length of radius 2 = 3 cm Length of radius 3 = 3 cm)

3 Measure 5 cm using your ruler and your pair of compasses.
    a Draw a circle with a radius of 5 cm.
    b Label the centre of the circle.
    c Draw one radius. Write 5 cm on the radius.

Activity 1 Answer	Activity 2 Answer
	(Length of radius 1 = 5 cm Length of radius 2 = 5 cm Length of radius 3 = 5 cm)

Activity 2: Learners work individually

• Say: **Work on your own. Do Activity 2 in the LAB.**
Walk around and assist learners as they draw the circles. Make sure that they are holding the pair of compasses, not the pencil, when they draw the circles. Encourage them to rotate the pair of compasses in large, smooth movements so that they get a neat circle.

Work on your own.

1 Go to Activity 1, question 1.

   a Draw another 2 radii in the circle with a 4 cm radius that you drew. (Remember we say 'one radius' but we say 'three radii".)

   b Measure the length of each radius. Write the measurements in the empty box next to the circle.

2 Do the same for the circles you drew in Activity 1, question 2.

3 Do the same for the circles you drew in Activity 1, question 3.

4 Look carefully at the radius measurements in each circle. Draw a ring around the correct word or words.

All radii in a circle are different / (the same) length.

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Discuss the spokes of a bicycle wheel – the word "spoke" is probably a new word for most learners. Make sure all the learners understand what to do.
- Answers in brackets.

Look at the picture of the bicycle wheel.
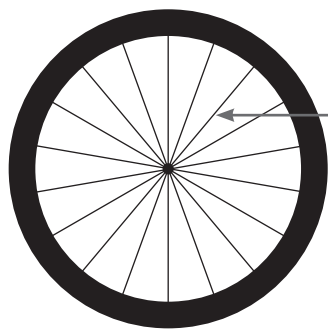
The spoke of a bicycle wheel is the piece of stiff wire that joins the centre of the wheel to the outside of the wheel.

Write a sentence explaining why the spokes in a bicycle wheel must all be the same length.
Use the word radius in your answer.
(Each spoke is a radius of the circle, and all radii must be the same to get a perfect circle.)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**

- **the radius is a straight line that joins the centre of a circle to any point on the edge of the circle**
- **all the radii in a circle are the same length. If the radii are not the same length, the shape cannot be a circle.**

Lesson 24: Diameters and patterns

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2-D shapes (pages 147, 184)
Lesson Objective: Learners will know that the diameter is double the radius and that it is the longest straight line you can draw in a circle. They will also be able to use a pair of compasses to draw circles and circle patterns.
Lesson Vocabulary: diameter, radius, straight line, centre
Teacher Resources: A3 poster: *Parts of a circle*
Learner Resources: pair of compasses, sharp pencil, a ruler, grid paper
Date: Week Day

1   MENTAL MATHS (5 MINUTES)

Fill in the missing numbers. The first one has been done for you.

$\div 6$

42 → 7
36 → (6)
12 → (2)
24 → (4)
60 → (10)
6 → (1)
18 → (3)
30 → (5)
48 → (8)
54 → (9)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Draw a line to match the word with the description.

circle		the middle of a circle
radius		flat, closed curve made up of points that are an equal distance from the centre
centre		straight line from the centre to any point on the circle

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 23 are provided in Lesson 23.
Use this time to purposefully address gaps in learners' knowledge and to identify and
address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

This is the fourth of five lessons on circles and one on spheres.
In this lesson:

- The learners discover that the diameter is the longest line in a circle. They also discover
  that the length of the diameter is two times the length of the radius.
- They then use their pairs of compasses to draw patterns on grid paper.

Say: **Today we are learning about another line in a circle. We will also use a pair of
compasses to draw circle patterns.**

Activity 1: Learners work individually and then work with the class

Say: **Do Activity 1 in the LAB.**

- Walk around to assist learners as they work through the activity.

> Work on your own
>
> You will need a pair of compasses, a sharp pencil and a ruler
>
> **1**   Draw a circle with a radius of 6 cm.
> Draw a dot to show the centre of the circle.
> Remember that where you placed the compass point when you drew the circle is the
> centre of the circle.

UNIT 3
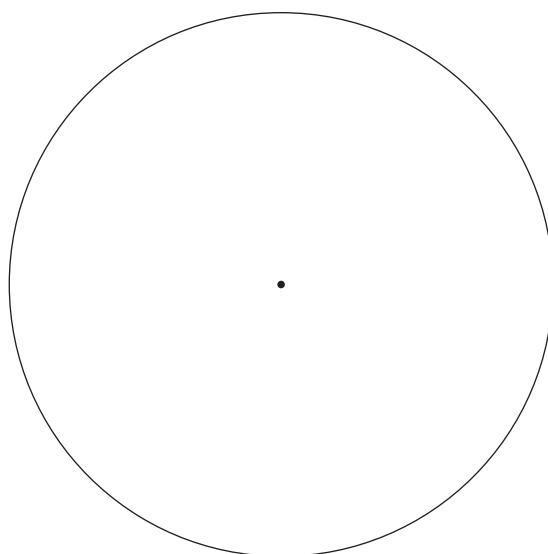
2 Draw 4 straight lines in the circle. One of the straight lines must go from a point on the circle, through the centre of the circle to a point on the opposite side of the circle.

(The learners' circle in (1) should look something like this:

diameter
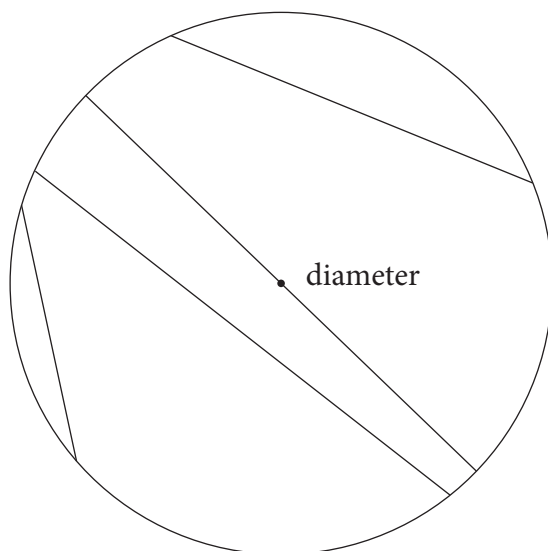
3 Measure the length of each straight line. Record the lengths in this table:

	Length
Line 1	
Line 2	
Line 3	
Line 4	

(Answers will vary but none should be more than 12 cm)

- Once the learners have measured the lengths of the lines, ask: **What do you notice about the position of the longest line in the circle and the centre of the circle?** (The longest line in the circle always passes through the centre of the circle.)

- Say: **The straight line that goes from any point on the circle through the centre of the circle to a point on the opposite side of the circle is called the DIAMETER.**
  - Write the word "diameter" on the board.
  - Tell the learners to write the word "diameter" on the correct line in the circle they drew in their LAB.

- Stick the A3 poster: *Parts of a circle* on the board.

- Say: **Look at the diameter in your big circle.**
  - **What do we call the part of the line from the centre to the circle?** (the radius of the circle)
  - **What do we call the other part of the diameter?** (also a radius of a circle)
  - **How long is the diameter?** (12 cm)
  - **How long is each of the radii?** (6 cm)

- Write on the board: **Diameter = 2 × radius**

Activity 2: Learners work on their own

- Make sure you know how to make this drawing BEFORE the learners have to work on this activity.

- Walk around the classroom while the learners work on this activity.
  Don't tell them what to do.
  Allow them to experiment until they get the drawing correct.

- As the learners work on this activity, they should realise that they should use five equal sized circles to draw the diagram. At the same time, they should focus on the length of diameter and radius of each circle.

- Say: **Work on your own to complete Activity 2 in the LAB.**

Work on your own
You will need a pair of compasses and a sharp pencil.

Copy this pattern onto the squared paper.
Think about where you should place the point of your pair of compasses, especially when it comes to drawing the shapes inside the circle. (Learners copy this pattern in their LAB.)

NOTE TO THE TEACHER:

Step 1: Draw the circle

Step 2: Keeping the pair of compasses open the same distance, place the point of the pair of compasses on each corner of the squared paper in turn and draw the "petals" of the flower.

Work on your own
You will need a pair of compasses and a sharp pencil.

Copy this pattern onto the squared paper.
Think about where you should place the point of your pair of compasses, especially when it comes to drawing the shapes inside the circle. (Learners copy this pattern in their LAB.)
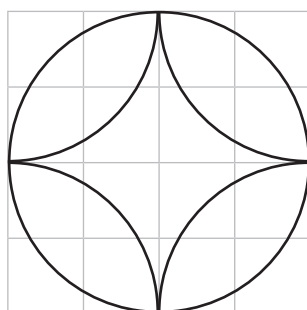
Activity 3: Learners work on their own

• Make sure you know how to make these drawings BEFORE the learners have to work on this activity.

• Walk around the classroom while the learners work on this activity.
  Don't tell them what to do.
  Allow them to experiment until they get the drawing correct.

• Say: **Work on your own to complete Activity 3 in the LAB.**

Work on your own

You need a pair of compasses, a sharp pencil, coloured pencils or crayons.

1 Draw this pattern on the squared paper.
Think carefully about where you should place the compass point.

NOTE TO THE TEACHER:

Step 1: Draw three circles the same size. The centres of these circles must be on the same straight line.

Step 2: Repeat what you did in Activity 2 to make the "petals" of the flower
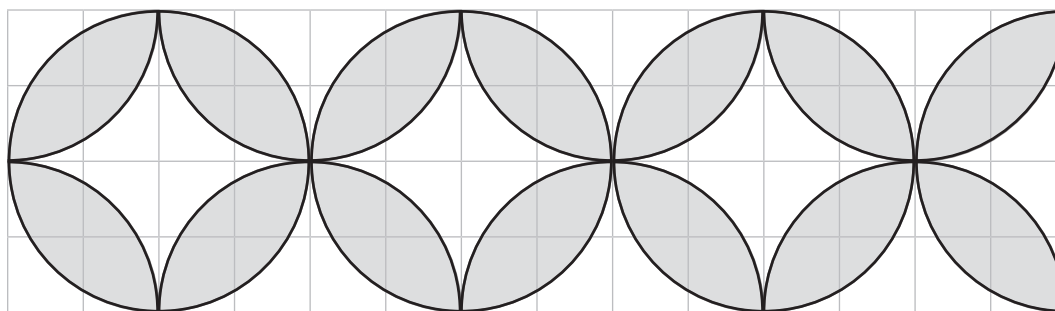
2 Draw this pattern on the squared paper.
Think carefully about where you should place the compass point.

NOTE TO THE TEACHER:

- Draw overlapping circles with the same radius.
- Make sure that the centres of the circles lie on the same line.
- Draw a semi-circle first.
- The centre of each the rest of the circles lies on the circumference of the circle to the left of it.
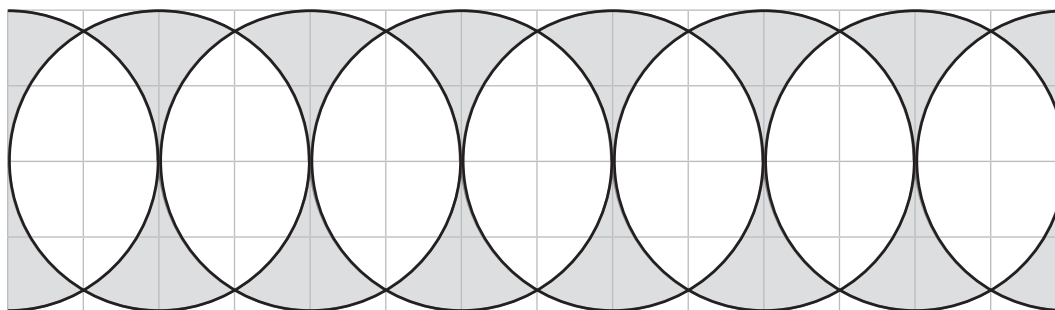
5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.

Draw this pattern on the given squared paper.

Think carefully where you should place the compass point.

NOTE TO THE TEACHER:

Step 1: Draw a semi-circle. Make the radius of the circle 4 blocks wide.

Step 2: Draw part of a semi-circle the same size next to the first semi-circle.

Step 3: Draw an upside down semi-circle, with the centre of the semi-circle where the first semi-circle meets the top line.

Step 4: Draw part of an upside down semi-circle the same size next to the first upside down semi-circle.

Step 5: Complete the diagram by drawing quarter-circles. The centres of these quarter-circles are the points where the circumferences of the semi-circles touch the lines of the squares.
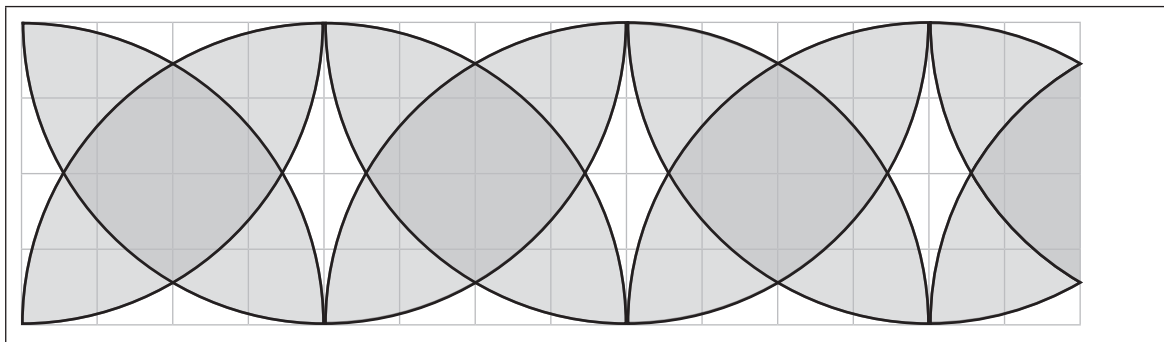
6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we learnt about the diameter of a circle. We know that:**

- **The diameter of a circle is a straight line that goes from any point on the circle through the centre of the circle to a point on the opposite side of the circle**
- **The diameter of a circle is two times longer than the radius of the circle**
- **The diameter of a circle is the longest straight line that can be drawn in a circle.**

Say: **We can draw patterns with a pair of compasses using the radius and diameter of the circles.**

Lesson 25: Using a pair of compasses to measure distance

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 2-D shapes (pages 147, 184)
Lesson Objective: Learners will be able to use a pair of compasses to measure and compare distances.
Lesson Vocabulary: pair of compasses
Teacher Resources: Pair of chalkboard compasses (if available), A3 poster: *Using a pair of compasses to measure distance*.
Learner Resources: Pair of compasses, sharp pencil; a ruler

Date:	Week	Day

UNIT 3

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	35 ÷ 7	(5)	**6**	28 ÷ 7	(4)
2	70 ÷ 7	(10)	**7**	7 ÷ 7	(1)
3	14 ÷ 7	(2)	**8**	42 ÷ 7	(6)
4	49 ÷ 7	(7)	**9**	56 ÷ 7	(8)
5	21 ÷ 7	(3)	**10**	63 ÷ 7	(9)

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Study this circle pattern.
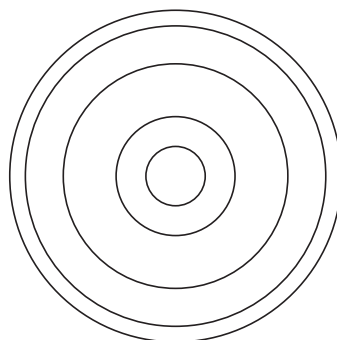
Circle the word to complete the sentence correctly:

To draw this pattern, I needed to use the same ⬭centre⬭/ radius / diameter.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 24 are provided in Lesson 24.
Use this time to purposefully address gaps in learners' knowledge and to identify and
address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

This is the fifth of five lessons on circles and one on spheres.
In this lesson the learners use a pair of compasses to measure and compare distances by
copying the distances onto a line.

Say: **Today we will learn what else we can use a pair of compasses for.**

Activity 1: Learners work in pairs

- You will need: large pair of chalkboard compasses and the A3 poster: *Using a pair of compasses to measure distance.*

- Say: **Work with your partner to do Activity 1 in the LAB.**

- Walk around to support learners as they work. Once learners have had a chance to discuss the activity and answer the question, use the poster and the chalkboard pair of compasses to revise the work.

Work with a partner.
You need a pair of compasses, a short pencil and a ruler.

Mpho wants to go to the park. Follow the instructions to work out which gate is
closest to Mpho.
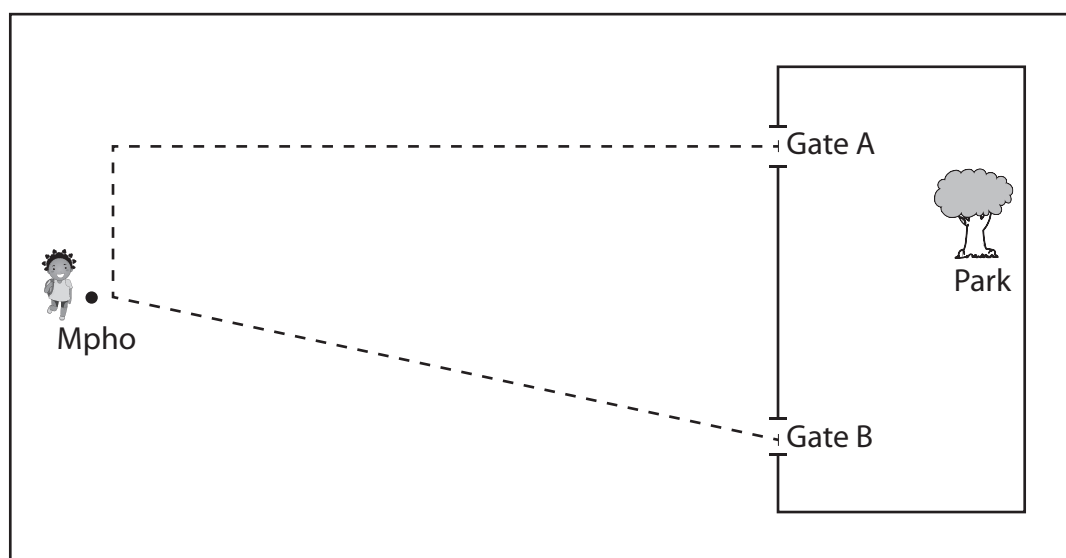
1 We can use a ruler to measure the distance from Mpho to Gate A and Gate B.
   Write down how you would do this.
   (Measure the distance to Gate B and then measure the two distances from Mpho to
   Gate A and add these two measurement together)

2 We can use a pair of compasses to help us find which distance is shorter.

   a Use your pair of compasses to copy each length of the route to Gate A onto the
      straight line below. Make a mark on the line between the two pairs of compasses.

   b Use your pair of compasses to copy the length of the route to Gate B onto the
      second straight line below.

Route to
Gate A

To the turn   from the turn to Gate A

Route to
Gate B
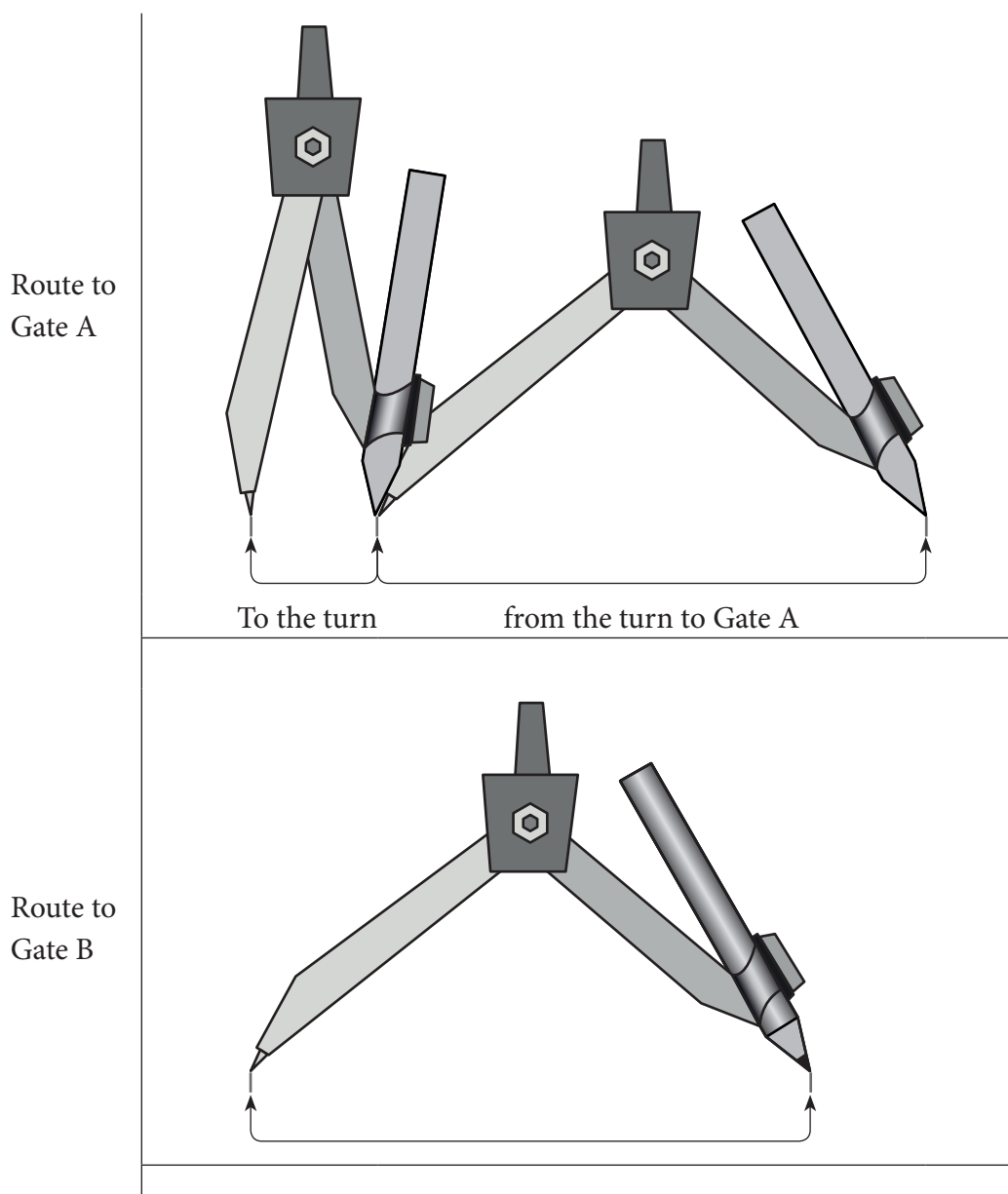
c) Compare the two lengths and then decide which gate is closer for Mpho. (Gate B)

UNIT 3

Activity 2: Learners work on their own

- Say: **Work on your own to do Activity 2 in the LAB.**
- Walk around to support learners as they work.
- Give learners a chance to discuss the activity and answer the questions. Do not rush to tell learners the answers.

Work on your own
You will need a pair of compasses, a short pencil and a ruler.

A farmer has two fields on her farm. She wants to know which field has a longer outside edge or perimeter.
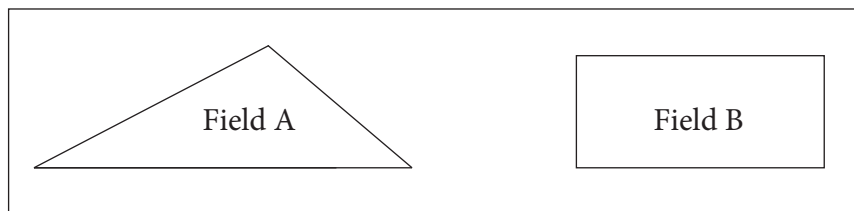
Field A

Field B

1. Use your pair of compasses to measure the lengths of the sides of Field A.
    Mark off the length of each side on the line below.
    Remember not to leave any space between each measurement.

Length of sides of Field A

Length of sides of Field B

2. Now use your pair of compasses to measure the lengths of the sides of Field B.
    Mark off the length of each side on the line above.
    Remember not to leave any space between each measurement.

3. Which field has a longer outside edge? Answer: (Field A.)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

You need a ruler or a pair of compasses.

Zamo has three taxi ranks near his house.

Taxi rank B

Taxi rank A

Taxi rank C
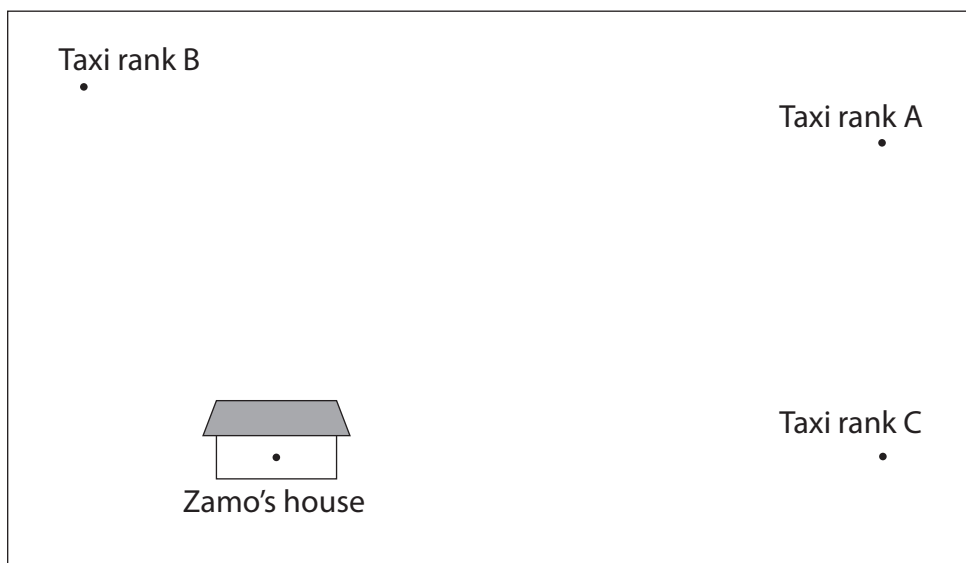
Zamo's house

1 Which taxi rank is closest to Zamo's house? Measure from dot to dot. (Taxi rank B)

2 How did you measure the distances?
(I used a ruler, or I used my pair of compasses)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt how to use a pair of compasses to measure and compare lengths.**

Lesson 26: Spheres

Teacher's notes

This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.

CAPS topics: Properties of 3-D objects (page 167)

Lesson Objective: Learners will be able to identify a sphere as a 3-D object with a curved surface. They will also be able to identify the centre, radius and diameter of a sphere.

Lesson Vocabulary: 3-D objects, sphere, curved surface

Teacher Resources:
ACTIVITY 1: A large round ball (for example: soccer ball or netball) to be used as an example of a sphere
ACTIVITY 2: A ball made out of clay, plasticine or Prestik/Bostik that is big enough to demonstrate what to do to the learners plus something to cut the ball
ACTIVITY 3: The A3 poster: *Parts of a circle*, strips of paper and Prestik/Bostik to cover the labels: centre, radius and diameter; the ball make out of clay, plasticine or Prestik/Bostik that you used for the last activity; the A3 poster: *Parts of a sphere*

Learner Resources:
ACTIVITY 1: A pair of compasses.
ACTIVITY 2: A piece of clay, plasticine or Prestik/Bostik and something to cut it.
ACTIVITY 3: Nothing extra

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

Complete:

	÷ 8	
16 →		→ (2)
40 →		→ (5)
8 →		→ (1)
56 →		→ (7)
72 →		→ (9)
24 →		→ (3)
80 →		→ (10)
32 →		→ (4)
48 →		→ (6)
64 →		→ (8)

2 LINK TO PREVIOUS LESSON (5 MINUTES)

This is the first lesson on 3-D objects in Grade 5. Revise concepts from previous grades.

Refer learners to the activity in the LAB.

These shapes are all 3-D Objects:
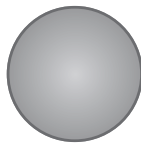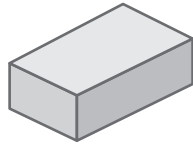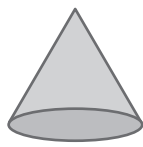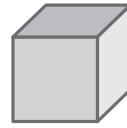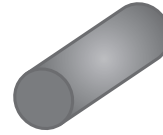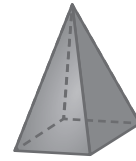
A	B	C	D	E	F

1 Which of these shapes have flat sides only? (B, D and F)
2 Which of these shapes has a curved surface only? (A)
3 Which of these shapes have flat and curved surfaces? (C and E)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 25 are provided in Lesson 25.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

In previous grades learners learnt about spheres as balls. They also classified spheres or balls and objects that can roll as "objects that have a curved surface", rather than objects that slide which are "objects that have at least one flat face".

This is the sixth of the five lessons on circles and one on spheres.
- In the first activity the learners draw a sphere from above and find that they get a circle.
- In the second activity the learners discover the shape that they get when they slice through a sphere made of clay, plasticine or Prestik/Bostik.
- In the third activity the learners revise the parts of a circle and extend this to the names of the parts of a sphere.

NOTE TO THE TEACHER:
When you and learners draw a circle, it is recommended that you use a pair of compasses, so that learners understand the circle that appears when you cut a sphere anywhere.

Say: **Today we are learning about spheres.**
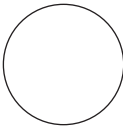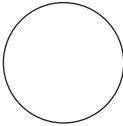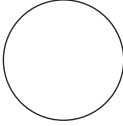
Activity 1: Whole class activity and learners work in pairs

You will need a large ball (for example: soccer ball or netball) which you will use as an example of a sphere.

- Hold the ball up and say: **The mathematical name for this ball is a *sphere*.**

- Hold the ball so that all learners can see it.
  - Ask: **Who would like to come to the chalkboard to help me draw a picture of the ball (or sphere) when we look down on it?**
  - Say, as you get the learner to stand over the ball and look down on it from above: **Look at the ball (or sphere) and draw the shape you can see.**
    (Learner should draw a circle on the chalkboard)
  - Say, as you get another learner to stand next to the ball and look at it from one side: **Look at the ball (or sphere) and draw the shape you can see.**
    (Learner should draw a circle on the chalkboard)
  - Say, as you get another learner to stand on the other side of the ball and look at it from another side: **Look at the ball (or sphere) and draw the shape you can see.**
    (Learner should draw a circle on the chalkboard)

- Say: **Work with a partner to do Activity 1 in the LAB.**

Work with a partner.
You need a pair of compasses.

1 Complete the table.

a Draw the shape you see when you look at the ball from above
b Draw the shape you see when you look at the ball from one side
c Draw the shape you see when you look at the ball from another side

2 Complete the sentence: A shape like a ball that looks like a (circle) when viewed from any angle is called a (sphere).

Activity 2: Whole class activity and learners work in pairs
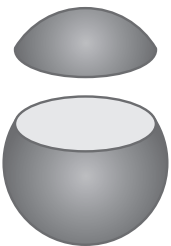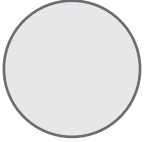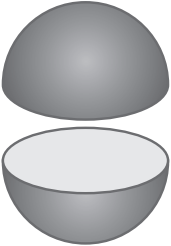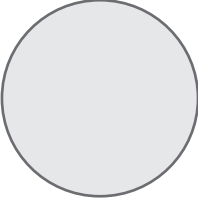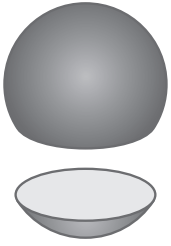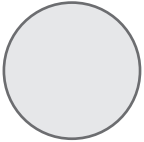
You will need: A ball made out of clay, plasticine or Prestik/Bostik that is big enough to demonstrate what to do to the learners plus something to cut the ball.

- Hold the ball so that all learners can see it.
    - Use your hand to pretend to cut the ball into two pieces.
    - Ask: **What shape will the *cut surface* be if I cut it like this?** (The learners should be able to say that when we cut a sphere, each flat face is a circle.)

- Repeat this activity but now cut your sphere to make two halves that are exactly the same.

- Say: **Work with a partner to do Activity 2 in your LAB.**

UNIT 3

Work with a partner.
You need a piece of clay, plasticine or Prestik/Bostik and something to cut it.

1   Make a ball with clay, plasticine or Prestik/Bostik.
    Try to make the ball look as much like a sphere as possible.

2   Look at the way that each of these spheres have been cut.
    Cut your sphere and complete the table.

		Draw the shape you would see
a		
b		
c		

3 When did you have the largest circle?
(When I cut the sphere exactly in half, I got the largest circle.)

4 Complete the sentence:
The cut surface of a sphere is always a (circle), no matter where you cut.

Activity 3: Whole class activity and learners work in pairs

You will need the A3 poster: *Parts of a circle*. Use strips of paper and Bostik/Prestik to cover the labels: centre, radius and diameter.
You will also need the ball make out of clay, plasticine or Prestik/Bostik that you used for the last activity.
And you will need the A3 poster: *Parts of a sphere*

- Say: **Look at this poster.**
  - Ask: **Who will show us the centre of the circle?**
    (Learner removes paper strip to reveal the label: centre)
  - Ask: **Who will show us the radius of the circle?**
    (Learner removes paper strip to reveal the label: radius)
  - Ask: **Who will show us the diameter of the circle?**
    (Learner removes paper strip to reveal the label: diameter)
  - Ask: **What do we know about the length of the radius and of the diameter of a circle?** ($2 \times$ radius = diameter or ½ the diameter = radius)

- Say: **Now look at this ball of clay (or plasticine or Prestik/Bostik).**
  - Ask: **What is the maths name for a ball?** (a sphere)
  - Ask: **What is the 2-D shape that is formed when the sphere is cut?** (a circle)
  - Ask: **When is the largest/biggest circle formed?**
    (When a sphere is cut exactly in half)

- Put up the A3 poster: *Parts of a sphere*.
  - Say: **Look at this poster of a sphere.**
  - Say: **When you cut a sphere exactly in half, the centre, radius and diameter of the circle that is formed is the centre, radius and diameter of the sphere.**

Work on your own

Fill in the labels centre, diameter and radius on this sphere.
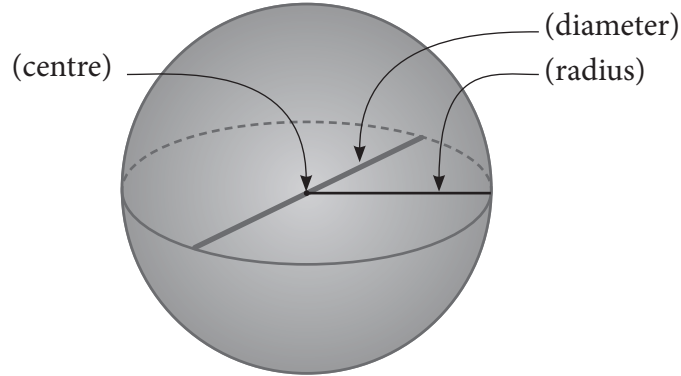
(centre)   (diameter)
             (radius)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

Fill in the missing numbers or words.

1   The cut surface of a sphere is always a (circle).
2   The centre of the sphere is the centre of a (circle) that is formed when you cut the sphere in (half).
3   The diameter of a sphere is (2) times the radius of the sphere.

---

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt about spheres. We know that:**
- **a sphere is a 3-D object that looks like a circle when viewed from any angle**
- **when we cut a sphere, the cut surface is a circle**
- **a sphere has a centre, radius and diameter.**

Lesson 27: Consolidation

Teacher's notes
This lesson allows for consolidation of the lessons in this unit.
CAPS topics: 2-D shapes (pages 147, 184)   Properties of 3-D objects (page 167)
Lesson Objective: Learners will be able to name some properties of circles and spheres, and will be able to use a pair of compasses to draw a circle.
Lesson Vocabulary: circle, sphere, radius, diameter, centre
Resources: Grade 5 learner's books and teacher's guides (if available)
Date: Week   Day

1   NOTES FOR THE TEACHER RELATING TO THIS WEEK'S WORK

The main topics in this unit were circles and spheres.

2   POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

Some learners struggle to 'read' a diagram which represents a 3-D object. Point out that a dotted line in a diagram represents edges that are 'at the back' of an object. In addition, shading can be used to show that the diagram is showing a 3-D object.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 26 are provided in Lesson 26.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

You could use this time for learners to complete classwork or homework activities as necessary.
You could use the Additional Activities from textbooks that you have, or use the Consolidation Activity given.

- Say: **Today we will revise what we have learnt about circles and spheres.**

Additional activities for consolidation

Refer to the following table. Select additional activities from the textbook/s you have.
Use the answers given in the Teacher's Guide to mark the work..

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	67-68	86-92	70-79	42-47	54-58	91-103	58-66	72-74	51-57
	121-127	149-158	130-136	82-87	107-113	167-175	123-131	135-142	99-104
	176-178	214-219	189-194	122-127	156-159	236-241	198-204	201-202	152-155
TG	45-49	87-93	80-83	35-38	38-40	98-111	45-52	72-80	50-57
	91-93	151-159	119-122	68-71	74-77	181-190	98-102	135-142	97-102
	135-137	213-217	157-159	104-107	107-109	259-265	162-170	199-202	149-153

OR, learners could complete the Consolidation Activity in their LAB.

Consolidation Activity – Answers

1 Use a pair of compasses.
  a Draw a circle with a radius of 5 cm.
  b Label the radius, the centre and the diameter of the circle.
  c What is the length of the diameter? (10 cm)
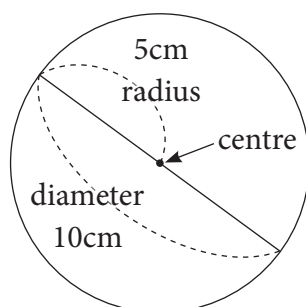
2 Use a pair of compasses.
  a Draw a circle with a diameter of 8 cm.
    Think carefully before you start!
  b Label the radius, the centre and the diameter of the circle.
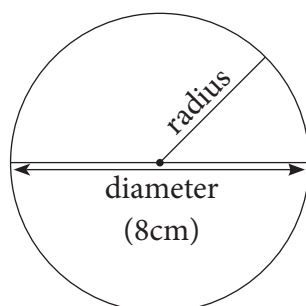
3 State whether each sentence is true or false.
If it is false, re-write the sentence to make it true.

a The radius is two times the diameter. (False)
(The diameter is two times the radius/ The radius is half the diameter)

b A pair of compasses can only be used to draw circles. (False)
(A pair of compasses can be used to measure length/ distance as well.)

4. Your friend wants to know what the difference is between a circle and a sphere.

Use the diagrams below to help you write down what you are going to tell your friend.
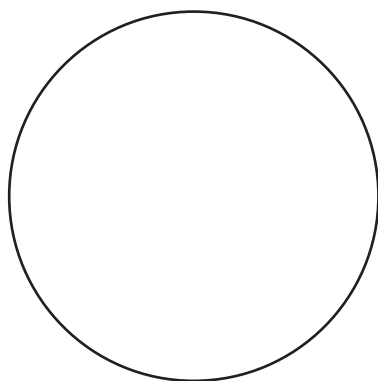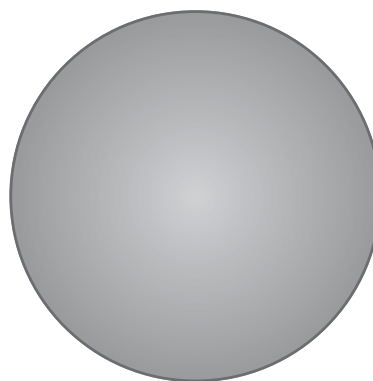
circle   sphere

(A circle is a 2-D shape while a sphere is a 3-D object. OR a circle is flat and a sphere is a ball OR something similar.

5   REFLECTION AND SUMMARY OF LESSON

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised the properties of circles and spheres.**

Unit 4: Broken line graphs

INTRODUCTION

This unit focuses on broken line graphs and temperature.

Graphing and representation of data forms part of Content Area 5: Data Handling. Temperature forms part of Content Area 4: Measurement. This is an introduction to both temperature and broken line graphs as learners did not learn about either of these topics in the Foundation Phase or in Grade 4.

Temperature is a measure of how hot or cold something is. As with all measurement, learners should estimate, measure, record, compare and order temperature. We use a thermometer to measure temperature, and, in South Africa, we measure temperature in degrees Celsius.

A broken line graph shows change over time. The horizontal axis is divided into units of time; and the vertical axis, shows the characteristic being studied. The points on the graph are connected by straight line segments to form a broken line that shows change over time. Examples of broken line graphs include temperature, height and mass graphs.

In this unit, we focus on the four framework dimensions in the following ways:

Framework dimension	How the framework dimension is developed in this unit
Conceptual understanding	Use of broken line graphs to show change over time.
Procedural fluency	Learners follow a structured process to draw broken line graphs. Learners know when to use a broken line graph to represent data.
Strategic competence	Learners identify what interval to use on vertical and horizontal axis.
Reasoning	Learners explain why a particular temperature-time broken line graph represents an increase or decrease over time.

In this unit, we build a **learning centred classroom** by paying attention to:

		Examples
Concept development	✓	Done in every lesson.
Speaking mathematics	✓	Learners use the correct terminology to discuss temperature.
Practising procedures	✓	Learners practise how to draw broken line graphs.
Explaining concepts and procedures	✓	Learners explain how and why they recorded methods in the way they did.
Connecting topics and concepts	✓	Learners connect measurement of time and temperature to data handling.
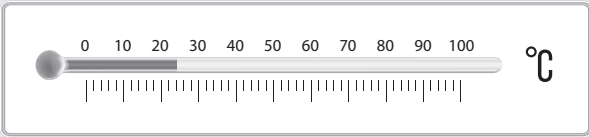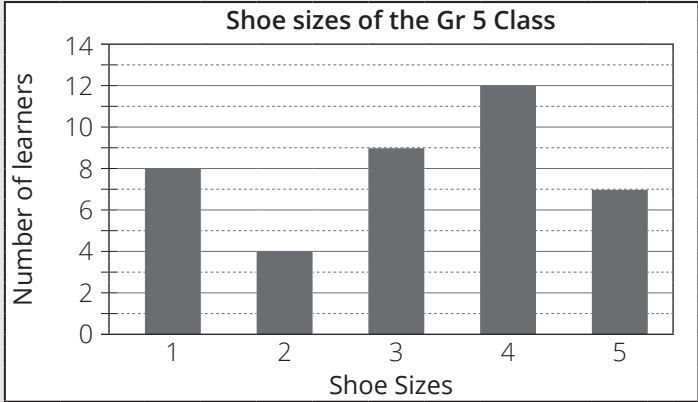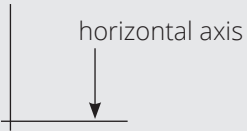
| Active learning | ✓ | Learners read and record data themselves and draw and interpret broken line graphs. |
| Applying maths in context | ✓ | Learners link their concept of temperature and its measurement to COVID-19. |

Mathematical vocabulary for this unit

Be sure to teach and use the following vocabulary at the appropriate place in the unit. It is a good idea to make flashcards of words and their meanings and to display these in the classroom at appropriate times.

Refer to the bilingual dictionary where necessary.

Term	Explanation / diagram
analogue thermometer	Measuring instrument that has a number line so that you can read temperature Example: 0 10 20 30 40 50 60 70 80 90 100 °C This analogue thermometer shows a temperature of 24 ºC
bar graph	A graph that uses bars to show information. The bars must all be the same thickness or width. Example: **Shoe sizes of the Gr 5 Class** Number of learners (y-axis: 0–14), Shoe Sizes (x-axis: 1–5)
body temperature	The temperature of the body measured by either an analogue or digital thermometer. The normal body temperature ranges between 35,5 ºC and 37,8 ºC.
boiling point	The temperature at which pure water starts to boil
broken line graph	Graph formed by line segments that are joined together. Broken line graphs show change over time

Term	Explanation / diagram	
Celsius	The temperature scale we use in South Africa It is written as °C Pure water freezes at around 0 °C and, at sea level, boils at around 100 °C	
constant	Remains the same, does not change	
data	Information, the complete set of information being used	
decimal number	A number that has a decimal comma followed by digits that show the fractional part of something Examples: 3,3 and 0,4	
decrease	Make smaller or less	
degree	Unit for measuring temperature	
digital thermometer	Measuring instrument that shows the temperature in numbers rather than on a number line	Example This digital thermometer shows a temperature of 36,6 °C
freezing point	Temperature at which pure water freezes to form ice	
graph	Drawing showing information	
horizontal axis	The axis in the graph that goes across or from side to side horizontal axis	
increase	Make bigger or more	
interval	The gap between two things. It could be an interval in numbers (the size of the gap in a number pattern) or it could be the gap between numbers on a scale Example: The interval on a medical analogue thermometer is usually 0,1	
maximum temperature	Highest temperature recorded in a specified time	
measure	To find the size of something that can be measured Examples: you can measure temperature, length, mass, capacity, volume and duration (how long something takes or lasts)	
minimum temperature	Lowest temperature recorded in a specified time	
normal body temperature	Body temperature of a person who is not sick	

Term	Explanation / diagram
number line	A line on which numbers can be placed according to their value. The gaps on the number line must be evenly spaced
record	Write down or draw
report	A written or verbal account of something that one has observed, heard, done, investigated or analysed
slope	The steepness and direction of a line Examples: Steep slope: Gentle slope:
Steepest slope	Having the sharpest slope
temperature	A measure of how hot or cold something is. We can measure the temperature of many things. Example: We can measure the temperature of air, food and our bodies
thermometer	Instrument used to measure temperature. In South Africa we measure temperature in degrees Celsius (°C)
vertical axis	The axis in the graph that runs up and down vertical axis →

Further practice for learners

This table references other sources (including textbooks) if you need additional activities.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia Viva
LB	183-186	225-226	199-203	130-133	164-167	252-256	212-217	209-216	160-161
TG	140-141	223-225	162-164	111-113	110-112	277-282	177-180	236-238	84-85

UNIT PLAN AND OVERVIEW FOR UNIT 4:
Broken Line Graphs

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
28	measure and record temperature on analogue and digital thermometers.	Teacher: A3 poster: *Thermometers*; A3 poster: *Analogue thermometers have a scale which is marked in equal intervals*; Different analogue and digital thermometers if available	
29	give the following temperatures: freezing point, boiling point, and normal body temperature; read calibrated and uncalibrated thermometers; and record and report temperature measurements.	Teacher: A3 poster: *Thermometers*; A3 poster: *Freezing point and boiling point and body temperature*; flashcards for the A3 poster: *Freezing point, boiling point and body temperature*; A4 poster 30-day calendar; An analogue thermometer Bostik /Prestik	
30	read temperatures given on a weather map and record temperatures in a table.	Teacher: A3 poster: *Weather map of South Africa*; A3 poster: *Reading a thermometer*	
31	read the change over time on a broken line graph.	Teacher: A3 poster: *Temperatures for 1 day*; A3 poster: *Graph showing temperature change over time in Emalahleni*; Flashcards: increasing, decreasing, no change, vertical axis, horizontal axis, heading, broken line graph	
32	read a variety of broken line graphs, and use broken line graphs to solve problems.	Teacher: A3 poster: *Temperature on one day in summer in Polokwane*	
33	draw a broken line graph.	Teacher: A3 poster: *The number of elephants and lions in a Game Reserve in South Africa*; Flashcards: title; label for the vertical axis, label for the horizontal axis, units on the vertical axis, units on the horizontal axis; legend A3 poster: *Temperature on 28 June* Bostik/ Prestik Learner: 3 different colour pens, pencils or crayons, ruler, eraser	

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
34	read a thermometer, record information in a table, and represent the data in a broken line graph.	Teacher: A3 poster: *Measuring body temperature*; A3 poster: *Hluphe's temperature – my first try*; A3 poster: *Hluphe's temperature – my second try* Learner: pencil, ruler, eraser	
35	read and interpret bar graphs, broken line graphs and combined graphs.	Teacher: A3 poster: *Temperature and rainfall in Durban*	
36	• revise and consolidate measuring, recording and reading temperature • revise and consolidate reading and drawing broken line graphs and reading combined graphs.	Teacher: Temperature and broken line posters for this unit. Learner: pencil, ruler, eraser Teacher and learner: Textbooks or DBE workbooks as available. OR Consolidation activity provided in TG and LAB	

Assessment for learning
Use the template provided at the beginning of this guide to think deeply about at least one of the lessons in this unit.

Reflection
Think about and make a note of: *What went well? What did not go well? What did the learners find difficult or easy to understand or do? What will you do to support or extend learners? Did you complete all the work set for the unit? If not, how will you get back on track?*

What will you change next time? Why?

Lesson 28: Temperature and thermometers

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum. CAPS Topic: 4.4 Temperature (page 186) Lesson Objective: Learners will be able to measure and record temperature on analogue and digital thermometers. Lesson Vocabulary: temperature, thermometer, Celsius, degree, record Teacher Resources: • Different analogue and digital thermometers if available including one that can be used to measure the outside temperature. (Note: Digital thermometers were issued to all schools as part of the COVID-19 PPE.) • A3 poster: Thermometers; A3 poster: *Analogue thermometers have a scale which is marked in equal intervals*. Learner Resources: None
Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

This is provided for the learners in the LAB.

Complete the flow chart:

	÷ 9	
18 →		→ (2)
90 →		→ (10)
36 →		→ (4)
9 →		→ (1)
72 →		→ (8)
63 →		→ (7)
27 →		→ (3)
81 →		→ (9)
45 →		→ (5)
54 →		→ (6)
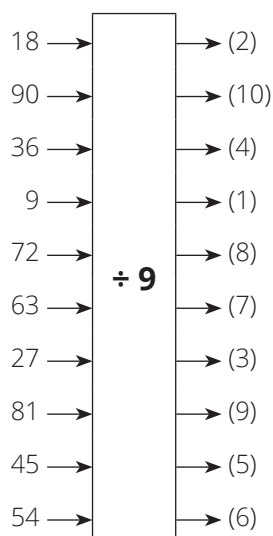
2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Ask the learners to do the following activity in their LAB. It revises work done in Grade 4.
- Mark the work with them.

Write down the missing numbers on these two number lines.

1

| 0,1 | 0,9 | **a** | 2,5 | **b** | | **c** |

   0   1   2   3   4   5

   a (1,8)
   b (3,4)
   c (4,9)

2

| **a** | **b** | 7,1 | 8,4 | 9,2 | **c** |

   5   6   7   8   9   10

   a (5,1)
   b (6,3)
   c (9,9)

---

3   CORRECT HOMEWORK ACTIVITY

This is the first lesson in this unit. There is no homework to correct.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

This is the first of three lessons on temperature.

In this lesson, learners find out what temperature is, how it is measured, and they measure and record their body temperature.

Say: **Today we are learning to measure and record temperature.**

Activity 1: Whole class activity and then learners work on their own

You will need a digital thermometer or the A3 poster: *Thermometers*.

- Show the digital thermometer:
  - Say: **Each day when you come to school, this instrument is used to measure something.**
  - Ask: **What is this instrument called?** (thermometer or digital thermometer)
  - Ask: **What does this instrument measure?** (your temperature)
  - Say: **Temperature is a measure of how hot or cold something is.**
  - Ask: **Why is your temperature is measured when you come to school?** (to see if you may be sick or not)
  - Say: **We measure temperatures in degrees Celsius which we write like this: ℃** (write on chalkboard)

- Say: **You know how your temperature is measured using a digital thermometer, but let's revise what you do.**
  Say:
  - **I switch on the thermometer like this.** (Demonstrate)
  - **I point the thermometer at (learner's name)'s arm like this, without touching the arm.** (Demonstrate)
  - **I press this button to get the temperature reading.** (Demonstrate)
  - **I read (learner's name)' temperature on this screen.** (Demonstrate)

- Ask: **Who would like to tell us what (learner's name)'s temperature is?** (Listen to answer, check the answer, and write on chalkboard like this: 37,2 ℃. If necessary, explain that the temperature on the screen might read 37.2 ℃, but we write it as 37,2 ℃. In other words, the thermometer might show a decimal point, but we write down a decimal comma.)

- Say: **When we write down the temperature measurement, we say we are recording the temperature.**

> NOTE TO THE TEACHER:
> Although 37 ℃ is often taken to be the normal body temperature, normal body temperatures actually vary between 35,5 ℃ and 37,8 ℃.

- Say: **Now complete Activity 1 in your LAB. Work on your own.**
  - Read through Activity 1 with the learners. Make sure they understand what they have to do.

- This is a five-day activity, so you are going to have to plan how you accommodate this task in the next four school days.
- One strategy is to ask the learners to record their temperatures when it gets taken as they get to school and to then write that day's temperature in the correct place in the LAB when they get to the maths class. Alternatively, give the person who takes the temperatures in the morning a class list on which the temperatures of the learners in your maths class are recorded.

Work on your own

1   Measure your body temperature today and then every day for four more days.
    Record your body temperature on this record sheet:

Day	My body temperature
1	
2	
3	
4	
5	

2) Answer this when you have recorded your temperature for five days:

    Is your temperature the same every day?

    _____

    (Answers will vary. Check that learners measure and record their body temperature accurately and that they write in the unit: $^{\circ}$C)

Activity 2: Whole class activity and then learners work in pairs

You will need an analogue thermometer or the A3 poster: *Thermometers* and the A3 poster: *Analogue thermometers have a scale which is marked in equal intervals.*

NOTE TO THE TEACHER:

A digital thermometer shows the actual temperature whereas the temperature on an analogue thermometer has to be read on a scale. Compare this to a digital watch where you can read off the actual time immediately and an analogue watch where you have to know how to work out the time from the position of the minute and hour hands. A person's temperature used to be measured using an analogue thermometer but, today, a digital thermometer is used as it doesn't have to be sterilised before being used to record a different person's temperature. Analogue thermometers are very rarely used to take a person's temperature.

- Show the analogue thermometer:
  - Ask: **When else do you use an analogue thermometer to measure temperature?** (to measure the outside temperature, to measure the temperature of the oven of the stove when you are cooking something in the stove; and so on)
  - Ask: **What is the difference between the way the digital thermometer shows the temperature and the way the analogue thermometer shows the temperature?** (the digital thermometer gives the numbers that show the temperature, and the analogue thermometer shows the temperature on a number line)

- Show the A3 poster: *Analogue thermometers have a scale which is marked in equal intervals.*
  - Use the poster to discuss with the learners how to read the scale of an analogue thermometer.

- Tell the learners to work with their partner and complete Activity 2 in their LAB.
  - Read through the activity with the learners. Make sure the learners understand what they should do.
  - Walk around and support the learners as needed.
  - Answers are provided below.

Work with a partner

1 Look at the thermometer and then answer the questions.
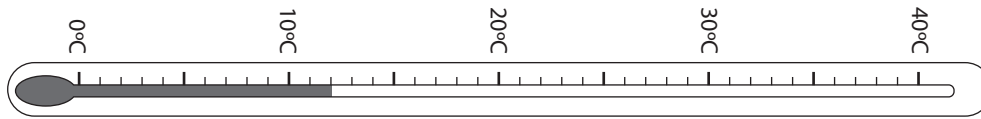
    a. What is the lowest temperature that can be read on this thermometer? (0 ºC)
    b. What is the highest temperature that can be read on this thermometer? (40 ºC)
    c. How many degrees do each of the shorter lines represent? (1 ºC)
    d. What temperature is shown on this thermometer? (12 ºC)

2 Edy's temperature this morning was 37 ºC.
Use a pencil to show 37 ºC on this thermometer:
(37 must be shown by shading in mercury to 37)
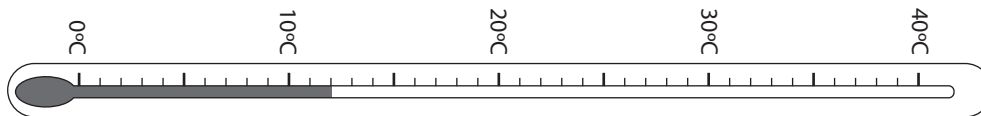
3 Look at the thermometer and then answer the questions.
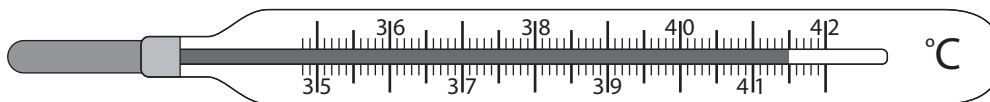
    a. What is the unit of measurement on this thermometer? (ºC)
    b. State whether True or False
        Each small line represents 0,1. (True)
    c. What temperature is shown on this thermometer? (41,5 ºC)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

---

1 What is the temperature shown on each thermometer?

A   °C   (37,5 °C)

B   °C   (36,5 °C)

C   °C   (37 °C)
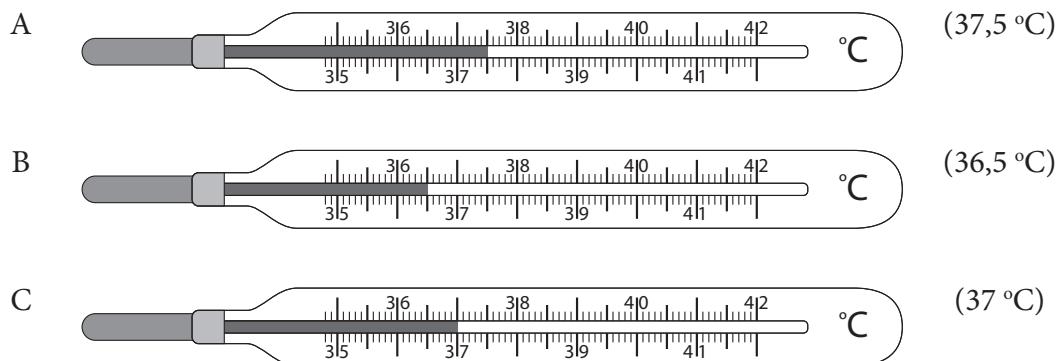
2 Tshanda's temperature is 38,4 °C.

    a Write Tshanda's temperature on this thermometer:

    b Do you think Tshanda might be sick? Give a reason for your answer.

    (Yes/ Tshanda could be sick. Her temperature is 38,4 °C which is above normal body temperature which is around 37 °C.

    Remind learners that we all get sick and sometimes have a high temperature.)

---

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**

- **temperature is a measure of how hot or cold something is**
- **we use a thermometer to measure temperature**
- **we measure temperature in degrees Celsius**
- **normal body temperature of human beings is around 37 °C.**

UNIT 4

Lesson 29: Measuring temperature

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS Topic: 4.5 Temperature (page 186)
Lesson Objective: Learners will be able to give the following temperatures: freezing point, boiling point, and normal body temperature. They will be able to read calibrated and uncalibrated thermometers; and to record and report temperature measurements.
Lesson Vocabulary: thermometer, temperature, freezing point, boiling point, normal body temperature
Teacher Resources: A3 poster: *Thermometers*; A3 poster: *Freezing point, boiling point and body temperature*; Flashcards for the A3 poster: *Freezing point, boiling point* and *body temperature*.
A4 poster: *30-day calendar*
Bostik / Prestik
An analogue thermometer.
Learner Resources: None

Date:	Week	Day

NOTE: Make sure all the learners have measured their temperature by the end of the lesson and have written the answer down in the table in their LABs.

1   MENTAL MATHS (5 MINUTES)

Match each temperature with one of the letters (A-J) shown on the thermometer.

The first answer has been filled in for you.
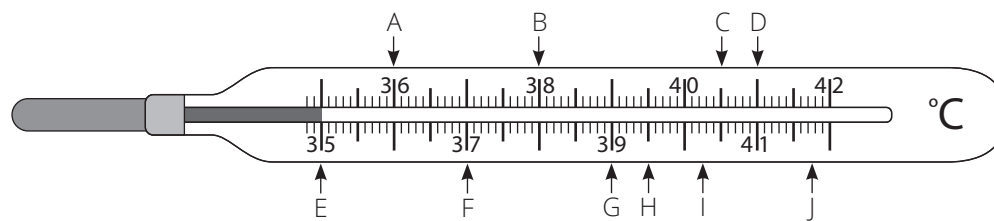
	Question	Answer		Question	Answer
1	36 °C	A	**6**	40,5 °C	(C)
2	35 °C	(E)	**7**	Two degrees below 40 °C	(B)
3	39,5 °C	(H)	**8**	39 °C	(G)
4	37 °C	(F)	**9**	One degree above 40 °C	(D)
5	41,8 °C	(J)	**10**	40,2 °C	(I)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Write down the temperature shown on each thermometer.

1 °C

-100
-90
-80
-70
-60
-50
-40
-30
-20
-10
-0

(89 °C)

2 °C

-50
-40
-30
-20
-10
-0

(28 °C)

3 °C

-50
-40
-30
-20
-10
-0
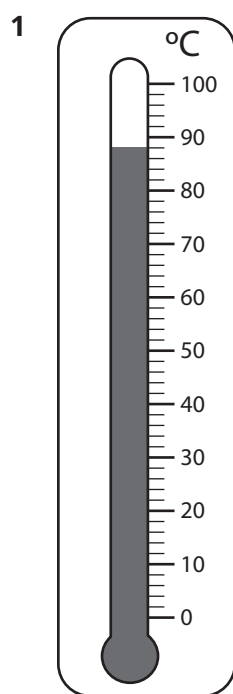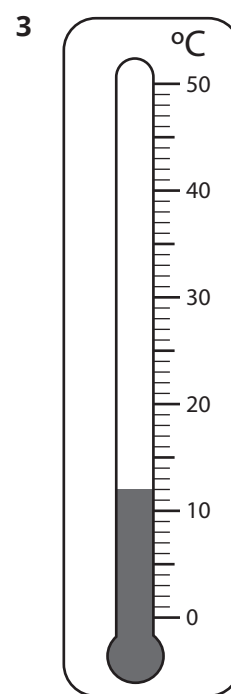
(12 °C)

---

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 28 are provided in Lesson 28.
Use this time to purposefully address gaps in the learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

Say: **Today we will learn about freezing point and boiling point of water.**

NOTES FOR THE TEACHER:
- The temperature at which pure water starts freezing to form ice is called the freezing point and is around 0 °C.
- The temperature at which pure water starts boiling is called the boiling point and is around 100 °C.
- If you have an analogue thermometer you can use to measure the air temperature every day, put the A3 Poster: *30-day calendar* up in your classroom and get the learners to record the temperature each day on the calendar. If possible, measure the temperature at the same time each day.

Remind the learners: Don't forget to measure your temperature today and write it in the correct place in Lesson 1 Activity 1.

Activity 1: Whole class activity and then learners work in pairs

For this activity you will need the following:

- A3 poster: *Thermometers*.
- A3 poster: *Freezing point, boiling point and body temperature*.
- The three flashcards which go with the A3 poster: *Freezing point, boiling point and body temperature*.
- A3 poster: *30-day calendar*
- Bostik /Prestik for sticking the flashcards on the poster
- Hot water
- Ice cubes

- Ask: **What do we use a thermometer for?** (to measure temperature)
  - Say, as you point to the word Thermometer on one of the posters: **The word thermometer comes from the word 'thermo' meaning heat and the word 'metrum' meaning measure.**
  - Say: **Give examples of where we use temperature in our everyday lives.**
    (Many answers are possible here. Some examples are: to measure your temperature when you are sick; for cooking or baking food; for heating or cooling homes, schools, vehicles, workplaces)

- Ask the learners: **At what temperature does pure water generally boil?** (100 ºC.)
  - Point to the flashcards and ask: **Who will come to the board and place the correct flashcard on the thermometer to show us the temperature at which pure water generally boils?** (Learner places the flashcard "Temperature at which water boils" next to the arrow at 100 ºC on the thermometer)
  - Ask the learners: **Would you burn yourself if you put your hand in boiling water?** (You would burn your hand badly and should immediately run cold water over your hand for at least 20 minutes to relieve the pain and reduce burning.)

- Ask the learners: **At what temperature does pure water generally freeze?** (0 ºC.)
  - Point to the flashcards and ask: **Who will come to the board and place the correct flashcard on the thermometer to show us the temperature at which pure water generally freezes?** (Learner places the flashcard "Temperature at which water freezes" next to the arrow at 0 ºC on the thermometer)
  - Ask the learners: **Would you burn yourself if you touched frozen water or ice?** (If you leave your hand for a long time on ice that is not melting, you could suffer frost burn.)

- Ask the learners: **Why is the temperature of 37 ºC an important temperature?** (A person's temperature is in a range around 37 ºC)
  - Ask: **Who will come to the board and place the flashcard in the correct position on the thermometer?** (Learner places the flashcard "Average body temperature" next to 37 ºC on the thermometer.)

- Tell learners to do Activity 1 in their LAB with their partner.
  - Read through the activity with the learners. Make sure the learners understand what they should do.
  - Walk around and support the learners as needed.
  - Answers are provided below.

Work with your partner.

1 Write the temperatures in the correct place next to the thermometer.

Analogue Thermometer

°C

Temperature at which water boils: (100 ºC)

Average body temperature: (37 ºC)

Temperature at which water freezes: (0 ºC)
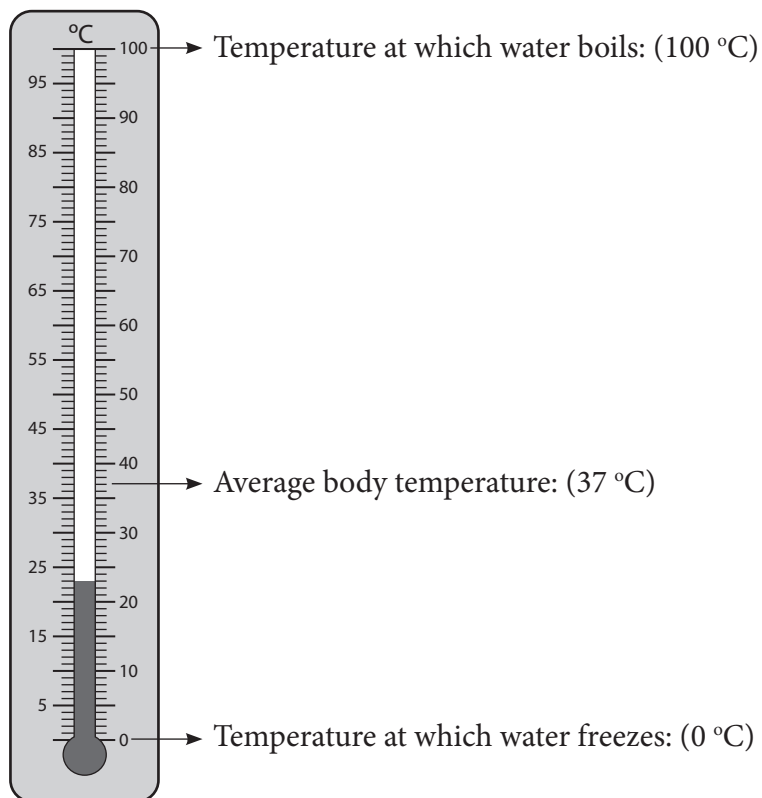
2 Draw a cross over the most likely temperature:

a The temperature of a very cold cool drink.

| ~~3 ºC~~ | 37 ºC | 100 ºC |

b The temperature of a very hot drink.

| 30 ºC | ~~94 ºC~~ | 0 ºC |

c Your body temperature one day.

| 18 ºC | 63 ºC | ~~37 ºC~~ |

d The temperature of the air on a hot day.

| 18 ºC | ~~34 ºC~~ | 68 ºC |

3 Read and record the temperature shown on each digital thermometer:

a

35.0   (35,0 ºC)

b

36.6   (36,6 ºC)

c

38.5   (38,5 ºC)

4 These baking instructions are given on a packet of frozen fish.

How to bake the fish in the oven
- Turn the oven on to 220 ºC.
- Place fish on a baking tray and bake in the oven for approximately 25 minutes

Read the instructions and then answer the questions.

a At what temperature must the fish be baked?   (220 ºC)

b For how long should the fish be baked? (25 minutes)

c Use an arrow to show the temperature on this oven thermometer at which the fish must be baked.
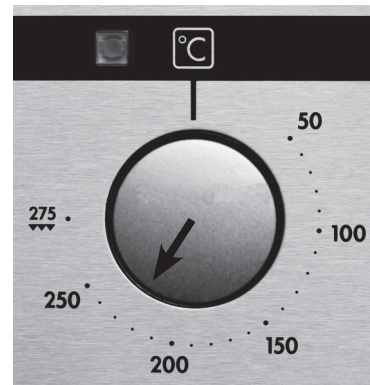
d Explain what would happen if you tried to bake the fish for 25 minutes at 300 ºC. (The fish will probably be burned because the temperature has increased from 220 ºC to 300 ºC.)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Lines are drawn to show the answers.

Draw a line to match the statement in Column A with the correct temperature in Column B.

Column A		Column B
Your temperature when you are healthy		42 °C
The temperature on a very hot day in South Africa		0 °C
The temperature inside your fridge		100 °C
The temperature needed to make ice cubes		6 °C
The temperature at which water boils		37 °C

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **Water freezes at about 0 °C**
- **Water boils at about 100 °C**
- **The normal body temperature is about 37 °C**
- **It is useful to be able to work with temperature as there are many everyday life situations where temperature is important.**

And say: **We have also practiced reading and recording temperature on digital and analogue thermometers.**

UNIT 4

Lesson 30: Reading and recording temperature

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 4.5: Temperature (page 186); 5.1 and 5.2: Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to read temperatures given on a weather map and to record temperatures in a table.
Lesson Vocabulary: maximum temperature, minimum temperature, interval, thermometer
Teacher Resources: A3 poster: *Weather map of South Africa*; A3 poster: *Reading a thermometer*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Round off to the nearest multiple of 10

	Question	Answer		Question	Answer
1	43	(40)	**6**	976	(980)
2	69	(70)	**7**	432	(430)
3	55	(60)	**8**	8	(10)
4	81	(80)	**9**	597	(600)
5	172	(170)	**10**	214	(210)

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Look at the thermometer and then answer the questions.

°C
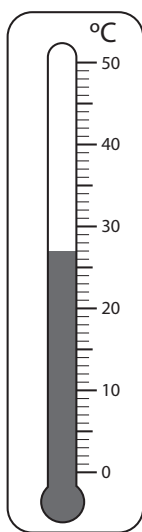
1   How many degrees do the small lines represent? (1 °C)

2   What temperature is the thermometer showing? (27 °C)

3   What is the highest temperature you can read on this thermometer? (50 °C)

4   What is the lowest temperature you can read on this thermometer? (0 °C)

5   At what temperature does pure water freeze? (0 °C)

6   At what temperature does pure water boil? (100 °C)

7   Could you use this thermometer to measure whether water that has been heated is at boiling point? Why? (No. Because it measures up to 50 °C not to 100 °C)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 29 are provided in Lesson 29.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

> NOTES FOR THE TEACHER:
> Maximum (highest) and minimum (lowest) temperatures are particularly important in the context of weather and weather forecasting. We introduce the concept of maximum and minimum temperatures, and learners practice reading and recording temperatures from a weather map and an analogue thermometer. Learners also record temperatures in a table.

Say: **Today we are going to read temperatures given and we are going to record temperatures in a table.**

Activity 1: Whole class activity and Learners work in pairs

You will need the A3 poster: *Weather map of South Africa*

- Say, as you display the weather map: **The expected maximum temperatures and minimum temperatures are shown on television or are given on the radio every day.**

- Say: **Let's look at the temperatures for Cape Town. The *minimum temperature* is 12 ºC and the *maximum temperature* is 19 ºC.**
  - Ask: **What do we mean when we talk about the *minimum temperature*?** (The lowest temperature of the day)
  - Ask: **What do we mean when we talk about the *maximum temperature*?** (The highest temperature of the day)

- Say: **Work with your partner to complete Activity 1 in your LAB.**
  - Read through Activity 1 with the learners. Make sure they understand what to do.
  - Walk around and support the learners as needed.
  - Answers are provided below.

Work with a partner

Record the maximum and minimum temperatures for each city in the table below. Then work out the difference between the minimum temperature and maximum temperature.

Temperatures in South Africa on 19 May 2021
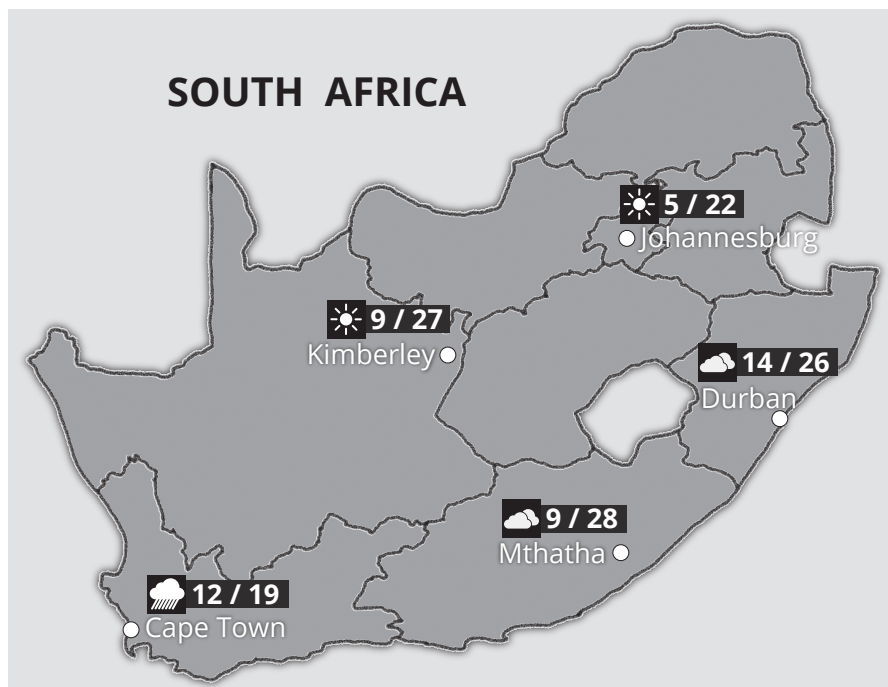
	Minimum Temperature	Maximum Temperature	Difference between the maximum temperature and the minimum temperature
Cape Town	(12 ºC)	(19 ºC)	(19 ºC – 12 ºC = 7 ºC)
Durban	(14 ºC)	(26 ºC)	(26 ºC – 14 ºC = 12 ºC)
Johannesburg	(5 ºC)	(22 ºC)	(22 ºC – 5 ºC = 17 ºC)
Kimberley	(9 ºC)	(27 ºC)	(27 ºC – 9 ºC = 18 ºC)
Mthatha	(9 ºC)	(28 ºC)	(28 ºC – 9 ºC = 19 ºC)

Activity 2: Whole class activity and Learners work in pairs

Put the A3 poster: *Reading a thermometer* on the board.

- Say: Let's practise reading a thermometer.
  - Ask: **What temperature is shown on this thermometer, (learner's name)?** (22 ºC)
  - Say: **Yes, you answered correctly. Please tell the class how you read the temperature?** (I saw a mid-line between 10s and there are 5 intervals between 20 ºC and 25 ºC. So I know that each small line represents one degree)

- Say: **By reading an outside thermometer during the day we can see how the air temperature changes.**

- Say: **Work with your partner. Complete Activity 2 in your LAB.**
  - Read through the activity with the learners. Make sure the learners understand what they should do.
  - Answers are provided below.

Work with your partner.

Zamo wanted to see how the air temperature changed during the day.
The thermometers below show the outside temperature every two hours during the day.

Read the temperature shown on each thermometer. Record the temperature readings in the table.

Temperatures for 1 day
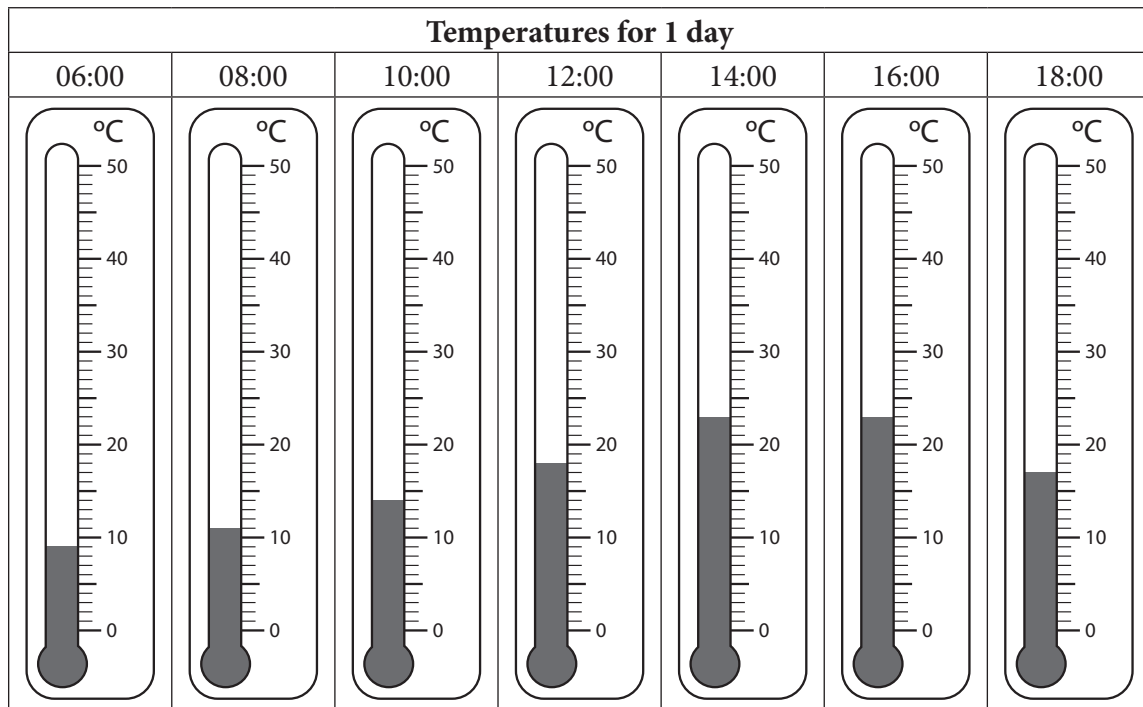
Time	06:00	08:00	10:00	12:00	14:00	16:00	18:00
Temperature	(9) ºC	(11) ºC	(14) ºC	(18) ºC	(23) ºC	(23) ºC	(17) ºC

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given.

Draw a line to match the description to the temperature.

Description		Temperature
Temperature needed for making ice cubes		180 ºC
Temperature of boiling water for tea		40 ºC
Temperature needed for baking scones		100 ºC
Temperature of a child sick with a fever		0 ºC

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt about maximum and minimum temperature. We have also read temperatures from a map and from thermometers and recorded them in a table.**

Lesson 31: Broken line graphs

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 5.1 and 5.2: Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to read the change over time on a broken line graph.
Lesson Vocabulary: graph, broken line graph, horizontal axis, vertical axis, increase, decrease, constant.
Teacher Resources: A3 poster: *Temperatures for 1 day*;
A3 poster: *Graph showing temperature change over time in Emalahleni*
Flashcards: *increasing, decreasing, no change, vertical axis, horizontal axis, heading; broken line graph*
Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

Question		Answer	Question		Answer
Round off to the nearest one			Round off to the nearest one		
1	6,4	6	**6**	36,3	36
2	2,7	3	**7**	0,2	0
3	43,5	44	**8**	99,8	100
4	138,1	138	**9**	50,6	51
5	138,7	139	**10**	9,5	10

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Read the temperature shown on each thermometer. Record the temperature in the space provided.

Temperature = (23) °C   Temperature = (56) °C
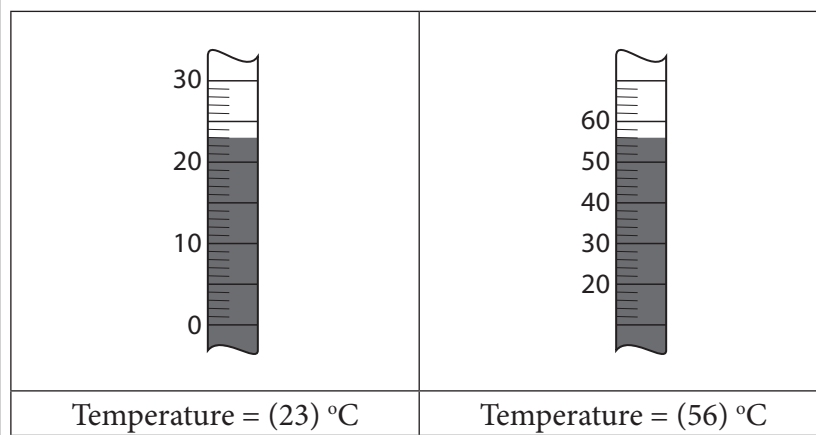
3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 30 are provided in Lesson 30.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER
- While a table is an effective way of recording data, it is not easy to see changes over time when data is recorded in a table.
- Because graphs show information as a picture, it is often easier to see trends on a graph than in a table.
- Broken line graphs (sometimes called line graphs) are a particularly effective way of showing changes over time.
- In this lesson we use changes in temperature during the day to introduce broken line graphs.

Say: **Today we are learning about broken line graphs.**

Activity 1: Whole class activity

You will need the A3 poster: *Temperatures for 1 day* and the A3 poster: *Graph showing change over time in Emalahleni*

- Say, as you display the A3 poster showing the table of temperatures: **Look at the table showing Temperatures for 1 day. What does this table tell you?**
  (The temperature at different times of the day)
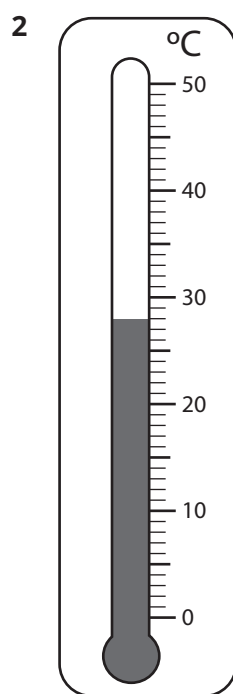 - Say: **Describe how the temperature changes during the day.** (The temperature starts low, then rises and then drops again. It is possible that learners will not be able to give this answer, or that they will not be able to answer.)

- Say, as you display the A3 poster: *Graph showing change over time in Emalahleni*
  - **A graph that looks like this is called a broken line graph.**
  - Display the flashcard: Broken line graph.

Activity 2: Whole class activity and learners work on their own

- Leave the two A3 posters on the wall.
- Tell learners to turn to Activity 2 in the LAB.
- This should be done as a whole class activity – work step-by-step with the learners.
- Remember that learners have not done broken line graphs in earlier grades.

Temperature change over time in Emalahleni

	How to guide learners as they read the graph
1 What does the graph show? (Temperature change over time in Emalahleni)	• Point out the heading. • Place the flashcard: Heading next to the heading on the graph
2. Look at the temperature at 06:00. **a** What was the temperature at 06:00? (17 ℃)	• Which axis shows Time? (The horizontal axis) • Find the dot which shows the temperature at 06:00. • Read the temperature at that dot. • Hint (if necessary): How do you find the temperature? (On the vertical axis. I use a ruler to reach the vertical axis from the dot.) • What does each mark on the vertical axis represent? (1 ℃) • What is the temperature shown by that dot? (17 ℃). • Display the flashcards Broken line graph, horizontal axis and vertical axis on the poster.

	How to guide learners as they read the graph
b What was the temperature at 08:00? (21 ºC)	Repeat questioning sequence above as necessary.
c By how much did the temperature change between 06:00 and 08:00? (4 ºC)	Write on the board: 21 ºC – 17 ºC = 4 ºC
d Did the temperature increase or decrease between 06:00 and 08:00? (increase)	Increase means get bigger or more.
e How does the graph show that the temperature is increasing?	This part of the graph starts off low and then goes up. This means that the temperature is increasing. Place the flashcard showing an increasing graph on the board.
3 Look at the temperature at 12:00. **a** What was the temperature at 12:00? (28 ºC)	
b What was the temperature at 14:00? (28 ºC)	
c Did the temperature increase or decrease between 14:00 and 16:00? (It stayed the same)	We say the temperature is constant.
d How did the graph show that the temperature stayed the same?	Between those two points, the graph is a horizontal. Place the flashcard showing the part of the graph with no change on the board.
4 Look at the temperature at 16:00. **a** What was the temperature at 16:00? (25 ºC)	
b What was the temperature at 18:00? (19 ºC)	
c Did the temperature increase or decrease between 16:00 and 18:00? (decrease)	Is 19 more or less than 25?

	How to guide learners as they read the graph
d How did the graph show that the temperature decreased?	That part of the graph starts off high and then goes down. This means that the temperature is decreasing. Place the flashcard showing the decreasing graph on the board
5. Fill in the missing words to describe how the temperature changed during the day. Use the words: decreased, increased or stayed the same in the right places in this sentence: The temperature (increased) until 12:00, (stayed the same) between 12:00 and 14:00, and then (decreased) between 14:00 and 18:00.	Learners can give reasons why they observe the graph in that way.

UNIT 4

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- The lines have been drawn in below.

Draw a line to match the broken line graph with the change it shows.

Description		Change
		Increasing
		Decreasing
		Constant (stays the same)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **A broken line graph has a heading, a horizontal axis, and a vertical axis**
- **A broken line graph shows change over time**
- **The change can be an increase, a decrease, or there can be no change.**

Lesson 32: Broken line graphs show change over time

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 5 Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to read a variety of broken line graphs and use broken line graphs to solve problems.
Lesson Vocabulary: broken line graph, horizontal axis, vertical axis, increase, decrease, stayed the same
Teacher Resources: A3 poster: *Temperature one day in summer in Polokwane*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Question		Answer	Question		Answer
Round off to one decimal place			Round off to one decimal place		
1	1,39	1,4	**6**	57,41	57,4
2	2,55	2,6	**7**	164,25	164,3
3	43,27	43,3	**8**	34,06	34,1
4	94,92	94,9	**9**	8,04	8,0
5	69,83	69,8	**10**	39,98	40,0

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Look at the broken line graph and then answer the questions.

Temperatures on one day in autumn in Mangaung
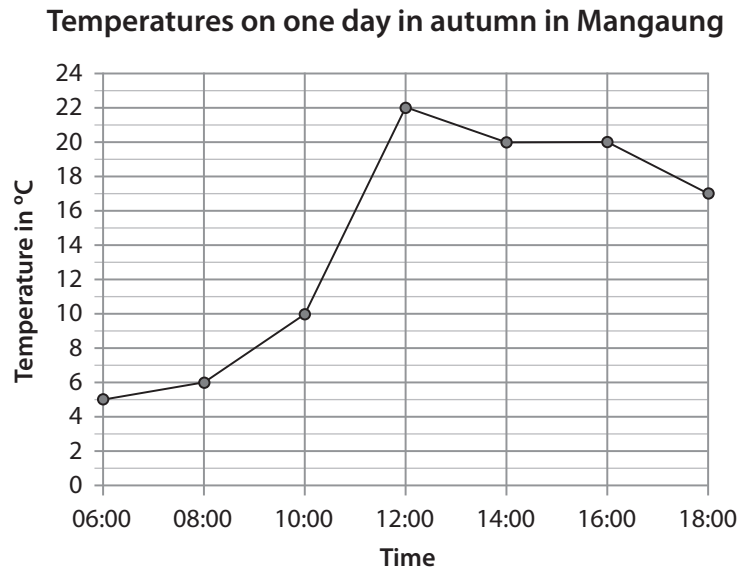
1. What was the highest temperature recorded? (22 °C)

2. At what time was the highest temperature recorded? (12:00)

3. Draw a circle around the correct words:

   a) The temperature (increased) / decreased / stayed the same between 10:00 and 12:00.

   b) The temperature increased / (decreased) / stayed the same between 12:00 and 14:00.

   c) The temperature increased / decreased / (stayed the same) between 14:00 and 16:00.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 31 are provided in Lesson 31.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

> NOTE TO THE TEACHER
>
> The slope of the line on a broken line graph shows two things:
> - the type of change (increase, decrease or no change), which is indicated by the direction of the slope, for example bottom left to top right or perhaps flat.
> - the amount of change, which is indicated by the gradient (steepness) of the slope.

Say: **Today we will practice reading broken line graphs, and we will use broken line graphs to solve problems.**

Activity 1: Whole class activity

Display the A3 poster: *Temperatures on one day in summer in Polokwane* on the board.

- Say: **Let's play a game. We are going to use this broken line graph. I will give the answer and you are going to give the question.**

Temperatures on one day in summer in Polokwane
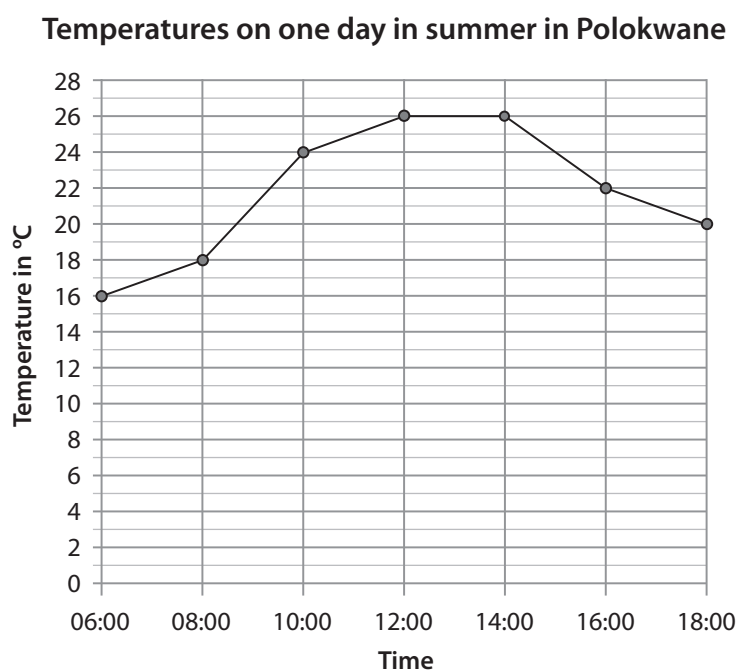
What you say:	The expected answer
1 The answer is 16 °C. What's the question?	What was the temperature at 06:00?
2 The answer is 08:00. What's the question?	At what time was the temperature 18 °C?
3 The answer is 16:00. What's the question?	At what time was the temperature 22 °C?

What you say:	The expected answer
4 The answer is 26 ºC. What's the question?	What was the temperature between 12:00 and 14:00?
5 The answer is decreasing. What's the question?	How did the temperature change between 14:00 and 18:00)? / Is the temperature increasing or decreasing from 14:00 to 18:00?
6 The answer is 1 ºC. What's the question?	What does one small line on the vertical axis represent? / What is the interval on the vertical axis?

Activity 2: Learners work in pairs

- Tell learners to work with a partner to do Activity 2 in the LAB.
  - Read through the activity with the learners. Make sure the learners understand what they are should do.
  - Walk around and support the learners as needed.
  - Answers are provided below.

Work with a partner.

The graph shows TWO broken line graphs.

Look at the graph showing the number of rhinos and hippos in a game reserve and answer the questions about the graphs.

A rhinoceros
(also called a rhino)

A hippopotamus
(also called a hippo)

Number of rhinos and hippos in a Game Reserve in South Africa
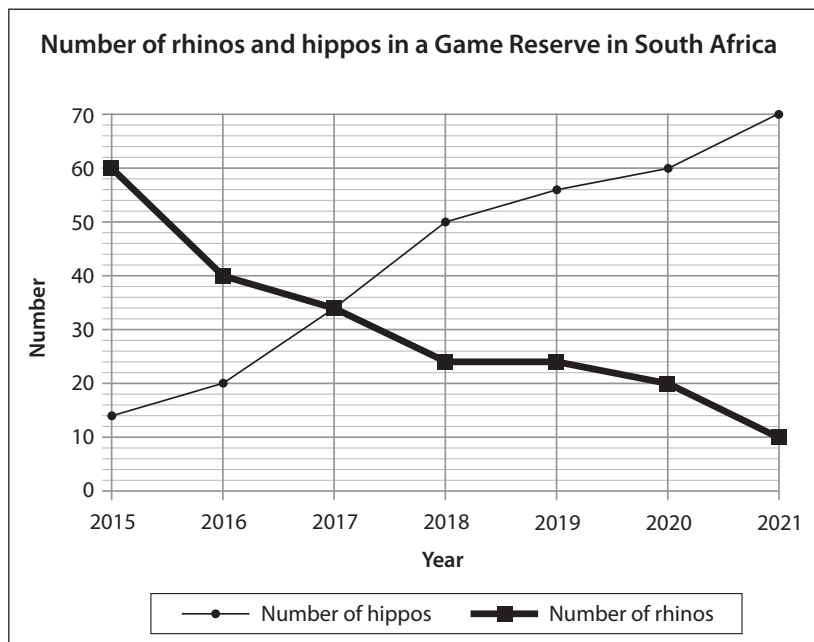
1. What does the thick broken line graph represent? (the number of rhinos)
   How do you know this? (the box at the bottom of the graph (also called the legend) tells us this)

2. What does the thin broken line graph represent? (the number of hippos)
   How do you know this? (the box at the bottom of the graph (also called the legend) tells us this)

3. What does each mark on the vertical axis represent? (2 animals)

4. How many hippos were there in the reserve in 2016? (20)

5. How many more rhinos than hippos were there in 2015? (60 – 14 = 46)

6. How many more hippos than rhinos were there in 2020? (60 – 20 = 40)

7. In which year were there the same number of hippos and rhinos in this Game Reserve? (2017)

8. Describe the change in the number of hippos in the reserve between 2015 and 2021. (The number of hippos increased each year)

9. Describe the change in the number of rhinos in the reserve between 2015 and 2021. (The number of rhinos decreased each year)

10. In which year was the difference in the number of hippos and rhinos the largest? (2021)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

The graph shows the number of elephants and lions in a game reserve.

Answer the questions about the graphs.

An elephant   A lion

Number of elephants and lions in a Game Reserve in South Africa

Year
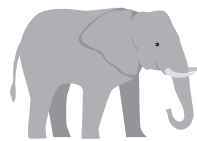
—•— Number of elephants   —■— Number of lions
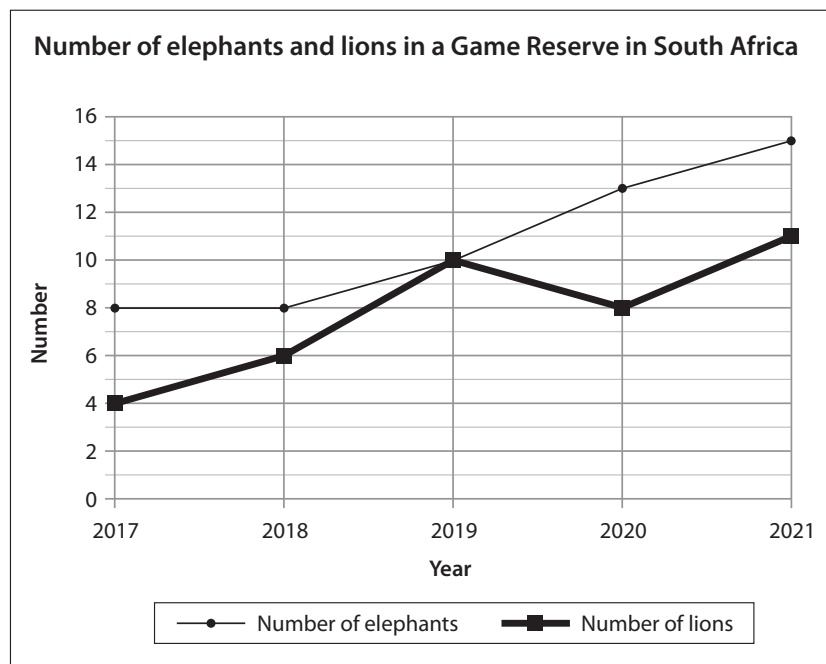
1. What does the thin broken line graph represent? (the number of elephants in the game reserve)

2. What does the thick broken line graph represent? (the number of lions in the game reserve)

3. What does each mark on the vertical axis represent? (1 animal)

4. How many more elephants were there in the reserve in 2021 than in 2017? (15 – 8 = 7)

5. In which year were there the same number of elephants and lions in this Game Reserve? (2019)

6. Describe the change in the number of lions in the reserve between 2017 and 2021.
   (The number of lions decreased between 2019 and 2020 but increased the rest of the time.)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that broken line graphs are particularly useful for understanding change over time:**

- **We can see the type of change (increase / decrease / no change)**
- **We can use the information shown on a bar graph to help us make decisions and solve problems.**

Lesson 33: Draw a broken line graph

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: 5 Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to draw a broken line graph.
Lesson Vocabulary: broken line graph
Teacher Resources: A3 poster: *Number of elephants and lions in a Game Reserve in South Africa*.
Flashcards: Title; Label for the vertical axis; Label for the horizontal axis; Units on the vertical axis; Units on the horizontal axis; Legend
A3 poster: *Temperatures on 28 June*
Bostik/ Prestik
Learner Resources: Three different coloured pens, pencils or crayons, ruler; eraser
Date: Week   Day

<div style="writing-mode: vertical">UNIT 4</div>

1   MENTAL MATHS (5 MINUTES)

Question		Answer	Question		Answer
	Round off to two decimal places			Round off to two decimal places	
1	8,624	8,62	6	43,809	43,81
2	7,391	7,39	7	59,602	59,60
3	0,457	0,46	8	24,796	24,80
4	14,079	14,08	9	3,095	3,10
5	7,413	7,41	10	8,998	9,00

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

- They will need three different coloured pens, pencils or crayons for drawing on the graph.

Look at the graph that you used in the previous lesson and complete the questions given below.

Temperatures on one day in autumn in Mangaung
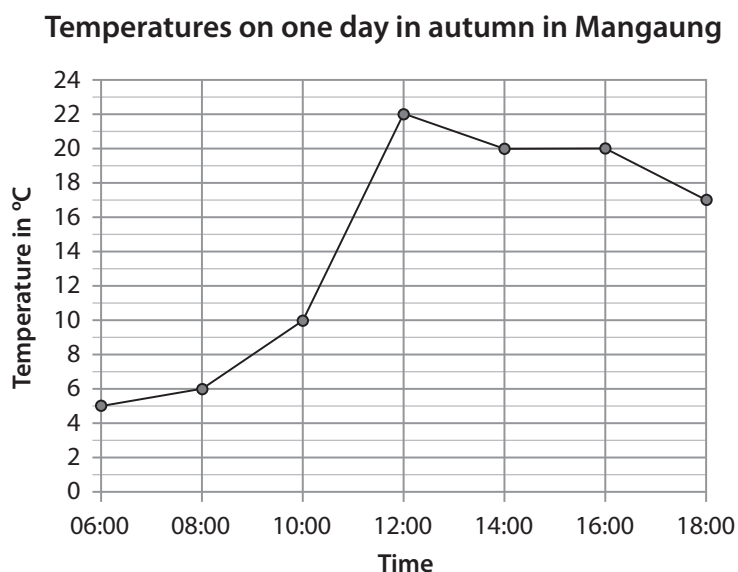
1. Use a coloured pen or crayon. Colour the part of the broken line graph which shows the largest increase in temperature on that day. (The part of the graph between 10:00 and 12:00)

2. Use another coloured pen or crayon. Colour the part of the broken line graph which shows where the numbers did not change for two hours. (The part of the graph between 14:00 and 16:00)

3. Use another coloured pen or crayon. Colour the part of the broken line graph which shows the steepest decrease in temperature. (The part of the graph between 16:00 and 18:00)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 32 are provided in Lesson 32.

Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

Be sure to show learners WHERE on the graph they can find each answer.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER
- In Grade 5, learners start to draw broken line graphs themselves.
- They started drawing bar graphs in earlier grades, so the idea of drawing graphs is not new to them.
- The structure and elements of graphs are the same in bar graphs and broken line graphs. So, the process needs to be logically structured and well scaffolded, and learners must be assisted to recall how to work out vertical and horizontal axis intervals themselves.

Say: **Today we are learning to draw a broken line graph.**

Activity 1: Whole class activity

- You will need the A3 posters: *Number of elephants and lions in a Game Reserve in South Africa.*
- You will need the flashcards: Title; Label for the vertical axis; Label for the horizontal axis; Units on the vertical axis; Units on the horizontal axis; Legend.

Say: **Today we are going to label the different parts of a broken line graph.**

- Stick the poster up on the board and stick the flashcards in any order on the board next to the poster. (See the next page for what your board should look like)
  - Take the flashcard "Title" and ask: **Which part of this graph is the title?**
    (Ask one of the learners to come and stick the flashcard in the correct space.)
  - Repeat the activity for "Label for the horizontal axis"
    "Label for the vertical axis"
    "Units on the horizontal axis"
    "Units on the vertical axis"
    "Legend" (the legend describes which graph is which)

UNIT 4

Units on the vertical axis

Title

Number of elephants and lions in a Game Reserve in South Africa

Label for the vertical axis

Number

16
14
12
10
8
6
4
2
0

2017　　2018　　2019　　2020　　2021

Label for the horizontal axis

Year

Units on the horizontal axis

Number of elephants　　Number of lions

Legend
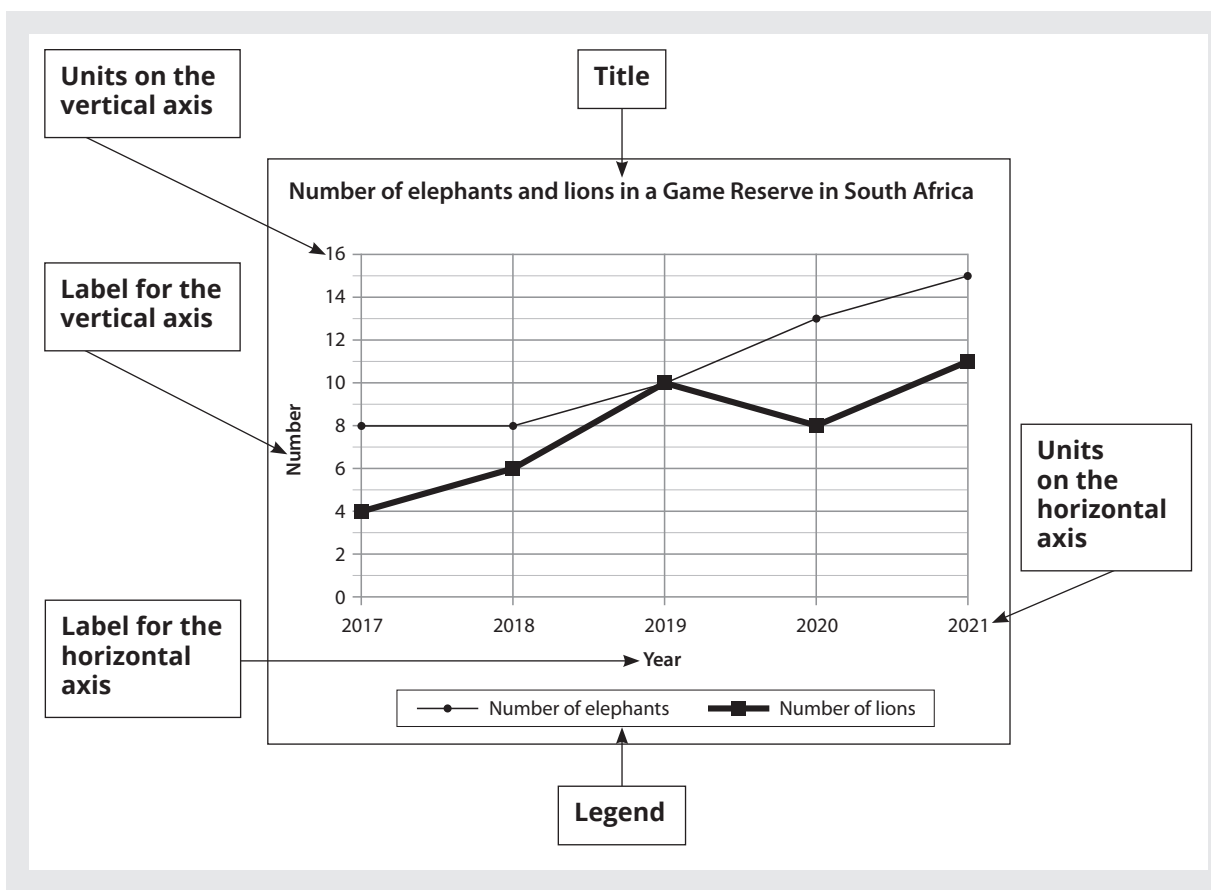
Activity 2: Whole class activity and learners work on their own

You will need the A3 poster: *Temperature on 28 June* which you should stick up on the board. The learners have this poster in their LAB.

- Say: **Today we are going to draw our own broken line graph.**
- Tell learners to turn to Activity 2 in the LAB where they have the same graph.
- This activity should be done together – with each learner filling in the answers in their own LAB.
- Work step-by-step with the learners.

Work with your teacher and on your own

Zamo lives in Bhisho. He measured and recorded the temperature every 2 hours from 06:00 to 18:00 on 28 June. The table shows the temperatures he recorded.

Temperatures on 28 June							
Time	06:00	08:00	10:00	12:00	14:00	16:00	18:00
Temperature	5 ºC	7 ºC	11 ºC	14 ºC	18 ºC	15 ºC	7 ºC

Use the information from the table to draw a broken line graph showing the temperatures on 28 June.

STEP 1: Fill in the title the graph. (Shown on the graph)	Ask: **What does the information in the table tell us?** (Temperatures on 28 June)
Temperatures on 28 June	Say: **Use this information to write the title of the graph.**
STEP 2: Fill in the label on the vertical axis and the label on the horizontal axis. (Shown on graph)	"Time" is shown on the horizontal axis and "Temperature in ℃" is shown on the vertical axis
Temperatures on 28 June / Temperature in ℃ / Time	
STEP 3: Look at the times in the table and fill in the times along the horizontal time axis. (Shown on graph)	Ask: **What is the earliest time?** (06:00)
Temperatures on 28 June / Temperature in ℃ / 06:00 08:00 10:00 12:00 14:00 16:00 18:00 / Time	Ask: **What is the latest time?** (18:00)
	Ask: **What is the interval in the times?** (2 hours)
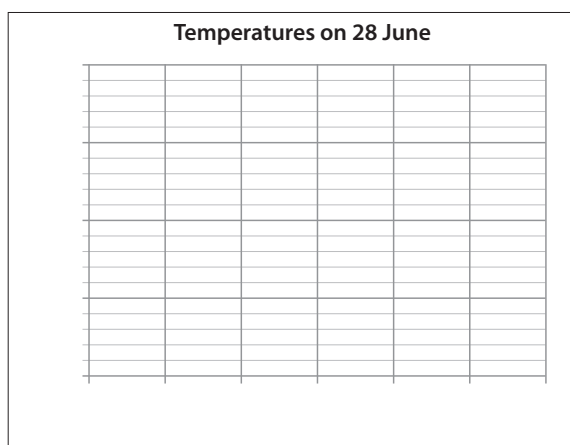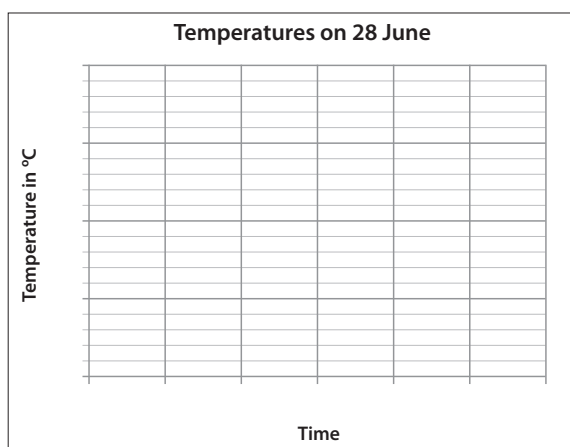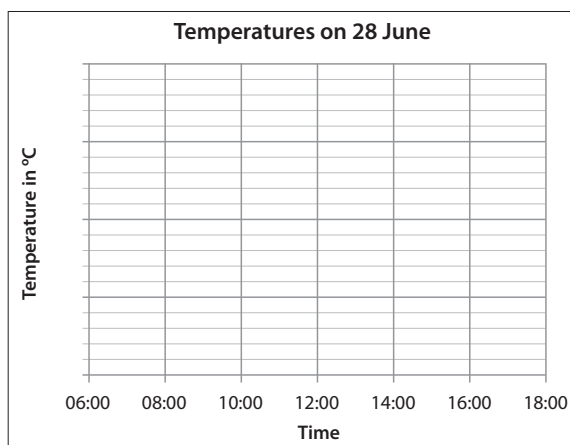
STEP 4: Look at the temperatures in the table and fill in the temperatures on the vertical axis. (Shown on graph)	Start with 0 and go up to 20. Let each line represent 1 ºC.
STEP 5: Make a dot for the temperature reading at each hour. (Shown on graph)	Say and demonstrate: **Find the line for 06:00. Move your finger along the line for 5 ºC. Make a dot where the 06:00 line and the 5 ºC line meet.** Do the same for the rest of the dots
STEP 6: Use a ruler. Connect the dots in order. (Shown on graph)	Connect the dots. Say: **You have now drawn your own broken-line graph!**
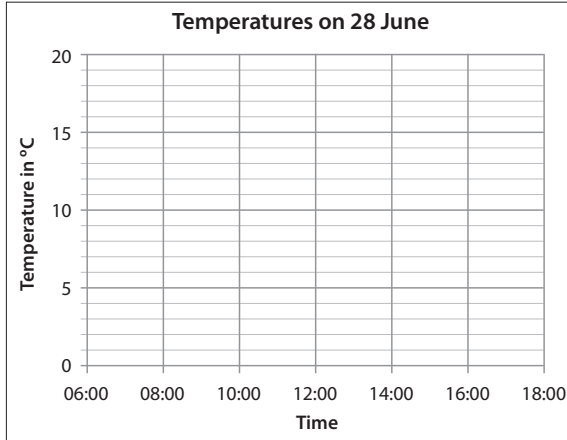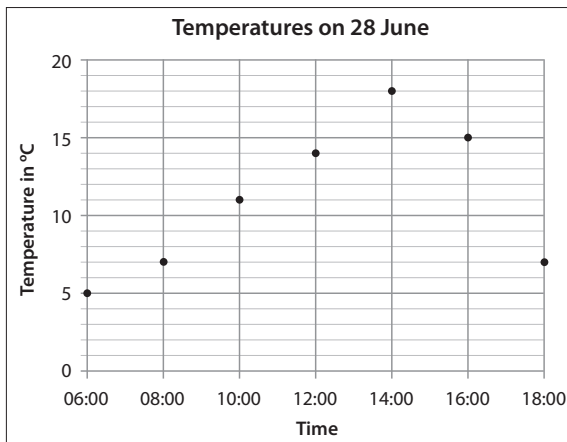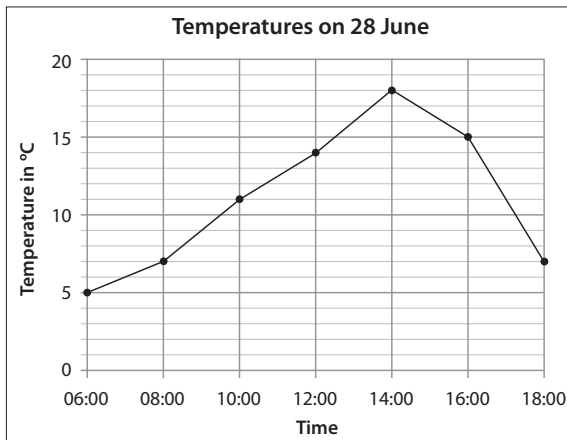
5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

Look at the broken line graph you drew in Activity 2.

Temperatures on 28 June
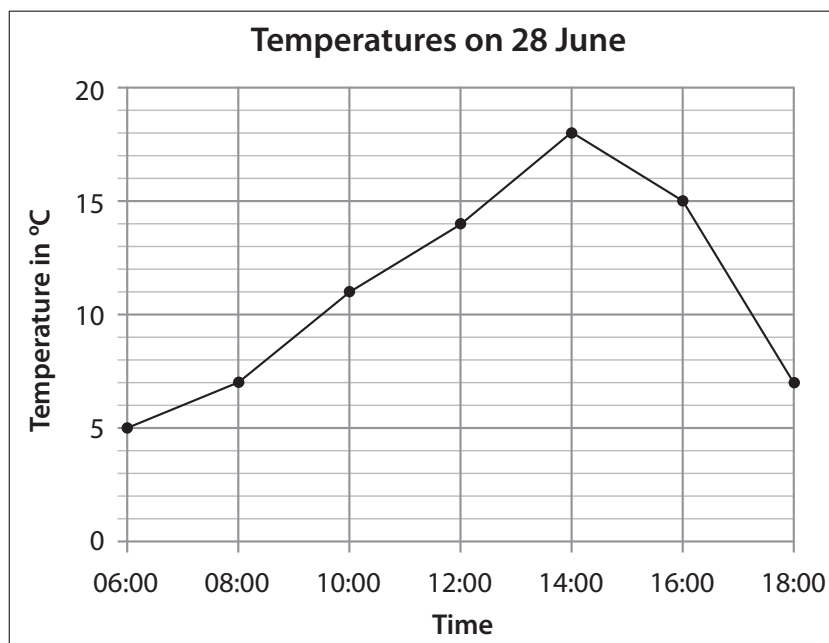
1. Between which hours was the temperature increasing? (06:00 and 14:00)

2. Between which hours was the temperature decreasing? (14:00 and 18:00)

3. Between which hours did the temperature decrease the most? (16:00 and 18:00)

---

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt how to draw a broken line graph.**
   We know:
- **that a graph must have a heading**
- **that a graph has a vertical axis and a horizontal axis.**
- **that both the vertical axis and the horizontal axis must have a label**
- **that both axes must have units marked on them**
- **how to plot the dots (or points) on the graph**
- **how to join the points to form the broken line graph.**

Lesson 34: More broken line graphs

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Temperature (page 186); Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to read temperature on a thermometer, record information in a table, and represent the data with a broken line graph.
Lesson Vocabulary: body temperature, data, broken line graph, decimal number, interval, vertical axis, horizontal axis
Teacher Resources: A3 poster: *Measuring body temperature*;
A3 poster: *Hluphe's temperature – my first try*; A3 poster: *Hluphe's temperature – my second try*
Learner Resources: pencil, ruler, eraser

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

	Question	Answer		Question	Answer
1	10 × 25	250	**6**	2 × 25	50
2	4 × 25	100	**7**	20 × 25	500
3	3 × 25	75	**8**	5 × 25	125
4	7 × 25	175	**9**	9 × 25	225
5	6 × 25	150	**10**	8 × 25	200

2 LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Thato heated water in a pot.

1 Which graph shows how the temperature of water changes when it is heated? (c)

a TEMPERATURE CHANGE

b TEMPERATURE CHANGE

c TEMPERATURE CHANGE
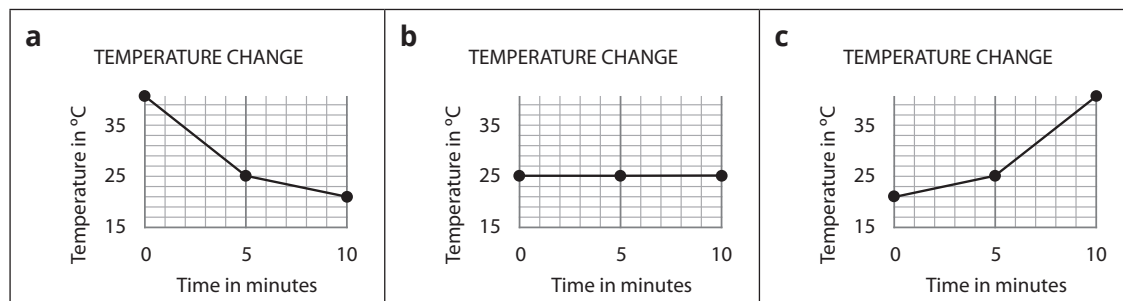
2 Give a reason for your answer. (The water gets hotter over time/ The temperature increases over time)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 33 are provided in Lesson 33.
Use this time to purposefully address gaps in learners' knowledge and to identify and
address learner

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER

In this lesson learners draw a broken line graph to represent data on body temperature.

We use the context of the measurement of body temperature during COVID-19 in order
to make learning relevant.

In general, body temperatures are clustered around 37 °C (normal body temperature). In
fact, they range between 35,5 °C and 37,8 °C. Changes in temperature are measured in
tenths of a degree. This requires a knowledge of decimals. The lesson starts with a short
revision of normal body temperature and decimals (tenths).

Say: **Today we are drawing broken line graphs of body temperature.**

Activity 1: Whole class activity

You will need the A3 poster: *Measuring body temperature*

- Display the poster and ask: **What temperature is shown on this
  thermometer?** (37,6 °C)
    – Write the temperature **37 °C** on the board.
    – Say: **Sipho's temperature today is 37 °C and the temperature on the poster
      is 37,6 °C. Is the temperature on the poster higher or lower than Sipho's
      temperature?** (higher)
    – Ask: **How do you know it is higher?** (If we round 37,6 °C off to the nearest tenth,
      we get 38 °C, which is higher than 37 °C.)
    – Ask: **How much higher is the thermometer on the poster than Sipho's
      temperature?** (0,6 degrees higher)
    – Ask: **What does the 0,6 degrees mean?** ($0,6 = \frac{6}{10}$ = 6 tenths. So, the temperature is
      six tenths of a degree higher or more than Sipho's temperature which is 37 °C)

Activity 2: Learners work in pairs

- Tell learners to complete Activity 2 in their LAB. Walk around the classroom to
  assist and guide learners, but do not give the answers. Allow learners time to think
  about, and discuss, their strategies.

UNIT 4

Work with a partner.

Hluphe was feeling sick. Her mother measured her temperature every two hours.

This is what the digital thermometers showed:

Time	Thermometer
10:00	37.1
12:00	37.6
14:00	38.2
16:00	39.0
16:00	38.5
20:00	37.4
22:00	36.8

1 Read the temperatures off the thermometers and write them in this table.

Time	10:00	12:00	14:00	16:00	18:00	20:00	22:00
Temperature	(37,1) ᵒC	(37,6) ᵒC	(38,2) ᵒC	(39) ᵒC	(38,5) ᵒC	(37,4) ᵒC	(36,8) ᵒC

2 The first three points have been plotted for you on the line graph to show how Hluphe's temperature changed over time.

NOTES FOR THE TEACHER: This is the graph the learners have in their LAB:

Hluphe's Temperature

a Does this graph have a heading? (Yes, Hluphe's Temperature)

b What label must we add to the horizontal axis? (Time)

c What label must we add to the vertical axis? (Temperature in ℃)

d The units have been given for you on both the horizontal and the vertical axis.

e The first three dots showing Hluphe's temperature have been drawn for you. Draw the rest of the dots.

f Use a ruler. Connect the dots in order.

NOTE TO THE TEACHER:

This is only the second broken line graph the learners have drawn so work with the learners and guide them through what they have to do.

This is what the learners' final graph in the LAB should look like:

Hluphe's Temperature

3 Look at your graph:
   a Describe what the graph looks like. (There is a lot of blank space on the graph.)
   b If the graph doesn't look right, how can we change it? (Maybe we can change the units on the vertical axis.)

UNIT 4

c Was it difficult to draw the dots? (It was difficult to find 38,5 °C; 37,4 °C and 36,8 °C because there is no calibration for decimals. So I could not place the dots accurately.)

d Can you see the change of temperature clearly and exactly on this graph? (not really)

Say to the learners: **We do not need to start the vertical axis at 0, we can start this vertical axis at 36.**

4 Let's draw a graph showing Hluphe's temperature on another set of axes. The headings, labels, units and the first three points/temperatures have been given. Complete the graph.

This is what the second graph in the LAB looks like:
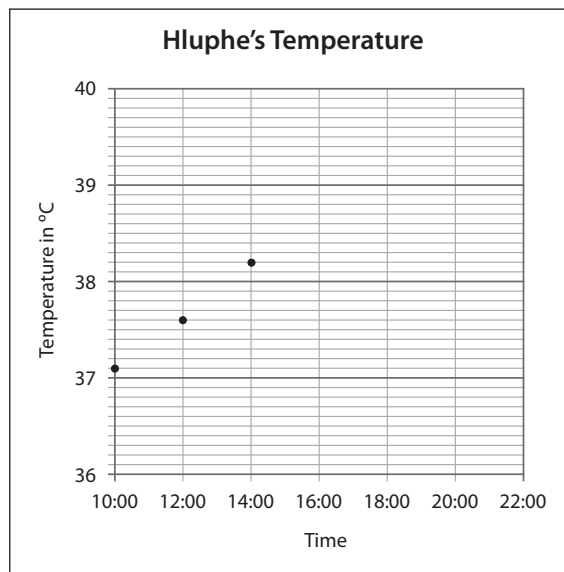
5 Talk about the two graphs you have drawn. Write sentences describing the differences you have noticed. (It is very difficult to read temperatures and see change on the first graph. The second graph leaves out temperatures 0 – 35 so that the line graph is not right at the top of the graph. Now we can read the temperature exactly and see the change of temperature clearly. It was easier to plot the points accurately on the second graph.)

This is what the completed graph should look like:
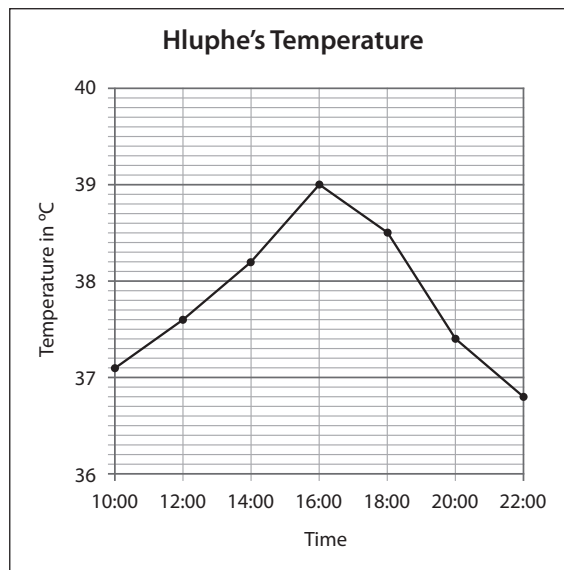
5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given below.

Mpho's mother kept a record of Mpho's height.

Both the table and broken line graph show Mpho's height.

Age in years	Birth	2	4	6	8
Height in cm	50	75	(100)	115	140

1   Use the graph to fill in the missing height on the table.
2   Finish the graph by joining the points that show Mpho's height.

WHAT THE LEARNERS ARE GIVEN   THE FINISHED GRAPH
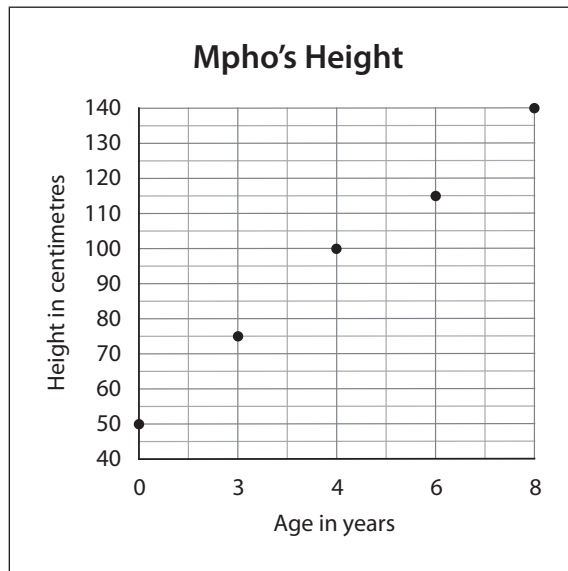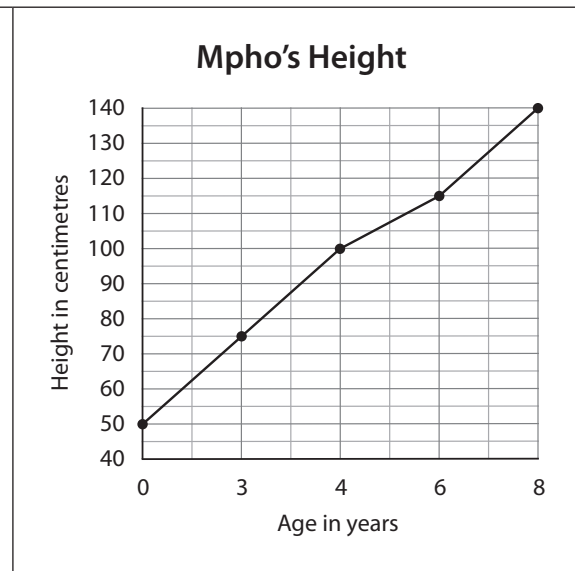
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6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to draw a broken line graph of body temperature.**

We have also learnt that:
- **There is a way to close up the range we need on the vertical axis in the graph**
- **We can adjust the intervals on the vertical axis according to what we need.**

Lesson 35: Combined graphs

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Temperature (page 186), Collecting, organising and representing data (page 30)
Lesson Objective: Learners will be able to read and interpret a bar graph, a broken line graph and a combined graph.
Lesson Vocabulary: combined graph, bar graph, broken line graph
Teacher Resources: A3 poster: *Temperature and rainfall in Durban*
Learner Resources: None

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

Question		Answer	Question		Answer
1	10 × 50	500	**6**	100 × 50	5 000
2	2 × 50	100	**7**	200 × 50	10 000
3	4 × 50	200	**8**	5 × 50	250
4	6 × 50	300	**9**	7 × 50	350
5	8 × 50	400	**10**	9 × 50	450

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

Look at the graph of Mpho's height that you drew for homework.

Answer the questions.

1 How tall was Mpho when she was 4 years old?
(100 cm)

2 How old was Mho when she was 115 cm tall?
(6 years)

3 About how tall might Mpho have been when she was 5 years old? Draw a circle around the answer.

(108 cm)   100 cm   115 cm

The graph the learners drew for homework.

Mpho's Height
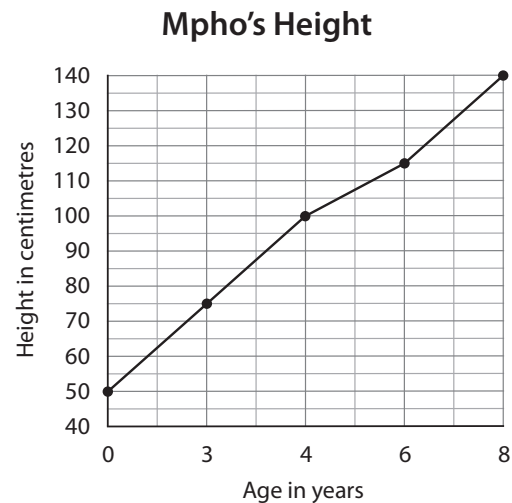
3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 34 are provided in Lesson 34.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER
In a combined bar graph, two sets of data or information are drawn on the same set of axes.
The horizontal axis indicates a time period, while the two vertical axes show two different characteristics.

Examples of combined graphs are:
- Maximum temperature and amount of rainfall each month.
- Temperature and the amount of electricity consumed each month.
- The number of tomatoes sold each month and the variations in price.

Learners need time to practise reading information off the two vertical axes and then drawing conclusions.

In this lesson we start off by revising reading information off a bar graph and off a broken line graph and finally reading information off a combined bar graph and broken line graph.

Say: **Today we are going to practise reading information off different types of graphs.**

Activity 1: Learners work in pairs

- Say: **In this Activity, we are going to revise reading information off a broken line graph and off a bar graph.**
- Tell learners to work with a partner to complete Activity 1 in their LABS.
- Walk around the classroom to support learners as they discuss and read the graphs.
- Once learners have had the opportunity to do the activity, work through the answers with them.

Work with a partner.

1   This graph shows the average maximum temperature in Durban/eThekwini during a year.
    Answer the questions about the graph.

Temperature in Durban/eThekwini

Average maximum temparature in °C (y-axis: 0, 10, 20, 30, 40, 50)

Months of the Year (x-axis: Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct, Nov, Dec)
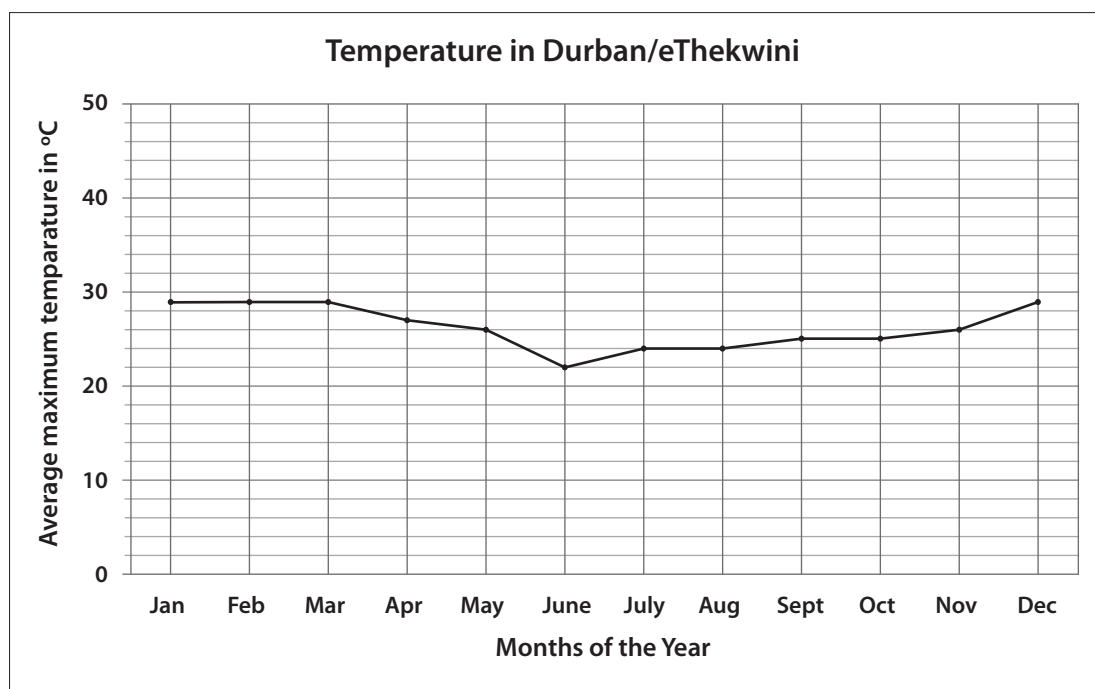
  a   During which four months was the average maximum temperature highest?
          (January, February, March and December)
  b   During which three months was the average maximum temperature lowest?
          (June, July, August)
  c   John says: "It is summer in Durban in June, July and August".
    i   Is John right or wrong? (Wrong)
    ii Give a reason for your answer.
            (It is winter in June, July and August because the temperatures are the lowest
            OR It is summer in December, January, February and March because the
            temperatures are the highest.)

2 This graph shows the total rainfall each month in Durban/eThekwini.
Answer the questions about the graph.

Rainfall in Durban/eThekwini
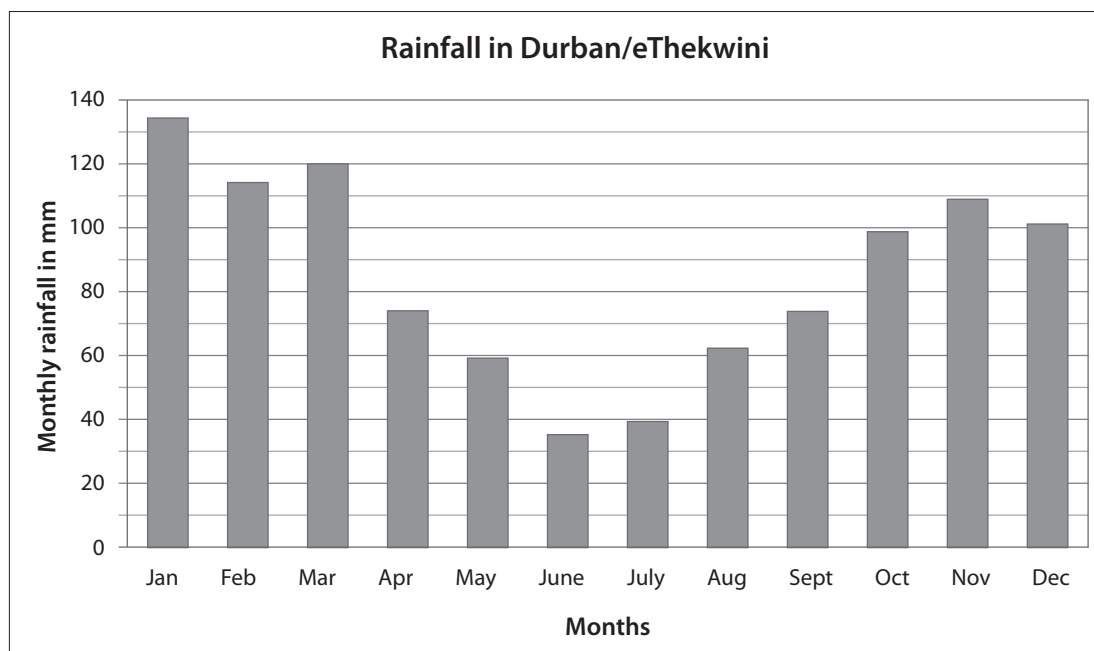
a During which month was the rainfall highest? (January)
b During which month was the rainfall lowest? (June)
c State whether true or false:
Durban receives more than 100 mm per month from November to March. (True)

Activity 2: Whole group activity and then learners work in pairs

Display the A3 poster: *Temperature and rainfall in Durban / eThekwini*

• Say: **This is a combined graph. Combined means to put together.**
• Ask:
    – **Why do you think this is a combined graph?**
    (It tells us about the monthly rainfall and temperature in Durban).
    – **What is the same as the graphs you saw in Activity 1?**
    (The labels on this horizontal axis in this graph (Jan, Feb, Mar, and so on) is the same as the labels on the horizontal axis in Activity 1.
    – **What is different to the graphs you saw in Activity 1 and 2?**
    (In a combined graph, there are two vertical axes, both on the left and right ends. The vertical axis on the left shows the total rainfall in mm, and the right one shows the average maximum temperature in ^{0}C.)

• Tell learners to turn to Activity 2 in their LABs.

- Tell them that you will work on question 1 together and then they will work on question 2 with their partner.
- Discuss question 1 with the learners, encourage them to give the answers, and write the correct answers on the board.
- Then tell the learners to work on question 2 with their partner.
- Walk around the classroom to support learners as they discuss and read the graph.
- Once learners have had the opportunity to do question 2, work through the answers with them.

1 Discuss this graph with your whole class.
This combined graph shows the total rainfall each month in Durban/eThekwini, AND the average maximum temperature each month.
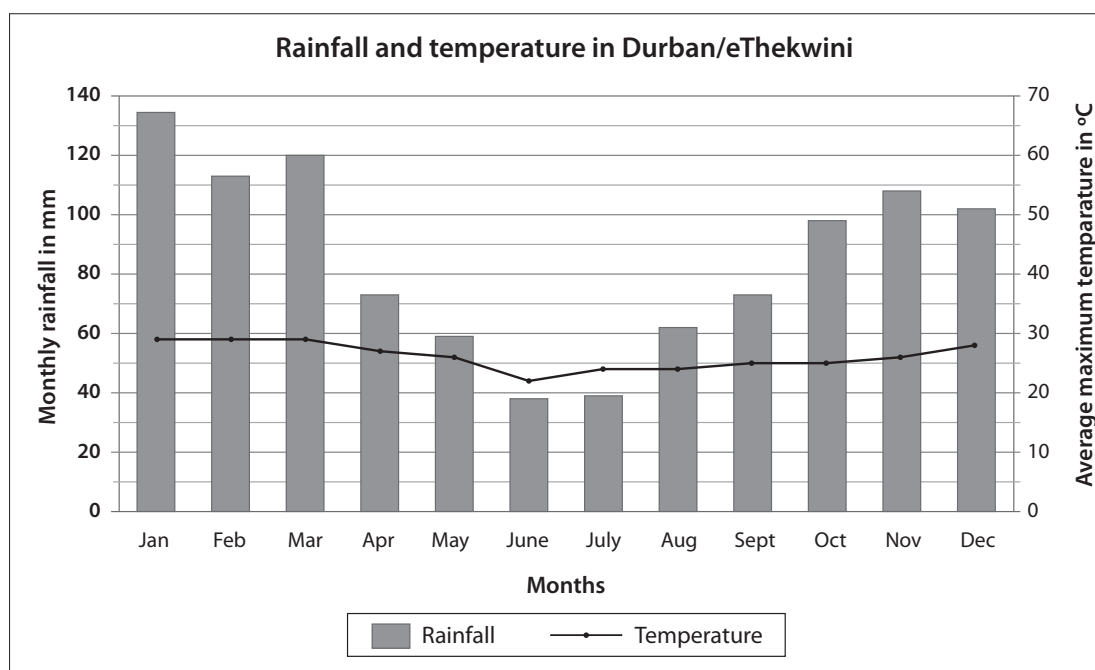
Rainfall and temperature in Durban/eThekwini

a Which graph shows the amount of rainfall each month? (The bar graph)
b On which axis can you read the amount of rainfall? (The left vertical axis)
c In which month was there the most rainfall? (January)
d In which month was there the least rainfall? (June)
e Which graph shows the temperature each month? (The broken line graph)
f On which axis can you read temperature? (The right vertical axis)
g In which four months was the temperature the highest?
(January, February, March and December)
h Write a conclusion by drawing a circle around the correct word:

Durban has its highest temperature in winter/summer.

Durban receives its highest rainfall in winter/summer.

Durban is a winter/summer rainfall area.

2 Discuss this graph with your partner.

This combined graph shows the total rainfall each month in Cape Town, AND the average maximum temperature each month.
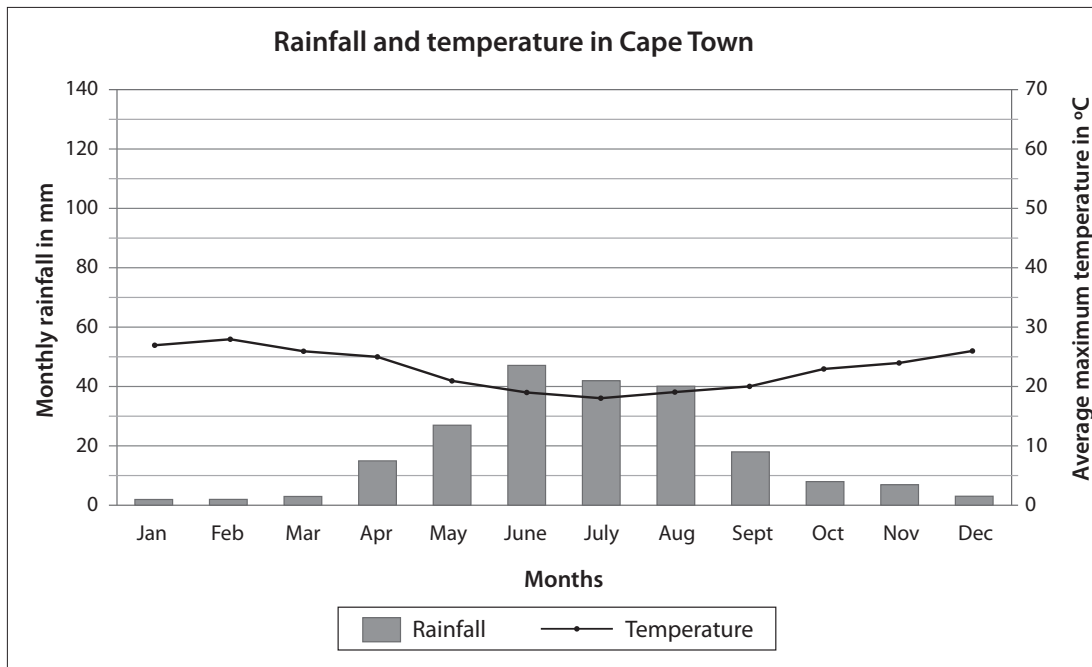
Rainfall and temperature in Cape Town

a Which graph shows the amount of rainfall each month? (The bar graph)
b On which axis can you read the amount of rainfall? (The left vertical axis)
c In which three months was there the most rainfall? (June, July and August)
d In which four months was there the least rainfall? (January, February, March and December)
e Which graph shows the temperature each month? (The broken line graph)
f On which axis can you read temperature? (The right vertical axis)
g In which month was the temperature the highest? (February)
h Write a conclusion by drawing a circle around the correct word:

Cape Town has its highest temperature in winter/(summer).

Cape Town receives its highest rainfall in (winter)/summer.

Cape Town is a (winter)/summer rainfall area.

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

This combined graph shows the total rainfall per month in Johannesburg and the average maximum temperature each month. Use the graph to answer the questions below the graph.

Rainfall and temperature in Johannesburg
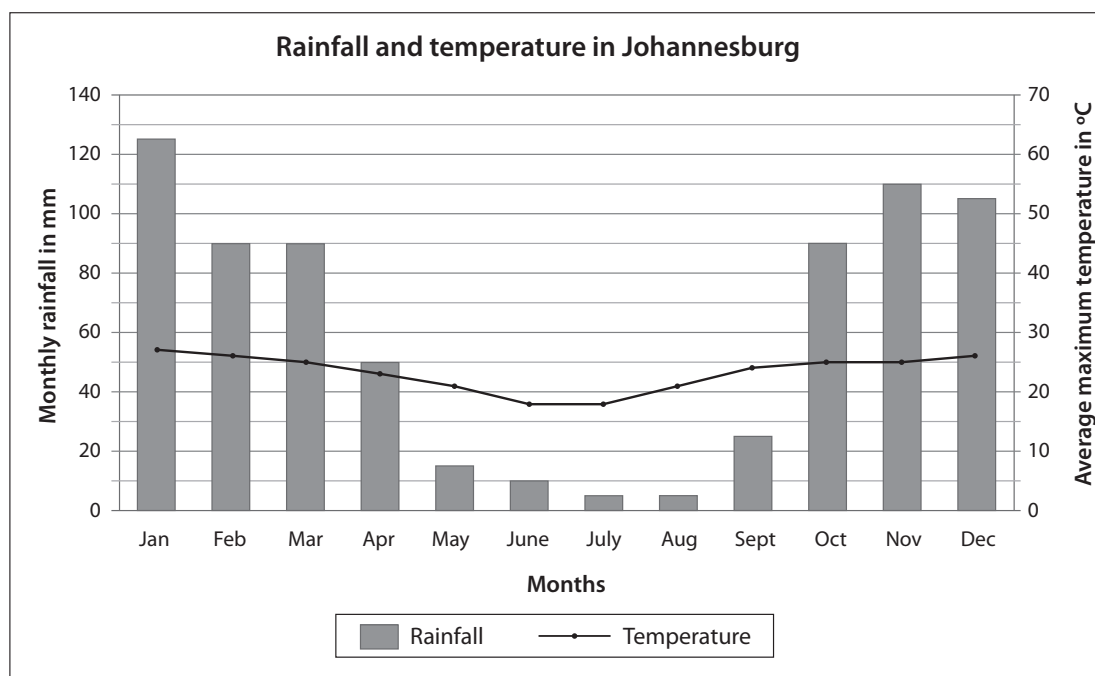
1   What information is given on the bar graph? (The amount of rainfall each month.)

2   What information can you read on the left vertical axis? (You can read off the rainfall.)

3   In which three months was there the most rainfall? (January, November, December.)

4   In which two months was there the least rainfall? (July and August)

5   What information is given on the broken line graph? (The average maximum temperature in °C.)

6   What information can you read on the right vertical axis? (You can read off the temperature.)

7   In which month was the temperature the highest? (January)

8   Does Johannesburg lie in a winter or summer rainfall area? (A summer rainfall area.)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt about combined graphs which are made up of a bar graph and a broken line graph. The horizontal axis indicates time and the vertical axes on the left and right show two different units.**

Lesson 36: Consolidation

Teacher's notes
This lesson allows for consolidation of the lesson of this unit.
CAPS topics: 4.4 Temperature (page 186); Collecting, organising and representing data (page 30)
Lesson Objectives:
1 Learners will revise and consolidate measuring, reading and recording temperature.   **2** Learners will revise and consolidate reading and drawing broken line graphs and reading combined graphs.
Lesson Vocabulary: broken line graph, temperature
Resources: Whichever textbooks or DBE workbooks the teacher or learners have. The temperature and broken line posters for this unit.
Date: Week   Day

UNIT 4

1 NOTES FOR THE TEACHER RELATING TO THIS UNIT'S WORK

The main topic in this unit was broken line graphs. Line graphs are new for Grade 5 learners.

2. POSSIBLE MISCONCEPTIONS LINKED TO THE WEEK'S WORK

- Some learners struggle with the fact that, unlike measurements such as length, you can't see temperature. Remind them that we can feel temperature and we can sometimes see the effects of temperature. For example, we might see frost on the ground when temperatures drop below freezing (0 ºC)
- Some learners struggle to read thermometers as number lines, particularly when the thermometer is vertical. It sometimes helps learners if the thermometer is placed in a horizontal orientation.
- Learners struggle to work out vertical axis intervals themselves.

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 35 are provided in Lesson 35.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 CLASSWORK

Say: **Today we are going to practise what we learned in this unit.**

- You could use this time for learners to complete classwork or homework activities as necessary.
- You could use the Additional Activities from any textbooks that you have, or you can use the Consolidation Activity given.

Additional activities for consolidation

Refer to the following table. Select additional activities from the textbook/s you have.
Use the answers given in the Teacher's Guide to mark the work.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Viva
LB	183-186	225-226	199-203	130-133	164-167	252-256	212-217	209-216	160-161
TG	140-141	223-225	162-164	111-113	110-112	277-282	177-180	236-238	84-85

OR, learners could complete the Consolidation Activity in their LAB.

Consolidation Activity

Work on these questions on your own.

1. Write down the temperature for each thermometer.

a
°C

b
°C

c
°C

d
°C

(40 ºC)   (24 ºC)   (37 ºC)   (82 ºC)
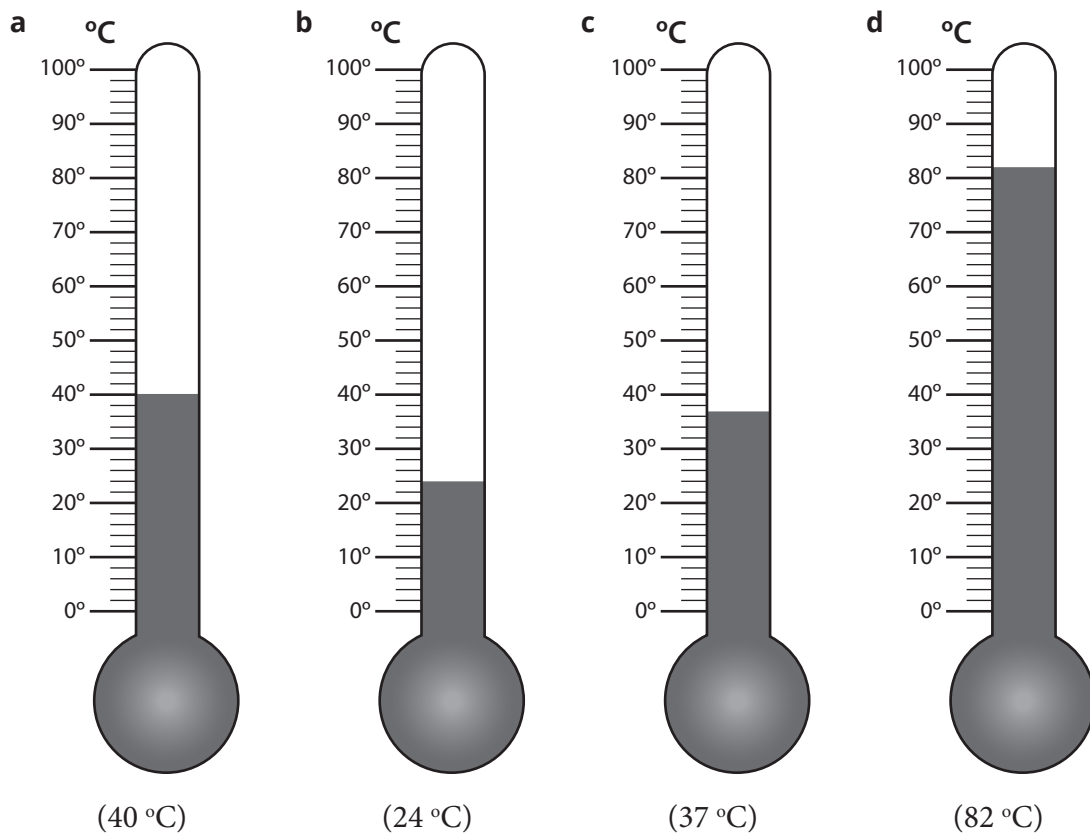
2 The following broken line graph and the table show how the mass of a baby changes over five months.

Baby's Mass
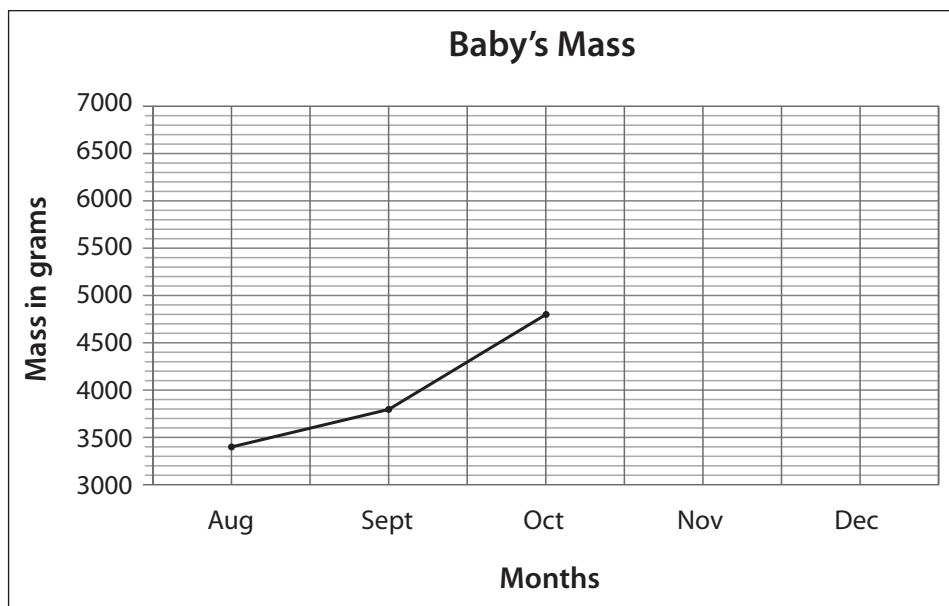
Month	Aug	Sept	Oct	Nov	Dec
Mass in grams	3 400	3 800	(4 800)	5 400	6 400

a Use the graph to fill in the missing mass on the table.
b Plot the masses for November and December on the graph and join the points.

Solution

Baby's Mass
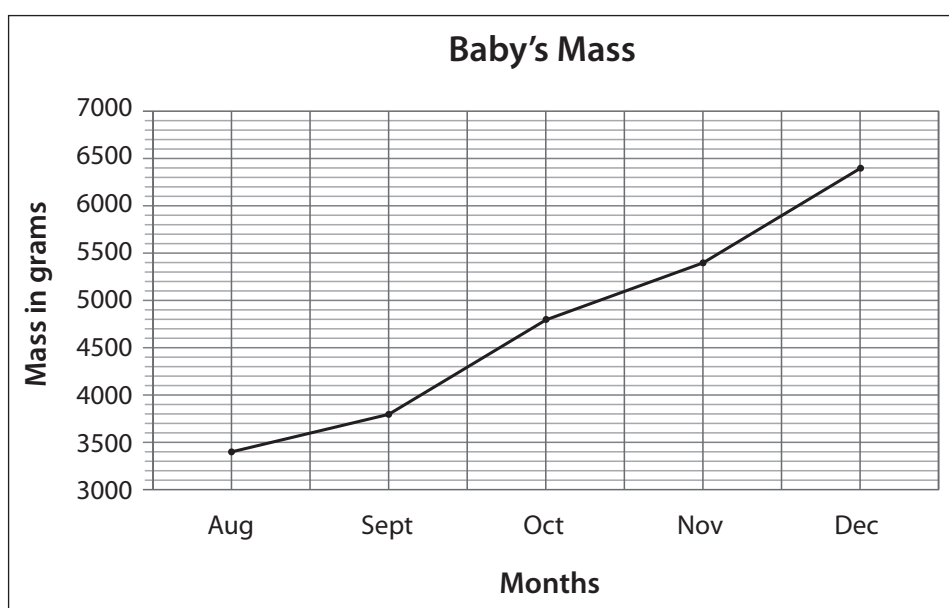
3 The combined graph shows:
- The number of kilograms of potatoes sold at Gogo's tuckshop.
- The price of 1 kilogram of potatoes.

Study the graph and then answer the questions.

Amount of potatoes sold at Gogo's tuckshop
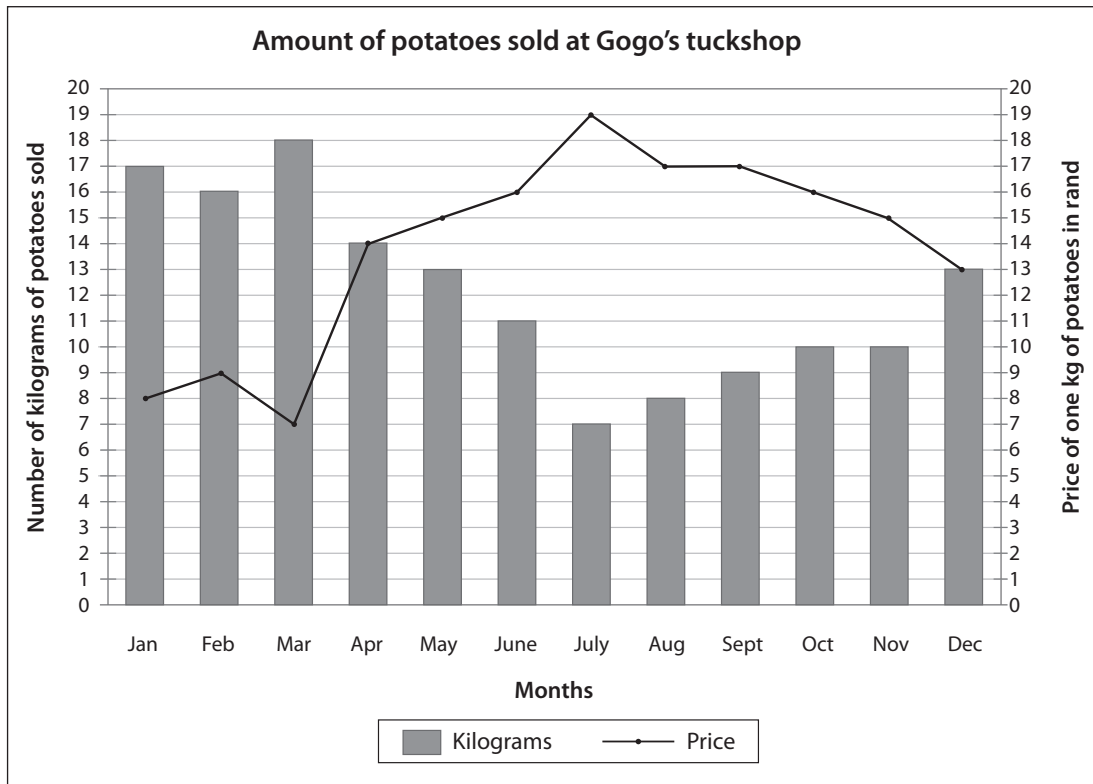
a Which graph shows the number of kilograms of potatoes Gogo sold each month? (The bar graph)

b Which graph shows the price of one kilogram of potatoes in rand? (The broken line graph)

c What was the lowest price of potatoes? (R7 per kg)

d In which month was the price of potatoes lowest? (March)

e How many kilograms of potatoes did Gogo sell in that month? (18 kg)

f In which month was the price of potatoes the highest? (July)

g How many kilograms of potatoes did Gogo sell in that month? (7 kg)

h Write a conclusion by drawing a circle around the correct word:

When the price of potatoes is low, Gogo sells (more)/ less potatoes.

When the price of potatoes is high, Gogo sells more (less)/potatoes.

5 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised reading thermometers and reading information off graphs.**

Unit 5: Patterns

INTRODUCTION

This unit focuses on geometric and numeric patterns (also called number patterns). Although patterns are found in all areas of mathematics, in CAPS the topic forms part of Content Area 2: Patterns, Functions and Algebra.

Learning to search for patterns and how to describe and extend them is part of doing mathematics and thinking algebraically.

In Grade 5
- learners continue to do the activities they did in Grade 4, they just learn to do them more quickly.
- learners show the patterns in different ways, including diagrams, verbal descriptions, flow diagrams and number sentences.
- They work with geometric patterns in which the shapes grow (increase) or decrease in different ways.

The function concept is captured in the idea of applying a fixed rule to one set of numbers to produce another set of numbers: Input numbers → Rule → Output numbers. A lot of the pattern work focuses on methods to find the rule or calculation plan, because the rule can be used to find missing output numbers and input numbers.

In this unit, we focus on the four framework dimensions in the following ways:

Framework dimension	How the framework dimension is developed in this unit
Conceptual understanding	Through the use of flow diagrams and tables, learners move from geometric patterns to numeric or number patterns.
Procedural fluency	Learners follow a procedure to draw line graphs.
Strategic competence	Learners decide which representation (flow diagram or table) will be better for recording changes when a geometric pattern grows.
Reasoning	Leaners compare output numbers in flow diagrams to conclude that order does not matter when adding only or multiplying only, but do matter when adding and multiplying together.

In this unit, we build a **learning centred classroom** by paying attention to:

		Examples
Concept development	✓	Done in every lesson.
Purposeful assessment	✓	The investigation is designed to give all stakeholders an insight into learners' understanding.
Problem solving	✓	Learners use patterns to solve real life problems.

| Connecting representations | ✓ | Learners show geometric patterns using different representations including flow charts, descriptions, diagrams and number sentences. |
| Addressing gaps in learner' knowledge | ✓ | Link to previous lesson, correction of classwork and homework activities, as well as consolidation activities are designed to address gaps in learners' knowledge. |

Mathematical vocabulary for this unit

Be sure to teach and use the following vocabulary at the appropriate place in the unit.
It is a good idea to make flashcards of words and their meanings and to display these in the classroom at appropriate times.

Term	Explanation / diagram
axis	Many graphs have two axes: a horizontal axis and a vertical axis. horizontal axis vertical axis
flow diagram	Diagram that shows the rule that works on input values to produce output values
geometric pattern	Repeated arrangement of shapes
input number	Number that you put into a table or flow diagram to produce an output number
interval	The gap between two things. It could be an interval in numbers (the size of the gap in a number pattern) or it could be the gap between numbers on a scale
line graph	Graph where all the points representing the relationship between the quantities lie on the line.
mass	The amount of matter that an object is made up of Example: A chicken has a greater mass than a biscuit
numeric pattern or number pattern	List of numbers that follow a certain sequence or pattern
octagon	Eight-sided 2-D shape
operation +; −; ×; ÷	Mathematical process The most common operations are add, subtract, multiply and divide
output number	Number that is produced by using the rule on an input number in a table or flow diagram
pattern	Repeated arrangement of things like shapes, numbers, colours or lines
predict	Say what you think might happen
rule	Procedure to follow

Term	Explanation / diagram
sequence	A set of numbers or shapes that follow each other in a particular order
stage	Step in a pattern
volume	The measurement of liquid or sand or rice in a container

Prior knowledge for this unit

Concepts in this unit are not entirely new for learners. They have dealt with some of the topics before.

Learners have:
- Worked with geometric shapes and shape patterns
- Worked with number sequences when skip counting
- Worked with flow diagrams (input-output diagrams) and tables
- Worked with inverse operations and the associative property
- Multiplied by 10, 100, 1 000
- Drawn and interpreted broken line graphs (Grade 5).

Further practice for learners

This table references other sources (including textbooks) if you need additional activities.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	42-48	43-49	31-34	17-20	20-27	46-54	21-27	24-25	15-20
	128-131	159-162	139-142	88-91	114-117	176-180	132-139	144-145	107-110
	193-198	237-239	214-219	146-148	175-181	264-268	228-236	234-236	176-180
	249-253	317-319	285-286	194-197	232-233	338-341	302-305	306-312	239-240
TG	29-33	53-58	53-56	17-19	15-19	48-58	16-20	24-31	15-19
	94-97	159-162	124-126	72-74	77-78	191-196	103-109	143-145	60
	146-150	233-236	169-172	120-123	116-120	291-296	190-197	234-244	91-94
	194-197	304-307	216-217	163-165	158-159	378-382	253-256	308-312	122-125

UNIT PLAN AND OVERVIEW FOR UNIT 5: Patterns

LP	Lesson objective Learners will be able to:	Lesson Resources Learners need classwork books, LABs, writing materials, rulers and scissors for all lessons.	Date completed
37	describe, extend, and write the rule for a geometric pattern in which the shape keeps its form, but gets larger (or smaller) in each stage.	Teacher: A3 poster: *A geometric pattern that grows bigger at each stage*; Bostik/ Prestik Learner: 60 matches or small sticks of equal length for each pair of learners	
38	describe, extend, and write the rule for a geometric pattern where a shape, or part of a shape, is added at each stage.	Teacher: None Learner: 30 matches or small sticks of equal length for each pair learners	
39	practise and consolidate geometric patterns in which a shape grows as the sides are lengthened; as well as geometric patterns in which a shape, or part of a shape, is added at each stage.	Resources: Grade 5 learners' books and teacher's guides as available	
40	work with numeric patterns, flow diagrams and tables.	Teacher and Learner: None	
41	use numeric patterns, tables and flow diagrams to develop concepts and skills that can be used with multiple operation.	Teacher and Learner: None	
42	multiply units or ones by multiples of 100 and 1 000 and will be able use the rule to create numeric patterns where there is a constant difference.	Teacher and Learner: None	
43	work with numeric patterns in which there is a constant ratio and with patterns which do not have a constant difference or a constant ratio.	Teacher and Learner: None	
44	draw and interpret a line graph that shows a relationship.	Teacher: A3 poster: *Graph showing relationship between water volume and mass*; Bostik/Prestik Learner: None	
45	use data from a table or flow diagram to draw and interpret a line graph that shows a relationship.	Teacher and Learner: None	
46	consolidate their knowledge of tables, flow diagrams, numeric patterns and line graphs that show the relationships between two numbers.	Resources: Grade 5 learners' books and teacher's guides as available	

Assessment for learning
Use the template provided at the beginning of this guide to think deeply about at least one of the lessons in this unit.

Reflection
Think about and make a note of: *What went well? What did not go well? What did the learners find difficult or easy to understand or do? What will you do to support or extend learners? Did you complete all the work set for the unit? If not, how will you get back on track?*

What will you change next time? Why?

Lesson 37: Describe and extend geometric patterns

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Geometric patterns (pp 169 – 171, 206)
Lesson Objective: Learners will be able to describe, extend, and write the rule for a geometric pattern where the shape keeps its form, but gets larger (or smaller) at each stage.
Lesson Vocabulary: pattern, geometric pattern, predict, input number, output number, rule
Teacher Resources: A3 poster: *A geometric pattern that grows bigger at each stage*; Bostik/ Prestik
Learner Resources: 60 matches or small sticks of equal length for each pair of learners.
NOTE: If matches are not available, learners can draw the geometric patterns made with matches. However, it is easier, and more fun, if they actually make the patterns.
Collect the matches at the end of the lesson so that they can be used in Lessons 38 and 39.

Date:	Week	Day

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	5 + 4 – 3 =	6	**6**	2 + 5 – 5 =	2
2	7 – 2 + 4 =	9	**7**	9 – 6 + 4 =	7
3	9 – 3 + 1 =	7	**8**	1 + 0 – 1 =	0
4	0 + 4 –2 =	2	**9**	4 – 1 + 3 =	6
5	2 – 0 + 2 =	4	**10**	5 + 4 – 3 =	6

2   LINK TO GRADE 3

This is the first lesson in this unit. There are no direct links to the previous lesson.

3   CORRECT HOMEWORK ACTIVITY

This is the first lesson in this unit. There is no homework to correct.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (50 MINUTES)

NOTE TO THE TEACHER:
- Learners work with geometric patterns where the shapes keep their form, but get larger or smaller at each stage.
- The use of concrete aids (matches) provides learners with opportunities to actually count the number of matches added from stage to stage. This will help them describe the pattern in words and understand how to record the data in a table and flow diagram.
- In all activities learners are required to develop a rule. This helps to link geometric patterns with numeric patterns.
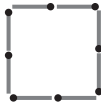
Say: **Today we are learning to describe and extend geometric patterns.**
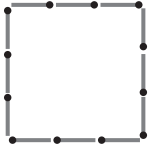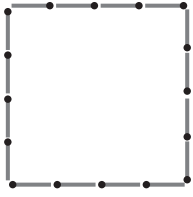
Activity 1: Whole class activity and learners work in groups
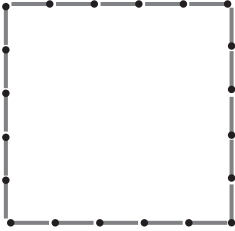
- Stick up the A3 poster: *A geometric pattern that grows bigger at each stage*.
  NB: Use Prestik/Bostik and rough paper to cover Stages 2, 3, 4 and 5 before the lesson. Each pair of learners will need 60 matches or toothpicks or small sticks.

A geometric pattern that grows bigger at each stage

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
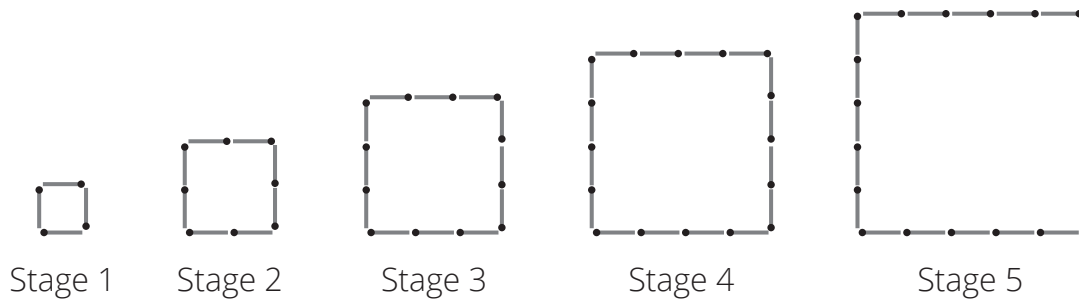
- Tell the learners to turn to Activity 1 in their LAB.

- Say: **Work on this activity with your partner.**

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Say, as you show Stage 1 of the pattern on the A3 poster: **This geometric pattern has been made with matches.** • Say: **Use the matches to build Stage 1 of the pattern.** • Ask: **How many matches do you need to build Stage 1?** (Four) • Say: **Draw Stage 1 in your LAB.**	Work with your partner **1** The Stage 1 geometric pattern on the poster has been made with matches. **a** Build Stage 1 using matches. How many matches do you need to build Stage 1? (4) **b** Draw Stage 1 here: Answer: Stage 1
• Say, as you uncover Stage 2 and show Stage 1 and Stage 2 of the pattern: **You used four matches to build Stage 1. Predict how many matches you will need to build Stage 2.** (eight / four more) • Say: **Use the matches to build Stage 2 of the pattern.** • Ask: **How many matches do you need to build Stage 2?** (Eight) • Say: **Draw Stage 2 in your LAB.**	**2** Look at Stage 2. **a** Build Stage 2 using matches. How many matches do you need to build Stage 2? (8) **b** Draw Stage 2 here. Answer: Stage 2

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
• Make sure that all five stages of the pattern are visible on the A3 poster. • Continue the process to build and draw stages 3, 4 and 5. For each stage, make sure that learners *predict* how many matches they will need for each stage.	**3** Look at Stage 3. **a** Build Stage 3 using matches. How many matches do you need to build Stage 3? (12) **b** Draw Stage 3 here: Answer: Stage 3 **4** Look at Stage 4. **a)** Build Stage 4 using matches. How many matches do you need to build Stage 4? (16) **b)** Draw Stage 4 here. Answer: Stage 4

UNIT 5

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	5 Look at Stage 5. **a** Build Stage 5 using matches. How many matches do you need to build Stage 5? (20) **b** Draw Stage 5 here: Answer: Stage 5
• Ask: **Who would like to tell the class how they described the geometric pattern?** • Allow different learners to describe the pattern. Discuss their answers with the whole class. • Leave the poster on display for use during Activity 2.	**6** Write a sentence to describe how you made this pattern. POSSIBLE ANSWERS - It is a pattern of squares, with each square bigger than the one before. - It is a pattern of squares. Each side of the square grows by one match from one stage to the next.

Activity 2: Learners work in pairs

• Say: **Work with a partner to do Activity 2 in your LAB.**
• Walk around the classroom to support learners as required. The answers are given in brackets.

Work with a partner

Look again at this geometric pattern made with matchsticks.

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
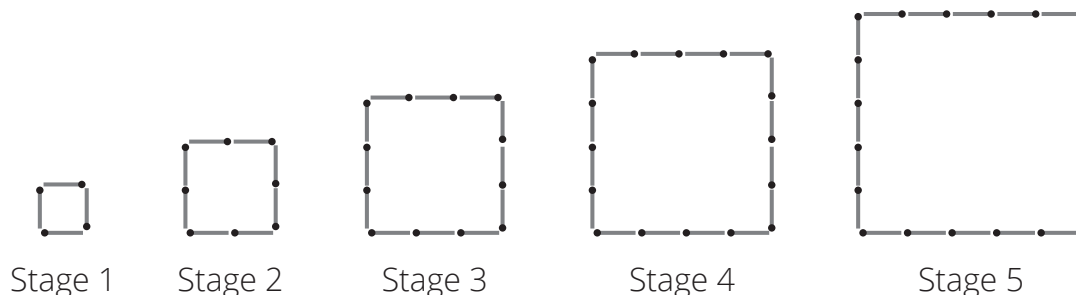
1   Complete the table to show the number of matches used for each stage.

Stage Number	1	2	3	4	5
Number of matches used	(4)	(8)	(12)	(16)	(20)

2   The stage number is the input number.
A rule can be found to find the output number
which is the number of matches.

Study the table and then complete this
number sentence:
Number of matchsticks = (4) × stage number

> **Input number:** the number
> that you put into a table or
> flow diagram to produce an
> output number.

3   A flow diagram was drawn to show the pattern.
Fill in the rule and the output numbers on the
flow diagram.
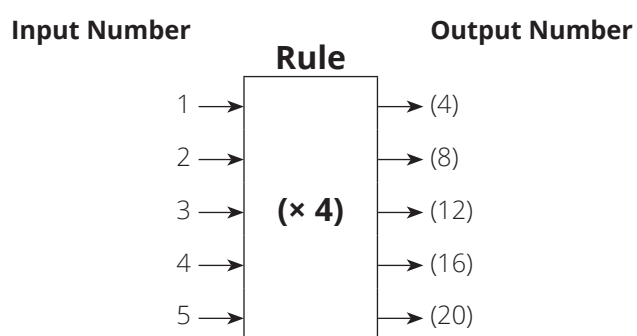
> **Output number:** the
> number that is produced
> by using the rule on an
> input number in a table or
> flow diagram.

Input Number   **Output Number**
                          Rule

1 →   → (4)

2 →   → (8)

3 →   **(× 4)**   → (12)

4 →   → (16)

5 →   → (20)

4   How many matches do you need for:
   a   Stage 6? (24)
   b   Stage 10? (40)
   c   Stage 12? (48)
   d   Stage 20? (80)

UNIT 5

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what the learners need to do for homework.
- Read the question in the LAB with the learners. Make sure all the learners understand what to do.
- Answers are given in the activity.

Look at another geometric pattern made of matches.

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
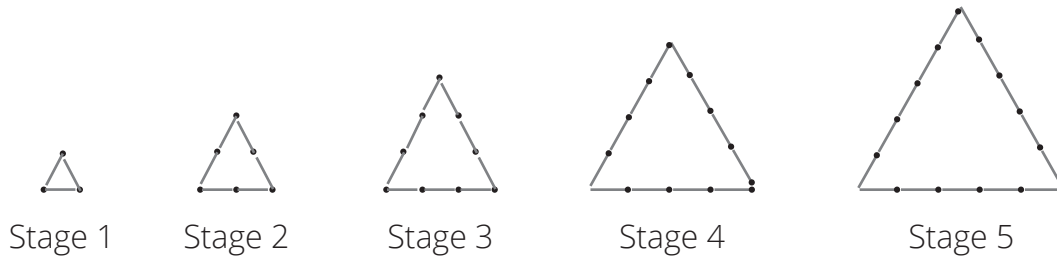
1 Draw Stage 4 and Stage 5 in the space provided.

2 How many matches did you add:

    a To Stage 1 to get Stage 2? (3)

    b To Stage 2 to get Stage 3? (3)

    c To Stage 3 to get Stage 4? (3)

    d To Shape 4 to get Stage 5? (3)

3 Count the number of matches used for each stage and write the answers in the table.

Stage number	1	2	3	4	5
Number of matches	(3)	(6)	(9)	(12)	(15)

4 How many matches would you need for:

    a Stage 6? (18)

    b Stage 10? (30)

    c Stage 20? (60)

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6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to:**
- **describe, extend, and write the rule for a geometric pattern**
- **record information in a table**
- **use a rule to fill in output numbers on a flow diagram.**

Lesson 38: More geometric patterns

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Geometric patterns (pp 169 – 171, 206)
Lesson Objective: Learners will be able to describe, extend, and write the rule for a geometric pattern where a shape or part of a shape is added at each stage.
Lesson Vocabulary: geometric pattern, stage
Teacher Resources: None
Learner Resources: 30 matches or small sticks of equal length for each pair of learners
Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$2 + 1 \times 2 =$	4	**6**	$4 + 1 \times 5 =$	9
2	$3 + 4 \times 1 =$	7	**7**	$3 \times 6 + 2 =$	20
3	$3 \times 2 + 4 =$	10	**8**	$0 + 1 \times 8 =$	8
4	$1 + 2 \times 3 =$	7	**9**	$6 + 3 \times 5 =$	21
5	$2 \times 3 + 2 =$	8	**10**	$4 + 2 \times 9 =$	22

2   LINK TO PREVIOUS LESSON (10 MINUTES)

Refer the learners to the activity in the LAB.

Look at the geometric pattern made of matches.

Stage 1   Stage 2   Stage 3
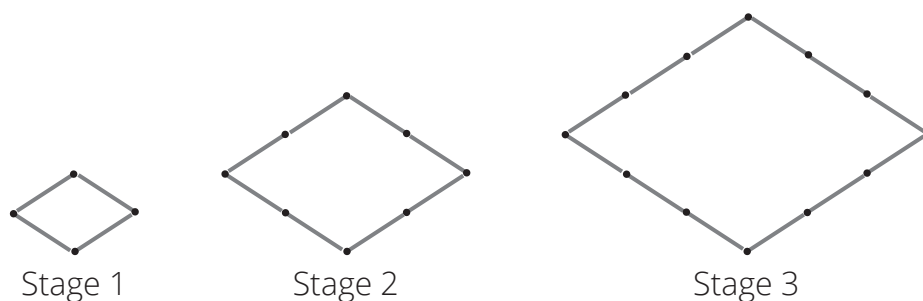
1   Complete the table to show the number of matches used for Stage 1, Stage 2, and Stage 3.

Stage number	1	2	3
Number of matches	(4)	(8)	(12)

> **2** If we know the **input number** (or stage number), and the **output number** (or number of matches), we can find the **rule**.
>
> Complete the rule: Number of matches = (4) × Stage number
>
> **3** Find the number of matches in
>   **a** Stage 5. (20)
>   **b** Stage 10. (40)

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 37 are provided in Lesson 37.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

> NOTE TO THE TEACHER:
> - Lesson 38 differs from Lesson 37:
>   - In Lesson 37 learners worked with geometric patterns in which the shapes increase or decrease in different ways.
>   - In Lesson 38 learners work with a geometric pattern in which a shape, or part of a shape, is added at each stage.
> - With both kinds of geometric patterns, the pattern is made by adding the same number of matches at each stage. Both geometric patterns result in numeric or number patterns with a *constant difference* (this means we add or subtract the same amount to get the rest of the terms in the pattern.).

Say: **Today we are learning to describe, extend, and write the rule for a geometric pattern.**

Activity 1: Learners work in pairs

- Say:
  - **In the last lesson we made shapes in a geometric pattern larger by adding more matches at each stage. The rule was easy to find because we added the same number of matches each time.**
  - **Today we are still going to look at geometric patterns which get larger. This time we add a shape or part of a shape at each stage. So we will have to think carefully about the rules because they are not always so easy to find.**

- Say: **Work with a partner to do Activity 1 in your LAB.**

- Walk around the classroom to support learners as necessary. The answers are given in the activity.

Work with your partner

Look at the following pattern made of matches.

Shape 1   Shape 2   Shape 3   Shape 4

1 Use matches to build Shape 1, 2, 3 and 4 of this geometric pattern:
(Practical activity – check that learners have the correct number of matches for each shape.)

2 How many matches did you add:
a to Shape 1 to get Shape 2? (2 matches)
b To Shape 2 to get Shape 3? (2 matches)
c To Shape 3 to get Shape 4? (2 matches)

3 Count the number of matches in Shape 1, Shape 2 and Shape 3 and write the answer in the table.

Shape number	1	2	3	4
Number of matches	(3)	(5)	(7)	(9)

4 If we know the input number (or shape number), and the output number (or number of matches), we can find the rule.

a We can work out the rule for this geometric pattern as follows:
Number of matches in Shape 1 = 2 matches + 1 match = 3 matches
Number of matches in Shape 2 = 4 matches + 1 match = 5 matches

Fill in the answers for Shape 3 and Shape 4:
Number of matches in Shape 3 = (6) matches + 1 match = (7) matches
Number of matches in Shape 4 = (8) matches + 1 match = (9) matches

b We can also write this:

Number of matches in Shape 1 = 1 × (2) matches + 1 match = 3 matches
Number of matches in Shape 2 = 2 × (2) matches + 1 match = 5 matches
Number of matches in Shape 3 = (3 × 2) matches + 1 match = 7 matches
Number of matches in Shape 4 = (4 × 2) matches + (1) match = 9 matches

Complete:
Number of matches in any shape = number of the shape × (2) + (1)

c) We can draw a flow diagram like this.

Input			Output
1			3
2			(5)
3	**× 2**	**+ 1**	(7)
4			(9)
5			(11)
10			(21)
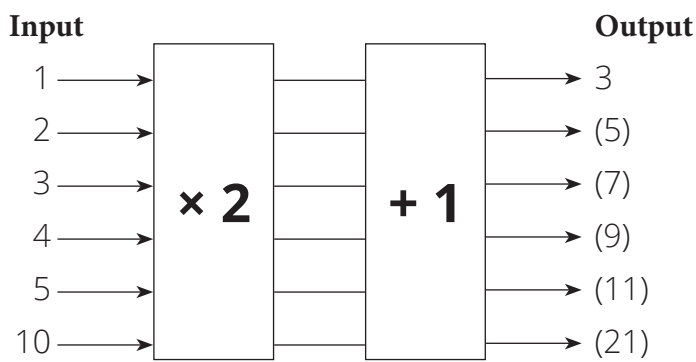
Input numbers
(Shape number)

Output numbers
(Number of matches)

Complete the flow diagram by filling in the missing output numbers.

Activity 2: Learners work in pairs

• Say: **Work with a partner to do Activity 2 in your LAB.**

• Walk around the classroom to support the learners as necessary.
The answers are given.

Work with a partner

This geometric pattern is drawn on squared paper.

Answer
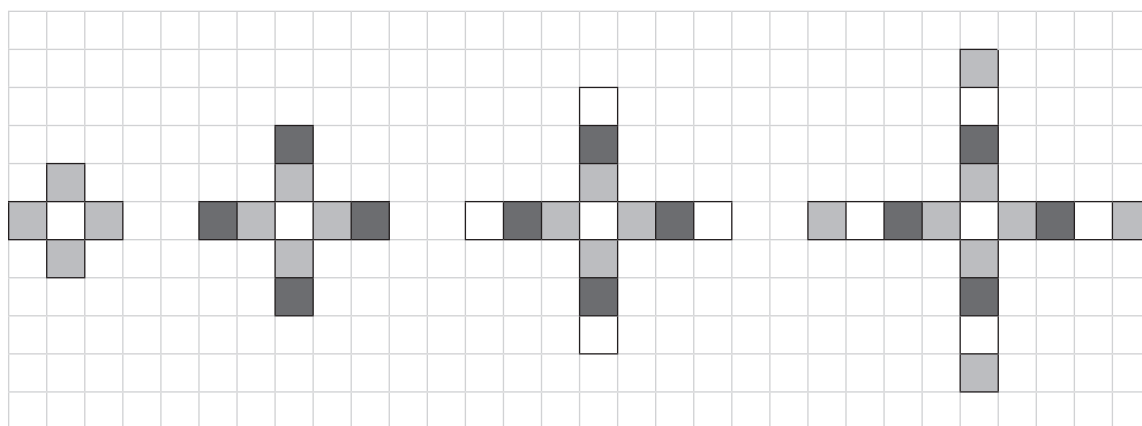
Stage 1   Stage 2   Stage 3   Stage 4

1   Draw Stage 4 on the squared paper.

2   How many squares did you add:
   a   To Stage 1 to get Stage 2? (4)
   b   To Stage 2 to get Stage 3? (4)
   c   To Stage 3 to get Stage 4? (4)

3   **a**   Count the number of squares in Stage 1, Stage 2, Stage 3 and Stage 4 and write the answers in the table.

Stage Number	1	2	3	4	5
Number of squares	5	(9)	(13)	(17)	(21)

   b   Use the table to work out the number of squares in Stage 5.

   c   Explain how you worked out the number of squares in Stage 5.
   (Possible answer: 5 + 4 = 9; 9 + 4 = 13; 13 + 4 = 17, so the number of squares in Stage 5 must be 17 + 4 = 21.
   Other answers are possible.)

UNIT 5

4 If we know the input number (the stage number) and the output number (the number of squares), we can find the rule.

We can work out the rule for the geometric pattern as follows:

Number of squares in Stage 1 = 4 squares + 1 square
$$= 1 \times 4 \text{ squares} + 1 \text{ square} = 5 \text{ squares}$$

Number of squares in Stage 2 = 8 squares + 1 square
$$= 2 \times 4 \text{ squares} + 1 \text{ square} = 9 \text{ squares}$$

a Complete the following:

Number of squares in Stage 3 = 12 squares + 1 square
$$= (3) \times 4 \text{ squares} + 1 \text{ square} = (13) \text{ squares}$$

Number of squares in Stage 4 = 16 squares + 1 square
$$= (4) \times 4 \text{ squares} + (1) \text{ square} = (17) \text{ squares}$$

Number of squares in Stage 5 = 20 squares + 1 square
$$= (5) \times 4 \text{ squares} + (1) \text{ square} = (21) \text{ squares}$$

b Complete:

Number of squares in any stage = stage number × (4) + (1)

5 We can draw a flow diagram like this.

Input			Output
1			(5)
2			(9)
3			(13)
4	**× (4)**	**+ (1)**	(17)
5			(21)
7			(29)
10			(41)

Input numbers
(Stage number)

Output numbers
(Number of squares)
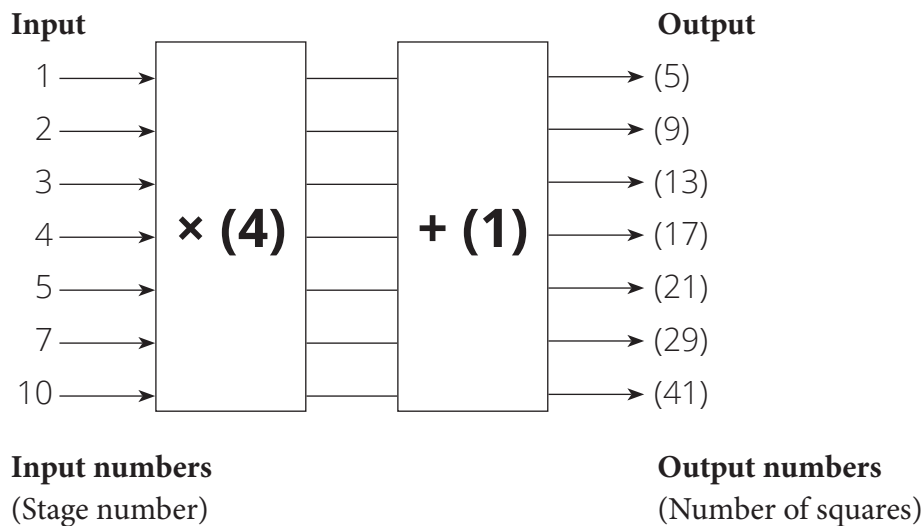
a Write the rule in the flow diagram.

b Fill in the output numbers.

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

Look at the pattern. Answer the questions.

Answer
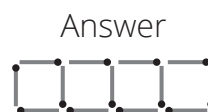
Diagram 1   Diagram 2   Diagram 3   Diagram 4

1   Draw Diagram 4 in the space provided.

2   How many matches did you add:

   a   To Diagram 1 to get Diagram 2? (3 matches)

   b   To Diagram 2 to get Diagram 3? (3 matches)

   c   To Diagram 3 to get Diagram 4? (3 matches)

3   Count the number of matches in each diagram and write them in the table.

Diagram number	1	2	3	4	5	6
Number of matches	(4)	(7)	(10)	(13)	(16)	(19)

4   Complete:

Number of matches in any diagram = diagram number × (3) + (1)

---

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt more about geometric patterns. We can:**
- **use words and sketches to describe geometric patterns**
- **extend geometric patterns**
- **write the rule for a geometric pattern.**

Lesson 39: Consolidation

Teacher's notes
This lesson allows for consolidation of the lesson of this unit.
CAPS topics: Geometric patterns (pp 169 – 171, 206)
Lesson Objective: Learners will practise and consolidate geometric patterns in which a shape grows as the sides are lengthened; as well as geometric patterns in which a shape, or part of a shape, is added at each stage.
Lesson Vocabulary: geometric pattern, stage, sequence
Resources: Grade 5 learner's books and teacher's guides as available.
Date: Week Day

1   NOTES FOR THE TEACHER RELATING TO THIS WEEK'S WORK

The main topic covered so far in this unit is geometric patterns. Learners worked with simple repeating patterns as well more complex geometric patterns in which the rule is more complicated than 'Add x'.

2   POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

Some learners struggle when asked to predict the number of shapes, matches etc. in subsequent stages. Remind learners to start by describing, in words, how to get from one stage to the next. Remind them that this description can help them find a rule for the pattern. Once they have a rule, they can use it to predict future stages.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 38 are provided in Lesson 38.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

- Say: **Today we are going over what we learned about geometric patterns. We will practise describing, drawing, extending and developing rules for different types of geometric patterns.**

- You could use this time for learners to complete classwork or homework activities as necessary.
  You could use the Additional Activities from textbooks that you have, or use the Consolidation Activity given.

Additional activities for consolidation
Refer to the following table. Select additional activities from the textbook/s you have.
Use the answers given in the Teacher's Guide to mark the work and provide feedback.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	42-48	43-49	31-34	17-20	20-27	46-54	21-27	24-25	15-20
	128-131	159-162	139-142	88-91	114-117	176-180	132-139	144-145	107-110
	193-198	237-239	214-219	146-148	175-181	264-268	228-236	234-236	176-180
	249-253	317-319	285-286	194-197	232-233	338-341	302-305	306-312	239-240
TG	29-33	53-58	53-56	17-19	15-19	48-58	16-20	24-31	15-19
	94-97	159-162	124-126	72-74	77-78	191-196	103-109	143-145	60
	146-150	233-236	169-172	120-123	116-120	291-296	190-197	234-244	91-94
	194-197	304-307	216-217	163-165	158-159	378-382	253-256	308-312	122-125

OR, learners could complete the Consolidation Activity in their LAB.

- Provide help as necessary. The answers are given below.

Consolidation Activity

Work on your own.

1 Look at the geometric pattern made of matches.

ANSWER

Diagram 1   Diagram 2   Diagram 3   Diagram 4
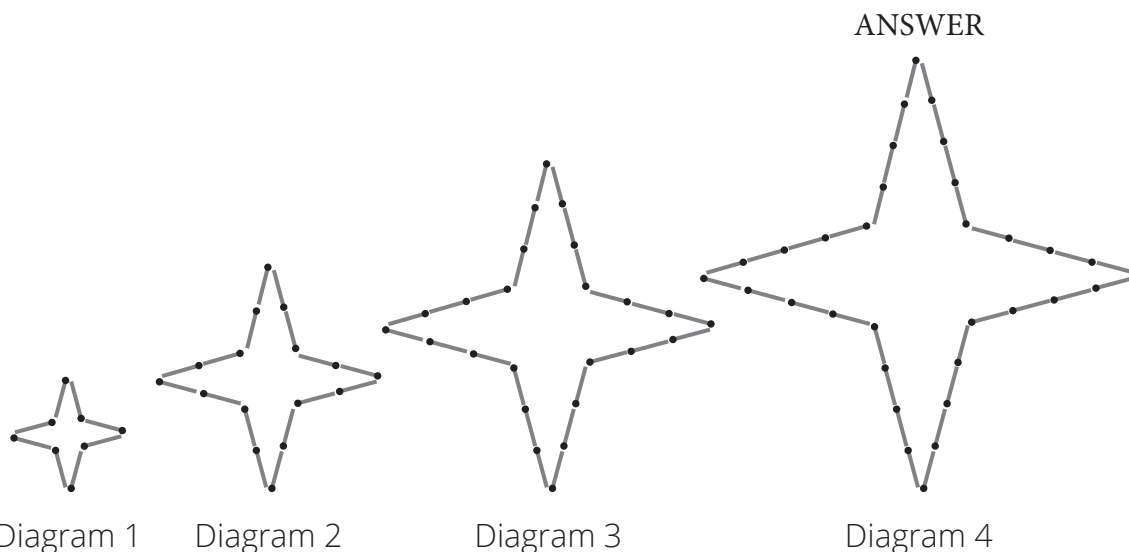
a Describe the diagrams in the geometric pattern.
(Each diagram is a star with four points and 8 sides. The star grows as matches are added to each arm. Each side grows by one match.)

b Draw Diagram 4 in the table.

c Count the number of matches in Diagrams 1, 2, 3 and 4 and write the answers in the table.

Diagram number	1	2	3	4
Number of matches	(8)	(16)	(24)	(32)

d Use the table to work out the number of matches in Diagram 5. (5 × 8 = 40)

e What rule can we use to find the number of matches in each diagram?
Complete the following:
Number of matches in any diagram = diagram number (× 8)

f Complete the flow diagram by filling in the rule and then using the rule to find the output numbers.

Stage	Rule	Number of matchsticks
1		(8)
2		(16)
3		(24)
4	**× 8**	(32)
5		(40)
8		(64)
50		(400)
100		(800)
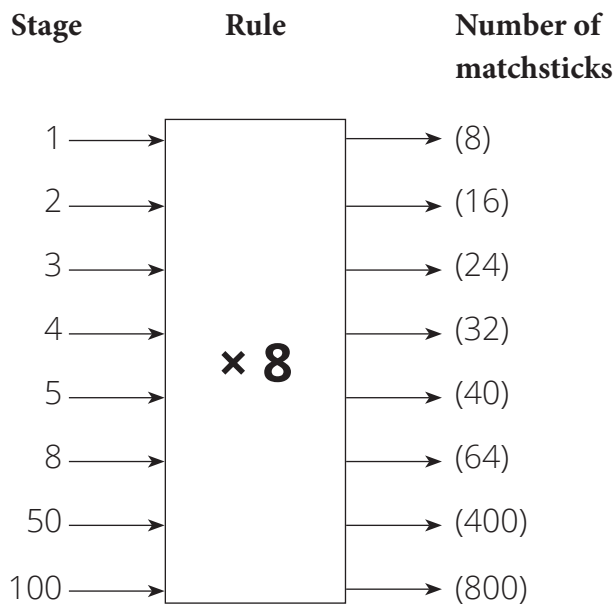
2 Study Stages 1, 2 and 3 of this geometric pattern made of matchsticks:

ANSWER   ANSWER

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
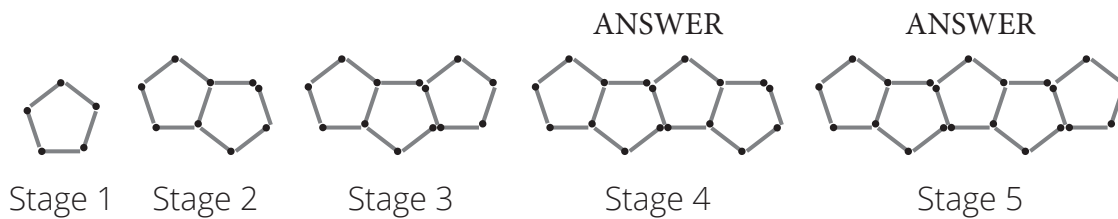
a Draw Stage 4 and Stage 5 in the spaces provided.

b How many matches do you add to get from:
- Stage 1 to Stage 2? (4 matches)
- Stage 2 to Stage 3? (4 matches)
- Stage 3 to Stage 4? (4 matches)
- Stage 4 to Stage 5? (4 matches)

c Count the number of matches in each Stage and write the answers in the table.

Stage Number	1	2	3	4	5
Number of matches	(5)	(9)	(13)	(17)	(21)

d Write a rule which you can use to find the number of matches in any stage:

Number of matches in any stage = stage number × (4) + (1)

3 Study Stages 1, 2, 3 and 4 of this geometric pattern made of squares:

ANSWER

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5

UNIT 5
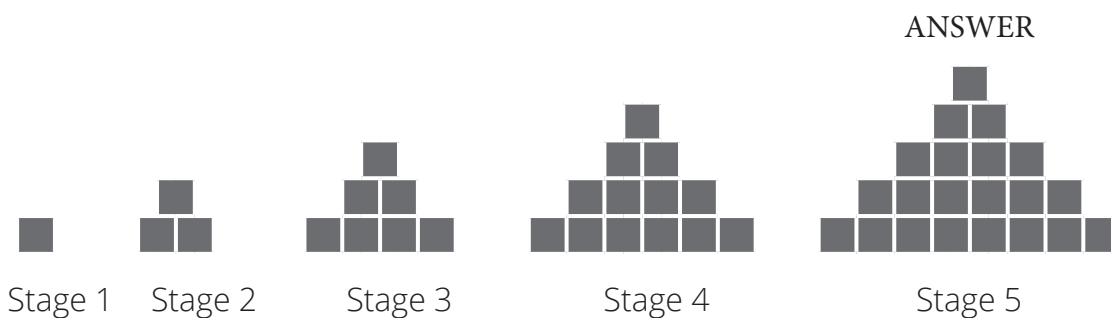
a Draw Stage 5 in the space provided.

b How many squares do you add to get from:
- Stage 1 to Stage 2? (2 squares)
- Stage 2 to Stage 3? (4 squares)
- Stage 3 to Stage 4? (6 squares)
- Stage 4 to Stage 5? (8 squares)

c Count the number of squares in each Stage and write the answers in the table.

Stage Number	1	2	3	4	5
Number of squares	(1)	(3)	(7)	(13)	(21)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised geometric patterns. We know that:**
- **geometric shapes and objects can be used to form geometric patterns**
- **a geometric pattern can be described in words**
- **a geometric pattern can be represented in a table or a flow diagram or in words**
- **patterns can grow by:**
    - **adding the same number to one stage to get the next stage**
    - **multiplying each stage by the same number to get the next stage**
    - **using mixed operations to find the next stage.**

Lesson 40: Numeric patterns, flow diagrams and tables

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Numeric patterns (pp 136 – 139, 189 – 191)
Lesson Objective: Learners will be able to work with numeric (or number) patterns, flow diagrams and tables.
Lesson Vocabulary: flow diagram, input number, output number, numeric pattern, octagon, rule
Teacher and Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	9 – 2 × 3 =	3	**6**	8 – 2 × 4 =	0
2	4 × 2 – 2 =	6	**7**	7 – 3 × 2 =	1
3	6 – 2 × 2 =	2	**8**	9 – 1 × 1 =	8
4	3 × 3 – 3 =	6	**9**	5 × 3 – 10 =	5
5	9 – 4 × 1 =	5	**10**	9 – 4 × 2 =	1

2 LINK TO PREVIOUS LESSON (15 MINUTES)

Refer learners to the activity in the LAB. The answers are given below.

Look at the geometric pattern made with octagons and squares:

ANSWER

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
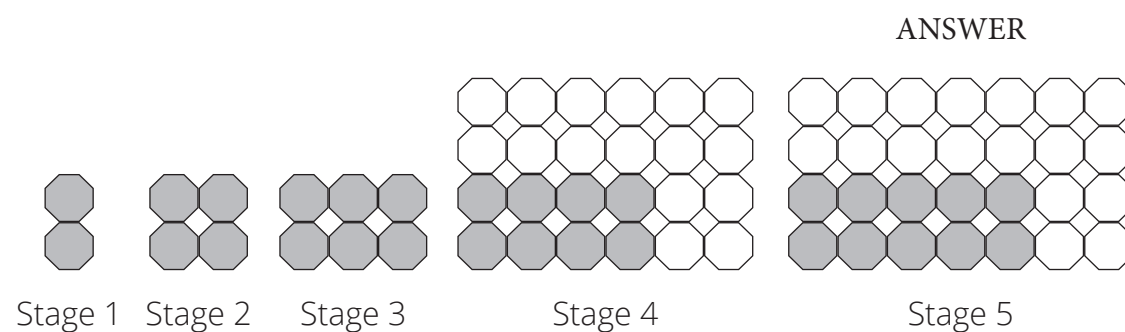
1 Colour in octagons to show Stage 4 and Stage 5 of the geometric pattern.
(See pattern above)

2 Look at Stage 3.
    a How many octagons are there in Stage 3? (6)
    b The octagons make squares between them. How many squares are there in Stage 3? (2)

---

3 Complete the table for Stages 1, 2, 3, 4 and 5.
Use what you found to fill in the values for Stage 6 and Stage 7.

Stage Number	1	2	3	4	5	6	7
Number of octagons	2	(4)	(6)	(8)	(10)	$(6 \times 2 = 12)$	$(7 \times 2 = 14)$
Number of squares	0	1	(2)	(3)	(4)	$(6 - 1 = 5)$	$(7 - 1 = 6)$

4 What number pattern can you see in the number of octagons in the
geometric pattern?
(2 times table)

5 What number pattern can you see in the number of squares in the geometric pattern?
(Whole numbers or counting numbers starting at zero)

6 Calculate the number of octagons:
  a in Stage 10 $(10 \times 2 = 20)$
  b in Stage 100 $(100 \times 2 = 200)$

7 Calculate the number of squares:
  a in Stage 10 $(10 - 1 = 9)$
  b in Stage 100 $(100 - 1 = 99)$

3 CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The previous lesson was a consolidation lesson. There is no homework to correct.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER:
- In this lesson learners work with numeric patterns, flow diagrams and tables. We switch between flow diagrams and tables so that learners can see that both flow diagrams and tables can be used to represent numeric patterns. We start with the familiar (geometric patterns) and then move to numeric patterns.

- Learners need to be able to work with flow diagrams (input-output diagrams) and tables in the following ways:

If given:	We can work out:
The rule and the output	The input
The rule and the input	The output
The input and the corresponding output	The rule

Say: **Today we are going to work with numeric patterns, flow diagrams and tables.**

Activity 1: Whole class activity and learners work with a partner

- Say: **Let's look at the geometric pattern with octagons and squares again.**
  Say: **We have already recorded the changes in the number of octagons and squares in a table.**
  Say: **Now let's see if we can record these changes in a flow diagram.**

- Say: **Work with a partner to do Activity 1 in the LAB.**

- Walk around the classroom to help learners as necessary. The answers are given in brackets.

Work with a partner

Use the geometric pattern made with octagons and squares to answer the questions.

Stage 1   Stage 2   Stage 3   Stage 4   Stage 5
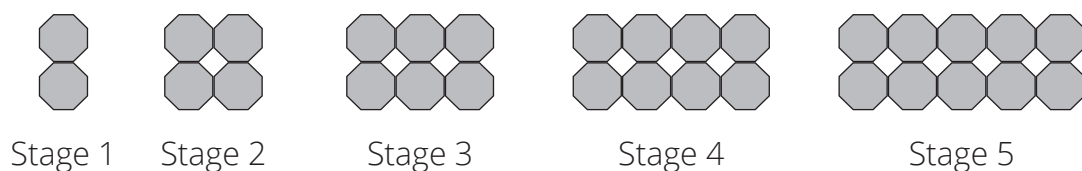
1 Complete each flow diagram by filling in the input numbers, rules and output numbers for the number of octagons and the number of squares.

   a Flow diagram showing the number of octagons.

Input number	Rule	Output number
1		2
(2)		(4)
(3)		(6)
(4)	(× 2)	(8)
(5)		(10)
(10)		(20)
(100)		(200)

UNIT 5

b Flow diagram showing the number of squares.
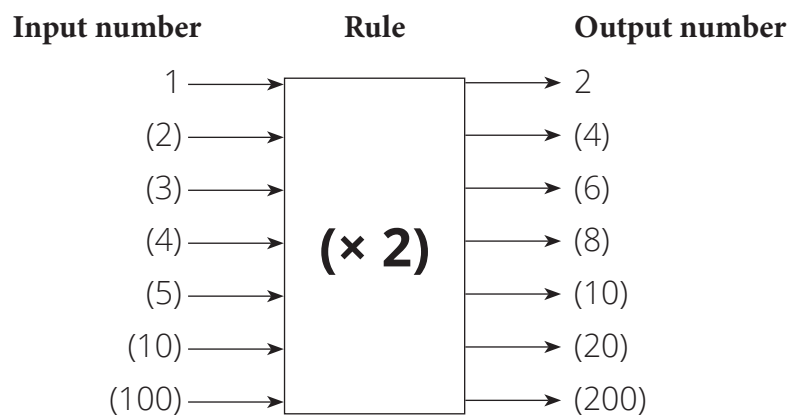
Input number	Rule	Output number
1		0
(2)		(1)
(3)		(2)
(4)	**(−1)**	(3)
(5)		(4)
(10)		(9)
(100)		(99)
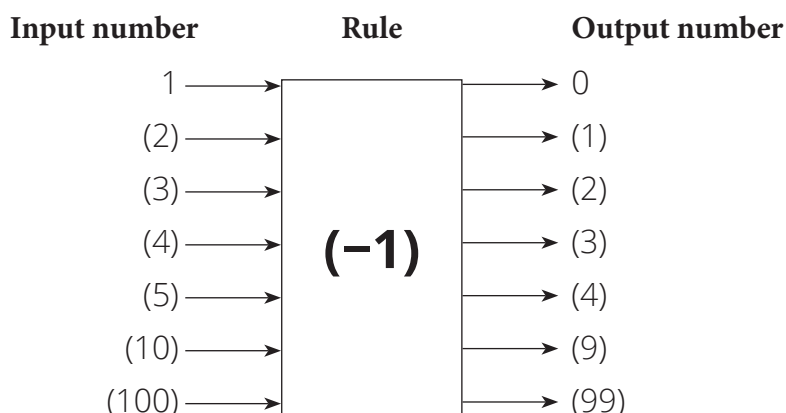
2 Look at the table you completed in the previous activity.

  a Compare the number of octagons in row 2 of the table to the output numbers in the octagon flow diagram. What do you notice?
  (The numbers in the table and the flow diagram are the same)

  b Compare the number of squares in row 3 of the table to the output numbers in the square flow diagram. What do you notice?
  (The numbers in the table and the flow diagram are the same)

3 The number sequences in the table make numeric patterns.

  a The number pattern for octagons is 2; 4; 6; 8; 10…
  What is the rule for moving from one number to the next in this numeric pattern?
  (Add 2)

  b The number pattern for squares is 0; 1; 2; 3; 4; 5…
  What is the rule for moving from one number to the next this numeric pattern?
  (Add 1)

Activity 2: Learners work on their own

- Say: **Work on your own on Activity 2 in the LAB.**

- Walk around the classroom to help learners as necessary. The answers are given in brackets.

Work on your own

1 Complete the two flow diagrams.

a   **Input number**   **Rule**   **Output number**

1 → → (8)
3 → → (24)
5 → **× 8** → (40)
8 → → (64)
10 → → (80)
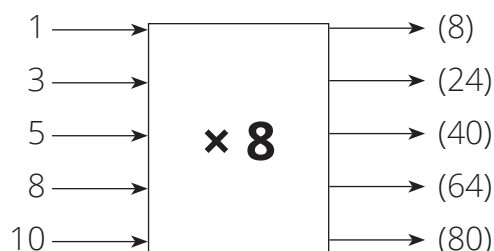
b   **Input number**   **Rule**   **Output number**

8 → → (1)
24 → → (3)
40 → **÷ 8** → (5)
64 → → (8)
80 → → (10)
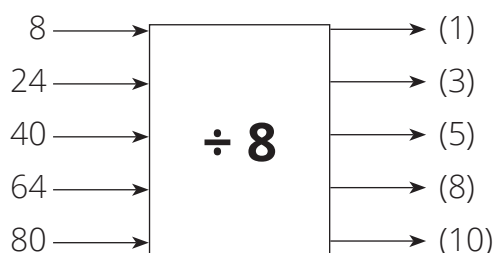
2 Compare the input numbers in the × 8 flow diagram and the output numbers in the ÷ 8 flow diagram.
What do you notice?
(The numbers are the same)

3 Compare the output numbers in the × 8 flow diagram and the input numbers in the × 8 flow diagram.
What do you notice?
(The numbers are the same)

4 Compare the rule in the first flow diagram and the rule in the second flow diagram.
What do you notice?
(÷ 8 is the inverse of × 8, and × 8 is the inverse of ÷ 8)

5 We can list the numbers in a flow diagram in a table.
Use the flow diagrams to complete the tables:

a

Rule: × 8					
Input number	1	3	5	8	10
Output number	(8)	(24)	(40)	(64)	(80)

b

Rule: ÷ 8					
Input number	8	24	40	64	80
Output number	(1)	(3)	(5)	(8)	(10)

6 Complete the sentences to make them true:

a I can see that $5 \times 8 = (40)$ and $40 \div 8 = (5)$.

b I can see that $10 (\times 8) = 80$ and $80 (\div 8) = 10$

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

Fill in the missing information on the flow diagram.
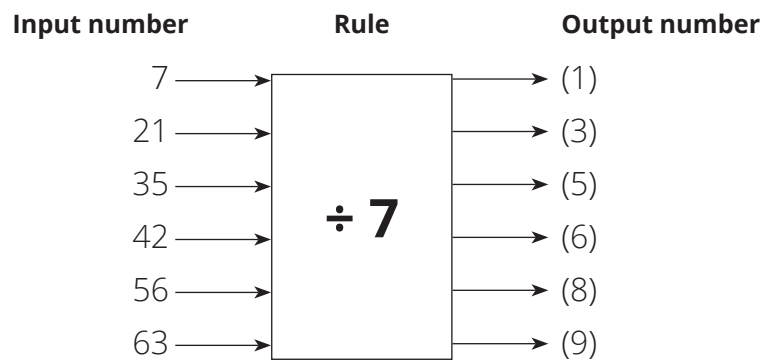
Input number	Rule	Output number
7		(1)
21		(3)
35		(5)
42	**÷ 7**	(6)
56		(8)
63		(9)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt more about using flow diagrams and tables to represent information from geometric and numeric patterns.**
We know that:
- **we can find the output number if we know the input number and the rule**
- **we can find the input number if we know the output number and the rule**
- **we can find the rule if we know the input number and the matching output number**
- **multiplication and division are inverse, or opposite, operations.**

Lesson 41: Rules of operations

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$4 + 2 \times 1 =$	6	**6**	$5 \times 3 + 5 =$	20
2	$4 - 2 \times 1 =$	2	**7**	$9 - 2 \times 3 =$	3
3	$4 \times 2 + 1 =$	9	**8**	$7 + 6 \times 2 =$	19
4	$4 \times 2 - 1 =$	7	**9**	$9 + 4 \times 5 =$	29
5	$6 - 3 \times 2 =$	0	**10**	$8 - 4 \times 2 =$	0

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB.

1   Complete the flow diagram.

Flow diagram: inputs 1, 3, 5, (6), 7, 11 → [× 4] → [+ 1] → outputs 5, 13, (21), 25, (37), 45
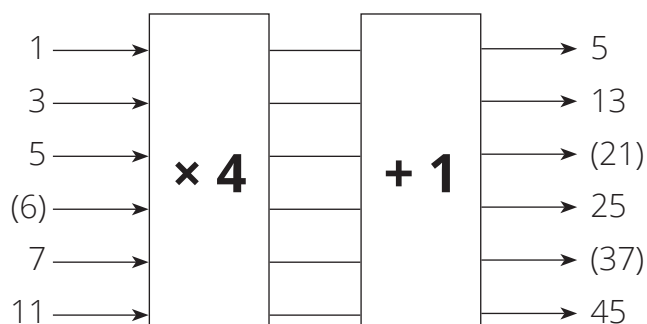
2   What do you notice about the rule?
(It has two parts: multiply by 4 and then add 1.)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 40 are provided in Lesson 40.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

UNIT 5

4 LESSON CONTENT – CONCEPT DEVELOPMENT (45 MINUTES)

NOTE TO THE TEACHER:
- Learners use number patterns and flow diagrams to develop concepts and skills that will be used in multiplication and division.
  This includes:
  - multiplication and division are inverse operations
  - how multiplication can be distributed over addition and subtraction (distributive law or property).
- As before, learners do not need to know the terms inverse operations or distributive law, but they do need to know how to apply these properties.

Say: **Today we are practising and learning more facts about working about operations.**

Activity 1: Learners work on their own

- Say: **Work on your own to do Activity 1 in the LAB.**

Work on your own

1 Complete the flow diagrams.

a

8	→	(1)
24	→	(3)
32	÷ 8 →	(4)
48	→	(6)
56	→	(7)
72	→	(9)

b

1	→	(8)
3	→	(24)
4	× 8 →	(32)
6	→	(48)
7	→	(56)
9	→	(72)
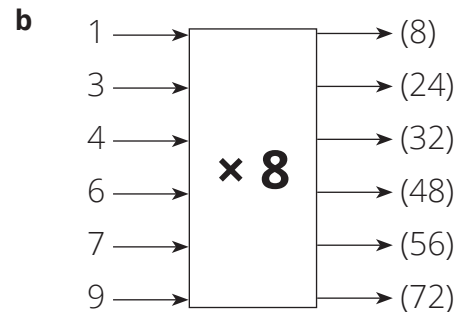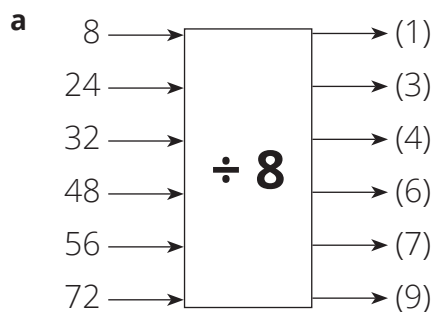
2 Can you use multiplication to check division? Give a reason for your answer.
(Yes. Multiplication and division are opposite operations.
Multiplication 'undoes' division and division 'undoes' multiplication.)

3 Can you use division to check multiplication? Give a reason for your answer.
(Yes. Multiplication and division are opposite operations.
Division 'undoes' multiplication and multiplication 'undoes' division)

4 Draw a flow diagram to show all of these multiplication calculations:

1×10 $\qquad$ 4×10 $\qquad$ 7×10 $\qquad$ 8×10 $\qquad$ 10×10

ANSWER
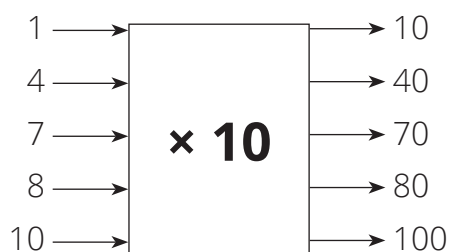
Activity 2: Learners work in pairs

- Say: **Work with a partner to do Activity 2 in the LAB.**

- Say: **Remember that you are working with a partner so that you can discuss your ideas and answers.**

- Walk around the classroom to assist as necessary. The answers are given below.

Work with a partner

Investigate whether the order of calculation makes a difference when multiplying and adding numbers.

1 Complete the two flow diagrams
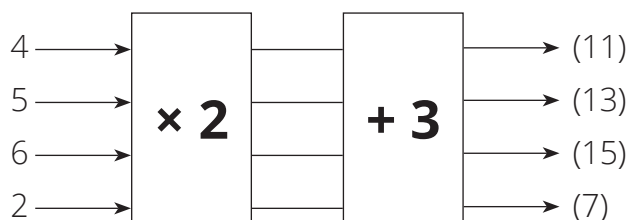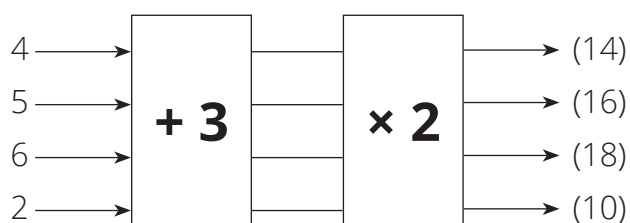
2 In this table, write two number sentences for each input number on the two flow diagrams.

Input Number	Number sentences
4	$(4 + 3) \times 2 = 7 \times 2 = 14$ and $(4 \times 2) + 3 = 8 + 3 = 11$
5	$[(5 + 3) \times 2 = 8 \times 2 = 16$ and $(5 \times 2) + 3 = 10 + 3 = 13]$
6	$[(6 + 3) \times 2 = 9 \times 2 = 18$ and $(6 \times 2) + 3 = 12 + 3 = 15]$
2	$[(2 + 3) \times 2 = 5 \times 2 = 10$ and $(2 \times 2) + 3 = 4 + 3 = 7]$

3 Study the two flow diagrams.

    a Does each flow diagram have the same input numbers? (Yes)

    b Are the output numbers the same? (No)

    c Give a reason for you getting your answer to b).
    (Adding 3 and then multiplying by 2 does not give the same answers as first multiplying by 2 and then adding 3.

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

One dog has 4 legs, 2 dogs have eight legs.

How many legs do 5 dogs have?

1 Complete the flow diagram and then the table to show the first 5 numbers in this numeric pattern.


```
1 ──────►  (4)
2 ──────►  (8)
3 ──  (× 4)  ──►  (12)
4 ──────►  (16)
5 ──────►  (20)
```
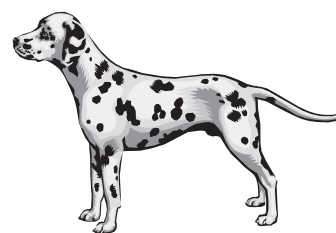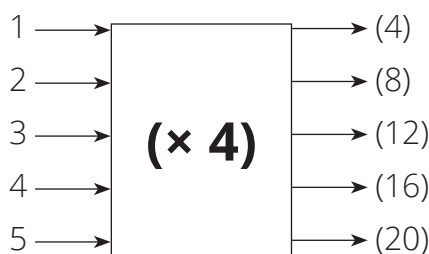
Rule: × 4					
Number of dogs	1	2	3	4	5
Number of legs	(4)	(8)	(12)	(16)	(20)

2 Write down the first 5 numbers in the numeric pattern formed by the output numbers.
(4; 8; 12; 16; 20)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **we can use multiplication to check division**
- **we can use division to check multiplication**
- **when working with addition and multiplication, the order in which we do the operations affects the final answer.**

UNIT 5

Lesson 42: Tables, flow diagrams and numeric patterns

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Numeric patterns (pp 137 – 139, 189 – 191)
Lesson Objective: Learners will be able to multiply units or ones by multiples of 100 and 1 000 and will be able use the rule to create numeric patterns where there is a constant difference.
Lesson Vocabulary: flow diagram, input number, output number
Teacher and Learner Resources: None
Date: Week   Day

1   MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$3 + 2 \times 6 =$	15	**6**	$4 \times (5 - 2) =$	12
2	$(3 + 2) \times 6 =$	30	**7**	$2 \times 5 + 2 =$	12
3	$7 - 3 \times 2 =$	1	**8**	$2 \times (5 + 2) =$	14
4	$(7 - 3) \times 2 =$	8	**9**	$1 + 3 \times 3 =$	10
5	$4 \times 5 - 2 =$	18	**10**	$(1 + 3) \times 3 =$	12

2   LINK TO PREVIOUS LESSON (5 MINUTES)

- Refer learners to the activity in the LAB. Answers are given below.

Work on your own and with a partner.

1   Complete the flow diagram on your own.
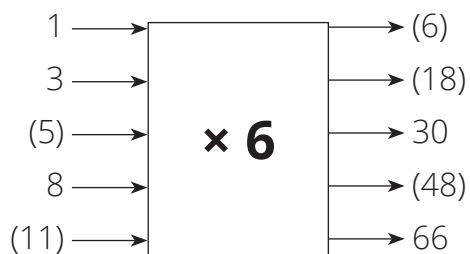
2   Work with your partner. Write down how you work out the missing input numbers in the flow diagram.
(We find the output numbers by multiplying the input numbers by 6.
So, we find the input numbers by dividing the output numbers by 6.
Division is the inverse of multiplication.
So, to find the value of ☐ in ☐ × 6 = 30, we calculate 30 ÷ 6 = 5)

---

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 41 are provided in Lesson 41.

Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:
- We use flow diagrams to help learners develop a technique for multiplying ones by multiples of 100 and 1 000. The use of carefully selected flow diagrams will help learners to see that it is sometimes useful to split the rule.
- Learners will also use flow diagrams and tables to help them find the missing rule in patterns in which there is a *constant difference*. In numeric patterns which have a constant difference, the same number is added or subtracted to form the numeric pattern. According to CAPS, learners should be given examples of numeric patterns which do not start with a multiple of the number they are adding or subtracting from. Examples meet this requirement.
- In the next lesson we will work with numeric patterns involving a *constant ratio*.

Say: **Today we will look for more ways of making some calculations easier. We will also practice finding the rule for different numeric patterns.**

Activity 1: Learners work in pairs

- Say: **Work with a partner to do Activity 1 in the LAB.**

- Walk around the classroom and support learners as necessary. Do not rush to tell learners the answers. Give them time to think, and to discuss with their partner.
- Give learners time to do question 1, then go through it with learners before they do question 2.

Work with a partner

1   Complete these two flow diagrams.

$$
\begin{array}{lcl}
3 & & 1\ 200 \\
4 & & (1\ 600) \\
(7) & \times\ \mathbf{400} & 2\ 800 \\
8 & & (3\ 200) \\
10 & & (4\ 000) \\
\end{array}
$$
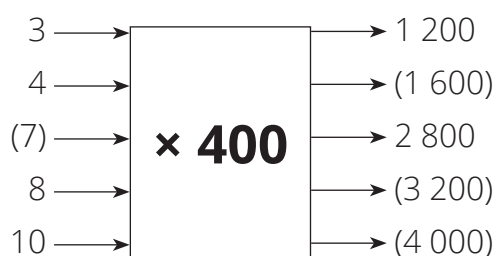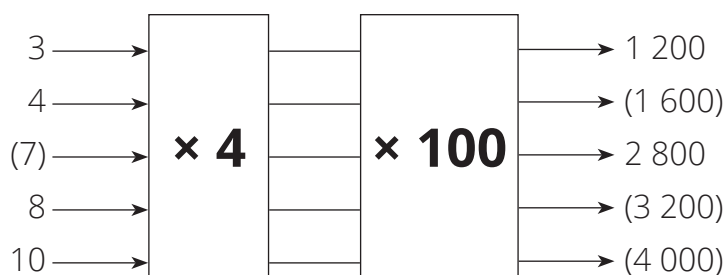
2 What do you notice about the input numbers and the output numbers in each flow diagram?
(The input numbers and the output numbers are the same in each flow diagram)

3 The rules in the two flow diagrams are different. Explain what the difference is between the two.
(In the first flow diagram the rule is to multiply by 400.
In the second flow diagram, there is a two-part rule: first multiply by 4 and then multiply by 100)

4 Which is easier:
- To multiply 12 by 400?
- To multiply 12 first by 4, and then multiplying the answer by 100?
(It is easier to first multiply 12 by 4 to get 48, and to then multiply 48 by 100 to get 4 800.)

5 **a** Fill in the two-step rule on the flow diagram to show an easy way to multiply by 4 000.
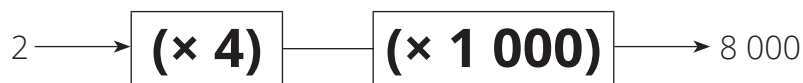
b Write, in your own words, an easy way to multiply by 4 000.
(Multiply by 4, which is easy because it is a single-digit number, and then multiply by 1 000)

Activity 2: Whole class activity and learners work in pairs

- Refer learners to Activity 2 in the LAB. They will work with you and with a partner. The answers are given in brackets.

WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	Work with your whole class and with your partner.

Say: **Let's use a rule and a table to create and work with some numeric patterns.**

Input numbers	Rule and output number
1	$(1 \times 3) + 2 = 5$
3	$[(3 \times 3) + 2 = 11]$
5	$[(5 \times 3) + 2 = 17]$
7	$[(7 \times 3) + 2 = 23]$
9	$[(9 \times 3) + 2 = 29]$
11	$[(11 \times 3) + 2 = 35]$

Show learners how to 'hop' from one input number to the next and to check:
- whether the hops are constant and whether the numbers are increasing (add) or decreasing (subtract)
- the 'size' of each hop.

1 a List the input numbers given in the table.
(1, 3, 5, 7, 9, 11)

b The input numbers form a number pattern.
Describe the rule you can use to write the numbers in the number pattern.
(Add 2 onto the first number to get the second number, and so on.)

- Confirm with learners that the '1' in the number sentence of the first output comes from the input number.
- Work through the calculation of the first output number with the learners.

2 The rule that is used to find the output numbers is:
(Input number $\times$ 3) + 2 = Output number

Use the rule to calculate the rest of the output numbers on the table. (See table for answers)

Confirm that the learners how to 'hop' from one input number to the next and to check:
- whether the hops are constant and whether the numbers are increasing (add) or decreasing (subtract)
- the 'size' of each hop.

3 a List the output numbers you calculated in the table.
(5; 11; 17; 23; 29; 35)

b The output numbers form a number pattern.
Complete the sentence to describe the rule you can use to write the numbers in the number pattern.
To get the next output number, you (add 6) to the previous number.

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WHAT YOU DO	WHAT THE LEARNERS HAVE IN THEIR LABS (Answers are given in brackets)
	c Write the next three numbers in the numeric pattern. (35 + 6 = 41; 41 + 6 = 47; 47 + 6 = 53)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do. Answers are given in brackets.

Use this table to answer the questions.

Rule: (Input number + 2) × 5 = Output number						
Input number	1	2	3	4	5	6
Output number	(1 + 2) × 5 = 15	(2 + 2) × 5 = 20	(3 + 2) × 5 = 25	(4 + 2) × 5 = 30	(5 + 2) × 5 = 35	(6 + 2) × 5 = 40

1 Write the input numbers as a numeric pattern and write the next three numbers in the numeric pattern.
(The numeric pattern is 1; 2; 3; 4; 5; 6. The next three numbers are 7; 8; 9)

2 Write the output numbers in the table as a numeric pattern.
(The numeric pattern is 15; 20; 25; 30; 35; 40)

3 Describe the numeric pattern formed by the output numbers.
(The numeric pattern starts at 15 and 5 is added each time to find the next number.)

4 Write down the next three numbers in the numeric pattern formed by the output numbers.
((7 + 2) × 5 = 9 × 5 = 45; (8 + 2) × 5 = 10 × 5 = 50; (9 + 2) × 5 = 11 × 5 = 55
OR 40 + 4 = 45; 45 + 5 = 50; 50 + 5 = 55)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **an easy way to multiply by a multiple of 10, 100, or 1 000 is to split the calculation into two steps. First multiply by a single-digit number, then multiply by 10, 100 or 1 000**
- **we can work out the rule in numeric patterns by checking whether the 'hops' are constant. We also need to know whether the numbers are increasing (add) or decreasing (subtract), and also, we need to know the 'size' of each hop.**

Lesson 43: More numeric patterns

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Numeric patterns (pp 137 – 139, 189 – 191)
Lesson Objective: Learners will be able to work with numeric patterns in which there is a constant ratio and with patterns which do not have a constant difference or a constant ratio.
Lesson Vocabulary: operation, flow diagram
Teacher and Learner Resources: None
Date: Week Day

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$2 + 0 \times 3 =$	2	**6**	$8 \times (1 + 4) =$	40
2	$(2 + 0) \times 3 =$	6	**7**	$6 + 3 \times 2 =$	12
3	$8 - 4 \times 1 =$	4	**8**	$(6 + 3) \times 2 =$	18
4	$(8 - 4) \times 1 =$	4	**9**	$1 + 1 \times 1 =$	2
5	$8 \times 1 + 4 =$	12	**10**	$(1 + 1) \times 1 =$	2

UNIT 5

2 LINK TO PREVIOUS LESSON (10 MINUTES)

- Refer learners to the activity in the LAB.

Find the rule and then write the next four numbers in each numeric pattern.

1 1; 4; 7; 10; …
Rule: (Add 3 or + 3)
Next four numbers in the pattern: (13; 16; 19; 22)

2 301; 304; 307; …
Rule: (Add 3 or + 3)
Next four numbers in the pattern: (310; 313; 316; 319)

3 469; 464; 459; …
Rule: (subtract 5 or – 5)
Next four numbers in the pattern: (454; 449; 444; 439)

4 187; 166; 145; …
Rule: (Subtract 21 or – 21)
Next four numbers in the pattern: (124; 103; 82; 61)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 42 are provided in Lesson 42.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER:
- In this lesson, the learners work with numeric patterns in which there is a constant ratio, as well as with patterns that have neither a constant difference nor a constant ratio.
- In numeric patterns which have a constant ratio, each number is multiplied or divided by the same number to form the numeric pattern. Examples of numeric patterns with a constant ratio are those formed by doubling (×2) and halving (÷2).

Say: **Today we are learning to work with numeric patterns in which the numbers do not increase or decrease by the same amount.**

Activity 1: Learners work in pairs

- Say: **Not all numeric patterns increase or decrease by the same amount. In Activity 1 we are going to look at some different numeric patterns.**

- Say: **Work with a partner to do Activity 1 in the LAB.**

- Walk around the classroom to support learners as required. The answers are given below.

Work with a partner

What is the rule?

Use the input numbers and the output numbers to work out the rule in each flow diagram.

1

2 →		→ 1
4 →		→ 2
6 →	**(halve or ÷ 2)**	→ 3
8 →		→ 4
10 →		→ 5
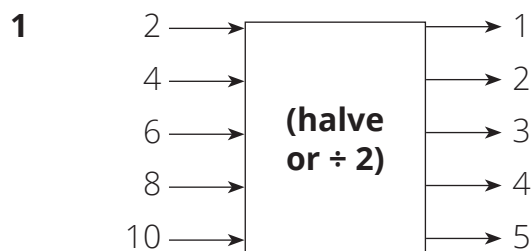
(NOTE: If the pairs try only addition or subtraction, let them continue for a while. If majority of the pairs don't find the rule give them a hint. Tell them that the rule does not involve the operations of addition or subtraction.)

2

```
5  ─────→  ┌──────────┐  ─────→  10
6  ─────→  │          │  ─────→  12
7  ─────→  │ (double  │  ─────→  14
8  ─────→  │  or × 2) │  ─────→  16
9  ─────→  └──────────┘  ─────→  18
```
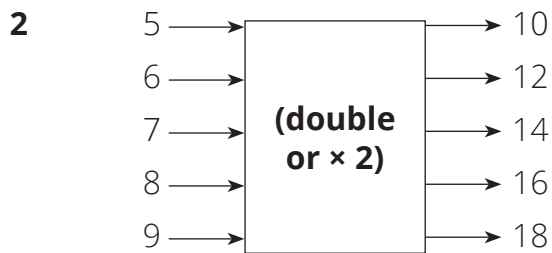
Activity 2: Learners work on their own

- Say: **Let's look at some more numeric patterns.**
- Say: **Work on your own to do Activity 2 in the LAB.**

- Walk around the classroom to support learners as required. The answers are given below.

- Once you have marked Activity 2, ask the learners: **What is the difference between the answers to questions 2 and 3.**
  (In question 2, we focused on only output numbers and found a rule between each number, but in Question 3 we compared input numbers and output numbers and could see another rule between input and output numbers.)

Work on your own

1 Work out the rule and then write the next three numbers in the numeric pattern.

  a. 1 600; 800; 400; …
  Rule: (Halve or divide by 2 or ÷ 2)
  Next three numbers in the numeric pattern: (200; 100; 50)

  b. 3; 6; 12; …
  Rule: (Double or multiply by 2 or × 2)
  Next three numbers in the numeric pattern: (24; 48; 96)

  c. 1; 3; 9; 27; …
  Rule: (Multiply by 3 or × 3)
  Next three numbers in the numeric pattern: (81; 243; 729)

2 Consider the numeric pattern 1; 4; 9; 16; 25; …

    a Investigate the pattern by finding the difference between each number in the pattern.
       4 – 1 = (3)
       9 – 4 = (5)
       16 – 9 = (7)
       25 – 16 = (9)

    b What is the rule?
       (Add 3; add 5; add 7; add 9; and so on. Add 2 more than the number that was added to the previous number)

    c Write the next three numbers in the numeric pattern: (36; 49; 64)

3 Investigate another rule for the number pattern 1; 4; 9; 16; 25; …

    a Complete the following: $1 \times 1 = (1)$
                           $2 \times 2 = (4)$
                           $3 \times 3 = (9)$
                           $4 \times 4 = (16)$
                           $5 \times 5 = (25)$

    b Give another rule: (The numbers 1, 2, 3, 4 and 5 are each multiplied by itself)

    c Draw a table to investigate the pattern in output numbers.

Input number	1	2	3	4	5	6	7	8
Output number	1	4	9	16	25	(36)	(49)	(64)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

For each of the following, work out the rule and then write the next four numbers in the numeric pattern.

1 1; 2; 4; 8; 16; …

Rule: (Start with 1 and then double each number to get the next number or × 2)

Next four numbers in the pattern: (32; 64; 128; 256)

2 512; 256; 128; 64; (32; …

Rule: (Start with 512 and then halve each number to get the next number or ÷ 2)

Next four numbers in the pattern: (32; 16; 8; 4)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt to work with numeric patterns that do not increase or decrease by the same amount from one number to the next. We know that we can use the rule for the numeric pattern to work out the next numbers in the pattern.**

UNIT 5

Lesson 44: Graphs to show a relationship

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Numeric patterns (pp 137 – 139, 189 – 191)
Lesson Objective: Learners will be able to draw and interpret a line graph that shows a relationship.
Lesson Vocabulary: line graph, volume, mass, interval, horizontal axis, vertical axis
Teacher Resources: A3 poster: *Graph showing the relationship between the volume of water and its mass*; Prestik/Bostik.
Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$7 - 2 \times 3 =$	1	**6**	$5 \times (4 + 2) =$	30
2	$(7 - 2) \times 3 =$	15	**7**	$5 \times 4 - 2 =$	18
3	$7 + 2 \times 3 =$	13	**8**	$5 \times (4 - 2) =$	10
4	$(7 + 2) \times 3 =$	27	**9**	$9 - 1 \times 9 =$	0
5	$5 \times 4 + 2 =$	22	**10**	$(9 - 1) \times 9 =$	72

2 LINK TO PREVIOUS LESSON (5 MINUTES)

Refer learners to the activity in the LAB.

Look at the numeric pattern 1; 2; 4; 7; 11; 16; …

1 Complete the following:
   $1 + (1) = 2$
   $2 + (2) = 4$
   $4 + (3) = 7$
   $7 + (4) = 11$
   $11 + (5) = 16$

2 Describe the rule that we can use to make the numeric pattern.
   (Start with 1, then add 1; add 2; add 3; add 4; add 5)

3 Continue the pattern for four more numbers.
   $(16 + 6 = 22;$
   $22 + 7 = 29;$
   $29 + 8 = 37)$

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 43 are provided in Lesson 43.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   LESSON CONTENT – CONCEPT DEVELOPMENT (40 MINUTES)

NOTE TO THE TEACHER:
- Straight line graphs (or line graphs) are a particularly effective way of showing change.
- In this lesson, learners draw and interpret a line graph that shows the change in mass that occurs when the volume of water in a bucket is changed.
- In this lesson learners will build on their knowledge of line graphs from Unit 4.

Say: **Today we will draw a straight line graph to show the relationship between water volume and total mass. We will use the table and the graph to answer questions.**

Activity 1: Whole class activity and learners work on their own

- Say: **We are now going to draw our own line graph**.

- Tell learners to turn to Activity 1 in the LAB.
- This activity should be done together – with each learner filling in the answers in their own LAB.
- Work step-by-step with the learners.
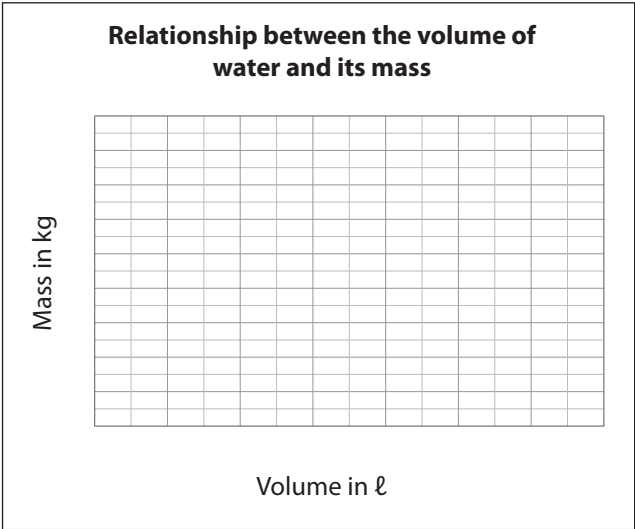
	SOLUTIONS
Work on your own and with the rest of the class. **These buckets can be filled with water and are very easy to use.** A Grade 5 class found that the mass of the bucket was 1,5 kg. They put one litre of water in the bucket and measured the mass of the water and the bucket. They then added another litre of water and measured the mass again. They recorded the information in this table:	

									SOLUTIONS
Water volume (in ℓ)	0	1	2	3	4	5	6	7	
Mass (in kg)	1,5	2,5	3,5	4,5	5,5	6,5	7,5	8,5	

1 What does the information in the table tell us?
(That as the amount of water in the bucket increases, the mass increases.)

2 The Grade 5 class drew a graph.

Relationship between the volume of water and its mass

Mass in kg
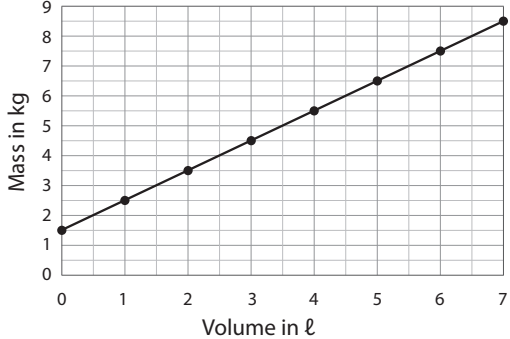
Volume in ℓ

a What is the title of the graph?
(Relationship between the volume of water and its mass)

b On which axis do we record the volume in litres?
(The horizontal axis)

c On which axis do we record the mass in kilograms?
(The vertical axis)

	SOLUTIONS

3 Study the table.

a What is the smallest volume?
(0 litres)

b What is the biggest volume?
(7 litres)

c What is the interval between
the volumes?
(1 litres)

The graph with the units filled in:

Relationship between the volume of water and its mass

Mass in kg (y-axis, 0 to 9)
Volume in ℓ (x-axis, 0 to 7)

4 Fill in the volume units, starting at 0 on
the graph.

5 Study the table again.

a What is the smallest mass?
(1,5 kg)

b What is the biggest mass?
(8,5 kg)

c What is the interval between
the volumes?
(1 kg)

6 Fill in the mass units starting at 0 and
going up in 1s on the graph.

7 a Find the vertical line for 1 litre.
Move your finger up the line for
l litre until you cross the horizontal
line for 2,5 kg.
Make a dot where the 1 litre line
and the 2,5 kg line cross.

b Find the vertical line for 2 litres.
Move your finger up the line for
2 litres until you cross the
horizontal line for 3,5 kg.
Make a dot where the 2 litre line
and the 3,5 kg line cross.

The graph with the points plotted

Relationship between the volume of water and its mass

Mass in kg (y-axis, 0 to 9)
Volume in ℓ (x-axis, 0 to 7)

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	SOLUTIONS
c Find the vertical line for 0 litres. Move your finger up the line for 0 litres until you cross the horizontal line for 1,5 kg. Make a dot where the 0 litre line and the 1,5 kg line cross. **d** Now draw the dots for 3 ℓ, 4 ℓ, 5 ℓ, 6 ℓ and 7 ℓ. **8** Use a ruler and draw a line to connect the dots in order. **9** What type of graph have you drawn? (A straight line graph)	The graph with the line drawn: **Relationship between the volume of water and its mass** Mass in kg (vertical axis: 0–9) Volume in ℓ (horizontal axis: 0–7) Stick the A3 poster: *Graph showing the relationship between the volume of water and its mass* on the board. Say: **This is what your graph should look like.**

Activity 2: Learners work in pairs

- Say: **Work with a partner to do Activity 2 in the LAB.**
  In this activity you will answer questions based on the table and the graph you drew in Activity 1.

Work with a partner

Here is the graph you drew in Activity 1.
Look at the graph and answer the questions.

Relationship between the volume of water and its mass

Mass in kg (y-axis, 0 to 9)
Volume in ℓ (x-axis, 0 to 7)
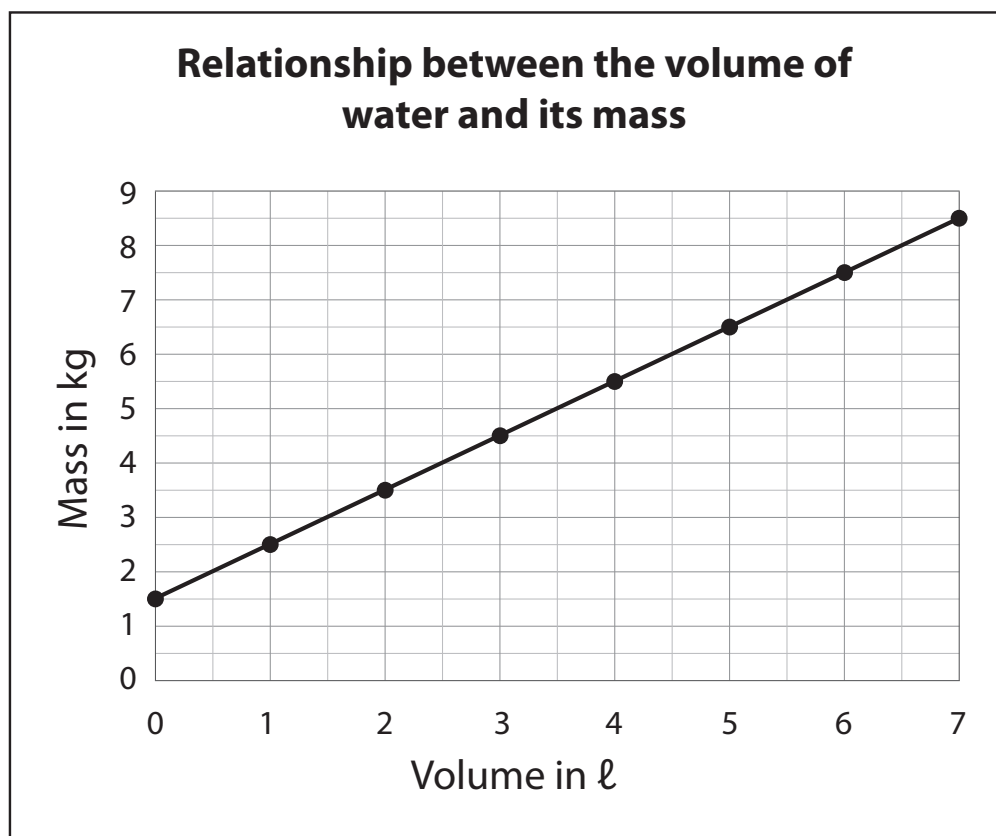
1 What was the total mass, in kg, when:
   a There were 4 litres of water in the bucket? (5,5 kg)
   b There were 5 litres of water in the bucket? (6,5 kg)

2 What will the volume of water in the bucket be when the total mass is:
   a 3,5 kg? (2 litres)
   b 7,5 kg? (6 litres)

3 Now answer these:
   a What will the mass be when there are 4,5 litres of water in the bucket? (6 kg)
   b What will the volume be when the total mass is 4 kg? (2,5 litre)

4 What is the mass of the empty bucket? (1,5 kg)

5 HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers are given in brackets.

Molly sells vetkoek in her spaza shop.

She drew a graph to show the cost of the vetkoek.

Relationship between the number of vetkoek bought and the cost
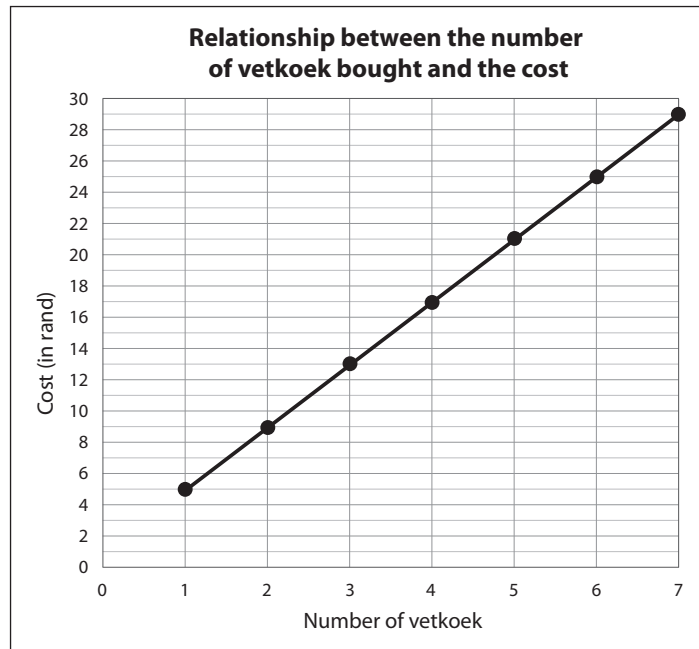
1 What is the cost, in rand, of:

    a 10 vetkoek? (R30)

    b 20 vetkoek? (R60)

    c 25 vetkoek? (R75)

    d 45 vetkoek? (R135)

2 Use the information given to work out the cost of 1 vetkoek.

    (Ten vetkoek cost R30, so 1 vetkoek must cost $\frac{R30}{10}$ = R3)

---

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **we can use information given in a table to draw a line graph.**
- **if the line is straight, we can use information from a table and a graph to answer and estimate information.**

Lesson 45: Graphs to show a relationship (2)

Teacher's notes
This lesson is one of the fully planned lessons to be used to cover the Term 1 curriculum.
CAPS topics: Numeric patterns (pp 137 – 139, 189 – 191)
Lesson Objective: Learners will be able to use data from a table or flow diagram to draw and interpret a line graph that shows a relationship.
Lesson Vocabulary: flow diagram, line graph, vertical axis, horizontal axis, input number, output number, rule
Teacher and Learner Resources: None

Date:	Week	Day

1 MENTAL MATHS (5 MINUTES)

		Answer			Answer
1	$9 - 2 \times 3$	3	**6**	$6 \times (2 - 1)$	6
2	$(9 - 2) \times 3$	21	**7**	$4 + 3 - 2$	5
3	$6 \times 2 + 1$	13	**8**	$4 + (3 - 2)$	5
4	$6 \times (2 + 1)$	18	**9**	$8 - 2 \times 3$	2
5	$6 \times 2 - 1$	11	**10**	$(8 - 2) \times 3$	18

2 LINK TO PREVIOUS LESSON (10 MINUTES)

Refer learners to the activity in the LAB.

Adam sells plants in a box at the local market.

He works out the costs of the plants and boxes.

Number of plants sold	1	2	3	4	5	6	7
Cost in rand	7	12	17	22	27	32	37

He draws a graph which he can use to easily work out what he should charge.

Relationship between the number of plants sold and the cost
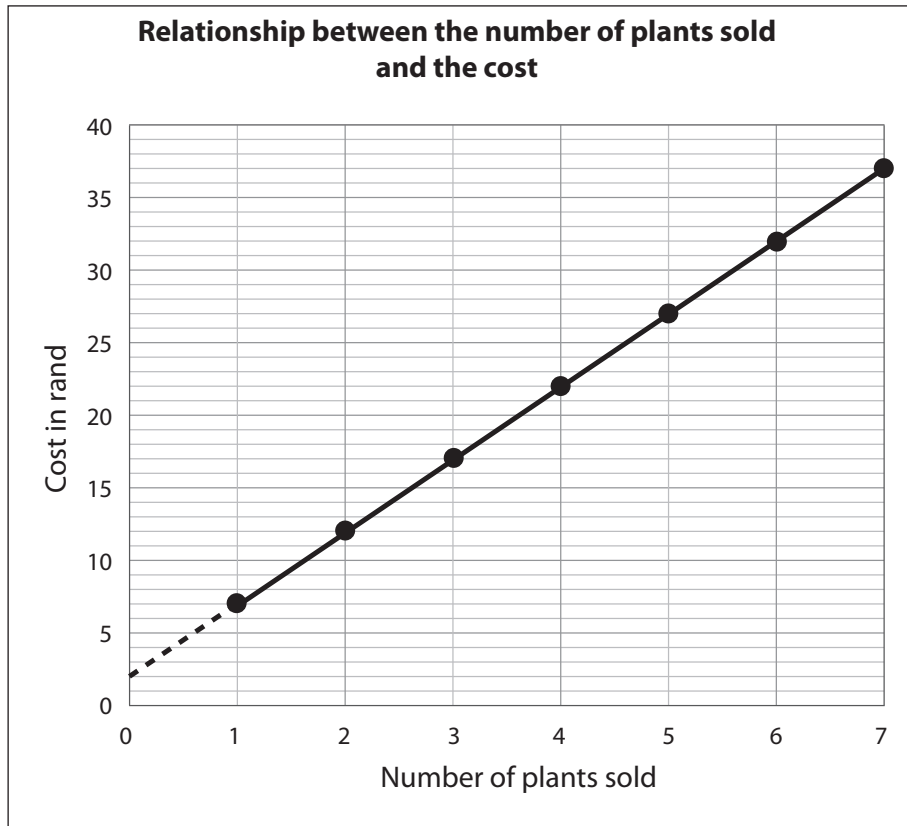
1   What will the cost be
    a   of 3 plants? (R17)
    b   of 7 plants? (R37)

2   How many plants would you get if you paid
    a   R7? (1 plant)
    b   R27? (5 plants)

3   What is the cost of the box that Adam places the plants in?
    Explain how you got your answer.
    (Extend the straight line to the left until it crosses the vertical axis. It cuts the vertical axis at R2, so the cost of the box is R2.)

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 44 are provided in Lesson 44.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4 LESSON CONTENT – CONCEPT DEVELOPMENT (35 MINUTES)

NOTE TO THE TEACHER:
- This lesson builds on the concepts developed in Lesson 44. Learners draw and interpret a line graph to show a relationship.
- In this lesson, learners get the data for drawing the graphs from a table and from a flow diagram.

Say: **Today we will draw a line graph to show a relationship. We will use information from a flow diagram and a table to draw the graph. We will answer questions based on flow diagrams, tables and graphs.**

Activity 1: Learners work in pairs

- Say: **Work with a partner to do Activity 1 in the LAB.**
- Walk around the classroom to support learners as necessary. The answers are given below.

Work with a partner.

Molly sells vetkoek for R4 each. She puts all the vetkoek she sells in a packet (which can hold up to 7 vetkoek). The packets cost R1 each.
Molly needs to calculate how much she will earn when she sells her packets of vetkoek.

1 Let's find the rule she can use for her calculations.

    a How much does a packet of 7 vetkoek cost?
       Write down the calculation and the answer. ($7 \times$ R4 + R1 = R29)

    b How much does a packet of 3 vetkoek cost?
       Write down the calculation and the answer. ($3 \times$ R4 + R1 = R13)

    c Which numbers in the calculation can change and which numbers don't change?
       (The number of vetkoek in a packet can change.
       The price of each vetkoek is R4 and that can't change.
       The cost of the packet is R1, and that can't change.)

    d What is the rule she can use to calculate how much she can earn for her packets of vetkoek?
       (The rule is $\times$ R4 and + R1)

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2 Now you know the rule. Complete the table.

Rule: multiply by 4 and then add 1							
Number of vetkoek in a packet	1	2	3	4	5	6	7
Amount earned (in rand)	(5)	(9)	(13)	(17)	(21)	(25)	(29)

3 We can also draw a flow diagram which Molly can use to work out how much she will earn.

First fill in the rule on the flow diagram and then fill in the output numbers.
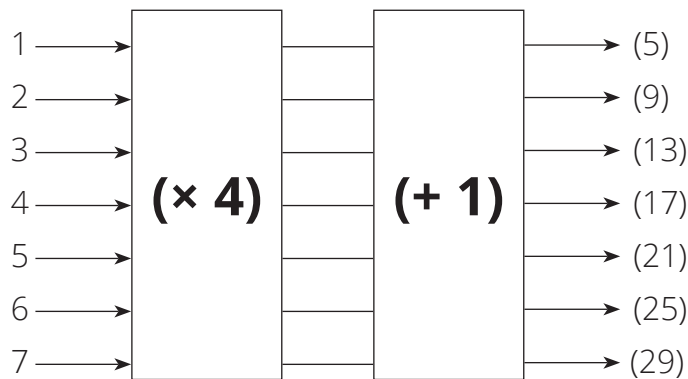
```
1 ──────►          │        │  ──────► (5)
2 ──────►          │        │  ──────► (9)
3 ──────►          │        │  ──────► (13)
4 ──────►  (× 4)   │ (+ 1)  │  ──────► (17)
5 ──────►          │        │  ──────► (21)
6 ──────►          │        │  ──────► (25)
7 ──────►          │        │  ──────► (29)
```

Activity 2: Learners work on their own

• Say: **Work on your own to do Activity 2 in the LAB.**

• Walk around the classroom to assist learners who are struggling to draw the graph.

Work on your own

1 Use the information from the flow diagram or the table in Activity 1 to draw a graph showing the relationship between the number of vetkoek in a packet and the amount of money earned in rand on the grid below.

Do this by:
a Filling in the labels on the horizontal axis and on the vertical axis.
b Filling in the units on the horizontal axis and on the vertical axis.
c Plotting the points on the graph.
d Drawing a line to connect the dots in order.

Relationship between the number of vetkoek bought and the cost
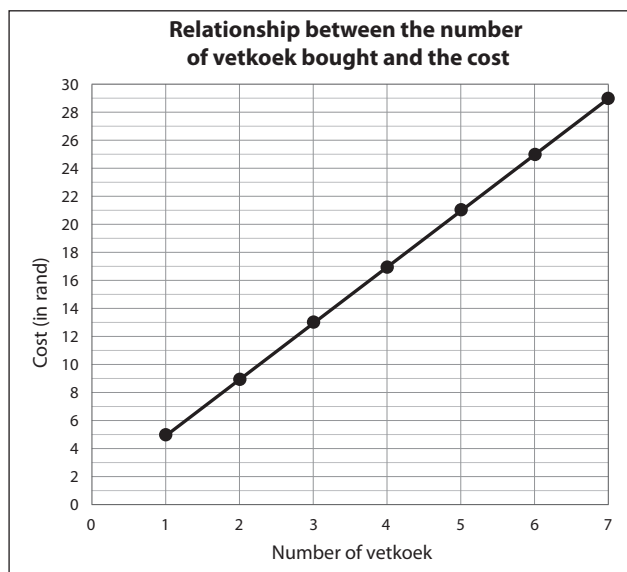
2   Use the graph to find Molly's earnings when:
    a   There are 2 vetkoek in a packet? (R9)
    b   There are 5 vetkoek in a packet? (R21)

3   How many vetkoek will be in the packet when Molly's earnings are:
    a   R13? (3)
    b   R29? (7)

5   HOMEWORK ACTIVITY (5 MINUTES)

- Explain what learners need to do for homework.
- Read the question in the LAB with learners. Make sure all the learners understand what to do.
- Answers in brackets.

1   Write the rule in the flow diagram to represent the data in the table:

Input number	2	4	6	8	10	12
Output number	10	14	18	22	26	30
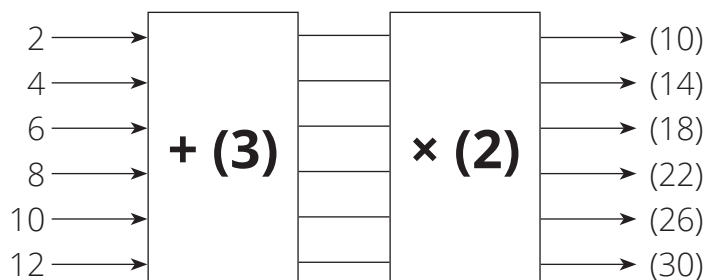
> **2** Use the rule to find the following:
>
> **a** When the input number is 7, what will the output number be? (20)
>
> **b** When the output number is 36, the input number is (15)

6 REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have learnt that:**
- **We can draw a line graph to show a relationship.**
- **We can use information from a flow diagram and a table to draw a graph.**
- **We can answer questions based on flow diagrams, tables and graphs.**

Lesson 46: Consolidation

Teacher's notes
This lesson allows for the consolidation of numeric patterns and line graphs.
CAPS topics: Numeric patterns (pp 137 – 139, 189 – 191)
Lesson Objective: Learners will consolidate their knowledge of tables, flow diagrams, numeric patterns and line graphs that show the relationships between two numbers.
Lesson Vocabulary: flow diagram, line graph, vertical axis, horizontal axis, data, input number, output number, rule
Resources: Grade 5 learners' books and teacher's guides as available.

Date:	Week	Day

1   NOTES FOR THE TEACHER RELATING TO THIS WEEK'S WORK

The main topic in this unit was numeric patterns.

2. POSSIBLE MISCONCEPTIONS LINKED TO THE UNIT'S WORK

- While most learners are able to apply the rule to get the output numbers, some learners struggle to find the rule. Remind learners that the rule is what we apply to the input numbers to get the output numbers.
- Many learners find it difficult to identify two stage rules. They need to try several combinations until they find one that works.

3   CORRECT HOMEWORK ACTIVITY (5 MINUTES)

The answers to the Homework Activity for Lesson 45 are provided in Lesson 45.
Use this time to purposefully address gaps in learners' knowledge and to identify and address learner errors.

4   CLASSWORK

Today we are going over what we learned in Lessons 40 to 45. We will practise tables, flow diagrams, numeric patterns and line graphs that show change.

- You could use this time for learners to complete classwork or homework activities as necessary.
- You could use the Additional Activities from textbooks that you have or use the Consolidation Activity given.

UNIT 5

Additional activities for consolidation

Refer to the following table. Select additional activities from the textbook/s you have.
Use the answers given in the Teacher's Guide to mark the work.

	Fabulous	Oxford Headstart	Oxford Successful	Platinum	Premier	Sasol Inzalo	Solutions for All	Study & Master	Vivlia
LB	42-48	43-49	31-34	17-20	20-27	46-54	21-27	24-25	15-20
	128-131	159-162	139-142	88-91	114-117	176-180	132-139	144-145	107-110
	193-198	237-239	214-219	146-148	175-181	264-268	228-236	234-236	176-180
	249-253	317-319	285-286	194-197	232-233	338-341	302-305	306-312	239-240
TG	29-33	53-58	53-56	17-19	15-19	48-58	16-20	24-31	15-19
	94-97	159-162	124-126	72-74	77-78	191-196	103-109	143-145	60
	146-150	233-236	169-172	120-123	116-120	291-296	190-197	234-244	91-94
	194-197	304-307	216-217	163-165	158-159	378-382	253-256	308-312	122-125

OR, learners could complete the Consolidation Activity in their LAB.

Consolidation Activity

Work on your own

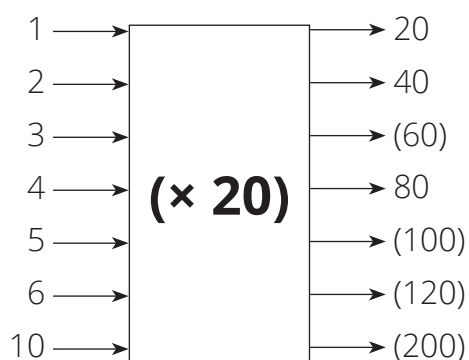**1 a** Fill in the output numbers on these two flow diagrams.
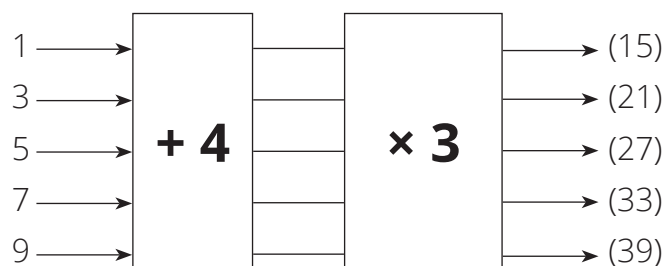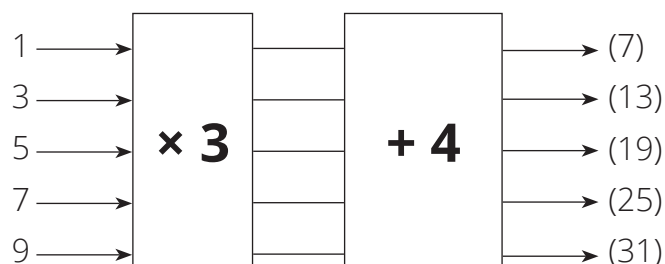
b Are the output numbers the same in both flow diagrams? (No)
c What do you notice about the two-step rules in the flow diagrams?
(The input numbers are the same, but when we swap the order of operations, the output numbers are different.)
d If you are adding and multiplying, can you change the order? (No)

2 Use the given numbers in the table to work out the rule.
(Output number = input number × 20)

1	2	3	4	5	6	10
20	40	(60)	80	(100)	(120)	(200)

a Use the rule to fill in the missing output numbers on the table.

b A flow diagram is drawn to represent the numbers in the table.
Complete the flow diagram.

1 ⟶ ⟶ 20
2 ⟶ ⟶ 40
3 ⟶ ⟶ (60)
4 ⟶ **(× 20)** ⟶ 80
5 ⟶ ⟶ (100)
6 ⟶ ⟶ (120)
10 ⟶ ⟶ (200)

3 a Use the given numbers in the table to complete the rule:
Output number = Input number × (4) + 1

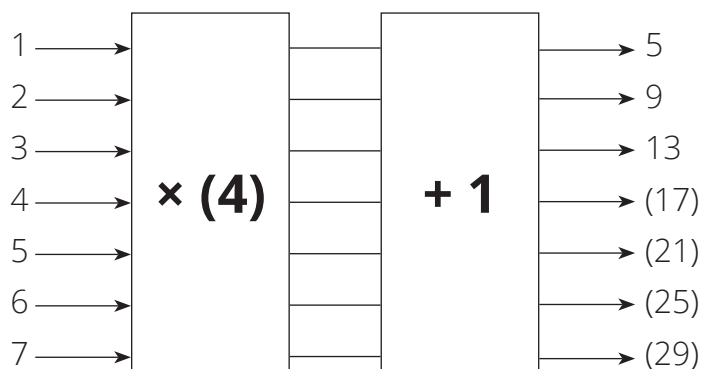| 1	2	3	4	5	6	7
5	9	13	(17)	(21)	(25)	(29)

b Use the rule to fill in the missing output numbers on the table.

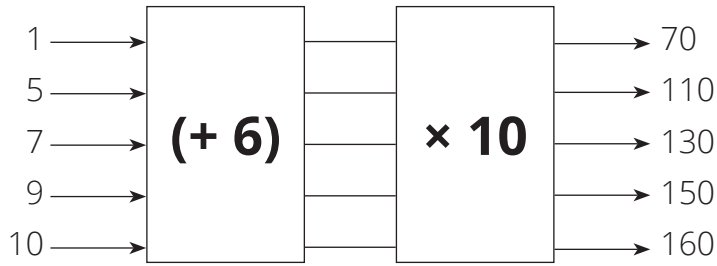**c** A flow diagram is drawn to represent the numbers in the table.
Complete the flow diagram.

1 ⟶ ⟶ 5
2 ⟶ ⟶ 9
3 ⟶ ⟶ 13
4 ⟶ **× (4)** **+ 1** ⟶ (17)
5 ⟶ ⟶ (21)
6 ⟶ ⟶ (25)
7 ⟶ ⟶ (29)

UNIT 5

4 Fill in the missing rule on the flow diagram.

Input	(+ 6)	× 10	Output
1			70
5			110
7			130
9			150
10			160

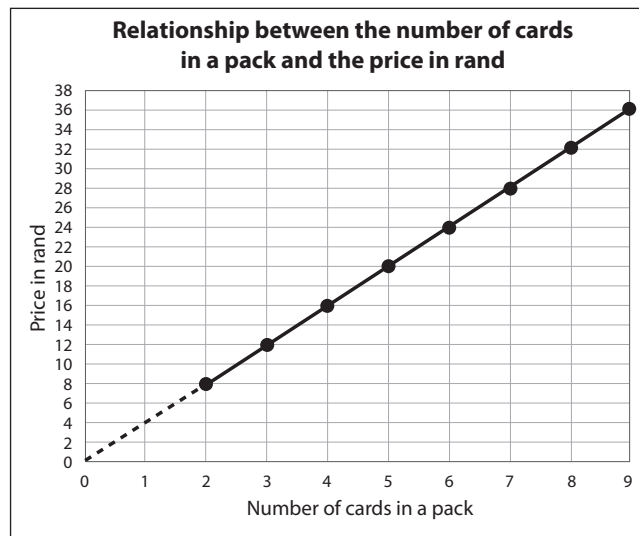**5** The bookshop sells Birthday cards in packs with different numbers of cards in each pack.

a Use the given numbers in the table to work out the rule.
(Output number = Input number × 4)

Number of cards in pack	2	3	4	5	6	7	8	9
Price in rand	8	12	16	20	(24)	(28)	(32)	(36)

b Use the rule to fill in the missing output numbers on the table.

c Use the data in the table to plot the points on the graph. Then draw a line to join the dots in order.

Relationship between the number of cards in a pack and the price in rand

Price in rand (y-axis: 0 to 38)
Number of cards in a pack (x-axis: 0 to 9)

d Extend the length of the line and work out what the price is of one birthday card (R4)

6   REFLECTION AND SUMMARY OF LESSON (5 MINUTES)

Call the whole class to attention and summarise the key concepts of the lesson.

Say: **Today we have revised tables, flow diagrams, numeric patterns and line graphs.**
   We know:
   - **Numeric patterns can be shown in tables, flow diagrams and graphs.**
   - **How to find the rule, input number or output number in a numeric pattern.**
   - **How to draw and interpret line graphs which show a relationship.**