Foundations For Learning

Intermediate Phase Mathematics Lesson plans

First term

Grade 6

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Contents

1 Introduction 5

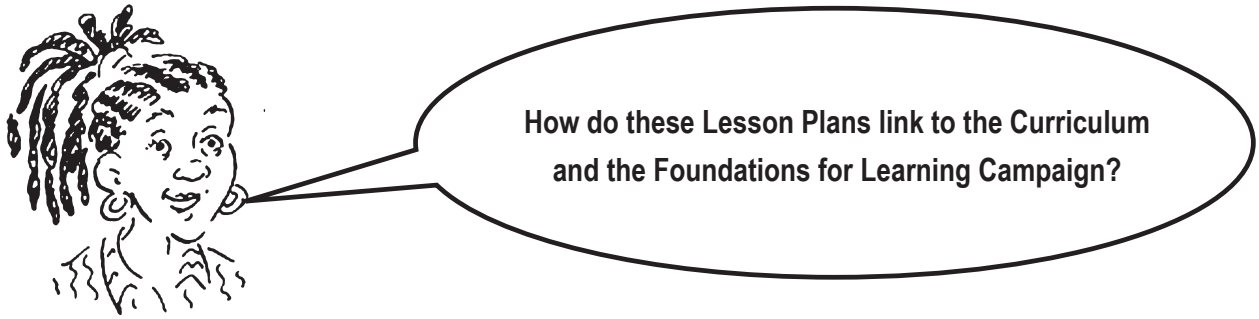
2 Mathematics 7
Counting 7
Mental and Number Sense 9
Problem Solving 10
Group teaching 11
Group work 11
Resources 11

3 First Term 13
Overview of Lesson Plans 13
Overview of Assessment Tasks 14
Lesson plans: 15
Week 1: Overview 15
Week 1: Lesson plans 16
Week 2: Overview 29
Week 2: Lesson plans 30
Week 3: Overview 41
Week 3: Lesson plans 42
Week 4: Overview 55
Week 4: Lesson plans 56
Week 5: Overview 71
Week 5: Lesson plans 72
Week 6: Overview 89
Week 6: Lesson plans 90
Week 7: Overview 103
Week 7: Lesson plans 104
Week 8: Overview 115
Week 8: Lesson plans 116
Week 9: Overview 129
Week 9: Lesson plans 130
Week 10: Overview 143
Week 10: Lesson plans 144

1. INTRODUCTION

BACKGROUND

The Foundations for Learning Assessment Framework which was distributed to all schools during 2008 contained 'milestones' for each grade. These milestones explain the content embedded in the Learning Outcomes and Assessment Standards, indicating the expected level of achievement of learners at the end of each quarter. This document contains lesson plans based on the milestones.



These lesson plans have been developed using:

- The NCS Learning Outcomes and Assessment Standards as the starting point
- The Milestones and
- Government Gazette 30880 of 14 March 2008, outlining the Foundations for Learning Campaign, which details the minimum expectations for the teaching of Literacy and Numeracy (Languages and Mathematics)

The following **table** provides an example of how these three documents are linked for Grade 5 Mathematics:

Learning Outcomes and Assessment Standards	Milestones for Mathematics for Grade 6	Government Gazette: Daily Teacher Activities during Mathematics time Grades 4 - 6	Grade 6 time allocation in Gazette
LO1 AS1 **LO1 AS4**	- Counting forwards and backwards in decimals. - Recognise the place value of digits in whole numbers to 6-digit numbers	Oral and mental work	10 minutes
		Review and correct homework from previous day	10 minutes
LO3 AS1; 2; 3	- Recognise, visualize and name 2-D shapes and 3-D objects focusing on similarities and differences between tetrahedrons and other pyramids; rectangles and parallelogram s - Describe, sort and compare 2-D shapes and 3-D objects in terms of properties : faces, vertices and edges.	Concept development and problem solving	35 minutes
		Give out homework	5 minutes

How do I use the time allocated for Mathematics?

The Government Gazette No 30880 provides the following breakdown of the formal teaching allocations for Mathematics and Languages in the Intermediate Phase per day:

Grade	Daily total for Mathematics	Daily total for Languages	Total per week For Mathematics	Total per week For Languages
Grade 4, 5 and 6	1 hour	1 hour 30 minutes	5 hours	7 hours 30 minutes

The Gazette further guides teachers by detailing the type of activities that should be contained in the Daily Activities. In the Intermediate Phase for Mathematics these are:

- Oral and mental work
- Concept development
- Problem solving

How, then can these lesson plans help teachers? What do they provide?

These Lesson Plans are intended to assist teachers to pace their teaching, give them guidance when planning their assessment tasks and provide suggestions to enrich teaching practice. They are not intended to be prescriptive and teachers are not expected to abandon good practice in order to blindly follow the plans. The Plans provide:

- **An overview of the term** broken into weekly units – compare this with your Work Schedule and ask yourself the following questions: Does your Work Schedule include similar content? Do you reach approximately the same point at the end of each term? The overview provides a useful termly checklist.

- **An overview for each week** – broken down into daily units; this helps you to see the content included in the week's lesson plans, to see how it is paced and to make use of specific lesson plans. Milestones and Learning Outcomes and Assessment Standards for the week have been included. The latter have been numbered as AS1, 2, 3 etc. No sub-bullets are indicated.

- **Individual lesson plans for each week** for the different components in Languages and Mathematics. The lessons for the week are broken down into daily steps, providing teachers with a breakdown of content and suggestions for implementation. However the plans are not prescriptive and allow you to use your own way of presenting the lesson. They are rich in practical ideas drawn from best practice and as such can enrich implementation in the classroom.

- **Suggestions for the Assessment Tasks** for each term for each of the components Remember:

How do teachers marry the activities in the Learner's Books and their own material with these Lesson Plans? Do the Lesson Plans replace the Learner's Books and Teacher's Guides?

Every class and learner is unique. There is no 'one size fits all'. Learners progress at different speeds and in different ways and you as the class teacher are best able to pace your teaching to the needs of your learners. You can introduce new material in an order that suits you and your learners.

These Lesson plans are not intended to replace the Teacher's Guides and Learner's Books or the material you have developed yourself:

- The Lesson Plans only provide some examples of worksheets for learners and some of the details as to how to present the lessons. You will need to provide further worksheets or activities from your own material or from textbooks.
- There will therefore be similarities between the Teacher's Guides and Learner's Books that you use and these Lesson Plans. However the order of content may be presented somewhat differently so you will need to match the content. These lessons are informed by the sequence of the milestones within the suggested Assessment Tasks per term provided in the Foundations for Learning document.

2. Teaching and learning mathematics in a Grade 6 classroom.

Introduction

" C*onceptual understanding and computational fluency with whole numbers, fractions and decimals form the bedrock of mathematics learning in both early and later years*" (NCTM: Navigating through numbers and operations).

By Grade learners should have developed a sense of how our number system is organised in that we group numbers in values of 10s, 100s, 1000s, etc. They should be able to count fluently in different number groups (multiples) as specified for Grade 4 and 5, to build and break down

numbers in different ways in order to compare number values, order them and do calculations involving all four operations, including division. They have developed an understanding of the meaning and relationships between the different operations.

This is the foundation we assume that further learning can take place in Grade 6, allowing learners to extend their place value understanding to investigate bigger numbers and to work more with irrational numbers, including common fractions and decimal fractions; (in the context of measurement.) multiples and factors.

We need to give emphasis in Grade 6 to multiplication and division of bigger numbers and help learners to be able to use the properties of numbers to do related calculations; for example how to use the distributive property when multiplying 134 x 23 for example, by breaking down the calculation into (134 x 20) + (134 x 3) to make the task more manageable.

We also need to expose learners to a wider range of different problem solving situations where these operations are used. At the same time it is important to further develop learners' computational fluency by extending the number range they are able to count in and practice their mental calculation skills.

It is important to remember that learners in Grade 6 are introduced to formal algorithms of column multiplication, and long division, for the first time and should still be encouraged to develop their own strategies for doing different calculations. There is a tendency to impose methods standard methods on learners too early which does not support their natural developmental inclination towards making sense of numbers and number relationships in their own way.

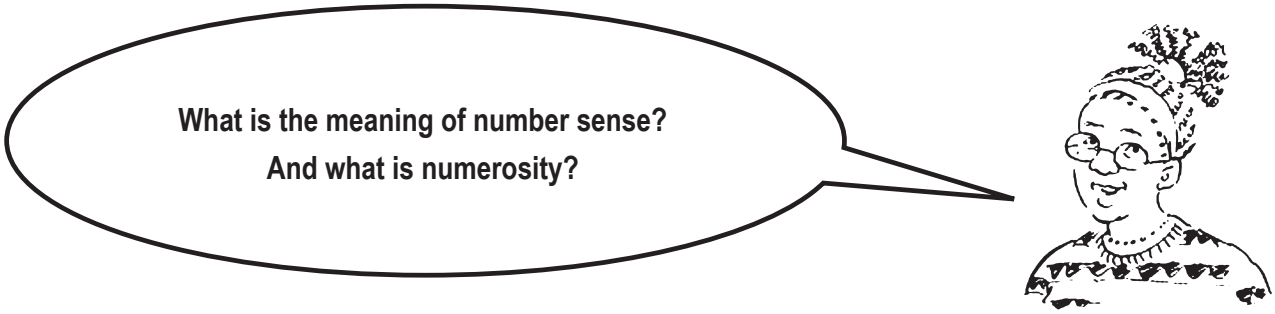
Many learners at this level for example, may still find it helpful for example to use drawings or diagrams to represent their thinking in relation to situations of sharing or grouping (multiplication and division) This should not be discouraged. Remember that a learner in Grade 6 is in transition from relying on concrete thinking and representations to being able to function more abstractedly. So to rush him/her would not allow the development of moving from one mode to another to takes it natural course.

Another key principle to consider is that learners learn a great deal from one another. So when giving them the chance to come up with their own ways to calculate or solve a measurement problem for example, it is important that make space in your lesson for learners to share and communicate their thinking with the rest of the class.

A further important change is that in many classes, learners in Grade 6 are using English as a medium of instruction which in many cases is not their home language. It is impossible to conduct a maths class for such learners entirely in English and expect them to communicate their thinking in a language they are not yet fluent in. One should still allow the space for learners to express themselves freely in their own language and then mediate the "mathematical conversations" in ways that every learner understands. This is very challenging, but simply ignoring the issue will only stifle

your learners' mathematical development and leave them frustrated, where they may for example well understand a concept or process well, but not yet have the tools to express themselves clearly in English.

MENTAL AND NUMBER SENSE ACTIVITIES



Many teachers are in a hurry for their learners to know facts off by heart. However, knowing facts off by heart is no indication that the learner understands what they are doing or that they will be able to use these facts in different contexts. It is much, much more important that you design activities which will help your learners develop a sense of number because it is this sense of number that learners use when trying to build up an understanding of computational strategies. You cannot teach number sense; you can only help learners acquire it by exposing them to various activities which allow learners to construct knowledge for themselves. Encouraging learners to reflect on what they are doing and then talk about it is helping these learners to develop a sense of number.

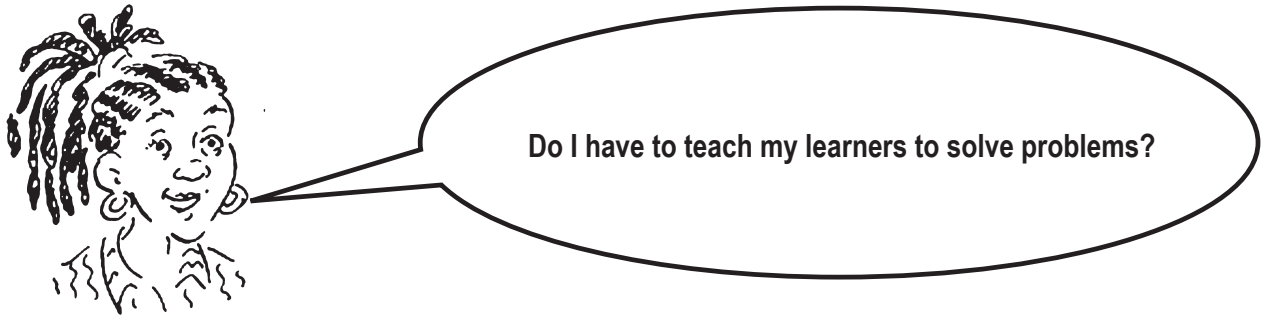
You will find learners at different levels of readiness in your class. Your programme should meet the needs of all the learners i.e. learners who are ready to move on should not be kept at the same level as learners who are still developing these essential skills.

Different kinds of knowledge (physical, social and logico-mathematical) play a role in developing learners' number sense and knowledge:

- *Physical* knowledge is the knowledge that the learner acquires from relating mathematical situations to physical models or representations; (this is more important at the Foundation Phase level, although some learners in Grade 4 are still reliant on using counters for example to represent numbers).
- *Social* knowledge can only be learnt by telling. So for examples naming numbers as decimals or fractions or using particular symbols to represent mathematical relationships is social knowledge that a learner needs to be told and cannot find out for himself/herself.
- *Logico-mathematical* knowledge refers to the type of knowledge that learners construct for themselves e.g. noticing the pattern in the place value system; or finding out that to subtract 456 – 345 they can add on from 345 to 456 to find the solution is something a learners can find out for themselves as their number sense develops over time.

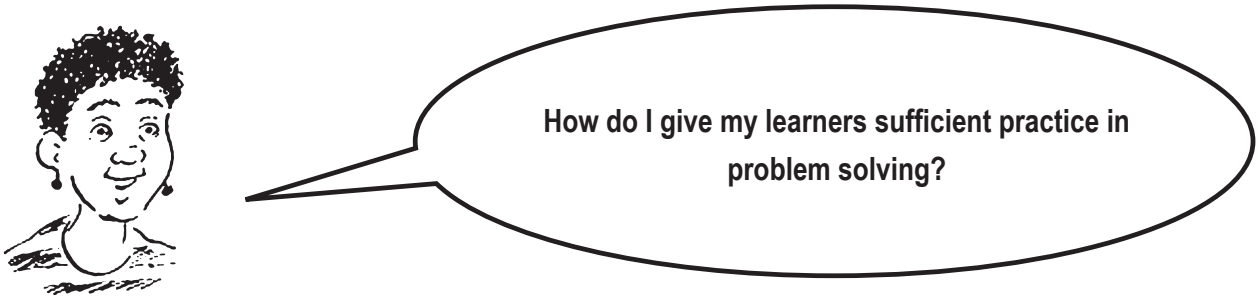
Your role as a teacher rather is to support your learners' development by providing appropriate activities that enable them to pass from one level of number level to the next where they integrate the different kinds of knowledge to solve particular problems or do calculations with number.

PROBLEM SOLVING



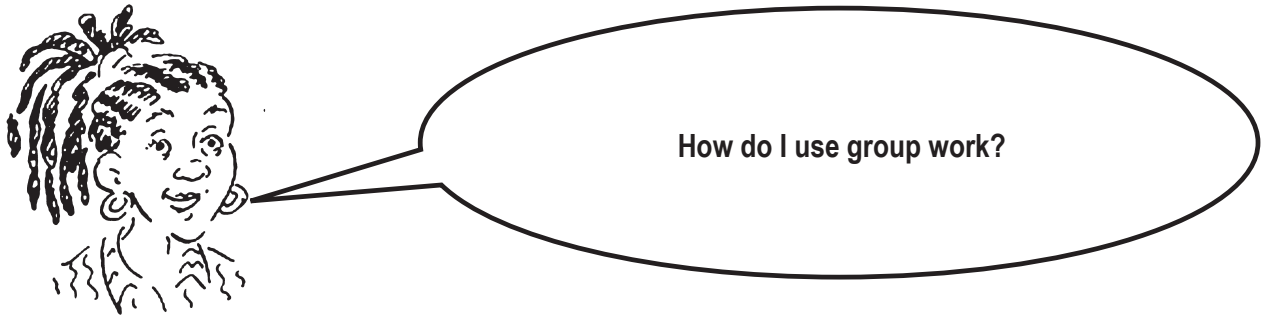
There are many different ideas as to what problem solving is and its value for young learners. However, one of the focal points of the Mathematics Learning Area is that learners be exposed to problems on a regular basis. But what exactly is a problem? A definition of a problem is "*A problem is a task that requires the person solving the problem to use knowledge, understanding and skills that he/she has acquired from other activities and to apply these to the new an unfamiliar situation and come up with a solution".*

By placing information in context, problem solving becomes a powerful activity and is one of the main vehicles for developing number sense. Therefore you need to constantly challenge learners with realistic, real-life problems without first teaching prerequisite tools or operations. In order to fulfill the purpose of word problems, learners should regularly be given problems which are new to them and for which they do not possess routine methods of finding the answer.



The objective of giving word problems is to enable your learners to develop new knowledge, take note of how others solve the problem and to reflect on their own thinking. Moreover the idea of presenting word problems after a set of skills and knowledge where only numbers are used is not to be encouraged. Rather word problems themselves are the vehicle for helping learners to see the relevance of why we need to manipulate numbers in particular ways, so that we are able to solve problems that have meaning in our lives. Exposing learners to a variety of problems enables them to develop their ability to interpret problems, and this helps to give meaning to the concept of the operations.

GROUP TEACHING OR GROUP WORK



Learners come to school with very different levels of readiness for formal teaching and learning due to variations in age, sex, ability and attendance. Some learners have special needs that should be identified at the beginning of the year, or could be made available from past records if the learner has attended Foundation Phase grades at the same school. Teaching and working in groups is a powerful tool to cater for all these diverse needs.

Group teaching and group work are also ideal for multi-grade and multi-phase classes. Group teaching means different things to different people. However, it is not just rearranging the desks into groups. You can:

- Teach learners in same ability groups so that they are taught at a pace that is comfortable for them and their learning is scaffolded. The quicker learners can be challenged and extended and the weaker learners can benefit from more time, support and attention in a small group situation. The learners do not need to be all at the same stage of learning and the activities given to the learners can be varied to meet their needs. Those with special needs can be supported in this way. To do this you will need to divide the learners into same-ability groups for certain activities. This works very well as it accommodates the range of abilities in a class, especially in large classes.

- In this term's work you will notice that for measurement and shape and space investigations, we propose mixed ability group teaching whereas for number work we go for same ability group approaches. You will need to make the call about which kinds of group organisation best suits the classes you're teaching. This will become clearer to you as the year progresses and you get to know your learners better.

RESOURCES

The Government Gazette No 30880 provides a list of recommended resources for Mathematics which schools should endeavour to provide. In addition to exercise books, Learner's Books, Workbooks and basic stationery which most schools already have, refer to the list of suggested equipment for the Intermediate Phase, that we believe re essential to have available to conduct your teaching and learning programme successfully.

OUR NEW CURRIC
THE NEW CURRICULUM

FIRST TERM OVERVIEW OF LESSON PLANS

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Oral and mental work	Counting : multiples of single digit numbers, fractions, decimals									
	Mental calculations using a range of techniques for addition, subtraction and multiplication									

Conceptual development and problem solving	Uses a range of techniques to perform written calculations.									
	Recognises the place value of digits in numbers to 6-digit numbers						Recognises the place value of digits in numbers to 6-digits			
	Addition and subtraction of whole numbers								Addition and subtraction of whole numbers	
			Multiplication of 3-digit by 2-digit numbers			Division of 3-digit by 2-digit numbers	Recognises multiples and factors of 2-digit numbers		Multiple operations with brackets	
				Fractions						
				Flow diagrams and tables						
	Rounding off				Recognises 0 in terms of additive property					
			History of number		Recognises 1 in terms of multiplicative property					
				Investigates geometric patterns		Investigates geometric patterns				
						2-D : rectangles and parallelograms Angles of corners		Data handling: tallies and tables	3-D: faces, vertices and edges	

THE ASSESSMENT FRAMEWORK

	ACTIVITIES THAT MAY BE USED FOR ASSESSMENT		
	COUNTING	**CONCEPT DEVELOPMENT**	**PROBLEM SOLVING**
WEEK 1		Written work involving rounding off to nearest 10, 100, 1000	
WEEK 2		Written work assessing addition and subtraction	
WEEK 3	Counting forwards and backwards in decimals	Oral and written work assessing multiplication	
WEEK 4	Mental calculations daily using a range of techniques		Practical and recorded work investigating geometric patterns
WEEK 5	Mental calculations daily using a range of techniques	Written activities for fractions Oral and written activities investigating 0 in terms of its additive property and 1 in terms of its multiplicative property.	
ASSESSMENT TASK 1 COMPLETED			
WEEK 6	Oral and mental work daily to be used as necessary for assessment.	Written work using flow diagrams and tables	Oral problem solving using division of 3-digit numbers by 2-digit numbers
WEEK 7		Practical activities: recognition of multiples and factors	2 dimensional shapes - angles
WEEK 8		Written tasks to be used for assessing addition, subtraction, multiplication and brackets using a range of techniques	Practical and written work leading to development of questionnaires, graphs, tallies and tables.
WEEK 9		Written work involving fractions	
ASSESSMENT TASK 2 COMPLETED			
WEEK 10			

The criteria for the assessment are drawn from the Learning Outcomes, the Assessment Standards and the Milestones First Term Week 1

First Term Week 1

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: LO1 AS1; AS3; AS4; AS8; AS9; AS10; AS11.	Milestones: • Count forwards and backwards in whole number intervals including decimals • Recognise and represent numbers in order to compare to a minimum of four digit whole numbers • Recognise the place value of digits in whole numbers to four digits. • Estimate and calculate by selecting and using operations appropriate to solve problems that involve rounding off to the nearest 10, 100 or 1 000. • Mental Calculations • Uses a range of techniques to perform written and mental calculations with whole numbers

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.

	Day 1	Day 2	Day 3	Day 4	Day 5
Content Focus	Revision of Grade 5 work	Counting in whole number intervals including decimals	Place value	Place value	Estimation and Rounding off
Resources	Worksheet	Chalkboard and textbook	Chalkboard and textbook	Chalkboard and textbook	Chalkboard and textbook

Week 1: Day 1
Notes to the teacher: • This is the first Mathematics lesson and we are going to do oral work based on the previous year's work. • Learners should know/be taught the meaning of terms like multiples, even numbers etc. • Prepare about 30 questions for the oral and mental activities daily. Some examples are provided in every lesson. Ask the question, pause, then name the learner you would like to pose the question to. • When consolidating, group learners according to seating arrangements to avoid too much disturbance. • Walk around the class and engage with and aid learners while they are working.
Resources: Chalkboard, textbooks

Oral and Mental Activity (10 minutes)

- This is the first lesson in Grade 6 and so it is a good idea to begin with some counting exercises as this is non-threatening and allows you to observe the level of the class. Ask one question at a time and lead the counting while whole class responds simultaneously e.g.
  - Count forward in 1s from 1 593 to 1 608.
  - Count backwards in 5s from 755 to 815
  - Count in 10s from 3 800 to 4 00.
  - Count in 8s from 32 to 80.
  - Count in even numbers between 2 393 and 2 413.
  - Count in odd numbers between 3 841 and 3859.
  - Count in tenths from 2,3 to 3,2.
  - Count in hundredths from 1,38 to 1,48

  ***Tip**: You can vary this activity by letting individual learners count, or by letting a group count. This must be fun and not seen as any sort of test.*

Concept Development (20 minutes)

- Write some 2-or-3-digit numbers on pieces of cardboard and put them in a box. Let learners work in groups as they are seated. Ask a learner from each group to take one of the numbers and once every group has a number, give them 3 minutes (use an egg-timer) to write down as many number facts about their number as possible. After 3 minutes, each group has a turn to read out all their number facts while the rest of the class checks that they are correct. The group with the most correct number facts gets 5 points. Repeat the activity and the first group to get 25 points is the winner!

Consolidation (20 minutes)

- Write the following questions on board, or find a similar exercise in the text book, or use a prepared worksheet. Tell learners to write the answers in their workbooks. Allow them to discuss the answers in their groups. An example of the type of exercises you want them to do is as follows:

1. Fill in the missing numbers:
   i. 5, 11,17 __, __, __
   ii. 5050, 6000, 6050, __, __, __

iii. 6780, 6880, __; __, __.
iv. Write down multiples of 6 beginning with 18 and ending with 108
v. Count backward in 100's from 1405 to 805
vi. Count forward in sevens from forty nine to 119.
vii. Count back ward in 4's from 64 to 24.
viii. Count in hundreds from 1530 to 2230
ix. Complete 0,23:; 0,22; 0,21; …….;0,10

2. Count in thousands:
i) 3 000; 4 000; _____; _____; _____; _____; 9 000.
ii) 3 217; 4 217; _____; _____; _____; _____; 9 217

3. Fill in the missing numbers and complete the sentences:
i. 936; ___; 736; 636; ___; ____; ____; ____; _____; 36.
I am counting in _____.
ii. Write down all the numbers when counting backwards in 50's from 2350 to 1950.
Write down all the numbers when counting in multiples of 30 from 930 to 1080
iii. Write down the next three numbers:
- 0,6; 0,7; 0,8; ____; _____; _____.
I am counting in _____.
- 2,06; 2,07; 2,08; ___;_____; _____.
I am counting in _____.
- 3,25; 3,50; 3,75; ____; _____; _____.
I am counting in _____.
- 5.3; 5,2; 5,1;_____; _____; _____.
I am counting forwards/backwards.

<u>Homework Activity</u>:
Select at least 5 suitable examples from textbook.

Week 1: Day 2

Notes to the teacher:

- Revise the concept of place value (that the same digit has a different value if it appears in a different place in a number). We would like learners to know that place value is about the position of the digits in numbers determine what size they represent. This is the important understanding of place value. Learners will apply their knowledge of place value when doing calculations.
- This activity is designed to revise the work done in the previous year, before introducing new concepts.
- Learners must be divided into groups of no more than six. To make grouping easier, ask them to form groups with those sitting around them.
- Encourage learners to apply the techniques learnt thus far to solve the problems and to discuss solutions before writing it down.
- You must move around the groups, engage with the learners, but try not to lead the discussion.
- At the start of every day, 10 minutes must be allocated to quick mental activities and reviewing of homework.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Ask learners to count in fractions of $\frac{1}{4}$ starting and stopping at given numbers e.g. $89\frac{1}{4}$ to $101\frac{3}{4}$
- Select individual learners to answer either orally or by writing the answers on chalkboard. Some examples of what you can ask are:
  - Write down the number: three hundred and forty five thousand eight hundred and nineteen.
  - Write the following number in words:150 205
  - What number is made up of 3 hundreds, 5 ones, 2 hundred thousands and 2 ten thousands?
- Call out the following and learners write the answers in their books. Swap books and learners mark them as you say the correct answers.

i)	7 x 5 =____;	vii)	6 x 7 =_____;
ii)	23÷ 1=____;	viii)	8 + 7 = _____;
iii)	8 x 40=___;	ix)	43 – 8 =_____;
iv)	5 x 6= ____;	x)	7 + 9 =_____
v)	45 ÷ 5=____;		
vi)	3 x9 = _____		

Concept Development: (30 minutes)

- Write any 4-digit number on the board and let the learners write the expanded notation in their books. Call one or two learners up to the board to write their expanded notation and explain what they are doing, e.g.
  - write the number 5 391
  - learners write 5 000+300+90+1

- Using the same number, ask if there are other ways that the expanded notation can be written. Learners may say any of the following:
  - 5 thousands, 3 hundreds, 9 tens and 1
  - (5x1 000) + (3x100) + (9x10) + 1
  - 1 000+1 000+1 000+1 000+1 000=5 000
    100+100+100=300
    10+10+10+10+10+10+10+10+10+1=91
    Tip: *Learners were introduced to the concept of expanded notation in Grade 2 and over the years the numbers they are working with have simply become bigger. Start this revision activity by using 4-digit numbers and, as you observe that the class understands the concept, increase the numbers to 5 and 6-digit numbers.*
- Encourage learners to find other ways of breaking up the number other than the usual expanded notation
- Now write 2 more 4-digit numbers on the board e.g. 3 173 and 6 705 and ask learners to write the expanded notation of the numbers in at least 2 different ways. Each time ask learners to write their answers on the board and allow learners to mark their own books.
- Now write a 5-digit number on the board which learners must write as expanded notation. If learners are able to do this, give them 2 more 5-digit numbers to write as expanded notation.

Consolidation: (20 minutes)

- Learners work in pairs and complete the following exercises in their books. You can use an activity from your textbook instead if you choose.
  Example questions you can write on the board:

1. a. What is the largest number that can be made from the following digits?
   i) 7
   ii) 3
   iii) 1
   iv) 2
   v) 5
   vi) 8

   b. What is the smallest 6 digit number that can be made using the same digits?
   c. What is the difference between these two numbers?

2. Arrange in order from largest to smallest:
   a. 410 444; 444140; 144404
   b. 871 903; 879 139 ; 872 931; 8 729

3. What number consists of 1 hundred, 7 thousands , 3 tens, 4 hundred thousands, five and 1 ten thousand?

4. Write in expanded form the number 423 138.

5. What are the values of the underlined digits:

i) 2 222

ii) 371 569

iii) 153 367

6. Write down the number that is equal to:-

i) 2 00 000 +30 000 +2 000 + 100 +5

ii) 400 000 + 20 000 +2000 + 200 +9

Week 1: Day 3

Notes to the teacher:

- Revise the concept of place value (that the same digit has a different value if it appears in a different place in a number). We would like learners to know that place value is about the position of the digits in numbers determine what size they represent. This is the important understanding of place value. Learners will apply their knowledge of place value when doing calculations.
- This activity is designed to revise the work done in the previous year, before introducing new concepts.
- At the start of every day, 10 minutes must be allocated to quick mental activities and reviewing of homework. Prepare about 30 questions for the oral and mental activities. Some examples are provided in every lesson. Ask the question, pause, and then name the learner you would like to pose the question to.
- When consolidating, group learners according to seating arrangements to avoid too much disturbance.

Resources: number cards, chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Play games with different multiples. Here are some examples:

  "Work out the secret number. My number is more than 1 315 and less than 1 330. It is in the 20s pattern. What is my number?"

  "Work out the secret number. My number is more than 3 315 and less than 3 330. It is in the 25s pattern. What is my number?"

  "Work out the secret number. My number is more than 5 315 and less than 5 360. It is in the 50s pattern. What is my number?"
- Give every learner a square piece of cardboard and ask them to write their own number between 1 and 10 on the cardboard. Tell them you will say a number and if their number is a factor of your number they must hold up their card. So if you say 12, learners with 1, 2, 3, 4 and 6 will hold up their cards.

Concept Development: (35 minutes)

- Write any 4-digit number on the board and let the learners write the expanded notation in their books. Call one or two learners up to the board to write their expanded notation and explain what they are doing, e.g.
  - write the number 3 914
  - learners write 3 000+900+10+4
- Using the same number, ask if there are other ways that the expanded notation can be written. Learners may say any of the following:
  - 3 thousands, 9 hundreds, 1 ten and 4
  - (3x1 000) + (9x100) + (1x10) + 4
  - 1 000+1 000+1 000=3 000
    100+100+100+100+100+100+100+100+100=900
    10+4=14

    ***Tip**: Learners should not be writing out the numbers as simply as the last example by the time they get to Grade 6. However, if they are, then you need to use 3 and 4-digit numbers until you are sure that they understand the concept of expanded notation.*

- Now write a 5-digit number on the board which learners must write as expanded notation. If learners are able to do this, give them 2 more 5-digit numbers to write as expanded notation. Once you are sure the learners can do this, give them some 6-digit numbers to write as expanded notation.
- Tell the learners that this time you want them to write the expanded notation vertically, not horizontally. Do one example with the class on the board, e.g.
  - Write the number 396 845 on the board.
  - Ask learners the place value of each digit and write it down as follows:-

3	→	300 000
9	→	90 000
6	→	6 000
8	→	800
4	→	40
5	→	5

  - Now ask them to add all the numbers i.e. 300 000+90 000+6 000+800+40+5
- Give the class the following numbers to write vertically in expanded notation:
  830 667 , 456 027, 879 145
- Ask if anyone knows another way to write numbers which will indicate the value of each of the digits. This is still revision of Grade 5 work, although you may need to revise this over the next two weeks to make sure learners are familiar with recording this way. Some learners should be able to tell you that you can write the numbers under the headings “Thousands”, “Hundreds”, etc.
- Now ask each of four learners to give any random number from 0 to 9
  - Write down the numbers in any order e.g.
    Answer from learner 1 1
    Answer from learner 2 0
    Answer from learner 3 7
    Answer from learner 4 9
  - Ask learners to make as many different numbers possible using all four digits given as answers e.g.1 079 and 7 901and 1 097 and 1 790
  - Discuss the values of each digit in each number on board be drawing the following grid on the board, encouraging the learners to tell you what each column stands for

Th	**H**	**T**	**Ones**
Thousands	Hundreds	Tens	Ones

  - Place each number given by learners in the grid and discuss the value of each digit for example

Th	H	T	Ones
1	7	9	0
Is made up of			
1	0	0	0
	7	0	0
		9	0

One thousand
Seven hundreds
Nine tens (ninety)

The value of the 9 under the Tens column = 90
The value of the 7 under the Hundreds column = 700
The value of the 1 under the Thousands column = 1 000
As the value of the number under the Ones column is nothing, it does not have to be recorded!

- Do a few more examples and then write some numbers on the board for learners to record in columns.
  Tip: *If there are learners that require the use of flard cards (place value cards) to break up numbers into their parts then please use it together with written activities.*

Consolidation: (15 minutes)

- Write the following on the board for learners to copy and complete in their class books, or find a similar exercise in your text book for them to complete.

  - What numbers are represented here?

Th	H	T	Ones
9			
		3	
	4		

  - What numbers are represented here?

Th	H	T	Ones
9	1	2	0
	4	3	5
		7	7

- Represent the following numbers in the tables below
  i) 213 567
  ii) 100 115
  iii) 25 960

HTh	TTh	Th	H	T	Ones
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

<u>Homework Activity:</u>

Select at least 5 suitable examples from textbook

Week 1: Day 4

Notes to the teacher:

- Discuss with learners the importance to be able to estimate quantities. Adults need to be able to estimate to see whether their shopping bill, for example, is correct. Reasonable estimates also help us to plan better. Estimation will help us to solve problems involving multiplication and division a little later in the year. Make sure that learners understand that estimation means to roughly calculate something.
- Discuss with learners what the concept of round off means. It is not quite the same as to estimate, but rather to express a number as the nearest significant number above or below it for ease of calculation. There are various ways of rounding off, but mainly rounding off occurs to the nearest multiple of 10.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Working in groups with a calculator ask learners to do the following
  - write down two 2-digit numbers e.g. 23 and 17.
  - in 10 seconds estimate the sum of the two numbers and write it down.
  - now use the calculator to find the answers.
  - Repeat the activity.

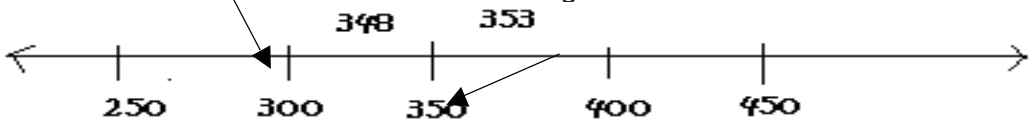
  The nearest estimate scores 1 point. An accurate estimated answer scores 2 points. The group who scores 20 points first is the winner.

  Tip: *The number of available calculators will determine how many learners in a group.*

Concept Development: (20 minutes)

- Ask learners if they know what estimating means (an approximate answer is found) e.g. 235+134+241 is roughly equal to 600
- Ask learners to estimate how many children in:
  - the class
  - the grade
  - the school
  - the world
  - Are there exactly 1000 learners in the school or is it maybe 989 or 995 or perhaps 1040?
- When a rough estimate is given instead of the exact number, we call this “rounding off.” Ask what learners know about rounding off as they have done this since Grade 4! Ask the following and use the answers to informally assess what learners really know about rounding off:
  - If you have 305 marbles, do you say you have about 300 or 400 marbles?
  - What about 390 marbles, 380, 310 marbles? We can decide quickly with these numbers because they are either close to 300 or 400.
  - What about 348 or 353 or 350? Here you may need to show learners numbers on the number line i.e. 350 is exactly in the middle and therefore 348 being on its left rounds off to 300 whereas 353 rounds off to 400.

Left of 350 therefore rounds off to 300 Right of 350 therefore rounds off to 400



- Emphasize that 350 is always rounded to 400 and that this is because mathematicians agreed to do this and not because of any hard and fast rule!
- Ask what happens when we round off to 100 e.g. round off 490, 376, 789 etc. What is the rounded off number a multiple of? - a multiple of 100.
- Discuss similar examples with rounding off to the nearest 1000, 10, 5 etc.
  Use examples as follows:-
  a. Round off to the nearest ten: 244, 256, 632
  b. Round off to the nearest hundred: 144, 156, 349, 999
  c. Round off to the nearest thousand: 6 754; 5 498; 5 023.
  d. Round off to the nearest five: 2; 14; 43; 76; 96; 83; 342

Consolidation: Group lesson activity: (15 minutes)

- Discuss how you would round off numbers to the nearest 5.
- Discuss why 15 rounded off to the nearest 100 is rounded off as 0.
- Ask learners to derive their own rules in their own words for rounding off e.g. always round off upwards if your number is more than halfway. Rules must be written in workbooks.
- Write the following on the board and tell learners to copy them into their books and complete them:
  - Round off to the nearest 10:
    i. 134
    ii. 208
    iii. 1 254
    iv. 999
  - Round off to the nearest 100:
    i) 167
    ii) 8 514
    iii) 5 475
    iv) 20
  - Round off the following quantities to the nearest R1 000,00
    i) The car costs R75 354
    ii) The funds raised at school is R2 353,00
  - Round off 2 567
    i) to the nearest 10
    ii) to the nearest 100
    iii) to the nearest 1 000
    iv) to the nearest 5.

<u>Homework Activity</u>: select similar examples to consolidate day's work. You may want get learners to round off shopping till slips or 'go' shopping using advertisements that they have collected. Money and shopping is a good everyday context to use for rounding off.

Week 1: Day 5

Notes to the teacher:

- Today you are going to give learners a written activity as a baseline assessment. Remember that these learners have just completed their Grade 5 year, so this activity should reflect the Grade 5 milestones and Assessment Standards.
- It is really important that you spend time revising work already done as this establishes a good foundation on which to build concepts to be learned in Grade 6. Do not hurry this revision period.
- At the start of every day, 10 minutes must be allocated to quick mental activities and reviewing of homework.

Resources: Worksheet

Oral and Mental Activity (10 minutes)

- Give every learner a square piece of cardboard and ask them to write their own number between 100 and 200 on the cardboard. Tell them you will say a number and if their number is a multiple of your number they must hold up their card. So if you say 5, learners with numbers ending in 0 or 5 will hold up their cards.
- Ask who is the tallest in the class, and then use the number that learner has written on his/her card e.g. 146. Every learner in the class now has to give one number fact where that number is the answer e.g. 100+40+6 is 146, or 150 take away 4 is 146 etc. No one may say a fact that has already been given!

Concept Development (30 minutes)

- Today learners will be involved in a written activity. This is NOT A TEST, but you will be able to use it to assess the level at which the class is working to inform your planning for the future. It should also serve as revision of the work done over the first three days of the week. Either use an exercise out of your text book, or design a worksheet similar to the one provided.

1. Fill in the missing number to make the number sentences true. Remember that the brackets show that you have to do those calculations first.

a. (5X7) +6 = _____

b. (6x8) – 3= ____

c. 3+ (15-7) x3 = _____

d. (11-3)x7 = _____

e. (7x3) +_____ = 26

f. (80x0) +7= _____

g. (27 ÷ ____) +4 = 13

h. 5x (42 ÷7)= _____

i. (43 - ____) x 9=7

j. (____x9) - 2=_____

k. 9 = (_____ ÷4) +4

l. 69 – (7x9) = _____

2. Copy and complete:

a) 1 734 = 1 000 + _____ + 30 + 4

b) 804 = 800 + _____ + 4

c) 3 074 = (3x____) + (___x 100) + (___x 10) + (4x ___)

3. Write in words:
a) 30 134
b) 12 813

4. Write in figures:
a) Thirty five thousand; three hundred and nine
b) Seventeen thousand and six

5. What is the value of each of the 4s in:
a) 43 842
b) 84 204

6. Consider the number 48 263:
a. Round off the number to the nearest:
i) ten ii) thousand iii) hundred iv) ten thousand

7. Choose an answer from the bracket which you think is the best estimate for each number sentence:
a) 72 + 34 = (160; 110; 120; 100)
b) 84 + 67 = (140; 150; 200; 160)
c) 298 + 415 = (600; 700; 800; 650)

8. Use the number line to answer the following questions:

a) Which letter represents 6 000?
b) What number does E represent?
c) What is the difference between the numbers represented by D and C?

9. Find the sum of each set of numbers:
a) 2 438 +7 624
b) 6 591+ 3 859
c) 1 648 + 2 004 + 89 + 214

10. Solve the following problems and show your thinking:
a) There are 1523 children in the school. 879 are girls. How many boys are there?
b) At the school concert, 353 adults and 675 children were seated. How many chairs were needed altogether?

First Term Week 2

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: LO1 AS8, AS9, AS10,AS11	Milestones: • Estimate and calculate by selecting and using operations appropriate to solve problems that involve - addition and subtraction of whole numbers with at least four digits - multiplication of three digit by two digit whole numbers • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.					
	Day 1	Day 2	Day 3	Day 4	Day 5
Content Focus	Addition of whole numbers	Addition of whole numbers	Subtraction of whole numbers	Subtraction of whole numbers	Multiplication of 3-digit numbers by 2-digit numbers
Resources:	Chalkboard and textbooks	Chalkboard and textbooks	Chalkboard and textbooks	Chalkboard and textbooks	Chalkboard and textbooks

Week 2: Day 1

Notes to the teacher:

- In Week 1 you dealt with rounding off and estimation. This is essential because when we add/subtract big numbers, we need to have a rough idea of what our answer should be. Learners should be using this skill before they do any calculation.
- Most of this week will be spent revising addition and subtraction, starting with four digit numbers Adding and subtracting in columns was a new technique taught in Grade 5, so start the revision by using expanded notation - which learners know well – before moving onto working in columns. Your pace will be determined by what your class can and cannot do. Learners should be encouraged to first estimate their answers by rounding off before solving problems
- It is important to display learners' own methods of calculations and for them to share thoughts and ideas with others. This will allow other learners to develop and challenge their own methods.
- Give learners the opportunity to try out a friend's method and compare it to their own.
- No learner should be allowed (without help) to continue using methods that they do not understand.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Write the following numbers on the board:
  3, 33, 63, 163, 1 673
  - Ask learners to add 1 to the numbers, then 10, then 7.
  - Ask learners to double and halve the numbers
  - Ask learners to multiply the numbers by 10.
    You can add your own ideas to this activity.
- Ask the shortest girl to choose a number between 50 and 250 e.g. 182. Every learner in the class now has to give one number fact where that number is the answer e.g. 100+80+2 is 182, or 200 take away 18 is 182 or double 91 is 182 etc. No one may say a fact that has already been given!

Concept development: (40 minutes)

- Start with mental/oral revision of place value/expanded form as learners should be familiar with this e.g.
  5 325 = 5 000 + 300 + 20 + 5
  2 598 = 2 000 + 500 + 90 + 8
- Ask if there are other ways of writing the expanded notation. Let one or two learners write their ways on the board e.g. 5 325
  - five thousands, three hundreds, two tens and five
  - (5x1000) + (3x100) + (2x10) + 5
  - 5000
    300
    20
    5
    All of these ways are correct and acceptable.

- Now give them a problem to solve where the digits in the two numbers add up over the whole ten, hundred, etc. It is important to put this into context as this gives meaning to what the learners are doing. You could ask the following:
  There were 3 549 spectators at the Pirates soccer match and 5 893 spectators at the Chiefs soccer match. How many people watched soccer?
  Allow learners to work in groups and leave them to work out the answers on their own. Again, it is not important how the learners record their thinking, but rather that you take note of the methods being used e.g. Do learners use expanded notation? Do learners write the numbers horizontally, or vertically in columns? Do learners encounter problems when numbers are more than the whole ten, hundred, etc.? Answers to these questions will enable you to plan at the level of the learners so that they develop a full understanding of manipulating numbers rather than just learning a rule with no understanding. Ask one or two learners to write their answers on the board explaining their thinking.
- Do a few more problems with numbers like these where the addition is not simple and straight forward.
- Write 5 325 +2 598 on the board and tell learners to first write the numbers in expanded notation and then to do the addition. This is what most learners will write:

  5 325 = 5 000 + 300 + 20 + 5
  2 598 = 2 000 + 500 + 90 + 8
  = 7 000 + 800 +110 +13
  =7000 + 800 + 123

  =7 923.

  ***Tip**: It is very important that learners are left to do this on their own and that they are allowed to use their own methods. If learners have a problem adding 110 and 13 together, encourage them to find a solution on their own. You can help by asking questions such as "What do you think will happen if you …..?" Learners DO NOT have to break the 110 into 100 and 10 if they don't need to. By now they should know (or be able to work it out by counting on their fingers) that 110+10 is 120, so 110+10+3 is 123.*
- Do another one or two examples like this using 4-digit numbers.

Consolidation (10 minutes)

Give learners the following type of exercise to do in their books. If they have a text book, look for something similar.

1) 1 234 + 1 582 = _____ 2) 2 087 + 1 361 + 4 176 = _____
3) 1 413 + 8 612 = _____ 4) 1 552 + 4 212 + 571 = _____

Week 2: Day 2

Notes to the teacher:

- It is always a good idea to first estimate an approximate answer before doing the actual addition and subtraction. Here rounding off skills are used.
- Most of this week will be spent revising addition and subtraction, starting with four digit numbers Adding and subtracting in columns was a new technique taught in Grade 5, so start the revision by using expanded notation - which learners now well – before moving onto working in columns. Your pace will be determined by what your class can and cannot do. Learners should be encouraged to first estimate their answers by rounding off before solving problems
- It is important to display learners' own methods of calculations and for them to share thoughts and ideas with others. This will allow other learners to develop and challenge their own methods.
- Give learners the opportunity to try out a friend's method and compare it to their own.
- No learner should be allowed (without help) to continue using methods that they do not understand.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Start the lesson by doing some counting e.g.
  - Count in 10s starting at 786 and stopping at 1 116 .
  - Count in 20s starting at 1670 and stopping at 1 830.
  - Count in 100s starting at 9 340 and stopping at 10 640.
- Call out the following type of mental exercises. Ask a few learners to give you their answer each time even if the first answer is correct. This encourages all the learners in the class to think of the answer and not just leave it to those learners who think quickly.

  i) 17 – 6 = _____
  ii) 21 + 9 = _____
  iii) 4 x 5 = _____
  iv) 9 x 0 = _____
  v) 7 + 9 = _____
  vi) 9 x 7 = _____
  vii) 5 x 8 = _____
  viii) 8 x 8 = _____

Concept development: (30 minutes)

- Write some 4-digit numbers on the board and tell learners to write them as expanded notation. Ask a few learners to write their expanded notation on the board and ask who else did it in that way. This helps learners' look critically at what they have done.
- Revise place value by writing 4 and 5-digit numbers on the board, underlining some of the digits and asking learners to value of the underlined digits e.g. What is the value of the underlined digits in 6<u>5</u> 2<u>3</u>9? Learners may either say "30" or "3 tens" - both are quite correct and indicate a good un derstanding of place value.
- Let learners work in groups (as they are seated) and give them the following problem to solve:

Mondi planted 4 847 trees in a new plantation. The other plantation has 3 956 trees. How many trees does Mondi have to fell?

If learners have a problem solving this, ask open-ended questions which will make them think about what they are doing. You can also encourage them to break up the numbers, as expanded notation for example. Once all the groups have finished ask some of the learners to write their answers on the board, explaining their thinking when solving the problem.

- Give learners a few more problems using numbers which are not easily added. Stay with 4-digit numbers for this week, gradually increasing the numbers so that, when added, the answer is a 5-digit number, e.g.

  Mrs. Abrahams has R8 460 in her banking account. She is able to save and by the end of the year has saved a further R6 675. How much money does she have in her account?
- Draw a table similar to the one provided and ask learners to write given numbers in the correct columns e.g.

	TTh	**Th**	**H**	**T**	**U**	Use these numbers and put them in the correct place. 43 532 50 257 87 005 38 254 1 680
i)	4	3	5	3	2	
ii)						
iii)						
iv)						
v)						

Consolidation (15 minutes)

- Learners complete a similar place value exercise in their class books.

Week 2: Day 3

Notes to the teacher:

- Having done addition for 2 days, spend the next 2 days doing subtraction. Remember, all the work at the moment is revision of work already done in Grade 4 and 5. However, it is vital that you do this revision and do not start immediately working with bigger numbers. Time spent now consolidating will pay dividends later in the year as you will have established a solid foundation for the learners to work from.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Do some counting patterns e.g.
  - Count in 2s and every time you also say a multiple of 3 clap your hands e.g. 2, 4, 6(clap), 8, 10, 12(clap). What pattern do you notice?
  - Count in 2s, clap your hands every time you say a multiple of 3 and stamp your feet every time you say a multiple of 4. What pattern do you notice?
- Ask questions where learners have to add or subtract whole 10s and whole 100s e.g.

30+40=	40-30=	130+40=	140-30=
80+50=	80-50=	180+50=	180-50=

2 000-500=
1 000-500=
1 800-500=
1 200-500=
1 700+400=
1 700-400=
1 740+1000=
1 740-1 000=

Concept development: (40 minutes)

- Write some 4-digit numbers on the board and tell learners to write them as expanded notation. Ask a few learners to write their expanded notation on the board and ask who else did it in that way e.g.
  6 927=6 000+900+20+7 OR
  (6x1 000) + (9x100) + (2x10) + (1x7)
- Using the expanded notation, ask what the new number will be if they:
  - Take away 300
  - Add 30
  - Take away four thousand
  - Add 11, and so on,
    Each time let learners explain which numbers they changed e.g.
  - *when I took 300 away from 6 927, I took the 300 away from the 900, so that left 6627*
  - *when I added 30 to 6 927, I added 30 to the 20 and that gave me 50, so the new number is 6 957.*

- Revise place value by writing 4 and 5-digit numbers on the board, underlining some of the digits and asking learners to value of the underlined digits e.g. What is the value of the underlined digits in 7<u>2</u> 1<u>9</u>9? Learners may either say "90" or "9 tens" - both are quite correct and indicate a good understanding of place value. Do this with a few numbers.
- Having done addition for two days, today you are going to do subtraction. It is not more difficult than addition, and you should not give the impression that it is. Put the numbers into context each time as this gives meaning to what the learners are doing. Let learners work in groups (as they are seated) and give them the following problem to solve:
  Mondi planted 4 887 trees in a new plantation. The old plantation has 3 456 trees. How many more trees are there in the new plantation?
  If learners have a problem solving this, ask open-ended questions which will make them think about what they are doing. You can also encourage them to break up the numbers, as expanded notation for example. Once all the groups have finished ask some of the learners to write their answers on the board, explaining their thinking when solving the problem.
- Give learners a few more subtraction problems using numbers which are easily subtracted. Stay with 4-digit numbers for this week, gradually increasing the numbers e.g.
  Mrs. Abrahams has R8 460 in her bank account. She spends R6 175 on a holiday. How much money does she now have in her account?
  Make sure that each time you ask learners to explain what they did to find a solution to the problem.

Consolidation (10 minutes)

- Let the learners do the following exercise in their class books, or find a similar activity in the text book.

  9 459 - 2 341 = _____
  6 332 – 122 = _____
  6 845 – 244 = _____
  4 609 – 3 045 = _____
  6 217 – 2 154 = _____

<u>Homework Activity</u>: Select 5 examples from textbook.

Week 2: Day 4

Notes to the teacher:

- Having done addition for 2 days, spend 2 days doing subtraction. Remember, all the work at the moment is revision of work already done in Grade 4 and 5. However, it is vital that you do this revision and do not start immediately working with bigger numbers. Time spent now consolidating will pay dividends later in the year as you will have established a solid foundation for the learners to work from.
- Do not worry if learners use different methods when subtracting two numbers. It is important that learners understand that there is always more than one right way – provided they can explain what they did, or how they found the solution.
- Working with subtraction in the context of word problems takes away learners' anxiety to only use "the correct method" – the one the teacher wants them to use – while allowing you to observe what they know and can do.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Draw a number line on the board and fill in some of the numbers, using the fractions that were dealt with in Grade 5. Ask different learners to come and fill in the missing numbers and fractions.
- Repeat this activity, using decimals and not common fractions.

Concept development (30 minutes)

- Write some 4-digit numbers on the board and tell learners to write them as expanded notation. Ask a few learners to write their expanded notation on the board and ask who else did it in that way e.g.
  6 927=6 000+900+20+7 OR
  (6x1 000) + (9x100) + (2x10) + (1x7)
- Using the expanded notation, ask what the new number will be if they:
  - Take away 20
  - Add 100
  - Take away one thousand
  - Add 4, and so on,
    Each time let learners explain which numbers they changed e.g.
  - *when I took 20 away from 6 927, I took the 20 away from the 20, so that left 6 907*
  - *when I added 100 to 6 927, I added 100 to the 900 and that gave me 1 000, so the new number is 7 027.*
- Revise place value by writing 4 and 5-digit numbers on the board, underlining some of the digits and asking learners to value of the underlined digits e.g. What is the value of the underlined digits in 7<u>2</u> 1<u>9</u>9? Learners may either say "90" or "9 tens" - both are quite correct and indicate a good understanding of place value. Do this with a few numbers.
- Having done addition for two days, you will spend Day 3 and 4 doing subtraction. It is not more difficult than addition, and you should not give the impression that it is. Put the numbers into context each time as this gives meaning to what the learners are doing. Let

learners work in groups (as they are seated) and give them the following problem to solve: *Toyota produced 4 268 cars in February. In March they sold 3 199 cars. How many cars do they still have to sell?*

If learners have a problem solving this, ask open-ended questions which will make them think about what they are doing. You can also encourage them to break up the numbers, as expanded notation for example. Once all the groups have finished ask some of the learners to write their answers on the board, explaining their thinking when solving the problem.

- Give learners a few more subtraction problems using numbers which are easily subtracted. Stay with 4-digit numbers for this week, gradually increasing the numbers e.g.
  Mt Mhikze had a sugar cane farm of 6 190 hectares. He sold 1 775 hectares to his neighbor. How big is Mr Mhikze's farm now?
  Make sure that each time you ask learners to explain what they did to find a solution to the problem.
- Draw a table similar to the one provided and ask learners to write given numbers in the correct columns e.g.

TTh	Th	H	T	U	Use these numbers and put them in the correct place.
					43 532 50 257
					87 005 38 254

- Using the numbers in the table, ask how the number would change if you subtracted 100 from each number, or 1000 from each number, or 500 from each number, or 5000 from each number. Discuss what happens to the digits in the columns each time.

Consolidation (20 minutes)

- Use any preferred method as a group to do the calculations below:
  a) 9 924 – 7 237= b) 7 555 – 1 548=
  c) 1 229 – 357=
  d) 3 285 – 1 159=
  e) 4 783 – 1 563=
  f) 9 678 – 7 593=

<u>Homework Activity:</u> Select at least 5 suitable examples from textbook or draw up a worksheet with similar exercises.

Week 2: Day 5

Notes to the teacher:

- Multiplication of multiples of 10 is introduced first so that the learners can grasp the process of multiplication of three digit whole numbers.
- When we break up a number and multiply each part we are using the distributive law e.g. 68 x 127 = 68 x (100 + 20 + 7) = (68 x 100) + (68 x 20) + (68 x 7).
- Learner's need to be able to use the distributive law. They don't need to know the name, only when it is useful to use as a strategy.
- It is important are able that learners are able to see pattern in mathematics. Sometimes it is also important for them to be able to make a rule from a pattern.
- In Grade 6 learners need to be able to multiply some numbers quickly in their heads. Some multiplication facts they need to learn e.g. 6 x 8. At other times they need to know quick strategies or short cut for multiplying e.g. what happens when you multiply by 100.
- Another strategy that is useful when learners multiply is the associate law. When you have broken up a number, sometimes can change the order in which you multiply e.g.
  9 x 500 = 9 x (5 x 100) = (9 x 5) x 100 = 45 x 100 = 4 500. Learners do not need to know the name of the rule. They only need to know that they can change the order of the multiplication or regroup the numbers to make the calculation easier.
- DO NOT be in a hurry to work with bigger numbers. You have the whole year to teach these rules!

Resources: Chalkboard and textbooks

Oral and Mental Activity (10minutes)

- Draw a table on the board and ask learners, one at a time, to write the number you give them in the correct columns. After each number, ask what would happen if you added or subtracted numbers from the written number e.g.

TTh	Th	H	T	U
6	5	8	4	7

Questions:

- If I add 400 (450/374/1008 etc.) to this number, what will the new number be?
- Which digits changed?
- Why did they change?
- What is the new number?

Concept development: (40 minutes)

- Draw the following table on the board and ask learners to give you the answers:

7x10=	7x100=	7x1 000=
5x10=	5x100=	5x1 00=
8x10=	8x100=	8x1 000=
2x10=	2x100=	2x1 000=
19x10=	19x100=	19x1 000=
13x10=	13x100=	13x1 000=

- Once the table has been completed, ask learners what they notice about the numbers in the first column, then the second column and then the third column. Ask why they think all the numbers in the first column end with a 0 and begin with the number before the multiplication sign. Explore the answers you get. Do the same for the second and third columns, discussing what is happening and why it is so. Finally ask if learners can make a rule when multiplying any number by multiples of 10 e.g. when we multiply a whole number by 10, we write a "0" at the end of the whole number e.g. 8X10=80.

  ***Tip**: If learners are not sure, encourage them to check the answers by counting e.g. 10, 20, 30, 40….80 is 8 tens!*
- Write the following on the board and write the answers, step by step, as given by the learners e.g.

  8 x 300
  = 8x(3x100)
  = (8x3) x 100
  = 24x100
  =2 400
- Working in their groups, learners work out the following. Encourage them to not only apply the rule, but to check if the answers are correct.

a) 7x20	b) 7x200	c) 7x2 000
d) 5x40	e) 5x400	f) 5x4 000
g) 80x5	h) 800x5	i) 8 000x5
j) 40x3	k) 400x3	l) 4 000x3

- Once you are sure that the learners understand what they are doing, let them copy the work into their books.

Problem Solving (10 minutes)

- Give learners one or two multiplication word problems to work out in their groups. Once all the groups have found a solution, let a few learners write the solution on the board explaining how they solved the problem. Use problems such as:
  - *The farmer packed 100 boxes of tomatoes and in each box there were 35 tomatoes. How many tomatoes did the farmer pack?*
  - *The farmer packed 5 boxes of tomatoes and in each box there were 135 tomatoes. How many tomatoes did the farmer pack?*

First Term Week 3

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: LO1 AS8; AS12, AS9, AS10, AS11	Milestones: • Estimate and calculate by selecting and using operations appropriate to solve problems that involve: - multiplication of 3 digit whole numbers by one digit whole numbers - multiplication of at least two digit whole numbers to one digit whole numbers • Describe and illustrate number systems different to our own. • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.					
	Day 1	Day 2	Day 3	Day 4	Day 5
Content Focus	Multiplication of three digit whole numbers by one digit whole numbers	Multiplication of three digit whole numbers by one digit whole numbers	Multiplication of two digit whole numbers by two digit whole numbers	Fractions	History of number
Resources:	Textbooks and chalkboard	Textbooks and chalkboard	Textbooks and chalkboard	Textbooks and chalkboard	Textbooks and chalkboard

Week 3: Day 1

Notes to the teacher:

- This is a continuation of the previous lessons where 2 and 3-digit numbers are multiplied by 1 or2-digit numbers, including whole 10s and 100s.
- DO NOT be in a hurry to work with bigger numbers. You have the whole year to teach these rules!
- It is essential that the multiplication you want learners to do is first put into context i.e. a problem situation, as this provides a conceptual base for constructing the concept of multiplication. Learners have been involved in developing their understanding of multiplication since Grade 1, so this is not new. However, the number range increases every year which is why you need to start like this in order to assess the level of understanding among your class.
- Oral and mental work is done daily and should include revision of work done to date.
- Written work should be done daily to revise the concepts and techniques learned.

Resources: Chalkboard and textbooks.

Oral and Mental Activity (10 minutes)

- Do some counting patterns e.g.
  - Count in 4s and every time you also say a multiple of 8 clap your hands e.g. 4, 8(clap), 12, 16(clap). What pattern do you notice?
  - Count in 4s, clap your hands every time you say a multiple of 8 and stamp your feet every time you say a multiple of 3. What pattern do you notice?
- Learners count in 4s and stop when you clap your hands e.g. 52. Ask how many 4s in 52? If 13 fours are 52, how much are 14 fours? If 14 fours are 56, how much are 7 fours? This activity helps learners establish the relationship between numbers, so you can repeat this activity with other multiples and other questions.
- Take any single digit number and ask learners to write down as many multiplication facts as possible. Encourage them to look for relationships e.g. if I know that 12 sixes are 72, I can work out what 24 sixes are, what 12 twelve's are, what 24 threes are, etc.

Concept Development (30 minutes)

- Make sure every learner has access to paper and writing materials e.g. pencil, eraser, etc. before starting. Learners may work on their own, with a friend or in a group. You will read the problem to the class and then encourage them to read it again for themselves. Leave the learners to solve the problem in their own way – do not interfere with learners as they work! The problems you pose will require computations such as 23x2, then 23x3, 23x5, 23x10, 23x12, 23x15, 23x20 and so on. An example of a problem could be:
  The motor car factory produces 23 cars a day. How many cars are produced in 2 days? How many cars are produced in 3 days? 5 days? 10 days?
- Do not do the whole range on one day. Work at the level and pace of the learners. If you ask how many cars are produced up to 10 days all on Day 1, you will have established a good platform to develop this further on day 2.

It is important that you allow learners each time to discuss the methods and strategies they used when solving these problems. They may have used repeated addition, or doubling or breaking up the numbers – all are correct. By working like this you are encouraging learners to look for simpler ways of solving the problem which leads to them being able to construct shorter methods.

Consolidation (20 minutes)
Find an exercise in the textbook, devise a worksheet or write work on the board where learners have to work out addition and subtraction of 2 4-digit numbers. This is revision of work done in Week 1 and 2.

Week 3: Day 2
Notes to the teacher: • This is a continuation of the previous lessons where 2 and 3-digit numbers are multiplied by 1 or2-digit numbers, including whole 10s and 100s. • DO NOT be in a hurry to work with bigger numbers. You have the whole year to teach these rules! • Emphasize the importance of knowing multiples of single digits . Learners need to know that the multiplication facts that they have learnt in previous grades will be applied in their calculations. Not all learners will see the connection so it has to be made explicit to them. • Oral, mental and written work is done daily and should include revision of work done to date.
Resources: Chalkboard and textbooks.

Oral and Mental Activity (10 minutes)

- Take any single digit number and ask learners to write down as many multiplication facts as possible. Encourage them to look for relationships e.g. if I know that 3x7 =21, I know that 6x7=42 because it is double 3x7. I also know that if 6x7=42 then 6x14=84 and 12x7 also equals 84.
- Draw a number line on the board and fill in some of the numbers, using the fractions that were dealt with in Grade 5. Ask different learners to come and fill in the missing numbers and fractions.

Concept Development (30 minutes)

- Make sure every learner has access to paper and writing materials e.g. pencil, eraser, etc. before starting. Learners may work on their own, with a friend or in a group. You will read the problem to the class and then encourage them to read it again for themselves. Leave the learners to solve the problem in their own way – do not interfere with learners as they work! The problems you pose will require computations such as 23x2, then 23x3, 23x5, 23x10, 23x12, 23x15, 23x20 and so on. On Day 1 you worked with computations up to 23x10, so today you will start there and work with other 2-digit numbers. An example of a problem could be:
  The motor car factory produces 23 cars a day. How many cars are produced in 10 days? How many cars are produced in 12 days? 15 days? 20 days?

The following are some examples of the type of computations you can expect from your class for the number of cars produced in 10 days. These are NOT methods for you to teach the learners! They are provided as a guide as to what you can expect.

Child 1:
23x2=46 23x2=46 23x2=46 23x2=46 23x2=46 (23x2 five times is the same as 23x10)
46+46=92 92x2=184 184+46=230 (if you count this up you will find that it is the same as 23x2 five times, or 23x10).

Child 2:
20x5=100 3x5=15 100+15=115 (broke the 10 into 5+5 and worked with one 5)
115x2=230 (if multiplying by one 5 gives 115, then another 115 is needed for the other 5)

Child 3:
20x10=200 3x10=30 200+30=230 (the 23 was broken up as 20 +3)

- Ask a problem using similar numbers e.g.
  A farmer packed 34 pockets of potatoes into 1 crate to send to the market. How many pockets of potatoes did he pack in 2 crates? 4 crates? 10 crates? 14 crates? 20 crate? 24 crates?
  Learners should use their knowledge of doubling and halving, building up and breaking down numbers, counting in multiples, etc. to work out the solutions to these problems. It is important that your questioning helps learner to become aware of the relation ship of the numbers.

Consolidation (20 minutes)

- Find an exercise in the textbook, devise a worksheet or write work on the board where learners have to work out addition and subtraction of 2 4-digit numbers. This is revision of work done in Week 1 and 2.

Week 3: Day 3

Notes to the teacher:

- This is a continuation of the previous lessons where 2 and 3-digit numbers are multiplied by 1 or2-digit numbers, including whole 10s and 100s.
- DO NOT be in a hurry to work with bigger numbers. You have the whole year to teach these rules!
- Emphasize the importance of knowing multiples of single digits . Learners need to know that the multiplication facts that they have learnt in previous grades will be applied in their calculations. Not all learners will see the connection so it has to be made explicit to them.
- Oral, mental and written work is done daily and should include revision of work done to date.

Resources: Chalkboard and textbooks.

Oral and Mental Activity (10 minutes)

- Draw a number line on the board and fill in some of the numbers, using the fractions that were dealt with in Grade 5. Ask different learners to come and fill in the missing numbers and fractions.
- Repeat this activity, using decimals and not common fractions.
- Learners count in fractions and/or decimals using number lines if they need them.

Concept Development (30 minutes)

- Let learners work in pairs to find a solution for the repeated addition you have written on the board e.g.:
  (20+3) + (20+3) + (20+3) + (20+3) + (20+3)+ (20+3)=
- Ask them to write this algorithm in as many ways as possible e.g.
  (20+3)x6= OR (20x6) + (3x6)= OR 23x6= and so on.
- Working in groups, give the learners the following type of problem to solve:
  A hardware factory sold screws in boxes of 24. Workers in the first shift packed 10 boxes, workers in the second shift packed 20 boxes, workers in the third shift packed 30 boxes and workers in the night shift packed 40 boxes. How many screws were packed during each shift?
  Once learners have found the answers, let them discuss their solutions with the whole class. Write the solutions on the board. Depending on the level of your learners, solutions could be:
  - 24x10=240 OR
  - (20x10) + (4x10)= 200+40=240 OR
  - (12x10) x2= 120x2=240 and so on

  Now give them the following problem to solve:
  The following day the first shift managed to pack 41 boxes of screws, the second shift packed 42 boxes, the third shift packed 43 boxes and the night shift packed 44 boxes. How many screws did each shift pack?
  As learners discuss the way in which they found the solution, record the solutions on the board. One solution could be:
  - 24x41 → (20x40) + (20x1) + (4x40) + (4x1) → 800+20+160+4=984.

Do not worry about the algorithms at this stage. The purpose of this activity is to evaluate the learners' understanding of multiplication. You need to make sure that learners understand **WHY** all the digits (numbers) in one number are multiplied with all the digits (numbers) of the other number.

Consolidation: Group activity: (20 minutes:)

- Find an exercise in the textbook, devise a worksheet or write work on the board where learners have to work out the multiplication of 3-digit numbers by a 1-digit number. Encourage learners to record their thinking i.e. how they work out the answers. e.g.

537x5=	276x3=	723x4=	137x8=
343x5=	276x6=	723x8=	137x9=

Tip: *You can use this written work as an assessment activity towards Assessment Task 1*

Homework Activity: Select at least 5 suitable examples from textbook or draw up a worksheet with similar exercises. Learners to choose method they comfortable with.

About Fractions

As a teacher, it is important that you have the following social knowledge regarding fractions. Therefore please read this carefully before beginning the work on fractions

If 3 pizzas have to be shared between 4 people it is obvious that each person cannot have a whole pizza. They will each get a portion – but how big is that portion? Up to now we have mainly dealt with whole numbers like 1, 2, 3, 10, 15, 100 etc. and so don't readily have a number which fits in between any of these. As a result, mathematicians invented a new type of number which has come to be called a fraction. In the problem above where we have to share 3 pizzas between 4 people, we have to divide 3 by 4. As we don't have this type of number we simply call it 3 divided by 4 and we represent it as $\frac{3}{4}$. As long as we don't get any confusion from learners we can use these numbers in any way we wish – the most common being a whole divided into 2, or $\frac{1}{2}$.

These work in numerous ways such as $\frac{3}{10}$ or $\frac{6}{7}$ etc. We could even have $\frac{7}{3}$ or $\frac{15}{7}$ which just means a number bigger than the one being investigated.

If we get 6 pizzas for 6 people, then common sense tells us that each person gets 1 whole pizza so that 6 divided by 6 gives 1 or $\frac{6}{6}$. The division sign gives a clue as to what is happening as it is a line with a dot above and below it i.e. ÷. The dots just represent any number. This invention is a trick often used by mathematicians where they need an extra tool (such as a fraction), they simply invent one! (although mathematicians would talk about "defining" it).

Now let's take another scenario. I have 2 cakes and I cut 1 into 3 and the other into 4 pieces. How do we go about giving 6 people the same amount of cake? Most of us would eventually decide that it is easier if each cake was cut into 12 pieces i.e. each piece of the 1st cake must be cut into 4, and each piece of the 2nd cake must be cut into 3. The 24 pieces can now be divided among the 6 people i.e. $\frac{24}{6}$ so that each person gets 4 smaller pieces or $\frac{4}{12}$ of the cake. If the pieces are looked at in respect of the portion of each cake we see that $\frac{4}{12}$ is the same as $\frac{1}{3}$. We can now say that $\frac{4}{12}$ is equivalent to $\frac{1}{3}$.

You will need to spend time developing this concept so do not be in a hurry and simply teach a rule.

Week 3: Day 4

Notes to the teacher:

- Learners must understand that a fraction is part of a whole. The concept of fractions has been used for centuries.
- By manipulation and experience with concrete material learners will learn to divide 8 into 2 equal parts or 4 equal parts and then to name each of the parts. Seeing the objects and doing practical exploration will help learners make sense of fractions and they will learn to understand what $\frac{1}{3}$ means.
- It is important that learners use the language of fractions and write it in different ways. e.g. saying and writing one third in words and then writing the symbol $\frac{1}{3}$. If there are any misconceptions with the understanding of fractions do not leave them unresolved.
- Even though the focus is on fractions, learners should do written work daily to consolidate and reinforce addition, subtraction and multiplication concepts.

Resources: Textbooks and chalkboard

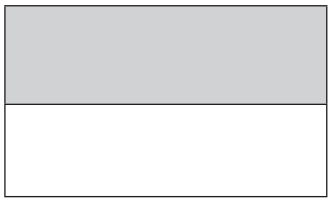
Oral and Mental Activity (10 minutes)

- Do some counting patterns e.g.
  - Count in 4s and every time you also say a multiple of 8 clap your hands e.g. 4, 8(clap), 12, 16(clap). What pattern do you notice?
  - Count in 4s, clap your hands every time you say a multiple of 8 and stamp your feet every time you say a multiple of 3. What pattern do you notice?
- Learners count in 4s and stop when you clap your hands e.g. 52. Ask how many 4s in 52? If 13 fours are 52, how much are 14 fours? If 14 fours are 56, how much are 7 fours? This activity helps learners establish the relationship between numbers, so you can repeat this activity with other multiples and other questions.
- Quick –fire questions and answers. Ask learners to count on in different number intervals e.g.:
  5 ; 10 ; 15 ; 20 ; 25 ;…
  0,1 0,2 0,3 0,4 OR 0,1 0,09 0,08 etc.
  ***Tip**: You can use this as an assessment activity towards Assessment Task 1 by giving different learners a chance to count in decimals. If you have a large class, do this every day until all the learners have been assessed.*

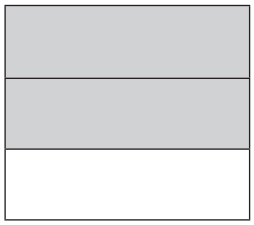
Concept Development (40 minutes)

- Use this activity as a baseline assessment to see whether learners remember and recall how to recognize and name the shaded parts. Draw the following sketches on the chalkboard. The learners must copy them down in their workbooks.

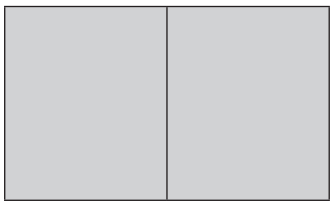
a)



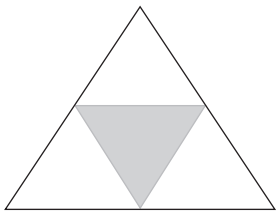
b)



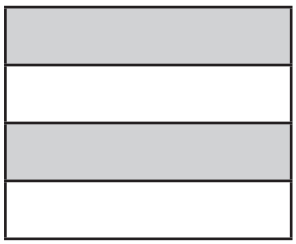
c)



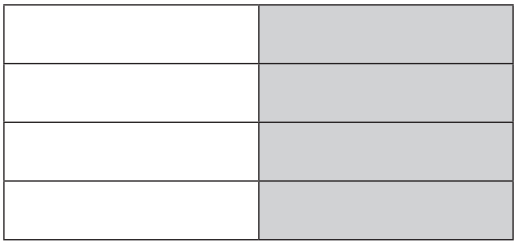
d)



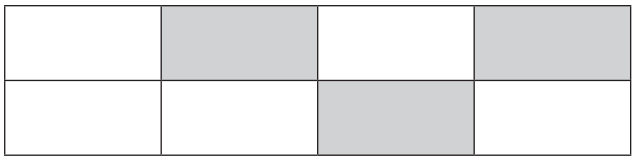
e)



f)



g)



Discuss the sketches with the class by asking questions such as:

- Into how many parts is each figure divided?
- How many equal parts of each figure are shaded?
  Learners record their answers next to the figure.

- Ask learners to look at figure g). It is divided into 8 EQUAL parts and 3 of these parts are shaded. Ask how this figure can be described i.e. 3 out of 8 parts are shaded. Ask if anyone knows how this is written before showing them that it is written like this :

  $\frac{3}{8}$ (of figure g) is shaded. We say that three eighths of the figure is shaded.
- Ask volunteers to write the fractions representing the shaded region next to the figure on the board. They can then copy these in their workbooks. Always focus learners' attention to the whole. Discuss that the sum of the equal parts of the whole is 1. Ask the following type questions e.g.
  - How many equal parts are there in figure d? Answer: there are four equal parts.
  - How many parts are shaded? Answer: one; fraction = one quarter

- How many parts are not shaded? Answer: three; fraction = quarters
- So one quarter plus three quarters are four quarters, or 1 whole, or simply 1.

- Learners now know how to name fractions as part of a whole so they should be able to apply this knowledge to word problems. The following problems deal with sharing and naming the parts. You can use this as an Assessment activity because it draws on previous knowledge. Do not rush the learners. Give them enough time to make sense of the problem and also to reflect on their answer. If they have drawn or illustrated their strategies that is acceptable. Encourage them to discuss their strategies with each other.

  - 4 friends share 9 chocolate bars equally. How many whole pieces does each one get?
  - Into how many equal pieces must they cut the remaining chocolate bars?

  Encourage learners to work with a friend to see what is the same and what is different about their strategies and answers.
- Look for similar type problems that allow learners to work out the number of parts and the equality of the parts.
- The following problem situation focuses on the size of fractions. It is best to give learners lots of practice with this so that they are able to construct meaning for themselves. Encourage them to work in groups discussing possible solutions and then to record their answers in their workbooks.
  - Thembi has a party at the local pizza parlour. When the pizzas are brought to the tables, they are all the same size, but they are all cut in different portions as follows:
    Pizza A was cut into 4 slices, ®we say quarters
    Pizza B was cut into 5 slices,®we say fifths
    Pizza C was cut into 6 slices ®we say sixths and
    Pizza D was cut into 8 slices.®we say eighths
    a) If you want the largest slice available, from which pizza would you take it?
    b) If you want the smallest slice available, from which pizza would you take it?
    c) If you want the second largest slice available, from which pizza would you take it?
    d) If you want the second smallest slice available, from which pizza would you take it?

Consolidation exercises (10 minutes)

- Display four thirds (using pictures, fraction strips, etc). Ask learners: is this more or less than 1 whole?
- Display five fourths (using pictures, fraction strips, etc). Ask learners: is this more or less than 1 whole?
- Display seven eighths (using pictures, fraction strips, etc). Ask learners: How much more do I need to get one whole?

Homework Activity: Give 5 similar examples from textbooks

Week 3: Day 5

Notes to the teacher:

- Point out to learners that our numerals are based on the Arabic number system. It is called Arabic numerals.
- You can look up a story on the history of number and read it out to the learners or give it as a comprehension passage.

Resources: Textbooks and chalkboard

Oral and Mental activity. (10 minutes)

- Count in fractions, forwards and backwards e.g. $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$.
- Count in decimals 0,1 0,2 0,3 0,4 OR 0,1 0,09 0,08 etc.

  ***Tip**: You can use this as an assessment activity by giving different learners a chance to count in decimals. If you have a large class, do this every day until all the learners have been assessed. Use it towards Assessment Task 1.*

Concept development: (40 Minutes)
Write the following on the chalkboard which learners write as notes in their workbooks:

Thousands of years ago, people did not have numerals and symbols that we use today. They used things like sticks, pebbles or even notches on sticks to count their sheep, or whatever needed counting.
The ancient Egyptians used picture symbols to represent numbers. See the table below:

Number	Egyptian symbol	Object represented
1	|	Vertical staff
10	∩	Heel bone
100		Coiled rope
1000		Lotus flower
10 000		Bent reed
100 000		Burbot fish

They combined these symbols to make up the number that they wanted represent.

e.g. 7 was written as |||||||

63 was written as ∩∩∩∩∩∩|||

123 was written as ||| ∩∩

The order in which the symbols were written was not important.

Complete the table:

Egyptian Symbol	Number
a)	6
	b)
	c)
d)	1325
e)	2313
f)	3003
g)	11 562
h)	324 421
i)	12 422

The Roman system in table form as compared to Arabic (our system):

Roman	Arabic
I	1
IV	4
V	5
VI	6
IX	9
X	10
XI	11
L	50
C	100
D	500
M	1 000

Emphasize that the order in which numerals are written in the Roman number system does have an effect on the value of the number. This is one of the earliest forms of place value.
Four was thought to be “one before five:” and was written as IV.

Six was thought to be “one after five” and was thus written as VI.
In the same way nine is written as IX and eleven as XI etc.
Eighty was written as LXXX (30 after 50) and ninety-nine as XCIX (one before hundred)

Consolidation (10 minutes)

- Working in pairs and using the tables above, learners complete the following in their classbooks.

1. Write the Roman numerals for:

a) 1 700 b) 56 c) 1 20 d) 14 e) 1002 f)1 979

2 .a). Write 12 and 123 in Egyptian symbols.

b) Now add the two numbers and give the answer in Egyptian symbols.

3. Write the Roman numeral and Egyptian symbols for 24 less than hundred.

***Tip**: Much of this is revision of work done in Grade 5 so you can use this activity towards Assessment Task 1.*

First Term Week 4

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: **LO 1,AS 5, AS 8** **LO 2 AS 1,AS 2,AS3,AS9,AS10,AS11**	**Milestones:** • Estimate and calculate by selecting and using operations appropriate to solve problems that involve: - equivalent fractions - finding fractions of whole numbers • Determine the output values for given input values or input values for given output values using: flow diagrams • Investigate and extend numeric and geometric patterns looking for a general rule or relationships : represented in a physical or diagrammatic form of learners' own creation • Write number sentences to describe a problem situation within a context • Mental Calculations • Use a range of techniques to perform written and mental calculations with whole numbers

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus	Equivalent fractions	Fractions	Determine output values for given input values	Geometric patterns	Problem solving: word problems
Resources:	Chalkboard, textbook Diagram sheet	Chalkboard, textbook	Chalkboard, worksheet	Chalkboard, textbook	Chalkboard, textbook

Week 4: Day 1

Notes to the teacher:

- Make learners aware that fractions occur everywhere in our life. We make use of fractions on a daily basis.
- Learners must understand that $\frac{1}{3}$ means one part out of three parts. So if we want to find $\frac{1}{3}$ of, we have to share 18 into three groups and take one group out of the three. Count how many in one group. Similarly, if we want to find $\frac{2}{3}$ of 18, we count how many in two groups.
- Some learners might not be ready to find fractions of whole numbers without concrete aid. For those that need it please give them counters to use.
- Even though the focus is on fractions, learners should do written work daily to consolidate and reinforce addition, subtraction and multiplication concepts.

Resources: Cards for the role playing, chalkboard, textbooks

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Tell learners the following kind of story, letting them work out the answers without writing anything down on paper :
  - There were 30x7 people on the train. At the first station half of 40 people got out and 5x6 people got on the train. When the conductor checked the tickets 0x65 people didn't have a ticket. How many people on the train did have tickets?
  - Make up your own story using the following: 32÷8; 1x8=; halve 88; 12x10=

Concept Development (40 minutes)

- Select three students to role play the following story. (To play a mother, sister and brother). Make cards with each one's words on and number it. Ask them to practice during the break or any convenient time.

Mother calls her daughter and says: "I baked 24 cookies. Please take a quarter of these cookies to the neighbor."

Sister to brother in a panic: "How many cookies is $\frac{1}{4}$ of 24?"
Brother to sister: "Divide the cookies into four equal parts. Take 1 group of the four parts and you have a $\frac{1}{4}$.
Sister: "Oh yes! A quarter is just 1 part out of four equal parts.
Sister: "This is what I will do: 24÷4=6, so each group will have 6 cookies.

So a $\frac{1}{4}$ of 24 =6.

Brother: Can you now figure out what is $\frac{1}{3}$ of 24?

Sister: $\frac{1}{3}$ of 24 = 24÷3=8

Brother: "Ok! Wise one, then how much is $\frac{2}{3}$ of 24?

Sister: "If $\frac{1}{3}$ of 24 =8, then $\frac{2}{3}$ of 24 should be 8x2=16.

Mother to daughter: "You're right. That is the way I work it out."

- Now ask learners to write the steps in their books and ask them to try the following exercise

1a) $\frac{5}{6}$ of 36 marbles b) $\frac{3}{8}$ of 24 cookies

c) $\frac{3}{4}$ of 100ml d) $\frac{1}{2}$ of 40 pencils

e) $\frac{8}{10}$ of 100 marks f) $\frac{2}{5}$ of 20 lollipops

g) $\frac{1}{6}$ of 72 eggs

2a) Which is more: $\frac{7}{8}$ of 256 or $\frac{5}{6}$ of 270 sweets?

b) How many days in a year? How many days in $\frac{3}{5}$ of a year?

c) How many days in $\frac{3}{5}$ of three years?

d) If there are 360 learners in a school and $\frac{7}{8}$ are boys, how many are girls?

e) There are 936 children. $\frac{1}{6}$ do not like the color blue. How many children like the color blue?

Note to the teacher:

Encourage learners to use any method to solve the last two examples i.e. they can first find $\frac{7}{8}$ of 360 (exercise d) and then subtract answer from 360 or they can find $\frac{1}{7}$ of 360 straight away. Engage them in discussion for the last few minutes of the lesson.

Homework: Select at least 5 examples from textbook.

Week 4: Day 2

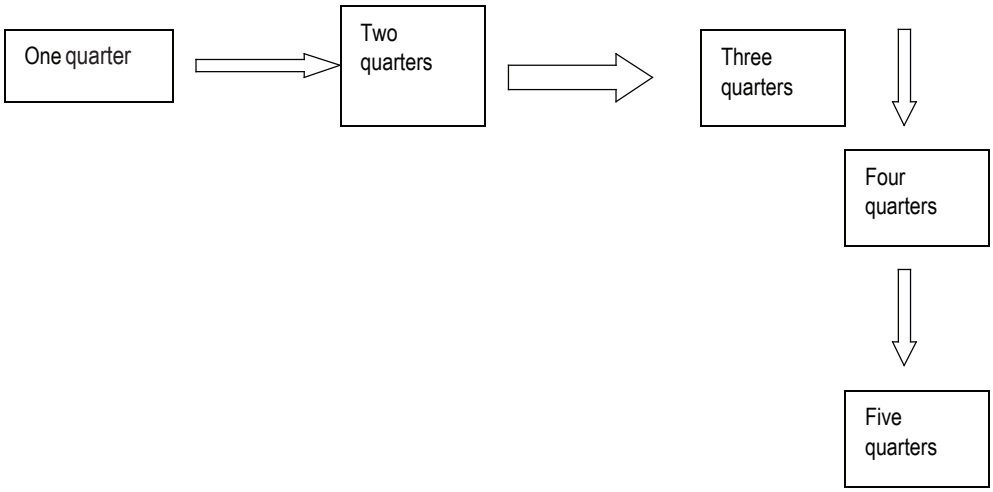
Notes to the teacher:

- This lesson deals with equivalent fractions.
- A diagram sheet with the circles is provided as Annexure 3 to be photocopied for the learners.
- This lesson encourages self-discovery of the properties of fractions (equivalent), therefore most of the lesson will comprise of group work.
- Remember to continue asking learners what the numerator and denominator tell us: by now they should know that:
  - the top number is the counting number. It tells us how many parts we have and how many parts we are talking about.
  - the bottom number tells us what is counted. It tells us what fractional part has been counted.
- Even though the focus is on fractions, learners should do written work daily to consolidate and reinforce addition, subtraction and multiplication concepts.

Resources: Chalkboard, textbook and photocopied sheet

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes



Let learners count in fractions by writing their answers in words as fast as possible and complete the chain

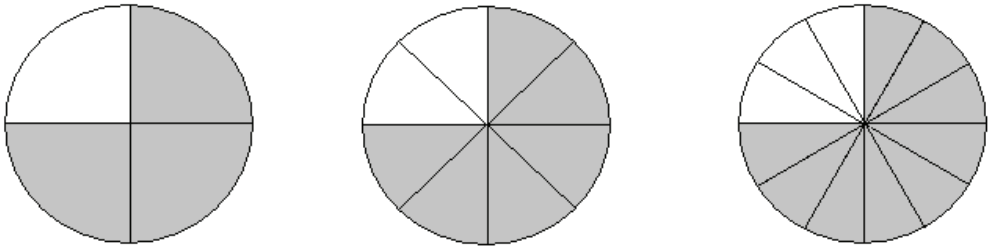
Concept development: 25 minutes

- Hand out the sheet of circles or draw the circles on the board, shading each one as in the worksheet. Discuss with the learners what they observe and record the findings on the board. The circles in each set are identical. The same fraction of each circle (of the same set) is shaded, but the circles are all divided into a different number of parts e.g. In set c): we

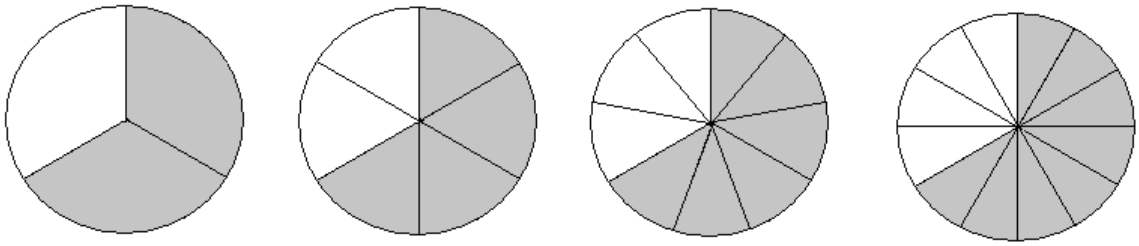
  notice that : $\frac{1}{2}$ of the first circle is shaded and
  $\frac{2}{4}$ of the second circle is shaded and
  $\frac{3}{6}$ of the third circle is shaded.

But we see that exactly $\frac{1}{2}$ of each of the circles in the set is shaded.
So to record our findings we can say that

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$$



↑
Set a)



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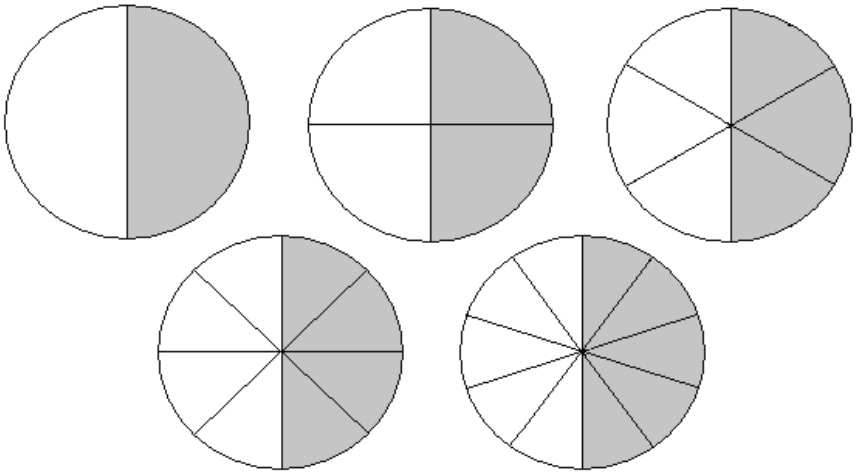
Set b)



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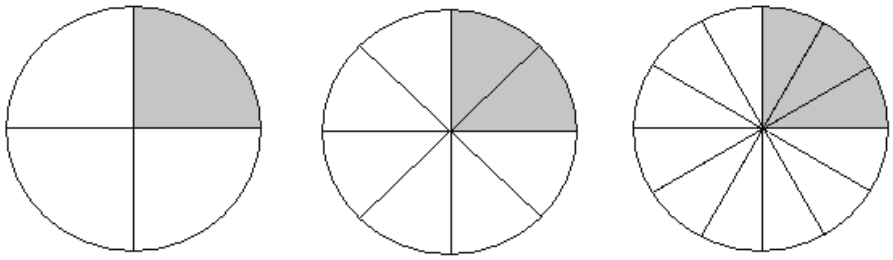
Set c)



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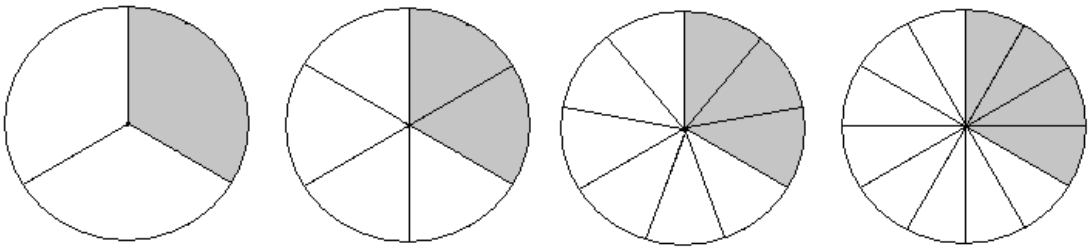
Set d)



↑
Set e)

- Ask learners what they notice about the relationship between the denominators and numerators. Let them discuss this for 5 minutes in their groups. Write down relevant suggestions/ findings. (Or suggest this if nobody else does)

  If your learners are not ready for the abstract explanation of finding equivalent fractions then please do not do this yet. Allow them more practical experiences with cut-out fraction pieces, Cuisenaire rods and their own fraction walls. Allow them to do this for a long while. It is better that they understand the concept of equivalent fractions that memorizing a rule that is meaningless.

- Focus learners attention on:

  $\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$ and $\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$ and $\frac{1}{2} = \frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

  Do as many examples as necessary to allow learners to develop their own understanding that to preserve equivalence, we must multiply both numerator and denominator by the SAME number.
  What number must be written in the frame to make the written statement true?

$\frac{1}{2} = \frac{\square}{18}$ answer: $\frac{1}{2} = \frac{1 \times 9}{2 \times 9} = \frac{9}{18}$

Remind learners that the numerator and denominator must be multiplied by <u>same</u> number through asking questions such as: what did we multiply 2 by to get 18? Answer is 9. So we also have to multiply the numerator by 9 to get the answer.

Consolidation (15 minutes)
Give the learners some more examples to complete. Either use their textbook, design your own worksheet or write the following on the board:
Tip: *You can use this activity towards Assessment Task 1*

$\frac{5}{6} = \frac{\square}{18}$?

$\frac{5}{6} = \frac{5 \times 3}{6 \times 3} = \frac{15}{18}$

Let learners work in pairs to answer similar type questions.
<u>A)</u>

1) $\frac{2}{3} = \frac{\square}{9}$

2) $\frac{3}{4} = \frac{9}{\square}$

3) $\frac{5}{12} = \frac{\square}{48}$

4) $\frac{1}{4} = \frac{5}{\square}$

5) $\frac{\square}{6} = \frac{9}{18}$

6) $\frac{4}{\square} = \frac{20}{25}$

B)
Write down 3 equivalent fractions for each of the following
An example has been done for you.

Eg. $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{30}{50}$

a) $\frac{1}{6}$ b) $\frac{3}{8}$ c) $\frac{5}{7}$ d) $\frac{3}{4}$ e) $\frac{1}{2}$

f) 1 (Remember $1 = \frac{2}{2} = \frac{3}{3}$ etc.)

Homework: Choose similar examples on equivalent fractions.

Week 4: Day 3

Notes to the teacher:

- Although all our flow charts are spider diagrams, encourage learners to be creative when they draw their own ones.
- Explain to learners that flow charts are just another way to represent number sentences.
  Remember that the square in the middle of the flowchart is like a machine. In our example our "machine" adds ten to every number that is being put into it. We call this number the input number. The number that comes out of the machine is the output number. Sometimes we can feed our input into two machines in other words; the number goes through two different processes. When we are given the output number, we find the input number by doing the opposite operation to that in the machine.
- It is important that learners know that the first input value corresponds with the first output value etc.

Resources: Chalkboard and textbooks

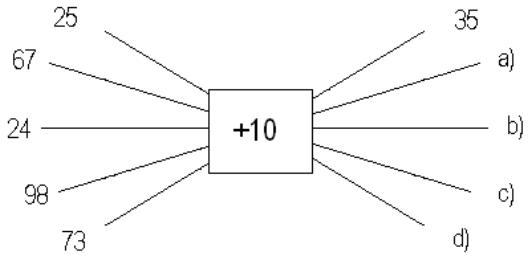
DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Begin the lesson with some mental and oral activities. Use this time to revise work learnt as well as encouraging learners become mentally agile when dealing with numbers e.g.
  - Count in 5s from 18 to 53;
  - Count back in 4s from 70 to 54
  - How much are :9x9=; 36÷4=; double 35; halve 83; 5x6= ; 6x5=; 60÷10=

Concept Development : (35 minutes)

- Learners should be familiar with flow charts, so start off by asking what they know about a flowchart e.g. input, output, operator, etc.
  Illustrate an example of a flow chart (in this case a spider diagram) and explain how it works.
  Eg.



Explain to learners that to find the output number 35, you look at input number 25. In other words the first number on the left corresponds with the first number on the right and vice versa. (This is very important.) So to find the output number for a), you need to look at the second number i.e. 67. This is how they write number sentences that can be derived from above:

25+10=35 (do the first one ,thereafter ask individual learners to give other answers
.

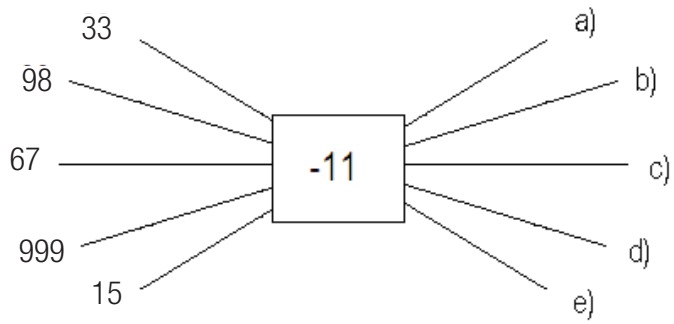
a) 67+10=
b) 24+10=
c) 98+10=
d)73+10=

Consolidation (15 minutes)

- With your partner, redraw the spider diagrams as neatly as possible. In the first two, find the input value. In the third one you have to find the output value. Once you have completed the spider diagram, record the number sentences.

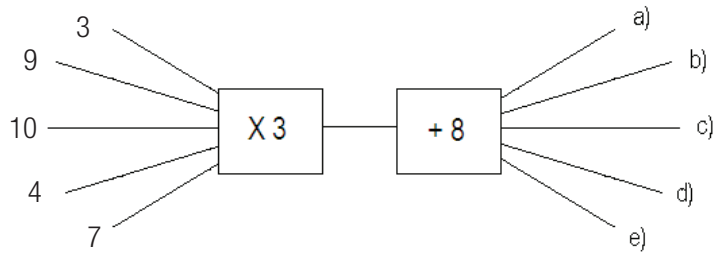
1.

input number output number



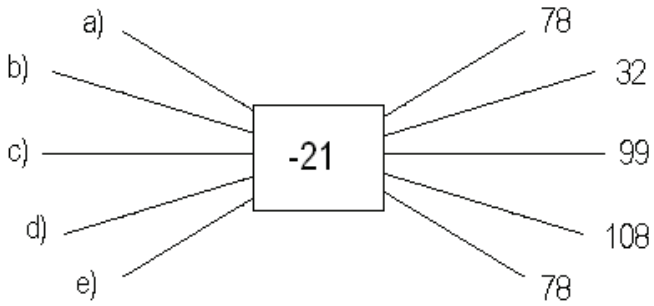
2.

Input number output number

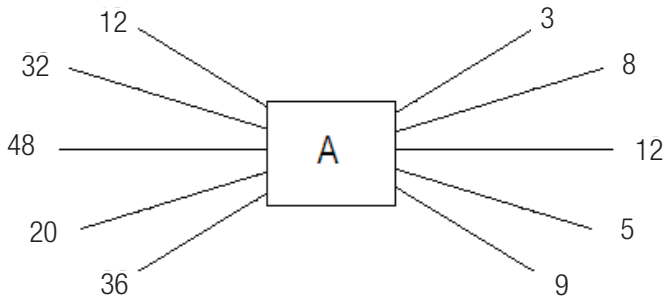


3. Find the input value (Learners should work out for themselves that if given the output number, they should do the inverse operation to get the input number.)

Input number output number



4. Find the missing number that must replace A.



- Learners should also be able to make a flow chart from a number sentence.
  Select a learner to draw a flow chart from the number sentences given in the example below. (it does not necessarily have to be spider diagrams.) Note: we need two machines, because each input number is undergoing two processes.
  5x 5 +3
  6x 5 +3
  4x 5+3
  10x 5+3
  7x 5+3
- Look in textbook for different examples of flow charts and illustrate some fun ones on the chalkboard.

Consolidation (15 minutes)
Draw a flow chart to represent the following number sentences: Remember to show your output values as well. You may change the diagram of your input machine.

1.
   a) 75-32
   b) 87-32
   c) 100-32
   d) 99-32
   e) 120-32

2.
   a) 45+22 - 4
   b) 66+22- 4
   c) 22+22 - 4
   d) 79+22 - 4
   e) 56+22 - 4

Week 4: Day 4

Notes to the teacher:

- When using the calculator in order to develop number sense, make learners aware that in order to obtain the correct answer they need to understand and enter the correct calculation.
- When we talk about patterns, we think about patterns in nature, like on leaves or trees, on animals, etc. We also think about number patterns. Number patterns can be found on house numbers in your street, and also on the number chart on the wall in the classroom. Point out and discuss the patterns on the number chart with the learners.
- It might be a good idea to draw the geometric patterns on the board before the time.
- When exploring and investigation patterns you will look to see if your learners can:
  - Describe the pattern.
  - Continue the pattern.
  - Create and continue their own patterns.
  - Follow the criteria stated to create the patterns.
  - Articulate a rule.

Resources: Chalkboard, number chart, text books.

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Let learners copy and complete the first four answers on their own. Then allow them to use the calculator if they wish.

  9109 x 1 = 9109

  9109 x 2 = 18 218

  9109 x 3 = 2..3..7

  9109 x 4 = ……6

  Let learners keep going till 9109 x9. Ask them to look for the patterns in the answers.

Concept development: (30 minutes)

- Ask learners what they understand by the term pattern. One answer might be that: "a pattern is a repetition of a design." Discuss with learners where patterns occur in all aspects of life i. e. in the house, in nature, in the playground, on fabrics, on animals etc.
- Draw examples of geometric patterns on chalkboard .e.g.

  ΩΩ; ΩΩ ΩΩ; ΩΩ ΩΩ ΩΩ ΩΩ; _____ ; _____

  Ask learners to complete the patterns.
- Ask learners to create their own geometric patterns in workbooks, about 5 (encourage them to be creative.)
- Learners to look at the pattern below and answer the questions:

Example 1:

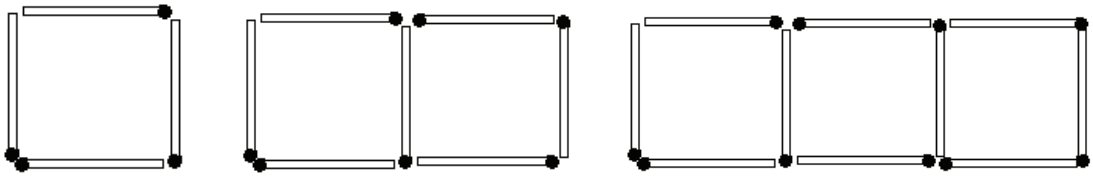


figure 1 figure 2 figure 3

a) How many matches were used in figure 1? (Write down their answer on board.)-4
b) How many in figure 2? Write it as follows: 4+3 or 4+(1x3)
c) How many in figure 3? 4+3+3 or 4+(2x3)
d) How many matches will be used for figure 5? 4+3+3+3+3 or 4+(4x3)

- Now ask questions to stimulate thinking about patterns and the need to find patterns e.g.
  - What pattern is developing?
  - Why is there a need to find a pattern?
  - Can you see that each figure has 4 plus (one less than the number of squares) x3?
  - Therefore figure 10 will have 4+ (9x3) matches i.e. 40 matches.

Some learners will say "Times the number by three and add one" are they right? Check this rule. (Impress on learners that they must check their rules.)
Ask learners to use whatever formula they found to determine how many matches will be needed to build figure 100.

Consolidation (20 minutes)

- Look at the pattern below:
  Example 2:

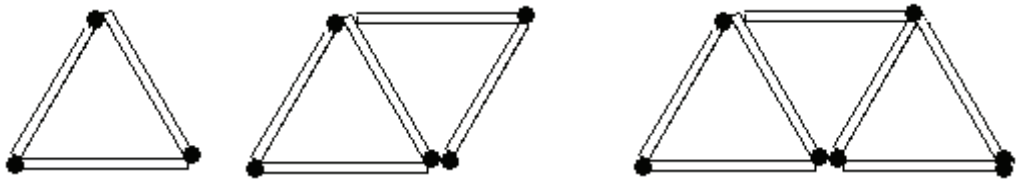


figure 1 figure 2 figure 3

a) How many matches would you use in the next figure?
b) How many matches would you use in figure 10?
c) Try to derive a general rule and then determine how many matches will be used for the 100th figure.
d) If you had 181 matches, how many hexagons (shapes) would you have?

- Here is another pattern. What do you notice?

Example 3:

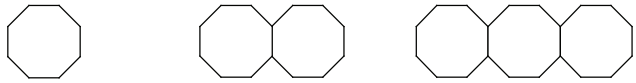


figure 1 figure 2 figure 3

a) How many lines would you use in the next figure?
b) How many lines would you use in figure 10?
c) Try to derive a general rule and thereafter determine how many lines will be used for the 100th figure.
d) If you had 181 lines, how many hexagons (shapes) would you have?

***Tip**: You can use this activity towards Assessment Task 1*

Homework: Select 5 similar examples from textbooks.

Week 4: Day 5

Notes to the teacher:

- This lesson will deal with problem solving. When learners do problem solving, it is important to allow them enough time to think through and discuss the problem.
- The learners should be encouraged to explore the problem by careful reading of the problem. They need to re-read it; think about it and even discuss it with their peers if necessary. They can draw diagrams if it can assist them to solve it.
- It is very important that the teachers DO NOT tell them what to do before they have gone through the exploration stage.
- Once the learners have a plan of action they need to use that plan to create a number sentence if necessary to solve their problem. Sometimes more than one step will be necessary. The learners must bear in mind that every word sum/problem requires a different type of thinking.
- It is best to start off using numbers with which the learners are familiar. They should not feel bogged down at first by lengthy calculations.
- Start the lesson by encouraging learners to use what they already know and own to solve the problems.

Resources: Worksheets and textbook

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- The following questions deal with division with remainders. Tell learners this. There is no need for surprises here. Let learners write down the answers as you call out the numbers and at the end give them the answers and let them mark their own work.

  15 ÷ 9
  22 ÷ 5
  46 ÷ 10
  13 ÷ 2
  34 ÷ 4
  7 ÷ 2
  10 ÷ 3

Concept development (45 minutes)

- Write the following examples on board, and ask different learners to volunteer the answer to each one. Allow discussion as to how they got their answers (see notes to teacher).
  - Peter had 100 marbles. He lost 40. How many does he have left?
    Most children will immediately know that the answer is 60 but it is important that they can explain WHY they feel the answer is 60. They need to develop a method that can accommodate larger numbers to work out problems like the following:
  - A farmer harvests 2 476kg of tomatoes. He sells 1 097kg. What mass of tomatoes does he have left?
  - In a forest there were 342 trees. A fire destroyed 225 of them. How many trees are left in the forest?

- Below are lots of word problems to present to learners. Choose the ones you want or use your own. Allow learners to discuss and solve questions on their own with a partner or in a group. Move around in the class and engage in discussion, but do not lead it (while learners are doing worksheet.)
  - There are 13 baskets with 5 eggs in each basket. How many eggs are there altogether?
  - There are 16 tables with 4 chairs at each one. How many chairs are there altogether?
  - There are 8 carrots in a bunch. If Mother bought 6 bunches, how many carrots did she buy?
  - There are 35 parking bays in one row in the parking lot. If there are 47 rows of parking bays, how many cars can park there?
  - 15 friends sit around the table. Two are girls. How many boys?
  - In our class of 45 learners, 27 write with a pen, whereas the rest prefer to write with a pencil. How many learners use pencils?
  - Mr. Thula has R685. He wants to buy groceries for R704. How much money does he still need?
  - In a school there are 192 less boys than girls. There are 524 girls.
    How many boys are there in the school?
    How many children altogether?
  - There are 7 workbooks, 5 readers and 2 textbooks on a table. How many books are there altogether?
  - I bought a lollipop for 30c, and a packet of chips for 55c. How much did I have to pay?
  - There are 475 foundation phase learners and 623 intermediate phase learners. If there are 157 senior phase learners, how many learners are there altogether?
  - Thandi has collected R132 on her list. Sipho has collected twice as much. How much money did the two girls collect altogether?
  - Eric weighs 58kg and his sister weighs 53kg. Their father is 22kg heavier than the brother and the mother is 3kg heavier than the sister. What is the total mass of the family?
  - If one sweet costs 10c, how many sweets can you buy for 53c? How much money will you have left over?
  - A car travels 1971km. It uses 1L of petrol for every 9km. How many litres of petrol are required for the journey?
  - There were 148 people on the beach. If they all came by car with 4 people in each car, how many cars were there?
  - Mother has to make 6 equal payments to pay off R2610. How much must she pay each time?
  - A taxi has 4 wheels. How many wheels do 235 taxis have?
  - What is the difference between largest number and the smallest number that can be made with the digits 7; 2; 0 and 5.
  - The sum of 4 numbers is 13021. Three of the numbers are 1572; 4368; 3209. What is the fourth number?

- A hawker packs his apples in packets of 5 each. If a box contains 250 apples, how many packets can he get from 3 boxes?
- One shelf in the library can carry 35 books. How many books does the library have if there are 17 shelves?

First Term Week 5

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: A S 5, AS 3 AS 8;AS 9, AS10,AS11	Milestones: • Recognise and represent in order to compare common fractions including specifically tenths • 0 in terms of its additive properties • 1 in terms of its mulplicative properties • Mental Calculations • Use a range of techniques to perform written and mental calculations with whole numbers.

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.

	Day 1	Day 2	Day 3	Day 4	Day 5
Content Focus	Properties of zero and one	Properties of zero and one	Revision	Fractions of a whole number	Fractions (continued)
Resources:	Textbooks and Chalkboard, Worksheet	Textbooks and Chalkboard, Worksheet	Textbooks and Chalkboard Diagram sheet	Textbooks and Chalkboard Worksheet, Diagram sheet and worksheet	Textbooks, Chalkboard, diagram sheet, crayons

Week 5: Day 1

Notes to the teacher:

- This is a development exercise to make learners aware of the properties of zero and one. It is much better if you take a small group at a time when developing new concepts. You are then able to discuss the concept and observe, through your interaction with the learners, who has not grasped the new concept and needs more time to work on developing their understanding of the concept.
- While working with a small group set the rest of the class work which they can do easily. This prevents them from interrupting you when you are busy working with a small group of learners.
- The written work should be revision and consolidation of work done to date e.g. addition and subtraction in columns.
- You will work with Groups B and D today.

Resources: Chalkboard and textbooks

Oral and Mental Activity (10 minutes)

- Use a sorting table to sort numbers by two rules (criteria). Draw the table on the board for the whole class. Here is an example: *Sort the numbers from 100 to 150 into numbers that are or are not in the 4s counting pattern, and numbers that are or are not in the 5s counting pattern.* Give each learner an empty table to work in. They can do one sorting table **each day** this week. This is an example:

	In the 4s pattern	**Not in the 4s pattern**
In the 5s pattern	100, 120, 140	105, 110, 115, 125
Not in the 5s pattern	104, 108, 112	101, 102, 103, 106

- Let all the learners stand behind their chairs. Call out number expressions and the first learner to answer sits down. Carry on asking until everyone is sitting down. Here are some examples of what you can ask:

3x7= 3x6= 32÷8= 36÷6= 13+7= 21-9= 54÷6= 8+6= 35-9= 24÷4=

Concept Development (40 minutes)

- Divide your class into 4 groups (A, B, C and D). Set 3 of the groups work to do while you are working with the 4th group. You will do this activity over two days, working with Groups B and D on Day 1 and Groups A and C on Day 2. Some examples of work for the learners to do are:
  - Estimate how many paper clips are needed to measure around your maths workbook. Now use the paper clips to measure how many are needed. How accurate was you estimation? Record your answers in a table like this:

Objects to be used	Estimate	Actual number	How accurate
Maths Workbook and paper clips	20	26	6 too few
Teacher's table and rulers			
Desk and pencils			

- Complete the number sentences written on the board (consolidation of Week 5's lessons on division)
- Use a textbook and complete an activity.
- Write a paragraph saying how you feel when doing mathematics.
- Play a card game with a partner, or dominoes, or a board game, etc.

• Once the class is settled, work with Group B. Give each learner a piece of paper to write on.

- Ask them to write down the questions you ask and find the answers. As soon as they see a pattern, they must say so. Ask questions such as

  How much is 88+0? 88-0?
  How much is 11+0? 11-0?
  How much is 92+0? 92-0?

  Carry on like this until someone is able to tell you that when you add 0 to or subtract 0 from a number, the number remains unchanged.
- Now ask:

  How much is 88+0? 88-88?
  How much is 15+0? 15-15?
  How much is 64+0? 64-64?

  Carry on until someone is able to tell you that when you add 0 to a number it remains the same, but that when you subtract the whole number you have 0 as the answer. Ask what the difference is between the two groups of number sentences.
- Now let the group investigate how to work out the following:
  If we replace a number with x, what will x+0 be? What will x-0 be? What will x-x be? What will x+x be?
- Ask learners to write down 2+2+2+2 and write the answer. Ask how else they can write this repeated addition and they should write 4x2=8 and 2x4=8. Now ask them to write 1+1+1+1 and write the answer. Ask how else they can write this repeated addition and they should write 4x1=4 and 1x4=4. Ask what the answer to 23x1 is, and then ask how many 1s they will write in an expanded notation number sentence (23). Do this with a few numbers. Ask what they think will happen when you write 0+0+0+0? Ask them to write this as a multiplication number sentence (4x0=0 or 0x4=0). Ask if this will be true no matter how many 0s are written? Will any number multiplied by 0 always be 0?
- Give the group to find the missing numbers:
  ∏ x 0=6; ∏x0=12 0x∏=23 0x∏=100
  Learners should be able to tell you that there are no numbers that will make these number sentences true!
- Together with the learners draw up the following rules:
  Rules for 0.

a) If any number is multiplied by 0, the product is ___.

b) When 0 is multiplied by any number, the product is ____.

c) When a number is divided by 0 the quotient is ____.

d) When 0 is divided by a number the quotient is _____.

e) When 0 is added to any number, the sum _____.

f) When 0 is subtracted from any number the difference _____.

Rules for one:

a) Any number multiplied by one _____.

b) Any number divided by one _____.

Tip: *Observe how learners cope with this activity and use it towards Assessment Task 1*

Week 5: Day 2

Notes to the teacher:

- This is a development exercise to make learners aware of the properties of zero and one. It is much better if you take a small group at a time when developing new concepts. You are then able to discuss the concept and observe, through your interaction with the learners, who has not grasped the new concept and needs more time to work on developing their understanding of the concept.
- While working with a small group set the rest of the class work which they can do easily. This prevents them from interrupting you when you are busy working with a small group of learners.
- This lesson is a repeat of Day 1 because you will be working with Groups A and C today.
- The written work should be revision and consolidation of work done to date e.g. addition and subtraction in columns.

Resources: Worksheet, chalkboard, textbook

Oral and Mental Activity (10 minutes)

- Use a sorting table to sort numbers by two rules (criteria). Draw the table on the board for the whole class. Here is an example: *Sort the numbers from 100 to 150 into numbers that are or are not in the 4s counting pattern, and numbers that are or are not in the 5s counting pattern.* Give each learner an empty table to work in. They can do one sorting table **each day** this week. This is an example:

	In the 4s pattern	**Not in the 4s pattern**
In the 5s pattern	100, 120, 140	105, 110, 115, 125
Not in the 5s pattern	104, 108, 112	101, 102, 103, 106

- Let all the learners stand behind their chairs. Call out number expressions and the first learner to answer sits down. Carry on asking until everyone is sitting down. Here are some examples of what you can ask:

3x7=	3x6=	32÷8=	36÷6=	13+7=
21-9=	54÷6=	8+6=	35-9=	24÷4=

Concept Development (40 minutes)

- Divide your class into 4 groups (A, B, C and D). Set 3 of the groups work to do while you are working with the 4th group. You will do this activity over two days, working with Groups B and D on Day 1 and Groups A and C on Day 2. Some examples of work for the learners to do are:
  - Estimate how many paper clips are needed to measure around your maths workbook. Now use the paper clips to measure how many are needed. How accurate was you estimation? Record your answers in a table like this:

Objects to be used	Estimate	Actual number	How accurate
Maths Workbook and paper clips	20	26	6 too few
Teacher's table and rulers			
Desk and pencils			

- Complete the number sentences written on the board (consolidation of Week 5's lessons on division)
- Use a textbook and complete an activity.
- Write a paragraph saying how you feel when doing mathematics.
- Play a card game with a partner, or dominoes, or a board game, etc.

• Once the class is settled, work with Group B. Give each learner a piece of paper to write on.
  - Ask them to write down the questions you ask and find the answers. As soon as they see a pattern, they must say so. Ask questions such as

    How much is 88+0? 88-0?
    How much is 11+0? 11-0?
    How much is 92+0? 92-0?

    Carry on like this until someone is able to tell you that when you add 0 to or subtract 0 from a number, the number remains unchanged.
  - Now ask:

    How much is 88+0? 88-88?
    How much is 15+0? 15-15?
    How much is 64+0? 64-64?

    Carry on until someone is able to tell you that when you add 0 to a number it remains the same, but that when you subtract the whole number you have 0 as the answer. Ask what the difference is between the two groups of number sentences.
  - Now let the group investigate how to work out the following:
    If we replace a number with x, what will x+0 be? What will x-0 be? What will x-x be? What will x+x be?
  - Ask learners to write down 2+2+2+2 and write the answer. Ask how else they can write this repeated addition and they should write 4x2=8 and 2x4=8. Now ask them to write 1+1+1+1 and write the answer. Ask how else they can write this repeated addition and they should write 4x1=4 and 1x4=4. Ask what the answer to 23x1 is, and then ask how many 1s they will write in an expanded notation number sentence (23). Do this with a few numbers. Ask what they think will happen when you write 0+0+0+0? Ask them to write this as a multiplication number sentence (4x0=0 or 0x4=0). Ask if this will be true no matter how many 0s are written? Will any number multiplied by 0 always be 0?
  - Write the following and ask the group if the statements are true:

    8x7=56 then 56÷8=7 and 56÷7=8
    3x2=6 then 6÷3=2 and 6÷2=3

    Ask them to complete the division for 0x9. What will they write?
    If 0x9=0 then 0÷9=0
    Can you find a number to make the following statements true?

___x0=6 ___ x0= 100 0 x ___ =8

Learners should be able to tell you that there are no numbers that will make these number sentences true! If we take these same multiplication statements and rewrite them as division sentences, we get:

___x0=6 so 6÷0= ___ so 6÷ ___=0

___ x0=8 so 8÷0= ___ so 5÷ ___=0

However, we remember that there is no numbers to make these statements true, so we say that we cannot find an answer to 6÷0=. This means that we can not divide by 0. It is impossible to divide by 0. It is also not possible to find a number sentence to make these statements true:

6÷ ___=0 8÷ ___=0 5÷ ___=0

Tip: *DO NOT hurry this step. Let learners engage with this concept as often as possible until they have developed their own understanding of 0 in terms of its additive properties and 1 in terms of its multiplicative properties.*

- Together with the learners draw up the following rules:

  Rules for 0.

  a) If any number is multiplied by 0, the product is ___.

  b) When 0 is multiplied by any number, the product is ____.

  c) When a number is divided by 0 the quotient is ____.

  d) When 0 is divided by a number the quotient is _____.

  e) When 0 is added to any number, the sum _____.

  f) When 0 is subtracted from any number the difference _____.

  Rules for one:

  a) Any number multiplied by one _____.

  b) Any number divided by one _____.

Tip: *Observe how learners cope with this activity and use it towards Assessment Task 1*

Week 5: Day 3

Notes to the teacher:

- It is a good idea to have a day of written work every now and then. It helps learners focus on the different aspects of mathematics they have been engaged in.
- You can use this activity as part of your 1st Assessment Task if you wish.

Oral and Mental Activity (20 Minutes)

- Take learners outside and ask them to get into groups according to the number you call out e.g. make groups of double 9 less 10 (each group should have 8 learners in it), half of 20, half of 6 multiplied by 4, 10 more than 1, etc. Each time discuss how many groups and how many learners not in a group, linked to the number of learners in your class.

Concept Development (30 minutes)

- Back in the classroom, give each learner a copy of the worksheet, or write the work on the board for them to copy into their books. After the excitement of running around, this will help to settle the class.

Section A

Write down the answers only:

1. 21-11=	11. 5x4=
2. 15-9=	12. 8x7=
3. 16+3=	13. 6x6=
4. 5+12=	14. 4x9=
5. 42÷7=	15. 100x10=
6. 30÷6=	16. 36÷9=
7. 54÷9=	17. 72÷8=
8. 4+13=	18. 16-5=
9. 13-9=	19. 23-8=
10. 25-7=	20. 24÷6=

Section B

1. Fill in the missing numbers to make the number sentences true.

a) 28+37 =	b) (39-3) ÷ 6=
c) __ +9= 108	d) 99 + 9 = 9 x __
e) (67-7) ÷ 12=	f) 40 ÷ 8 + 5 =

2. Write down the number which is

a) 1 more than 3 999

b) 20 more than 3 987
c) 100 less than 1 496
3. What is the value of the underlined digit:
a) 9 867; b) 23 472 c) 20 021 d) 33 333; e) 15 802

4. What number is made up of the following:
7; 5 thousands; 3 ten thousands; and 9 hundred thousands.

5 Write from smallest to biggest.
31 252; 321 152; 35 212; 87 321

6. Round 2 519 off to the nearest :
a) ten
b) thousand
c) hundred

7. Subtract: a) 1 734 – 1 578

b) 2 000 – 354

8. Add: a) 709 + 616

b) 6 009 + 3 251

9. Multiply a) 215 x 3

b) 24 x 13

10. Divide: a) 678 ÷ 6

Tip: *Remember, this can be used towards Assessment Task 1*

Week 5: Day 4

Notes to the teacher:

- Learners must understand that a fraction is part of a whole. By manipulation and experience with concrete material and word problems, learners will learn to divide 8 into 2 equal parts or 4 equal parts and then to name each of the parts. Seeing the objects and doing practical exploration will help learners make sense of fractions and they will learn to understand what $\frac{1}{3}$ means.
- It is important that learners use the language of fractions and write it in different ways. e.g. saying and writing one third in words and then writing the symbol $\frac{1}{3}$.
- Revise terminology like numerator and denominator.
- A sheet of diagrams as well as a worksheet have been provided in the annexures and can be photocopied.

Resources: Chalkboard**,** worksheets, textbooks, and crayons.

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Revise number bonds, multiples, counting etc

E.g. 56 ÷ 8 = 7 × 9 = 64 ÷ 8=

7 + 5 = 19 – 7 = 25 – 9 =

- Let learners copy and complete the first four answers on their own. Then allow them to use the calculator if they wish.

8741x 1 = 8741

8741 x 2 = 17 482

8741 x 3 = 26 223

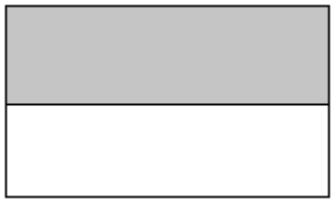
8741 x 4 =

Let learners keep going till 8741 x9. Ask them to look for patterns in the answers

Concept Development: (20 minutes)

- Hand out photocopied sheet (from Annexure 2) to learners to paste in their books or find similar type examples and use them. This is the same as the work done in Week 3 so use it as a quick revision of what learners should know.

1. a)



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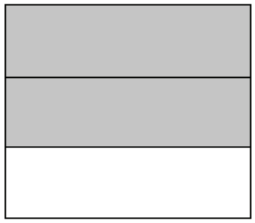

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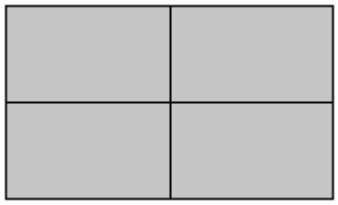

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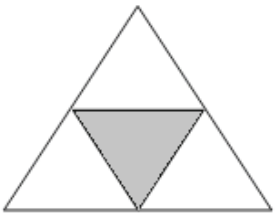

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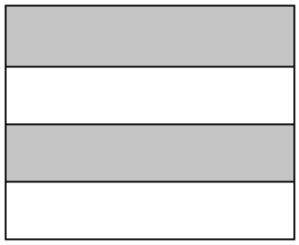

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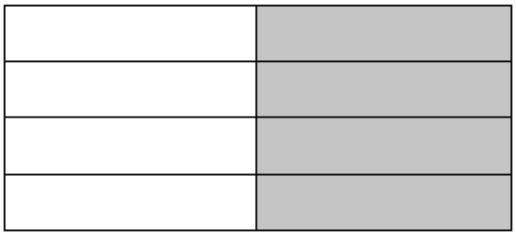
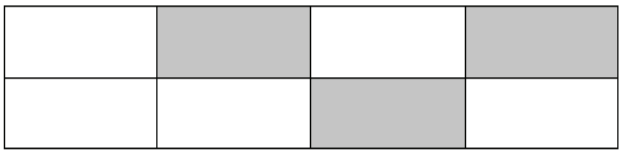


g)



1) Into how many parts is each figure divided?
2) How many equal parts of each figure are shaded?
3) Look at figure g. It is divided into 8 EQUAL parts and 3 of these parts are shaded. So we can say that 3 out of 8 parts are shaded. We write this as $\frac{3}{8}$ (of figure g) is shaded and we say that three eighths of the figure is shaded.

- You may ask volunteers to write the fractions representing the shaded region next to the figures on the board. They can then copy these in their workbooks.

Consolidation Activities (30 minutes)
Photocopy the following exercises and use it as a worksheet on fractions. Learners can write answers on worksheet.

<u>Worksheet on fractions</u>

Thembi has a party at the local pizza parlour. When the pizzas are brought to the tables, they are all the same size, but they are all cut into different portions.

Pizza A was cut into 4 slices, →we say quarters
Pizza B was cut into 5 slices,→we say fifths
Pizza C was cut into 6 slices →we say sixths and
Pizza D was cut into 8 slices.→we say eighths
Pizza E was cut into 10 slices → we say tenths

Discuss the following in groups and write answers in workbook.

a) If you want the largest slice available, from which pizza would you take?
b) If you want the smallest slice available, from which pizza would you take?
c) If you want the second largest slice available, from which pizza would you take?

d) If you want the second smallest slice available, from which pizza would you take?

e) Write from smallest to biggest.

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

- Point out to the learners that $\frac{1}{5}$ can also be written as 1 ÷ 5, and $\frac{1}{4}$ can be written as 1 ÷ 4 etc.
- We have a symbol for "is more than". It looks like this " >" i.e. 5 > 2 and we read it as 5 is more than 2.
- We have a symbol for "is less than". It looks like this " < " i.e. 2 < 7 and we read it as 2 is less than 7.

1.Choose the correct form from those in brackets

a) $\frac{1}{2}$ is (more than / less than) $\frac{1}{3}$

b) $\frac{1}{4}$ is (more than / less than) $\frac{1}{3}$

c) $\frac{1}{7}$ is (more than / less than) $\frac{1}{4}$

d) $\frac{4}{6}$ (< ; >) $\frac{4}{5}$

f) $\frac{3}{7}$ (< ; >) $\frac{3}{8}$

g) $\frac{1}{3}$ (< ; >) $\frac{1}{4}$

h) $\frac{1}{2}$ (< ; >) 1

2 .Which would you prefer? $\frac{1}{3}$ or $\frac{1}{5}$ of a pie? (Assuming that you like pies)

3) Arrange the following from biggest to smallest:

a) $\frac{1}{5}$; $\frac{1}{4}$; $\frac{1}{2}$; $\frac{1}{3}$; $\frac{1}{6}$; $\frac{1}{8}$; $\frac{1}{7}$

b) $\frac{4}{8}$; $\frac{3}{8}$; $\frac{6}{8}$; $\frac{2}{8}$; $\frac{7}{8}$; $\frac{1}{8}$; $\frac{5}{8}$

<u>Homework Activity</u>: Do on worksheet:

1. Which is the largest : $\frac{1}{3}$, $\frac{1}{2}$ or $\frac{1}{4}$?

2. Which is smallest : $\frac{2}{8}$; $\frac{2}{6}$; $\frac{2}{3}$; $\frac{2}{9}$

Week 5: Day 5

Notes to the teacher:

- This lesson will build on the concept of fractions.
- At the end of the lesson, learners will realise that fractions like $\frac{4}{4}$ are equal to one whole.
- They will work with equivalent fractions using the fraction wall. They will also compare fractions. Learners find the relative size of fractions difficult to understand and visualize. They tend to look at the fractions as whole numbers e.g. they will say that one eighth is bigger than one third. If there learners that are struggling with this concept please use concrete and practical activities to support them.
- Revise terminology like NUMERATOR and DENOMINATOR.
- A separate sheet has once again been provided to be photocopied for your convenience. You will find it as Annexure 3.
- For further consolidation, prepare similar questions from textbook.

Resources: Worksheet, crayons and textbook

Oral and Mental Activity (10 minutes)

- Revise number bonds, tables, etc. by asking questions such as:

6x5= 44÷2= 5x0=

0÷12=; 6x7=; 8x8=

66÷3= 12x100 50÷10= 7÷7= 6x9= 6x6=

Concept Development (30 minutes)

- Photocopy the worksheet and hand it out as a group work exercise to do in class. If you do not have access to a photocopy machine, write the work on the board for the learners to copy into their books. Move around the class while learners are busy and engage in, but do not lead, the discussion. The point of the exercise is to explore the concept of fractions.

<u>Worksheet 2 on fractions</u>

Look at the figures and answer the questions that follow:

a)

b)

c)

d)

e)

f)

g)

1 Complete the following:

In a) $\frac{\square}{7}$ is shaded

In b) $\frac{2}{\square}$ is shaded

In c) $\frac{\square}{\square}$ is shaded

In d) $\frac{\square}{\square}$ is shaded

In e) $\frac{\square}{\square}$ is shaded

In f) $\frac{\square}{\square}$ is shaded

In g) $\frac{\square}{\square}$ is shaded

2. What do you notice? _____

3. Let learners discuss their answers. How much of :

- sketch (a) is shaded?
- sketch b) is shaded?

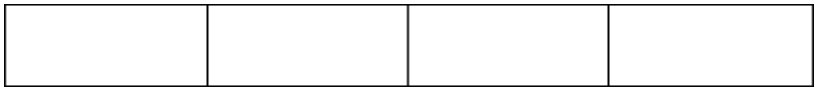
4.Can you see that $\frac{5}{5}$ = I whole

What about $\frac{7}{7}$? $\frac{10}{10}$?; $\frac{100}{100}$?
Discuss with group

5. Use the diagrams below to answer the following questions:

a)

b)



c)

d)

e)

1) Colour in half of each figure

2) How many quarters did you shade? Write your answer as a fraction e.g. $\frac{2}{4}$

3) How many sixths did you shade? Write your answer as a fraction.

4) By comparing diagrams fill in the missing numbers

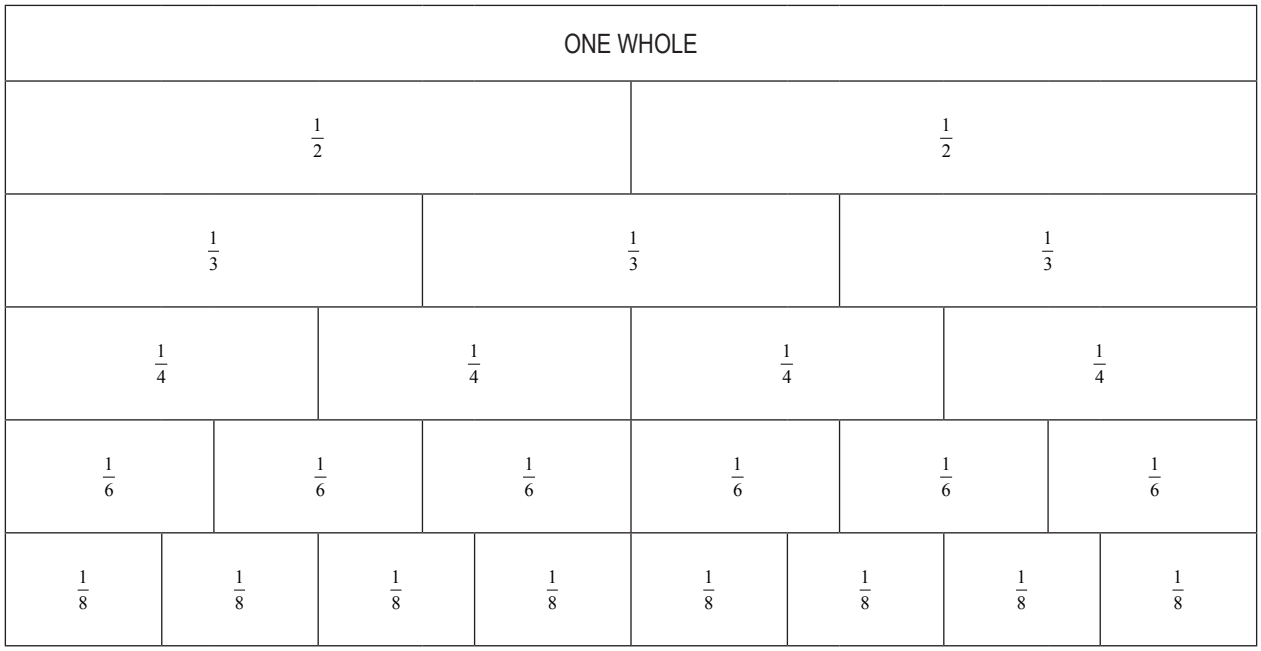
a) $\frac{1}{2} = \frac{2}{\square}$

b) $\frac{1}{2} = \frac{\square}{8}$

c) $\frac{2}{4} = \frac{\square}{8}$

d) $\frac{5}{10} = \frac{1}{\square}$

e) $\frac{2}{4} = \frac{\square}{6}$



Use the diagram to answer the following questions:

1) Fill in > , < or = in place of #

a) $\frac{1}{3}$ # $\frac{1}{4}$

b) $\frac{2}{2}$ # 1

c) $\frac{2}{6}$ # $\frac{1}{3}$

d) $\frac{3}{8}$ # $\frac{2}{4}$

e) $\frac{2}{3}$ # $\frac{1}{2}$

f) $\frac{4}{8}$ # $\frac{2}{3}$

2) Fill in the missing numbers. These examples are centered on equivalences.

a) $1 = \frac{\square}{2} = \frac{\square}{3} = \frac{\square}{6}$

b) $\frac{2}{\square} = \frac{4}{6}$

c) $\frac{1}{3} = \frac{\square}{6}$

d) $\frac{2}{8} = \frac{1}{\square}$

e) $\frac{3}{6} = \frac{\square}{8} = \frac{\square}{2}$

***Tip**: Use this activity towards Assessment Task 1*

SUGGESTED ACTIVITIES FOR ASSESSMENT TASK 1
GRADE 6 MATHEMATICS FIRST TERM

WEEKS 1-5

COMPONENT	MILESTONES	WKS	TASKS
COUNTING AND MENTAL ACTIVITIES	• Count forwards and backwards in decimals. • Mental calculations using a range of techniques for addition, subtraction and multiplication within the number range dealt with	3 1-5	Oral work Week 3 Day 4 and 5 Oral and Mental work done daily
CONCEPT DEVELOPMENT	• Describe and illustrate number systems different to own, e.g. Roman Number Systems, Egyptians, etc. • Recognise and represent numbers in order to compare: - to a minimum of 6-digit whole numbers - common fractions including specifically tenths - 0 in terms of its additive property. - 1 in terms of its multiplicative property • Estimate and calculate by selecting and using operations appropriate to solve problems that involve: - rounding off to the nearest 5, 10, 100 or 1000 - addition and subtraction of whole numbers - multiplication of at least whole 3-digit by 2- digit numbers - equivalent fractions. • Use a range of techniques to perform written and mental calculations with whole numbers including - building up and breaking down numbers - rounding off and compensating - using a calculator	3 5 1 2 3 4-5 1-5	Written work Day 5 Oral and written work during Week 5 Written work Day 5 Written work during the week Oral and written work Daily - use what is appropriate for your class
PROBLEM SOLVING/ INVESTIGATION	• Investigate and extend numeric and geometric patterns looking for a general rule or relationships: - represented in physical or diagrammatic form - of learners own creation	4	Practical and written work done on Day 4

First Term Week 6

Hours: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: **LO 1 AS 8, AS9,AS10,AS11** **LO3 AS 3**	**Milestones:** • Estimate and calculate by selecting and using operations appropriate to solve problems that involve division of at least a whole three digit number by a single digit. • Recognise, visualize and name 2-dimensional shapes • Describe and classify 2-dimensional shapes • Investigate and compare 2-dimensional shapes using a pair of compasses • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers. • Determine the output values for given input values, or input values for given output values using : - verbal description - flow diagrams - tables

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus	What makes a circle	Drawing circles of different sizes Drawing circles with a pair of compasses	Making patterns with circles Flow diagrams	Division of three digit by two- digit whole numbers	Division of three digit by two- digit whole numbers
Resources:	a long stick	strips of cardboard, drawing pins, pencils Pairs of compasses	Pair of compasses for drawing on the board. Pairs of compasses for learners	Chalkboard and textbooks	Chalkboard and textbooks

Week 6 : Day 1

Notes to the teacher:

- A circle is the curve that joins all points at a fixed distance from a point at the centre of the circle.
- Learners have been identifying and naming circles since Grade 1. Learners may have been drawing circles by tracing around plates, cups etc or using a template. The focus in Grade 6 is not about knowing whether a shape is a circle or not, neither is it on being able to draw a circle. In Grade 6 the focus needs to be on:
  - understanding that a circle is the curve that joins all points at a fixed distance from a point in the middle of the circle and
  - using a pair of compasses
- A pair of compasses is not easy to use. With a pair of compasses you are able to set the distance between the compass point (which becomes the centre of the circle) and the pencil (which draws the points of the circle). In cheap pairs of compasses the screw which should hold the pencil and the compass point at a fixed distance apart often allows some movement. This means that cheap pairs of compasses are usually very difficult to use.
- When drawing a circle it must be emphasized that the centre is NOT part of the circle. Only the points a fixed distance from the centre are part of the circle.

Resources
a long stick

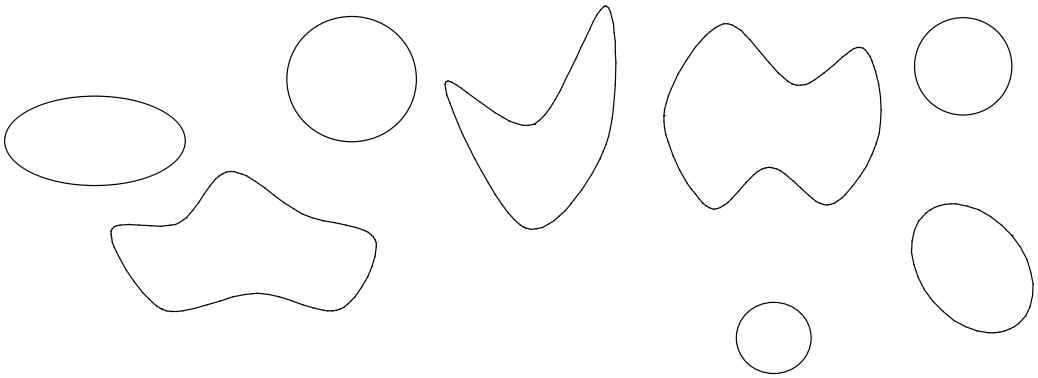
DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Write a set of numbers from 10 000 to 20 000 e.g. 10 100, 10 011, 11 001, etc. on pieces of cardboard. Call out 10 learners to the front of the class and give each one a randomly chosen number. Learners must order themselves from the smallest number to the largest. Ask which number is 1st, 2nd, etc. Do this activity a few times giving other learners a chance to participate.
- Tell learners the following kind of story, letting them work out the answers without writing anything down on paper :
  - At the first bus stop 13 people got on the bus. At the next stop, 4 got off the bus and 7 got on. At the next stop 11 got off the bus and 9 got on. How many shoes are there in the bus?
  - At the first bus stop the number of people getting on the bus was double 6. At the next stop the number of people getting off the bus was 64÷4 and the number of people getting on the bus was 3 times 4+2. How many fingers were there in the bus?

Concept Development 30 minutes

- Draw a number of shapes with curved sides on the chalkboard e.g.



Ask learners to:

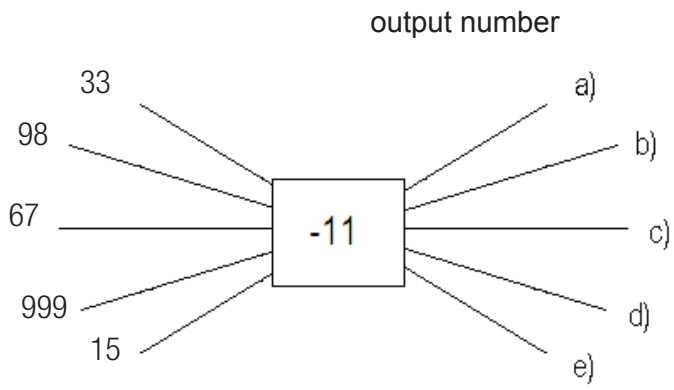
- say which shapes are circles
- describe what is the same about all the shapes
- explain how they can tell the circles from the shapes that are not circles. The idea is for learners to start thinking and talking about the fact that the distance between the centre of the circle and the circle is fixed.

- Go outside with the class. Take a long stick with you. Ask any learner to take the stick and to stand one stick's length away from you. He/she should then hand the stick to another learner. Repeat this until all the learners have had a turn. By the end the learners should be standing in a circle around you. You may have to change the direction you face from time to time to help learners understand that there are many points around you at the distance of the stick's length away. Emphasize that you are not part of the circle. Ask learners what shape they have formed. Explain that a circle is the curve that joins all the points at a fixed distance away from the centre.

Consolidation (20 minutes)

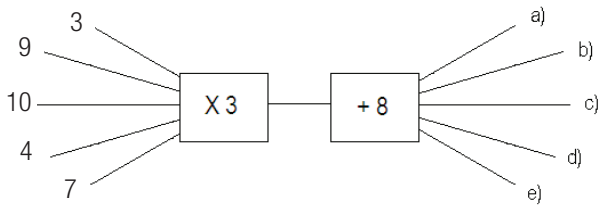
- Draw some spider diagrams on the board, or find an activity using flow diagrams in your text book, where learners are given the input value and they have to find the output value. Once you have completed the spider diagram, record the values in a table.

  1.



	33	98	67	999	
- 11					

2. Input number output number

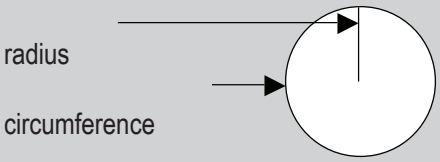


	3	9	10	4	7
X 3	9				
+ 8	17				

Week 6 : Day 2

Notes to the teacher:

- A circle is the curve that joins all points at a fixed distance from a point at the centre of the circle.



- The length of the circle is called the circumference i.e. if we start at any point on the circle, move around all the other points on the circle until we reach the start point, then the total distance is called the circumference.
- The radius is the distance from the centre of the circle to the circle.
- A circle is the curve formed by joining all points at a fixed distance from a point at the centre of the circle.

Resources
strips of cardboard, drawing pins, pencils
Pairs of compasses

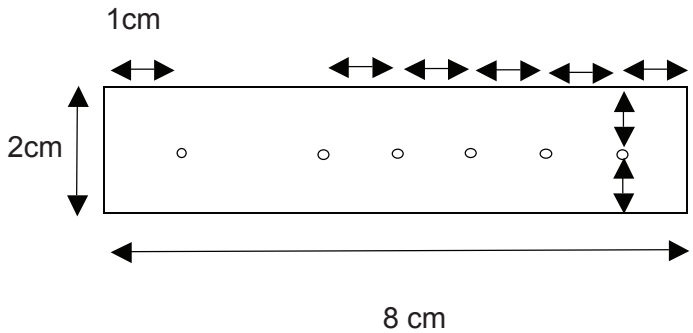
DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Begin the lesson with some mental and oral activities. Use this time to revise work learnt as well as encouraging learners become mentally agile when dealing with numbers e.g.
  - doubling and halving (using 4 digit numbers)
  - ask what the words tri / penta / hexa etc. mean?
  - name all the shapes you know, etc.

Concept Development 20 minutes

- Show learners how to make a model that can be used to draw circles. You need to:
  - cut a cardboard strip about 2 cm wide and 8 cm long.
  - make a hole 1 cm in from each end.
  - make more holes at 1 cm distances from each other.

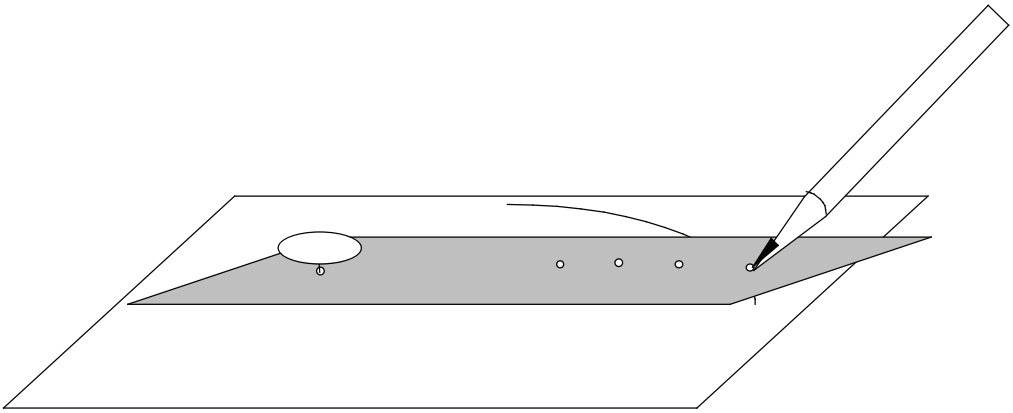


Show learners how to use the circle-maker to draw circles. Explain that

- the length of the circle is called the circumference
- The radius is the distance from the centre of the circle to the circle.

Consolidation (30 minutes)

- Each learner makes a circle maker. They pin it to a page in their books with a drawing pin and draw circles by placing their pencils in each of the holes.



- Ask learners what they can say about the circle when the hole is close to the drawing pin and when the hole is far from the drawing pin.
- Show learners how to draw circles using a pair of compasses.

Consolidation 30 minutes
Ask learners to draw circles of different size e.g. with a radius of 3 cm; 4cm; 6 cm;

Very Important!

At this stage of their development, learners must realise that a circle consists ONLY of the points on the circle. Misunderstanding of the concept at this stage causes considerable confusion when learners do Euclidean Geometry at Secondary School.

Week 6 : Day 3

Notes to the teacher:

- Today you will be dealing with concentric circles i.e. circles of different sizes which have the same centre.
- You will also develop patterns with circles of the same size, with circles of different sizes and with overlapping circles.
- You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. rounding off.

Resources
Pair of compasses for drawing on the board.
Pairs of compasses for learners

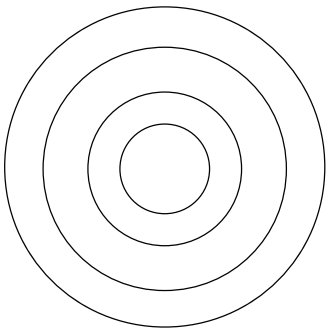
DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

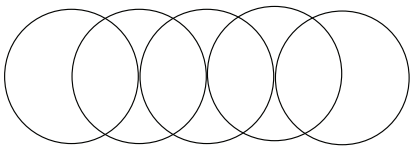
- Start this lesson looking at patterns using numbers. Some ideas are:
  - Complete the pattern: 214 ; 217 ; 221 ; 226 ; … etc.
  - Complete the pattern: 23 ; 29 ; 31 ; … etc. (only if learners know prime numbers)
  - Half of 1000 is … ; half of 10 000 is … etc.
- You can also do some counting patterns e.g.
  - Count in 3s and every time you also say a multiple of 6 clap your hands e.g. 3, 6(clap), 9, 12(clap). What pattern do you notice?
  - Count in 3s, clap your hands every time you say a multiple of 6 and stamp your feet every time you say a multiple of 4. What pattern do you notice?

Concept Development (30 minutes)

- Show learners that you can make different patterns with circles. When you draw circles of different sizes with the same centre, we call them concentric circles. “Con” means with; “centric” comes from the same word as centre. Let learners experiment drawing their own concentric circles.



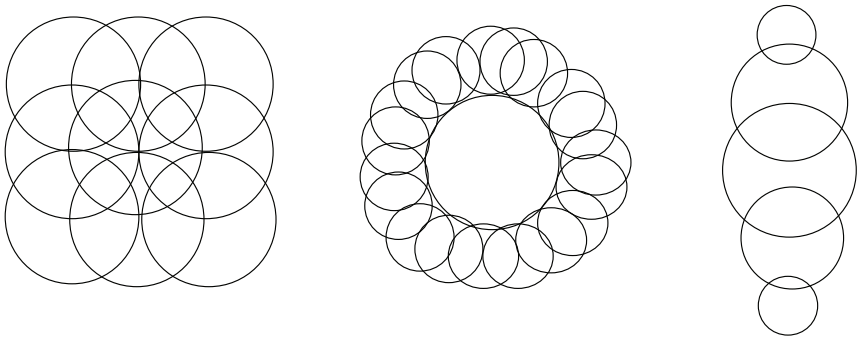
- Ask learners to develop their own patterns with circles that are the same size. Once they have drawn their own you can show them the following pattern as another example.



- Divide learners into groups. Each group should produce at least six different patterns made with circles. Provide learners with the following criteria :
  - Some patterns should have overlapping circles.
  - Some patterns should have circles of the same size only.
  - Some patterns should have circles of different sizes.

  Each group makes a poster with their patterns and write how each pattern was formed.

Here are some examples of patterns using the criteria:

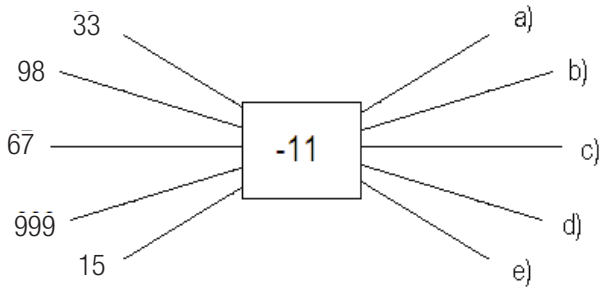


You will find other examples in your textbook.

Consolidation (20 minutes)

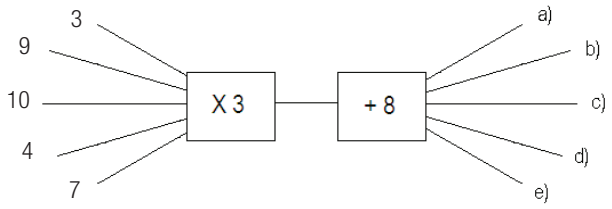
- Draw some spider diagrams on the board, or find an activity using flow diagrams in your text book, where learners are given the input value and they have to find the output value. Once you have completed the spider diagram, record the values in a table. The same numbers have been used here as in Day 1. This is simply as an example of the type of activity you need to prepare, using numbers applicable to the level of your learners.

1. input number output number



	33	98	67	999
- 11				

2. Input number output number



	3	9	10	4	7
X 3	9				
+ 8	17				

***Tip**: Use this as one of the activities for Assessment Task 2.*

Week 6: Day 4

Notes to the teacher:

- During the warm up activities select examples that emphasize the inverse relationship between division and multiplication. However, do not limit your examples to this only. You must make sure that the activities you give the learners will help them to understand that division could also be a form of addition or subtraction. For example, the answer to 64÷4 can be worked out as □x4=64, or 4x□=64, or 4+4+4+4 etc. to make 64, or even 64 – 4 – 4 – 4 -- 4 etc.
- Remind learners to estimate answers first before actually doing the division.
- Do not be in a hurry to introduce long division. The Assessment Standards indicate that learners only need to be able to do long division algorithms **by the end of the year**. During this first term you are revising and assessing what learners know about division and this will inform your planning.

Resources: Chalkboard and textbooks

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Begin the lesson with some mental and oral activities. Use this time to revise work learnt as well as encouraging learners become mentally agile when dealing with numbers e.g.
  - Call 2 learners up to the board. You give them the multiplication statement and they must write the two complete division number sentences (including the answer)

    7x6= so 42÷7= and 42÷6=

    9x8= so 72÷8= and 72÷9=
    9x5= so 45÷9= and 45÷5=
    4x8= so 32÷8= and 32÷4=
    7x8= so 56÷8= and 56÷7=
  - How many groups of 8 are there in 72?
  - How many groups of nine are there in 45?
  - How many groups of 4 are there in 32? And so on.

Concept development: 40 minutes

- Put learners into groups of 4 and give each group different division problems to solve whereby they have to build up to the solution. Leave them to solve the problems on their own, using their own methods.
- Once groups have solved their problems, let them explain their solutions and demonstrate their methods by writing on the board. Encourage learners to look for similarities and differences between their methods and the ones being demonstrated. This is very important so allow enough time for this to take place.

The purpose of this activity is for learners to develop their own methods of solving division problems as well as to refine their methods as they grow more confident in their understanding of what they are doing. Therefore you should start by giving word problems to solve as this provides a context. Your problems should provide opportunities for learners to build up (addition and multiplication) as well as to break down (using subtraction) numbers to find the solution. Learners are then able to develop their own understanding of the commutative, associative and distributive properties of whole numbers, even though they may not know these names. Once learners have formed their own methods and strategies, these can become formalized into a long division algorithm by the end of the year.

The following are examples of division problems where learners are likely to build up to the answer:

- Dad is paving a narrow path in the garden. The path is 30cm wide and 9 metres long. The bricks Dad wants to use are 30cm square bricks. How many bricks will Dad have to buy to build the path?
- A new soccer stadium is being built and has 30 stands. The organizers want to get 3 300 people to watch the matches live. How many people can they fit in each stand?
- A farmer wants to plant 2 736 trees and he can prepare 114 equal rows on the piece of land available. He wants each row to have the same number of trees, so how many trees must be planted in each row?

  ***Tip**: You want to make tasks easy and tedious so that learners look for quicker ways of solving the problems e.g. instead of saying 30+30+30+30 etc. they may say 10x30=300.*

Week 6: Day 5

Notes to the teacher:

- During the warm up activities select examples that emphasize the inverse relationship between division and multiplication. However, do not limit your examples to this only. You must make sure that the activities you give the learners will help them to understand that division could also be a form of addition or subtraction. For example, the answer to 64÷4 can be worked out as □x4=64, or 4x□=64, or 4+4+4+4 etc. to make 64, or even 64-4-4-4-4 etc.
- Remind learners to estimate answers first before actually doing the division.
- Do not be in a hurry to introduce long division. The Assessment Standards indicate that learners only need to be able to do long division algorithms **by the end of the year**. During this first term you are revising and assessing what learners know about division and this will inform your planning.

Resources: Chalkboard and textbooks

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Begin the lesson with some mental and oral activities. Use this time to revise work learnt as well as encouraging learners become mentally agile when dealing with numbers e.g.

9x6= ,35÷5= ,72÷9= , 48÷6= ,30÷6=

60÷6= ,0x7= ,7÷7= ,0÷5= ,60÷60=

45÷5= ,28÷4= ,24÷6= ,40÷8= ,0÷1=

Concept development: (30 minutes):

- Put learners into groups of 4 and give each group different division problems to solve whereby they have to subtract (break down) to find the solution. Leave them to solve the problems on their own, using their own methods.
- Once groups have solved their problems, let them explain their solutions and demonstrate their methods by writing on the board. Encourage learners to look for similarities and differences between their methods and the ones being demonstrated. This is very important so allow enough time for this to take place.

The purpose of this activity is for learners to develop their own methods of solving division problems as well as to refine their methods as they grow more confident in their understanding of what they are doing. Therefore you should start by giving word problems to solve as this provides a context. Your problems should provide opportunities for learners to build up (addition and multiplication) as well as to break down (using subtraction) numbers to find the solution. Learners are then able to develop their own understanding of the commutative, associative and distributive properties of whole numbers, even though they may not know these names. Once learners have formed their own methods and strategies, these can become formalized into a long division algorithm by the end of the year.

The following are examples of division problems where learners are likely to build up to the answer:

- A new soccer stadium is being built and it has 3 300 seats for spectators. It has been designed to fit 110 seats in each stand. How many stands are needed?
- A farmer wants to plant 2 736 trees with 24 trees in each row. How many rows must he prepare so that all the trees can be planted?

Tip: *Use this activity towards Assessment Task 2.*

- Using the problem of the farmer, tell the class you would like to show them how you worked it out. Discuss each step as you write it on the board. Write the following:

	2736	
Minus 1x24	24	
	2712	(trees left to plant)
Minus 1x24	24	(take away 12, then take away another 12)
	2688	(trees left to plant)
Minus 1x24	24	
	2664	(trees left to plant)

Ask the learners if there is a quicker way to do this as this is taking so long! Try:

	2736	
Minus 100x24	2400	
	336	(trees left to plant)
Minus 10x24	240	
	96	(trees left to plant)
Minus 2x24	48	
	48	(trees left to plant)
Minus 2x24	48	

All the trees have been planted!

We planted 100+10+2+2 rows of trees. Therefore we need 100+10+2+2=114 rows to plant 2736 trees if there are 24 trees in each row.

- Now write the following on the board and tell learners to use your method to work out the answer. Allow them to work in pairs or groups if they need to.
  - 1440÷60=
  - 2470÷5=

Tip*: Use this to assess learners' understanding as part of Assessment Task 2.*

First Term Week 7

Hours: 5	**Number of Periods: 5**
Mathematics LO 1,LO 3 AS 1, AS 2, AS 9,AS10, AS11	**Milestones:** • Recognise, visualize and name 2-dimensional shapes focusing on: - similarities and differences between rectangles and parallelograms • Describe and classify 2-dimensional shapes in terms of properties: - length of sides - angle size of corners. • Investigate and compare 2-dimensional shapes according to length of sides and angle size of corners - drawing shapes on grid paper - using a pair of compasses • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills and to build number sense.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus: Two dimensional shapes	Naming 2-D shapes Features of 2-D shapes i.e. how many sides they have.	Sorting shapes according to kind of sides (straight/ curved) and number of sides Naming 2-D shapes	When are mathematical shapes the same? Making 2-D shapes with straight sides Naming 2-D shapes with straights sides	Difference between rectangles and other parallelograms focus on lengths of sides and size of angles of shapes	Difference between rectangles and other parallelograms focus on lengths of sides and size of angles of shapes
Resources	textbook	Pairs of scissors Pages with shapes on them.	dotted paper	cardboard strips split pins/safety pins rulers	square grid paper

Week 7 : Day 1

Notes to the teacher:

- Learners work with all of the shapes they worked with in Grade 4 and Grade 5 i.e. Circles, triangles, squares, rectangles , pentagons, hexagons, septagons / heptagons, octagons.
- The only new two-dimensional shape in Grade 6 is a parallelogram
- In this lesson learners will be:
  - Sorting, grouping and naming shapes according to:
  - kind of sides (straight or curved)
  - number of sides
  - number of angles
- You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. rounding off, addition and subtraction in columns, etc.

Resources: textbook

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

Do the following mental and oral activities at the beginning of the lesson:

- Count in 8s
- Addition and subtraction which learners are able to do comfortably
- Listen carefully. I'm counting: 246, 238, 230. What number comes next?
- What is the value of the underlined digit? E.g. 2 32<u>2</u>, 3<u>5</u> 498, 67 <u>4</u>10, etc.
- How many sides does a heptagon have?
- What do you call a shape with 8 sides?
- Give other shape that also has 4 sides?

Concept Development (30 minutes)

- Learners have been learning about shapes since they started school, so start the lessons by finding out what they already know. Ask learners how we group shapes - according to whether their sides are straight or curved. We group shapes with straight sides according to the number of sides they have: 3 or 4 or 5 or 6 or 7 or 8 etc.
- Ask learners to name any shape they know. Write these up on the board. Prepare columns on the board as shown below. As learners list examples of shapes write them under the correct column.

Shapes						
straight sides						curved sides
3 sides	4 sides	5 sides	6 sides	7 sides	8 sides	

By the end of the whole class teaching time you should have a table with the following words filled in.

Shapes						
straight sides						curvedsides
3 sides	4 sides	5 sides	6 sides	7 sides	8 sides	circle
triangle	quadrilateral square rectangle	pentagon	hexagon	septagon heptagon	octagon	

- Learners may also know names of other quadrilaterals such as kite, parallelogram, rhombus and trapezium. If these names do not come up, leave them for a later lesson. If learners don't give examples for some shapes fill these in yourself. If learners cannot remember the names of shapes ask them to draw a shape on a piece of paper. The drawings can be placed in the correct column. Remind learners what the mathematical terms for shapes mean.

  Tri – 3
  Quad - 4
  Penta - 5
  Hexa - 6
  Septa and Hept - 7
  Octa - 8
  Angle - where two straight lines meet

A triangle has 3 angles. It also has 3 straight sides. "gon" also means angle. A pentagon has 5 angles. It also has 5 straight sides.

- Help learners to find ways to remember what the parts of these words (prefixes) mean. If you know other words in which the same prefix occurs it can help to remember them e.g. "Tri" is found is tricycle; learners may know about the Pentagon in USA from watching TV; "Oct" in octopus (an 8 legged sea creature).
- If you can link like sounding words, it can help you to remember meaning e.g. "hex" sounds a bit like six. Does "sept" sound like seven?

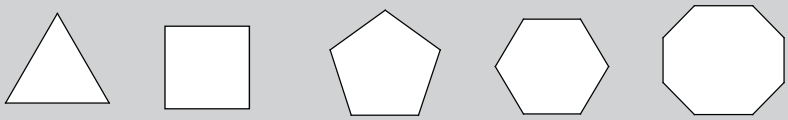
Consolidation (20 minutes)

Find an exercise in your textbook which asks learners to sort or group and name two dimensional shapes. Learners complete this individually.

Week 7 : Day 2

Notes to the teacher:

- The focus of this lesson is on sorting shapes according to the kind of sides (straight / curved) and the numbers of sides.
- We call closed two dimensional shapes with straight side polygons. Learners do not need to know this word yet. We can group shapes with straight sides by counting the number of sides.
- Some shapes with straight sides are called regular. Regular shapes have:
  - all sides the same length
  - all angles the same size.



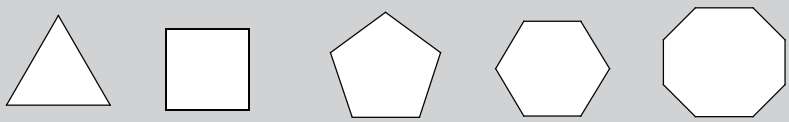
- Sometimes books only show regular shapes. But there are also many shapes that are irregular because their sides have different lengths and their angles can be different sizes. Learners should see both kinds of shapes.
- You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. rounding off, multiplication, etc.

Resources

Pairs of scissors

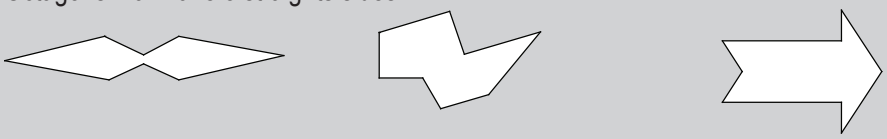
Pages with shapes on them. Try to get a mixture of shapes on each page. Shapes with different numbers of straight sides.

Have some regular shapes like these below.

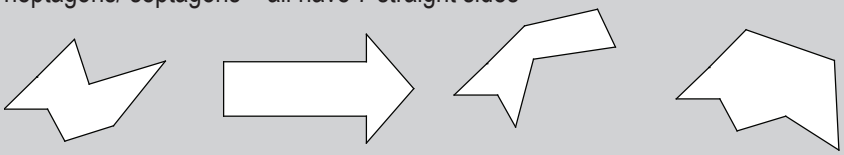


Have some irregular shapes with straight sides, like these below. These shapes are sorted into groups and named, mix them up on the learners' sheets.

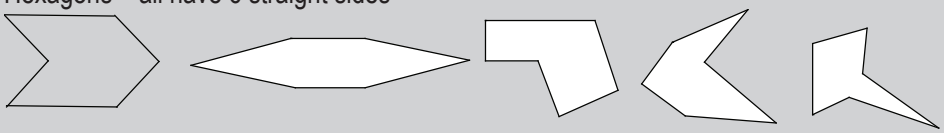
Octagons – all have 8 straights sides



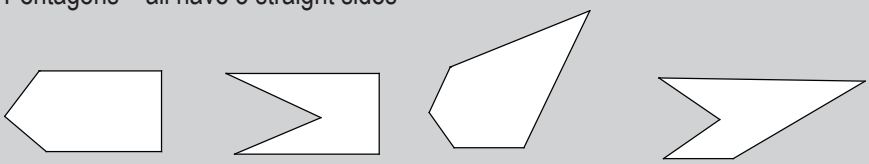
heptagons/ septagons – all have 7 straight sides



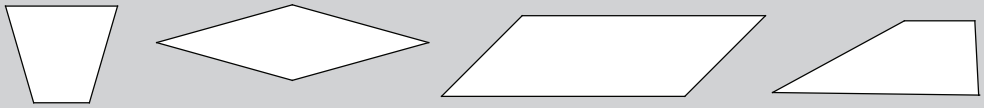
Hexagons – all have 6 straight sides



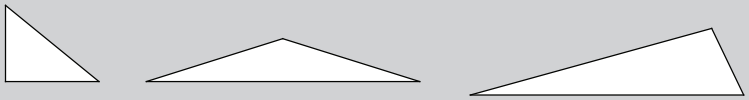
Pentagons – all have 5 straight sides



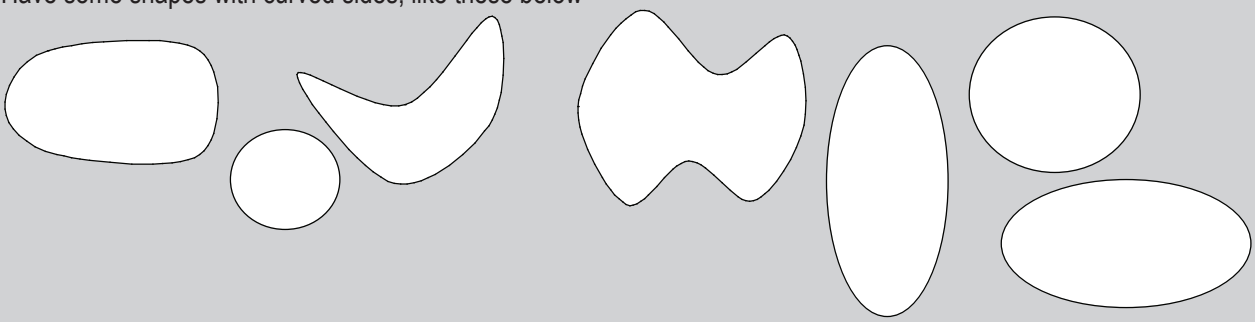
Quadrilaterals – all have 4 straight sides



Triangles – all have 3 straight sides



Have some shapes with curved sides, like these below



DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Choose 2 or more of the following ideas to do with your class:
  - Counting in 3s, 4s, 6s, 8s etc.
  - Name all the shapes that have 4 sides
  - Draw the following shapes and continue with the pattern: circle, pentagon, square, triangle, circle, pentagon,……
  - Name the similarities between a square and a rectangle
- Give each learner a piece of paper and ask them to write a number from 1 and 12. Tell them that you are going to write a number on the board and if their number is a factor of your number they must hold it up. For example, if you write the number 72, learners with numbers 1, 2, 3, 4, 6, 8, 9 and 12 should all hold up their numbers. You can easily observe who is able to identify the factors of familiar numbers.

  ***Tip**: Use this activity as part of Assessment Task 2.*

Concept Development (30 minutes)

- Revise the names of shapes with straight sides with learners.
- Give each learner a page with shapes on which learners cut out. Working in groups, learners place all the shapes on their tables. They then sort the shapes into groups and make posters of the different groups. They give each group of shapes a name. Posters can be displayed in the classroom.

Consolidation (20 minutes)

- Look for an exercise in your textbook which asks learners to group shapes. Learners can do this for homework.

Week 7 : Day 3

Notes to the teacher;

- Learners learned about right angles in grade 5. They are only required to work with protractors and degrees in Grade 7. In this lesson learners use a simple angle measurer, like the corner of a piece of paper to be able to say whether angles are right angles, bigger than right angles, or smaller than right angles.
- Identify right angles in any position.
- Identify right angles in objects and drawings of shapes.
- Describe other angles as bigger than a right angle or smaller than a right angle.

DAILY ACTIVITIES

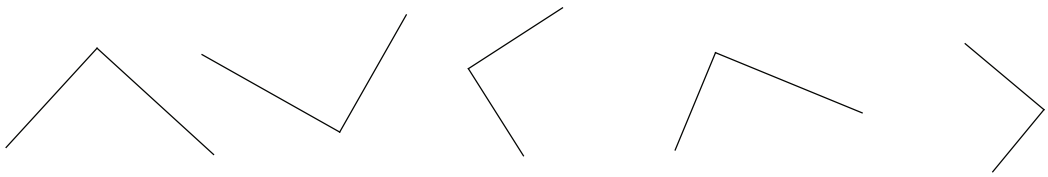
Oral and Mental Activity (10 minutes)

- Choose 2 or more of the following ideas to do with your class:
  - Counting backwards and forwards in e.g. 4s, 6s 7s etc.
  - 1 210 + ∏ = 2 420 etc.
  - Which number is the biggest: 214, 412, 124? etc.
  - Which number is smaller than 214: 412 or 124? etc.
- Give each learner a piece of paper and ask them to write a number from 1 and 12. Tell them that you are going to write a number on the board and if their number is a factor of your number they must hold it up. For example, if you write the number 72, learners with numbers 1, 2, 3, 4, 6, 8, 9 and 12 should all hold up their numbers. You can easily observe who is able to identify the factors of familiar numbers.
  ***Tip**: Use this activity as part of Assessment Task 2.*

Concept Development (20 minutes)

- Draw a right angle on the board to remind learners what a right angle looks like.

Draw other right angles in different positions. Learners need to be able to recognise right angles no matter which way they face



Remind learners that we can use the corner of a piece of paper to check whether the angle is a right angle. Your textbook may explain other ways of testing whether and angle is a right angle.

- Draw other angles on the board. Some of these should be bigger than a right angle, others smaller than a right angle.

  Ask learners to say which angles are bigger than a right angle and which are smaller than a right angle.
- Ask learners to look around the classroom and name objects or shapes that have
  - right angles.
  - angles smaller than right angles
  - angles bigger than right angles.

Consolidation 30 minutes

Learners copy a table like the one below into their books and draw in angles.

angles smaller than right angles	right angles	angles bigger than right angles

Find an exercise in your textbook, or compile a worksheet, that asks learners to identify right angles, angles smaller than right angles and angles bigger than right angles.

- ***Tip:*** *You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. rounding off, addition, subtraction, fractions, etc.*

Week 7: Day 4

Notes to the teacher:

- Learners have been working with squares and rectangles since Grade 2.
- In Grade 5 they developed the language to be able to talk about why rectangles and squares are different. The focus was on the lengths of their sides.
- In Grade 7 learners will focus on quadrilaterals (4-sided shapes) in detail.
- This year learners focus on how the size of the angles affects the quadrilateral. Learners compare rectangles and other parallelograms. The easiest way for learners to understand this is to see a model that can move between showing a rectangle and other parallelograms.
- The difference between a rectangle and other parallelograms is that all the angles of a rectangle are right angles.

Resources
Cardboard strips,
split pins / safety pins/ paper clips,
rulers,
pairs of scissors

DAILY ACTIVITIES

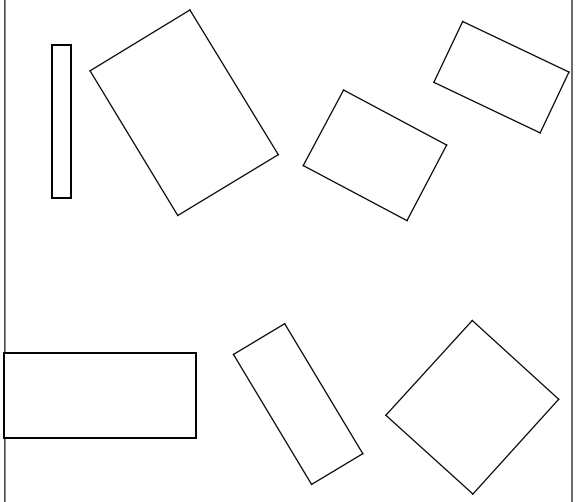
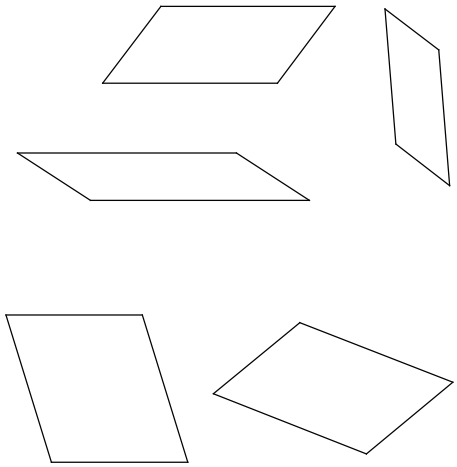
Oral and Mental Activity (10 minutes)

- Tell learners to count in 3s but every time they say a number which is a multiple of 4, they clap their hands e.g. 3, 6, 9, 12 (clap). Make it fun, but observe who manages and who doesn't.
- Have a number pattern ready for use each day. Use a variety of patterns and ask them in different ways. Some learners may want to use counters or number boards to help them.
  - Ask learners to call out the pattern as a class, or as groups, or as individuals, e.g. "Starting at 852, count in tens up to 1 142."
- Use a sorting table to sort numbers by two rules (criteria). Sort these numbers into numbers that are or are not in the 20s pattern; and the numbers that are or are not in the 50s pattern: The numbers are 100, 120, 130, 140, 150, 160, 170, 180, 190 and 1000. Learners complete the tables that you have provided for them. Write the unsorted numbers on the board. Start with smaller numbers and make it more difficult as learners become familiar with this activity. Here is the answer:

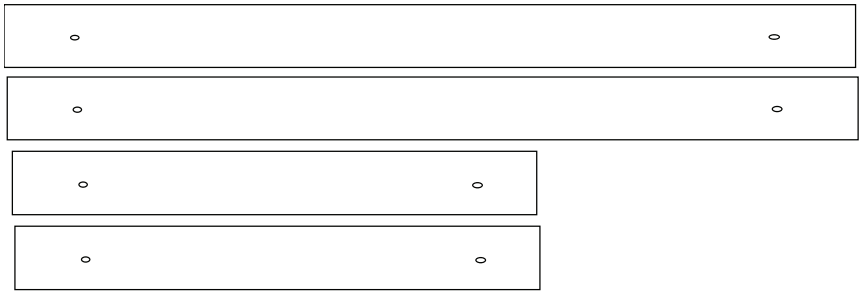
	In the 50s pattern	**NOT in the 50s pattern**
In the 20s pattern	100	120, 140, 160, 180
NOT in the 20s pattern	150	130, 170, 190

Concept Development (30 minutes)

- Ask if learners know the difference between rectangles and parallelograms. If not, show learners how rectangles and parallelograms are different.

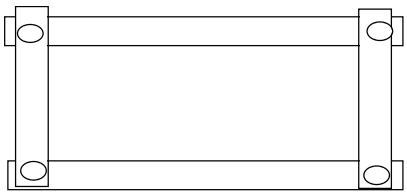
Rectangles	Parallelograms
	
• opposite sides equal in length • all angles right angles	• opposite sides equal in length • all opposite angles the same size

- Ask learners to describe:
  - what is the same about all rectangles.
  - what is the same about all parallelograms.
  - what is different about rectangles and parallelograms.
  - what is the same about rectangles and parallelograms.
  - what would happen if all the angles are the same size?
- Tell learners that they are going to make a model that can change from a rectangle to other parallelograms. Hand out cardboard and split pins or safety pins or paper clips. All learners must make two shorter and two longer strips. It is useful for the class to make quadrilaterals with different measurements. Show them your strips which are each 1cm wide, two longer strips between 9 cm and 15 cm and shorter strips between 5 cm and 8 cm.

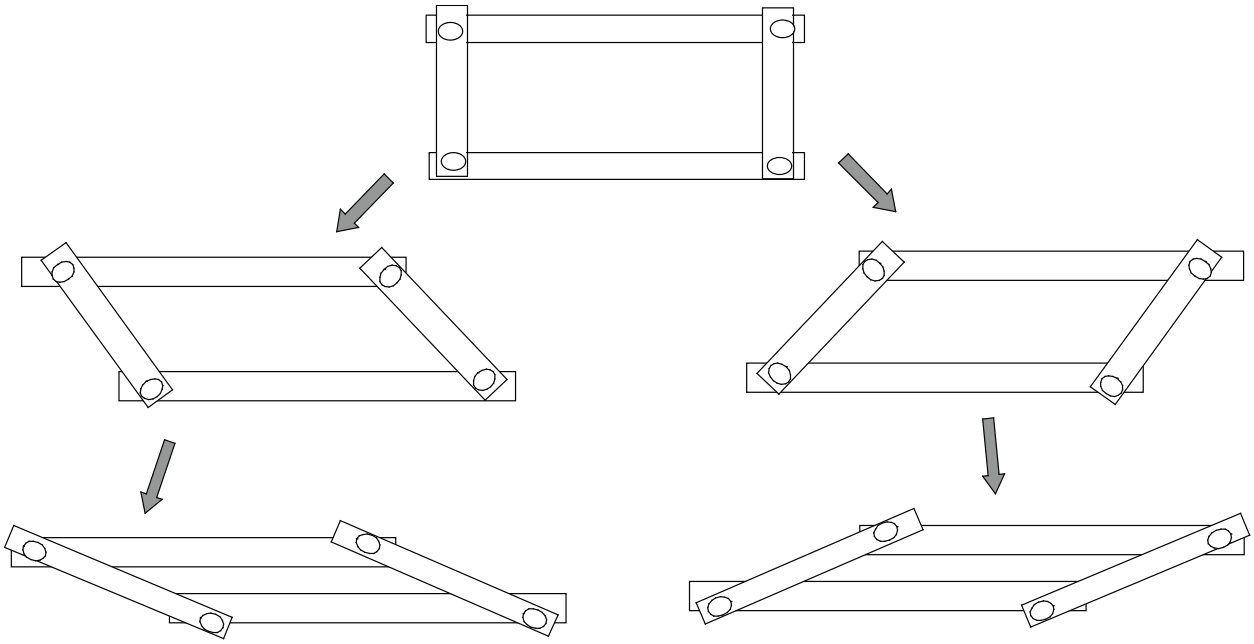


- Following your instructions, learners make holes 1 cm in from each end and join the strips with split pins to make a quadrilateral.

- Let learners experiment moving the quadrilateral to make either a rectangle or a parallelogram.



- Let learners experiment moving the quadrilateral to make either a rectangle or a parallelogram.



- Ask learners what they notice about the sides of the quadrilateral – they stay the same i.e. the lengths of the pieces of cardboard do not change.
- Ask them to describe what happens to the angle sizes – they change according to the shape.

Consolidation (20 minutes)

- Using the quadrilateral they have made, learners show each other shapes and ask whether it is a rectangle or a parallelogram.

Week 7: Day 5
Notes to the teacher: • The difference between a rectangle and other parallelograms is that all the angles of a rectangle are right angles. • In South Africa we tend to use the term 'rhombuses' rather than 'rhombi', though both are correct.
Resources square grid paper textbook
DAILY ACTIVITIES
Oral and Mental Activity(10 minutes) • Play games with different multiples. Here are some examples: "Work out the secret number. My number is more than 1 315 and less than 1 330. It is in the 20s pattern. What is my number?" "Work out the secret number. My number is more than 3 315 and less than 3 330. It is in the 25s pattern. What is my number?" "Work out the secret number. My number is more than 5 315 and less than 5 360. It is in the 50s pattern. What is my number?" • Give each learner 8 matches and ask them to first build a rectangle and then a parallelogram. **Concept Development (**10 minutes) • Revise the features of parallelograms and rectangles. • Prepare two cards, one with the word rectangle and one with the word parallelogram. Call two learners to the front and let them choose a card. They must draw their shape on the board. • Working in groups, learners list the features of parallelograms and rectangles. Ask one learner from each group to write one feature at a time on the board, but they may not write a feature already on the board. Continue taking turns to write a feature until all the features have been written on the board. • Ask learners to describe a regular parallelogram and then to say what we would call a parallelogram with all angles equal. **Consolidation (**40 minutes) • Learners divide a page of square grid paper in half. On one half they draw as many different rectangles as they can. On the other half they draw as many different parallelograms as they can. Learners label the shapes. • Find an exercise in your textbook, or devise a worksheet, in which learners need to identify and name rectangles and other parallelograms. Learners work individually on this. • ***Tip:*** *You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. addition, subtraction, multiplication, etc.*

First Term Week 8

Week: 5	**Number of Periods: 5**
Mathematics Learning Outcomes and Assessments: **LO 5 AS 2, AS4,AS, AS7, AS9,AS10, AS11**	**Milestones:** • Uses simple data collection sheets that involves counting objects in order to collect data • Organize and record data using tallies and tables. • Ask simple questions about own school and family environment and identifies appropriate data sources in order to address issues in that environment. • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers including - adding and subtracting in columns

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills as well as build up number sense

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus	Tables and bar graphs - reading, drawing and comparing Addition and Subtraction	Pictographs with many –to-one correspondence	Describing information using mode	Tables and bar graphs – reading, drawing and comparing	Tables and bar graphs – reading, drawing and comparing
Resources:	Maths Class work book Pencil or Pens Square grid paper Board and Chalk	Maths Class work book Pencil and pens Square grid paper Board and Chalk	Maths Class work book Pencil or Pens Square grid paper Board and Chalk	Maths Class work book Pencils or Pens Square grid paper Board and Chalk	Maths Class work book Pencils or Pens Square grid paper Board and Chalk

Week 8: Day: 1

Notes to the teacher:

- In this lesson learners will
  - Organize information using the frequency table.
  - Describe information using mode.
  - Design a system which allows them to sort and organize the information in a way that is efficient and systematic.
- You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. place value, estimation, etc.

Resources
Maths Class work book
Pencils or Pens
Square grid paper
Board and Chalk

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Start this lesson looking at patterns using numbers. Some ideas are:
- Complete the pattern: 1 569 ; 1 571 ; 1 574 ; 1 578 ; … etc.
- Complete the pattern: 23 ; 29 ; 31 ; … etc. (only if learners know prime numbers)
- Double 1000 is … ; half of 50 000 is … etc.

Concept Development (30 minutes)

- Ask if the learners remember what a tally table is. A tally table is used to organize information. The tally table uses the symbol to show 5 objects. Give learners the following information (ungrouped data). The data (information) below was collected from a Grade 6 class in the Eastern Cape. The data shows the brand of Takkie that the Grade 6s would like to own.

Nikes	Reeboks	Addidas
La Costa	CATS	Vans
All Stars	Chuck Taylor	All Stars
Puma	Addidas	Nikes
Reeboks	Addidas	All Stars
Puma	All Stars	Addidas
Vans	Puma	Nikes
Chuck Taylor	Nikes	Reeboks
CATS	Puma	Nikes
Puma	Nikes	Addidas
Nikes	Puma	CATS
Reeboks	All Stars	Nikes
Puma	Vans	Puma
All Stars	Addidas	Addidas
Puma	CATS	All Stars
Nikes	Puma	Reeboks

- Ask learners to copy the ungrouped data and to construct a tally table using this data. If you have an activity in your textbook that allows learners to work with tally tables then use it.
- Once they have done this ask them to compare the ungrouped data and the tally table by posing the following type questions:
  - Which is easier to read and why?
  - What information does the ungrouped data not tell us?
- As a whole class, discuss the following questions which are based on the table:
  - Which brand of shoe appears the most? Why do you think this is?
  - Which is your favourite brand of shoe? Why?
  - Do you know the prices of some of these shoes?
  - Which shops sell these kinds of shoes?
  - Does the kind of shoe you wear say something about you? What does the data say about the Grade 6 class in the Eastern Cape?
  - Which shoe is the 'coolest' and why?
  - Do you think that owning a pair of the shoes mentioned is an 'absolute necessity'?
  - What does the information in the table say about the parents of this Grade 6 Class?
  - How do you think the data was collected?
  - If you had to collect the above information, would you collect it from only your class or from all the Grade 6s at your school?

    Allowing discussions will encourage interesting conversations as well as debates. The focus should not be on whether or not you have the brand of shoe mentioned; it should be about the brand preference of 'teens' in South Africa. Explain to learners that the age group 10 to 14 years are known as 'teens' and are one of South Africa's biggest consumer population.
- Learners could examine ads that show the different brands of shoes. Allow learners the opportunity to critically look at the ads and who the ad is aimed at.

Consolidation (20 minutes)

- Give learners a worksheet or find an exercise in the text book or write the work on the board for learners to complete by themselves. The following are examples of what you will give them as it will be for assessment purposes:

  - What is the value of the underlines digits

    53 **9**76 **9**31 267 76**9** 347 671 3**9**9

  - Arrange the numbers from smallest to biggest.
  - Complete the following number sentences. Write them in columns under the headings Th H T U and find the answers.

    4289+4216= 6477+2358=

    7564-4152= 7531-2147=

  - Complete the following number sentences:

    (2x9) +88 -20= 99÷ 3+(6x100)-0=

***Tip**: This work can be done over two days as it is part of assessment. You can either do part of it on the first day and the rest on the second day, or you can provide a similar activity on the second day to give learners more than one opportunity to demonstrate what they can do.*

Week 8: Day 2

Notes to the teacher:

- In this lesson learners will:
  - Construct a pictograph with a many to one correspondence and use appropriate keys (e.g. one picture = ten persons);
  - Draw bar graphs
- Critically read and interpret data presented in the frequency table, pictograph and bar graph.
- Although drawing bar graphs and pictographs are milestones for later in the year, there is no harm in letting the learners draw them now (it is revision of Grade 5 work). Collecting data, representing and interpreting it are all inter-linked; it does not make sense to omit any aspect of this process.

Resources:
Maths Class work book
Pencils or Pens
Square grid paper
Board and Chalk

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Learners will enjoy puzzle type mental questions.
  - There are 10 people in a taxi. 6 get on and 9 get off. How many in the taxi now.
  - Are 60 centimetres + 60 centrimetres longer than a metre?
  - Lulu was born 5 years before Mthunzi. Lulu is 13 years old. How old is Mthunzi?
  - If today is Friday, which day will it be in eight days time?
  - Add the odd numbers between 8 and 20.
- Learners write any number between 100 and 200 on a piece of paper. Tell learners you are going to write a single digit number on the board and if their number is a multiple of your number they must hold it up. Once learners have committed themselves to indicating a number let them use a calculator to check whether their number is a multiple of your number. You can easily observe who is able to identify the multiples of familiar numbers.
  ***Tip**: Use this activity as part of Assessment Task 2.*

Concept Development (20 minutes)

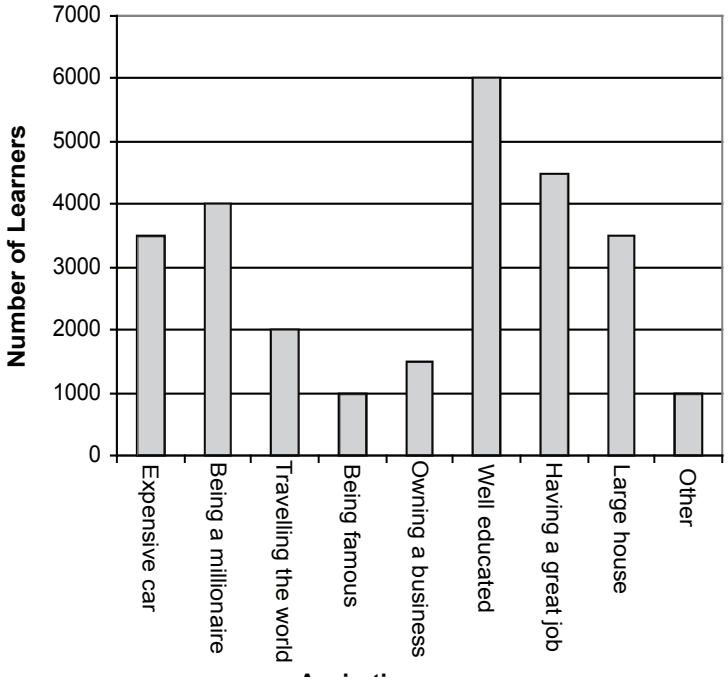
- Give each learner a copy of the table that focuses on aspirations of Grade 5 and 6 learners.

Aspirations	Number of learners
Owning an expensive car	3 500
Being a millionaire	4 000
Traveling the world	2 000
Being famous	1 000
Owning a business	1 500
Being well educated	6 000
Getting a great job	4 500
Owning a large house	3 500
Other	1 000

Ask learners to draw a pictograph showing the information in the table. Let ☺ stand for five hundred. A pictograph is a graph drawn with pictures. A pictograph always has a heading and a key.

Consolidation (30 minutes)

- Give learners the following bar graph that is based on the information in the table and their pictograph:



You might want to ask some of the following type questions:

- Why do you think 6 000 Grade 5s and 6s feel that being well educated is important?
- What information are we not given about this data?
- How do you think this information was collected?
- What do you think 'Other' means?
- Study the table, your pictograph and the bar graph. What is the same and what is different?
- The numbers on the vertical axis on the bar graph are in groups of how many?

It is important that learners are aware that information/data can be presented in different forms or representations:

- a table or frequency table
- a picture
- a pictograph and a
- a bar graph

Assessment Activity
If you want to give learners an assessment activity then look for an exercise that allows learners to practice the drawing of pictographs, graphs and tables. If you cannot find one, use this activity as one of the assessment activities for Assessment Task 2.
You might want to assess the following:
Is the learner able to:
- Draw and read information from a table.
- Draw and read information from a pictograph.
- Draw and read information from a bar graph.

Week 8: Day 3

Notes to the teacher:

- In this lesson learners will:
  - Organize information using the tally table.
  - Describe information using the mode. (Revision of Grade 5 work. Mode = the number that occurs the most)
  - Design a system that allows them to sort and organize the information in a way that is efficient and systematic.
- You must make sure that every day your learners are given some written work which consolidates the concepts and techniques learned e.g. place value, multiplication, division, etc.

Resources
Maths Class work book
Board and Chalk

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Give learners the following numbers and ask them to find pairs of numbers where one is double the other. Then they must find a number that is half their number.
  290, 230, 145, 265, 530, 390, 210, 780, 355, 105, 370, 185, 460, 710

Concept Development (20 minutes)

- Explain to the class that today they will be learning a way to describe information. In statistics the information that is repeated the most often is called the *mode*. The mode allows us to describe the score that occurs most often in a collection e.g.
  - In this set of numbers, which number occurs the most:
  1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 4, 5, 5, 5 . There are more 2s than the other numbers so 2 is the mode.
- Tell learners that the following information shows the results of a Natural Science test from a Grade 6 class. The test was out 100.
  55, 58, 65, 85, 63, 59, 45, 59, 60, 57, 65, 72, 60, 50, 40, 65, 52, 80, 76, 47, 53, 55, 65, 78, 82, 65, 50, 64, 52, 73, 65, 58, 55, 76, 60, 72, 65, 54, 70, 75, 50, 62, 57, 65, 53
  Ask learners to organize the information, from the lowest to the highest score, in a table showing the number of times the results appear. Ask learners to design a system that allows them to sort and organize the information in a way that is efficient and systematic. Learners should organize their information from the lowest result to the highest result. If the result 50 appears 3 times then they should write it out three times, e.g. 50, 50, 50. The information is then recorded in a table could like:

The result obtained	Frequency
40	1
45	1
47	1
50	3

- Give the class a number of examples of numbers and ask them to find the mode.

Consolidation (20 minutes)

- Give learners a worksheet or find an exercise in the text book or write the work on the board for learners to complete by themselves. The following are examples of what you will give them as it will be for assessment purposes:

  - What is the value of the underline digits
    53 **9**76 **9**31 267 76**9** 347 671 3**9**9

  - Arrange the numbers from smallest to biggest.
  - Complete the following number sentences. Write them in columns under the headings Th H T U and find the answers.
    4289+4216= 6477+2358=
    7564-4152= 7531-2147=

  - Complete the following number sentences:
    (2x9) +88 -20= 99÷ 3+(6x100)-0=

***Tip**: This work can be done over two days as it is part of assessment. You can either do part of it on the first day and the rest on the second day, or you can provide a similar activity on the second day to give learners more than one opportunity to demonstrate what they can do.*

Week 8: Day 4

Notes to the teacher:

- In this lesson learners will
  - Organize information using the frequency table.
  - Organize ungrouped data.
  - Construct tally tables.
  - Pose questions based on the table.
  - Read information from a bar graph and answer questions based on the bar graph.

Resources
Maths Class work book
Pencil or pens
Square grid paper
Board and Chalk

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Do some counting patterns e.g.
  - Count in 4s and every time you also say a multiple of 8 clap your hands e.g. 4, 8(clap), 12, 16(clap). What pattern do you notice?
  - Count in 4s, clap your hands every time you say a multiple of 8 and stamp your feet every time you say a multiple of 3. What pattern do you notice?
- Counting backwards and forwards in 100s starting and stopping at any number e.g. count in 100s starting at 103 and stopping at 613.
- Write these numbers on the board and ask learners to arrange them from the heaviest to the lightest e.g. 1 500 g, 15 kg, 15 000 mg etc.
- Write other numbers on the board and ask learners to arrange them from the lightest to the heaviest e.g. 50 mg, 10,5 kg, 98 g etc.

Concept Development (20 minutes)

- During this lesson learners will complete a data collection sheet that asks simple questions about the community that they live in. Explain to the learners that Stats South Africa who collects, sorts, organizes, and represents the Census information used a very similar questionnaire to collect information about the living conditions of people in South Africa. Copy the questionnaire from Annexure 4 for each learner. Go through the questions with the class making sure that everyone knows how to use the questionnaire and that they understand the questions asked. Learners paste their questionnaire in their maths class work book and tick the appropriate answer. There might be times that they circle more than one answer e.g. some learners might have six languages spoken in their community.
- Once learners have completed the questionnaire ask them how they found it. It is important they reflect on the usefulness of it. Use the following kind of questions to help learners reflect on the questionnaire as a data collecting instrument or tool:

- Was the questionnaire too long?
- Did you understand the questionnaire?
- Were the questions understandable?
- What do you think this questionnaire is trying to find out?

- Learners now summarise the information about their community. Ask them to write down the main questions that they think the questionnaire is trying to find out. You should expect learners to state the following:
  - Which languages are spoken in the communities from the Grade 5 class at……..(school)
  - Do the communities from the Grade 5 class at …..(school) have recreational facilities?
  - What are the problems experienced by communities in our class?
- If time allows ask learners to work in groups of ten and summarise aspects of the questions from everyone in the group. See the summarised table. Tell learners that this table is also known as a frequency table and a frequency shows us how many times the information appears.

Week 8: Day 5
Notes to the teacher: • In this lesson learners will - Design their own data collecting sheet. - Answer their research question.
Resources Maths Class work book Pencil or pens Square grid paper Board and Chalk
DAILY ACTIVITIES
Oral and mental activities (10 minutes) • Ask learners to try and do the following in their heads. Present each pair of number sentences together. Do them one at a time. Once you have completed all 5, ask learners to discuss their strategies and share them with each other. 8 x 10 and 8 x 5 12 x 10 and 12 x 5 29 x 10 and 29 x 5 46 x 10 and 46 x 5 83 x 10 and 83 x 5 **Concept Development** (40 minutes) • Working in groups of 3, learners will design their own data collecting sheet. The focus is still on learning about the communities that they live in. It might be useful to have some categories that the groups could focus on so that time is not wasted. In order to design the data collection sheet they need to have a research question that they will investigate by collecting data/information. Learners need to think quite carefully what data they will collect in order to answer their research question. Groups could find out about: - The kinds of toilets in their communities. Here is a list of toilets that are generally found in South African Communities: o Flush toilet with off site disposal o Chemical toilet o Pit latrine o Bucket toilet If learners are going to investigate the kinds of toilets in their communities they need to write down their research question. - The kinds of transport system available in their area. Learners could ask: o How far the airport is from their home. o If there is a taxi service in their area. o If there is a bus service in their area. o If there is a train service in their area.

- What sources of energy are used for household cooking, heating and lighting in their community:
  - If there is electricity from mains.
  - If there is electricity from generator
  - If there is gas
  - If there is paraffin
  - If there is wood
  - If there is coal
  - If there is candles
  - If there is animal dung
  - If there is solar energy

- Explain to the class that their questionnaire can:
  - Be shorter than the one they completed. It might be useful not to have too many categories.
  - Have yes or no responses.

  Remind learners that the purpose of collecting information is to answer a question. Firstly they need to write down their questions.
- Once learners have collected the information make 10 copies for each group so that they can distribute their questionnaire to another Grade 5 class. Once they have collected the information they should construct a frequency table. By collecting the information from one Grade 5 class and not all the classes inform learners that they are doing a survey. Here are some important vocabulary and facts that they need to know:
  - The grade 5 class that information is collected from is known as the target group or the population.
  - When conducting a *census* data/information is collected from each member of the target population.
  - If information is collected from only one grade 5 class then this class (population or target group) is called a *sample.*
  - When we collect information from a *sample* then we tend to make generalizations about the total population.

    Each group should reflect on how others have found their data collecting sheet:
    How long did it take to complete?
    Was it too long?
    Were their questions really helpful?

Assessment Activity

Use the above activity to assess whether learners can: (these are examples)

- Design their own data collection sheet
- Devise appropriate categories so that they can collect the information that is required to answer the question posed.
- Pose a question
- Conceptualise an efficient data collecting method

This activity will contribute towards Assessment Task 2

First Term Week 9

Hours:5	**Number of Periods: 5**
Mathematics LO 3 AS 1a, 2a, 3[a], AS9,AS10, AS11	**Milestones:** • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers • Recognise, visualize and name 3-dimensional objects focusing on: - similarities and differences between tetrahedrons and other pyramids • Describe and classify 3-dimensional objects in terms of properties: - faces, vertices and edges. - angle size of corners. • Investigate and compare 3-dimensional objects according to faces, vertices and edges & angle size of corners. - make 3-dimensional models using drinking straws to make a skeleton and nets provided by the teacher. • Estimate and calculate by selecting and using operations appropriate to solve problems that involve: - addition and subtraction of whole numbers with common fractions (mixed numbers) - finding fractions of whole numbers.

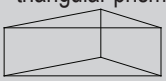
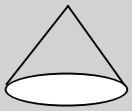
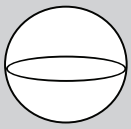
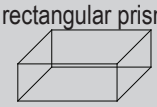
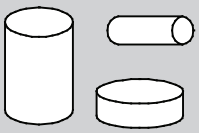
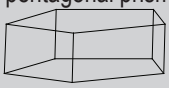
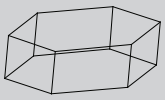
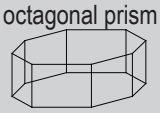
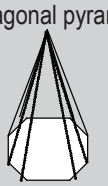
Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills and to build number sense.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus: Three dimensional objects	Sorting and describing three dimensional objects - with flat surfaces or curved surfaces.	Describing objects according to its kind of faces and the number of faces. Fraction worksheet	Differences between cubes and square-based pyramids. Fraction worksheet	Differences between triangular prisms, tetrahedra and other triangular pyramids	Differences between Comparing different kinds of pyramids, by describing their bases and other faces
Resources	A range of everyday objects that are shaped like prisms, cylinders, cones, spheres, pyramids or sets of 3-D geometric objects	A range of everyday objects that are shaped like prisms, cylinders, cones, spheres, pyramids or sets of 3-D geometric objects	Cardboard nets of cubes and square based pyramids Models of cube and square based pyramids	Cardboard nets of triangular prisms, tetrahedra and other triangular pyramids Models of triangular prisms, tetrahedra and other triangular pyramids	Cardboard nets of pentagonal, hexagonal and octagonal pyramids. Models of pentagonal, hexagonal and octagonal pyramids.

Week 9: Day1

Notes to the teacher:

- In this lesson you can assess what learners remember about three-dimensional objects in previous grades.
- The focus of this lesson is for learners to:
  - sort three dimensional objects into
    objects with flat surfaces
    objects with flat and curved surfaces
    objects with curved surfaces only
  - describe objects according to the kind of surface
  - name three dimensional objects.
- For now they just need to be able to separate objects according to their surfaces. By the end of the year learners should be able to name many of the objects in the table below, and to tell the difference between pyramids and prisms.

Three dimensional objects				
3D objects with only flat faces			3D objects with flat and curved surfaces	3D objects with only curved surfaces
Prisms	Pyramids	Other	cone	sphere
triangular prism 	triangular pyramid	learners will find out more about these in later grades		
rectangular prism 	square-based pyramid		cylinders 	
pentagonal prism 	pentagonal pyramid			
hexagonal prism 	hexagonal pyramid			
octagonal prism 	octagonal pyramid 			

Learners need to develop and use the following vocabulary:
Sphere, flat surface, curved surface, triangular, square, rectangular, prisms, pyramid, cone, sphere, cylinder, cylindrical, conical

Resources
If your school has boxes of three dimensional mathematical objects use these. If not, then you will need everyday objects (such as recycling material) shaped like mathematical objects e.g.

- cylinders
  - cans of different heights and widths:
  - coffee cans, cooldrink cans; vicks vapour rub tins, condensed milk cans, tinned fruit or vegetable cans, baby milk formula cans. snuff tins, canned fish tins, shoe polish tins
  - old glue stick tubes
  - pieces of old pipe or tubing
- spheres
  - balls of different sizes
  - oranges
  - marbles
- rectangular prisms and cubes.
  - boxes of different sizes:
  - cereal boxes, medicine boxes (grandpa, panado); toothpaste boxes, tea boxes, milk boxes, juice boxes, chalk boxes, matchboxes
  - bricks or small blocks of wood
- objects shaped like other prisms
  - boxes with different shapes such as sweet boxes and chocolate boxes
- objects shaped like cones
- objects shaped like pyramids

You may find it difficult to get cones and pyramids from ordinary packaging. You may need to make your own examples from nets.

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Revision of 2D shapes

Concept Development (20 minutes)

- Remind learners that we can group mathematical objects according to the kind of surfaces. If your class is organised into groups, give a bag of three dimensional objects to each group. If your class is not organised into groups, put one or more three-dimensional objects on each learner's desk. Ask them to sort the objects into groups that have:
  - only flat surfaces
  - only curved surfaces
  - flat and curved surfaces
- Some objects have only **curved surfaces**. Ask if any learner has an object with only curved surfaces on it. Learners can hold up these objects. They can bring them to the front of the classroom and place them together. This group should contain all the balls. Check whether learners know that objects shaped like balls are called spheres.
- Some objects have only **flat surfaces**. Ask if any learner has an object with only flat surfaces on it. Learners can hold up these objects then bring them to the front of the classroom and place them together. Learners should bring all the prisms. Ask learners if they know thename of any of these objects. Ask learners to talk about the shape of the faces: are they squares, rectangles or triangles?

- Some objects have **flat surfaces** and **curved surfaces.** Ask if any learner has an object with one curved surface and two flat surfaces on it. Learners can hold up these objects. Check whether learners know that these are called cylinders. Ask learners what shape the flat surfaces have. They should recognise that they are circles. Ask learners to bring all the cans to the front of the classroom and place them together. Hold up different looking cans. Ask learners what the same about the cans is, and what is different about the cans. Learners can talk about cans being taller or shorter, wider or narrower. Make sure that learners understand that even if a can is wider than it is high, it is a cylinder. Shoe polish tins, snuff tins and vicks tins are all cylinders.
- Ask if any learner has an object with one curved surface and one flat surface on it. Learners can hold up the cones. Check whether learners know that these are called **cones**. Ask learners what shape the flat surface has.

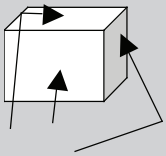
Consolidation (20 minutes)
Find an exercise in your textbook that asks learners to sort and name three dimensional objects. Learners complete this exercise for homework.

Week 9: Day 2

Notes to the teacher

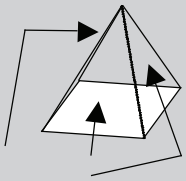
- In mathematics a flat surface of an object is called a **face**.

Rectangular Prism



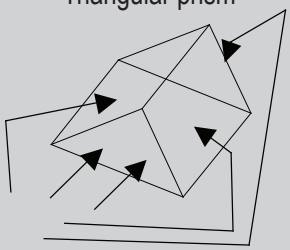
faces

Square-based pyramid



faces

Triangular prism



faces

- This lesson focuses on objects with only flat faces. These are called polyhedral. Although learners do not need to know the word, ask what they think it means. Focus only on pyramids and prisms. In later grades learners can work with other polyhedra.
- By the end of this lesson learners should:
  - know what a face on a geometrical object is
  - know how many faces there are on a rectangular prism or cube
  - talk about the number and shape of faces on different three-dimensional objects
  - recognise drawings of three dimensional objects.

  A drawing of a three dimensional object is more abstract than the real object. Learners need to learn to interpret drawings of three dimensional objects.

Resources

If your school has boxes of three dimensional mathematical objects use these. If not, then you will need everyday objects (such as recycling material) shaped like mathematical objects.You will need

- objects shapes like prisms
  - boxes of different sizes:
  - cereal boxes, medicine boxes (grandpa, panado); toothpaste boxes, tea boxes, milk boxes, juice boxes, chalk boxes, matchboxes
  - bricks or small blocks of wood
  - boxes with different shapes such as sweet boxes and chocolate boxes
- objects shapes like pyramids

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Write numbers in the bottom of egg cartons ($\frac{1}{2}$ dozen eggs). Put two counters or small stones in the egg carton. Close the lid and have learners shake the carton. They open it up and multiply, add, divide or subtract the two numbers together. They can play as teams and keep score.

Concept Development (30 minutes)

- Give each learner an object that has only flat surfaces. The objects should include a range of prisms and some pyramids. Ask learners to show their object to the class. Learners should count the number of faces on the object and to say what shape each of the faces is. Draw each object on the board as the learner talks.

- Learners copy and complete a table from textbook in which they list shapes and number of faces and name object.

Drawing of object	Number of faces that are shaped like					Total number of faces	Name of object
	triangles	squares	rectangles	pentagons	hexagons		

Consolidation (20 minutes)

- Give learners a worksheet, or find a similar exercise in your text book, that asks them to add and subtract mixed numbers as well as finding fractions of whole numbers. This work was done in Week 5, so this is revision of that work.
  ***Tip**: Use this activity towards Assessment Task 2.*

Week 9:Day 3

Notes to the teacher:

- This lesson focuses on differences between cubes and square-based pyramids. Learners will also:
  - learn that pyramids and prisms are named according to the shape of the base.
  - visualise the faces on a three dimensional mathematical objects.
- Find out about differences between pyramids and prisms in general.
- By the end of the lesson learners need to develop and use the following vocabulary to talk about pyramids and prisms: *base, triangle, square, face, square base pyramid, cube* .

Resources
Cardboard nets of cubes and square based pyramids
Model of cube and square based pyramids

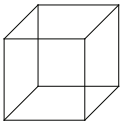
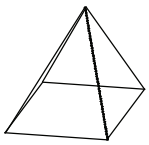
DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Tell learners the following kind of story, letting them work out the answers without writing anything down on paper :
  - At the first bus stop 33 people got on the bus. At the next stop, 14 got off the bus and 17 got on. At the next stop 31 got off the bus and 29 got on. How many shoes are there in the bus?
  - At the first bus stop the number of people getting on the bus was double 16. At the next stop the number of people getting off the bus was 64÷4 and the number of people getting on the bus was 3 times 4+2. How many fingers were there in the bus?

Concept Development (30 minutes)

- Demonstrate how to cut out and fold a square based pyramid from a net. Learners work in pairs. One of the pair cuts out the net of the pyramid. The other cuts out the net of the cube. Learners number each face on their net. Each learner folds and builds their objects. Let pairs of learners describe their objects to the class. Each learner should say how many faces on their object, how many faces are triangles and how many faces are squares.
- Show learners how to draw a cube and a square-based pyramid. Learners copy a table like the one below into their books

Drawing of object	Number of faces that are triangles	Number of faces that are squares	Total number of faces	Name of object
				
				

Consolidation (20 minutes)

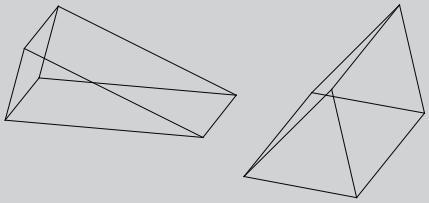
- Give learners a worksheet, or find a similar exercise in your text book, that asks them to add and subtract mixed numbers as well as finding fractions of whole numbers. This work was done in Week 5, so this is revision of that work.
  ***Tip**: Use this activity towards Assessment Task 2.*

Week 9: Day 4

Notes to the teacher:

Prisms

- Most of the faces of prisms are rectangles or squares. A prism has two faces that do not have to be rectangles or squares. These two faces are exactly the same, and they are opposite each other. These are called the base of the prism. The prism is named after the base. In this lesson these bases are triangles. This prism is called a triangular prism



Triangular prisms

Pyramids

- Most of the faces of a pyramid are triangles which meet at a point. This point is called the apex. Opposite the apex is the base. There are different kinds of pyramids. The pyramid is named after the shape of the base. In this lesson the base is a triangle.

Triangular pyramids

- A triangular pyramid that has all four faces identical equilateral triangles is called a tetrahedron.
- This lesson focuses on differences between triangular prisms, tetrahedra and other triangular pyramids. Learners will also:
  - learn that pyramids and prisms are named according to the shape of the base
  - visualise the faces on three dimensional mathematical objects
  - find out about differences between pyramids and prisms in general.
- By the end of the lesson learners need to develop and use the following vocabulary to talk about pyramids and prisms: *base, triangle, square, face, triangular pyramid, tetrahedron, triangular prism.*

Resources

Cardboard nets of triangular prisms, tetrahedrons and other triangular pyramids.
Models of triangular prisms, tetrahedrons and other triangular pyramids.

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Teach your class this card game for two or more players. You need a set of single digit number cards (four each of the numbers 1 to 9) for each group, a die (1-6) and some paper and pencil. Each player takes three cards from the deck and uses them to create a 3-digit number between 101 and 999. Player 1 rolls the die to see who will win 5 points. If the die lands on an odd number (1, 3, 5), the player who made the lower 3-digit number wins 5 points. If the die lands on an even number (2, 4, 6), the player who made the higher 2-digit number wins 5 points. Players continue building numbers and rolling the die. The first player to reach 30 points is the winner.

Concept Development (30 minutes)

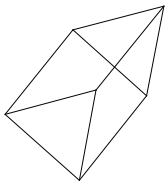
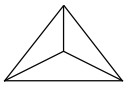
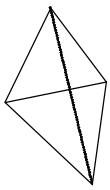
- Show the learners samples of what they will build. Remind them about the features of prisms. Explain which two of the objects are **pyramids**.
- Demonstrate how to cut out and fold a triangular based pyramid from a net.
- Learners work in mixed ability groups of three, each learner cutting out one of the following nets: a triangular prism, a triangular pyramid and other tetrahedron. Learners number each face on their net. Each learner folds and builds their objects. Learners talk to each other about the faces: how many faces each object has, which faces are the same and which faces are different.
- Let groups of learners describe their objects to the class. Each learner should say how many faces on their object, how many faces are triangles and how many faces are rectangles.

> When all the faces of a pyramid are triangles, we call it a triangular pyramid. When all four triangular faces are exactly the same, the pyramid is called a tetrahedron. Tetra means four. Hedron means face. If the one face of the pyramid is not a triangle, then the pyramid is named after this face e.g. square-based pyramid. The prism is named after the base. The prism made is called a triangular prism.

- Show learners how to draw a triangular pyramid, a tetrahedron and triangular prisms.

Consolidation (20 minutes)

Learners copy a table like the one below into their books. They fill in the information in the table.

Drawing of object	Number of faces that are triangles	Number of faces that are squares	Total number of faces	Name of object
				triangular prism
				tetrahedron
				triangular pyramid

Week 9: Day 5

Notes to the teacher:

- This lesson focuses on the similarities and differences between different pyramids. Learners will also:
  - learn that pyramids and prisms are named according to the shape of the base.
  - visualise the faces on three dimensional mathematical objects
  - find out about differences between pyramids and prisms in general.
- By the end of the lesson learners need to develop and use the following vocabulary to talk about pyramids: *base, triangle, square, face, triangular pyramid, tetrahedron, pentagonal pyramid, hexagonal pyramid, octagonal pyramid.*

Resources
Nets of pentagonal, hexagonal and octagonal pyramids**.**
Models of pentagonal, hexagonal and octagonal pyramids**.**

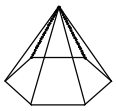
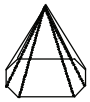
Oral and Mental Activity (10 minutes)

- Use the cards made for the oral activity on Day 4. Working in pairs, each learner takes 3 cards. They use any of the four operations (add, subtract, multiply and divide) and try to make a number as close to 20 as possible. The person closest to 20 gets 5 points. The first one to reach 50 wins. An example could be:
  Learner 1 draws 2, 6 and 9. Learner 2 draws 9, 8 and 1. Learner 1 can say 2+6+9=17 or 2x6=12 12+9=21. Learner 2 says 9+8+1=18. If learner 1 gets 17, then learner 2 wins, but if learner 1 gets 21 then learner 1 wins.

Concept Development (30 minutes)

- By now learners will know how to cut out and fold a net of a pyramid. Hand out nets of pyramids. Learners who are not so sure of LO 3 can make pentagonal pyramids, the middle group hexagonal pyramids and the stronger learners can make octagonal pyramids.
- Learners talk to each other about the faces:
  - how many faces does each pyramid have;
  - which faces are the same and which faces are different.
- Remind learners that pyramids are named after the shape of the base. Ask different learners to show and tell what shape the bases of their pyramids are. Ask learners what shape the faces are that are not the base. Ask different learners to name their pyramids. Ask learners to describe the shape and the number of each kind of face of their pyramids.

Consolidation (20 minutes)
Learners copy and complete a table like the one below. Encourage learners to try and complete as much as they are able.

Drawing of object	Number of faces that are shaped like				Total number of faces	Name of object
	triangles	pentagons	hexagons	octagons		
						pentagonal pyramid
						hexagonal pyramid
						octagonal pyramid

Learners can say what the relationship is between the shape of the base and the total number of faces in a pyramid.

SUGGESTED ACTIVITIES FOR ASSESSMENT TASK 2
GRADE 6 MATHEMATICS FIRST TERM
WEEKS 6-9

COMPONENT	MILESTONES	WKS	TASKS
COUNTING AND MENTAL ACTIVITIES	• Mental calculations using a range of techniques for addition, subtraction and multiplication within the number range dealt with	6-9	Daily oral and mental work
CONCEPT DEVELOPMENT	• Recognise the place value of digits in whole numbers to 6-digits • Recognise, represent and compare: - multiples and factors of 2-digit whole numbers • Estimate and calculate by selecting and using operations appropriate to solve problems that involve: - addition and subtraction of whole numbers with common fractions (mixed numbers) - division of at least 3-digit by 2-digit numbers. - finding fractions of whole numbers. - multiple operations of whole numbers with or without brackets • Use a range of techniques to perform written and mental calculations with whole numbers including - adding and subtracting in columns • Determine the output values for given input values, or input values for given output values using : - verbal description - flow diagrams - tables	8 7 and 8 9 6 8 8 6	Written work on Day 1 and 3 Oral and practical activities Written activities on Day 2 and 3 Oral problem solving activities on Day 5 Written activities on Day 2 and 3 Written activities on Day 2 and 3 Written activities on Day 3
PROBLEM SOLVING/ INVESTIGATION	• Describe and classify 2-dimensional shapes and 3-dimensional objects in terms of properties: - faces, vertices and edges. - length of sides - angle size of corners. • Organise and record data using tallies and tables	7 and 9 8	Practical work the whole week Oral, practical and written work every day

First Term Week 10

Hours: 5	**Number of Periods: 5**
Mathematics LO 3 AS 1a, AS2a,AS 3a	**Milestones:** • Mental calculations • Use a range of techniques to perform written and mental calculations with whole numbers. • Recognise, visualize and name 3-dimensional objects focusing on: - similarities and differences between tetrahedrons and other pyramids • Describe and classify 3-dimensional objects in terms of properties: - faces, vertices and edges. • Investigate and compare 3-dimensional objects according to faces, vertices and edges: - make 3-dimensional models using drinking straws to make a skeleton and nets provided by the teacher.

Mental Strategies: Mental strategies are done with the whole class every day. The time should be used to develop skills and to build number sense.

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Content Focus: Three dimensional objects	Counting edges and vertices in 3D models of pyramids Building skeleton pyramids	Describing pyramids according to the shape and number of faces, and the number of vertices and edges.	Describing the shape of faces of prisms. Counting the number of faces, edges and vertices of prisms.	Describing pyramids and prisms according to the shape and number of faces, and the number of vertices and edges	Naming prisms and pyramids Describing the shape of faces Counting the number of faces, edges and vertices.
Resources	Either toothpicks and soaked whole dried peas / jelly-tots or paper rolled into tubes and string or straws and pipe cleaners	Cardboard or plastic models of pyramids. Skeleton models of pyramids and prisms	Cardboard or plastic models of pyramids and prisms -rectangular prisms, hexagonal prisms, octagonal prisms Skeleton models of pyramids and prisms.	Models of rectangular prisms, hexagonal prisms, octagonal prisms Either toothpicks and soaked whole dried peas / jelly-tots or paper rolled into tubes and string or straws and pipe cleaners.	

Week 10: Day 1

Notes to the teacher:

- An edge of an object is where two faces meet.
- A vertex of an object is where three or more edges of an object meet.
- In this lesson learners focus on describing pyramids by counting their edges and vertices. Learners need to develop and use the following vocabulary:
  - Edges of objects
  - Vertices of objects.
- When you look at the model of an object built from a net, what you see most easily are the faces of the object.
- When you build a skeleton of an object from toothpicks, straws or rolled tubes of paper, you see the edges most easily. You can also count the "corners" or vertices.

Resources

You can use different apparatus to make the skeleton of an object. Choose one or more of the following kinds of apparatus:

- toothpicks and jelly-tots or whole dried peas that have been soaked the night before
- straws and pipe cleaners
- string and paper that has been rolled into a tube.

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Write numbers in the number range you are dealing with in the bottom of egg cartons ($\frac{1}{2}$dozen eggs). Put 2 counters or small stones in the egg carton. Close the lid and have learners shake the carton. They open it up and multiply, add, divide or subtract the two numbers together. They can play as teams and keep score.

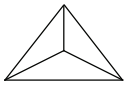
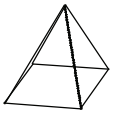
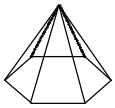
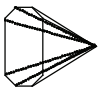
Concept Development (30 minutes)

- Show learners a model of skeleton tetrahedron and a tetrahedron built from a net. Ask learners to talk about how they are the same. Ask learners to talk about how they look different.
- Explain that so far learners have counted and described the faces of objects. Now they are going to count the edges and vertices of objects. Explain by showing on both kinds of models that:
  - An edge of an object is where two faces meet.
  - A vertex of an object is where three edges of an object meet.
- By the end of the lesson you want to have skeleton models of :
  - tetrahedra
  - square based pyramids
  - pentagonal pyramids
  - hexagonal pyramids
  - octagonal pyramids

  Divide the learners into groups, each group building one of the following: a tetrahedral, square based pyramids, pentagonal pyramids, hexagonal pyramids or octagonal pyramids.

Consolidation (20 minutes)

Let pairs of learners show, name and describe each kind of pyramid. They should count the edges and corners in front of the class. Build up a table on the board as learners report.

Drawing of pyramid	Name of pyramid	number of edge	number of vertices
	tetrahedron	6	4
	square-based pyramid		
	pentagonal pyramid		
	Hexagonal pyramid		
	Octagonal pyramid		

Week 10: Day 2

Notes to the teacher:

- In this lesson learners focus on describing pyramids. They do this by:
  - talking about the shape of the faces of the pyramids
  - counting the number of faces, edges and vertices of pyramids.
- Learners need to develop and use the following vocabulary: edges of objects, vertices of objects, faces of objects, triangular, square, pentagonal, hexagonal, octagonal.

Resources
Cardboard or plastic models of pyramids.
Skeleton models of pyramids and prisms

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Let all the learners stand behind their chairs. Call out number expressions and the first learner to answer sits down. Carry on asking until everyone is sitting down. Here are some examples of what you can ask:

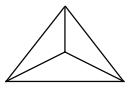
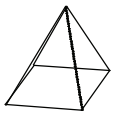
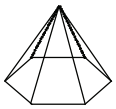
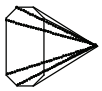
13x7=	3x16=	72÷8=	36÷6=	135+7=
621-9=	54÷6=	108+106=	35-19=	24÷4=

Concept Development (20 minutes)

- Revise the counting of faces of nets, using plastic or cardboard models of pyramids. It will be easier for learners to count faces if they look at pyramids made from plastic or from cardboard nets.
- Spread the skeleton model pyramids around the class, so that each learner can see every kind of model. Also let learners see models of pyramids made by nets, so that they can count their faces.

Consolidation (30 minutes)

- Give learners copies of the table below to complete, but leave the last three columns on the right hand side blank. These columns have been completed here for your information.

Drawing of pyramid	**Name of pyramid**	**shape and number of faces (use cardboard models / plastic to see this)**	**number of edges**	**number of vertices**
	tetrahedron	4 triangular faces	6	4
	square-based pyramid	4 triangular faces 1 square face (base)	8	5
	pentagonal pyramid	5 triangular faces 1 pentagonal face (base)	10	6
	Hexagonal pyramid	6 triangular faces 1 hexagonal face (base)	12	7
	Octagonal pyramid	8 triangular faces 1 octagonal face (base)	16	9

Week 10: Day 3

Notes to the teacher:

- For the last three maths lessons, learners have focused on pyramids. In this lesson learners go back to looking at prisms.
- Remind learners about the difference between prisms and pyramids (see Week 9: Day 4).
- In grade 5 learners described prisms by looking at the shape and number of their faces. Now learners will also count the edges and vertices of prisms.

Resources
Cardboard or plastic models of pyramids and prisms.
Models of rectangular prisms, hexagonal prisms, octagonal prisms.
Skeleton models of pyramids and prisms

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- You will need sets of single digit numbers (4 each of 1 to 9) and whole tens (four each of 10 to 90). Place these in a plastic packet and give one to each group. Each learner takes out 6 numbers and arranges them in the easiest way (for them) to count them. Write any 5-digit number on the board and learners must add their cards to the number on the board and record their answer on a piece of paper. Finally learners arrange themselves according to their answers from smallest to biggest. The first group ready is the winner.

Concept development (30 minutes)

- Remind learners about the definition of prisms provided in Week 9 Day 4. Learners make skeleton models of prisms. It will be easier if they can look at the models made by nets or plastic models whilst they work. Weaker learners can make skeleton models of cubes. Middle group can make skeleton models of pentagonal prisms and the strong learners can either make skeleton models of hexagonal or octagonal prisms.

Consolidation (20 minutes)

Each learner writes a short paragraph by filling in the missing words.

I made a …….. prism.
It has ……. edges and ……. corners.
A …….. prism has ….. faces.

Learners can also try to draw their prisms.

Week 10: Day 4

Notes to the teacher:

- Describing pyramids and prisms by
  - talking about the shape of the faces
  - counting faces, edges and vertices.

Resources
Models of rectangular prisms, hexagonal prisms, octagonal prisms

DAILY ACTIVITIES

Oral and Mental Activity (10 minutes)

- Write a set of numbers from 10 000 to 20 000 e.g. 10 100, 10 011, 11 001, etc. on pieces of cardboard. Call out 10 learners to the front of the class and give each one a randomly chosen number. Learners must order themselves from the smallest number to the largest. Ask which number is 1st, 2nd, etc. Do this activity a few times giving other learners a chance to participate.
- Give each learner a piece of paper and ask them to write any 5-digit number. Tell them to get into groups of 8 and arrange themselves according to their number from largest to smallest.

Concept Development (20 minutes)

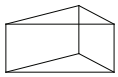
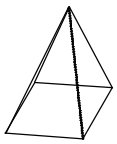
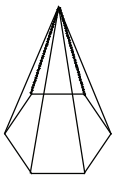
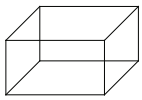
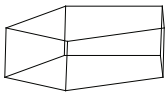
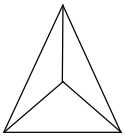
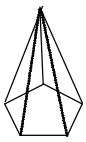
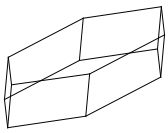
- Learners take turns to show the skeleton model of the prisms they made.
- Learners show how many edges and vertices their prism has.
- Learners talk about the shape of the bases of the prisms.

Consolidation (30 minutes)

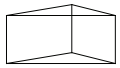
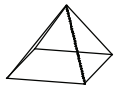
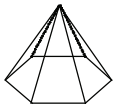
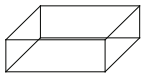
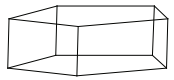
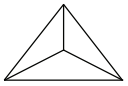
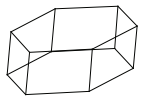
Spread the skeleton models and other models around the class, so that each learner can see every kind of model.

Use the following table or find one like it in your textbook. Let learners copy and complete a table. It is important that learners fill in:

- the shape of the faces
- the number of faces, edges and vertices.

Drawing of object	Name of object	shape and number of faces	number of edges	number of vertices
				
				
				
				
				
				
				
				

Week 10: Day 5
Notes to the teacher: • In this assessment learners will be describing pyramids and prisms by: - writing about the shapes of the faces of the objects - counting faces, edges and vertices.
DAILY ACTIVITIES
Oral and Mental Activity (10 minutes) • Take learners outside and ask them to get into groups according to the number you call out e.g. make groups of double 9 less 10 (each group should have 8 learners in it), half of 20, half of 6 multiplied by 4, 10 more than 1, etc. Each time discuss how many groups and how many learners not in a group, linked to the number of learners in your class. **Concept Development** (40 minutes) • Back in the classroom give learners a table like the one provided which they must copy and complete. Use one from the textbook, design your own worksheet or write the table on the board. The table should include a place for learners to fill in the shape of the faces, as well as the number of faces, edges and vertices. This written activity will consolidate what learners have been learning about.

Drawing of object	Number of faces that are shaped like					Total number of faces	Number of edges	Number of vertices	Name of object
	triangles	squares	rectangles	pentagons	hexagons				
									
									
									
									
									
									
									

Annexures

Annexure 1: An example of square paper.

Annexure 2: Week 5 Day 4

Annexure 3: An example of a worksheet on equivalent fractions

Annexure 4: Questionnaire on your community.

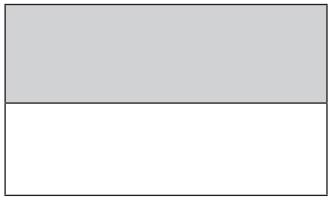
Annexure 1

An example of squared paper.

Annexure 2

Diagram sheet for Week 5 Day 4:

a)



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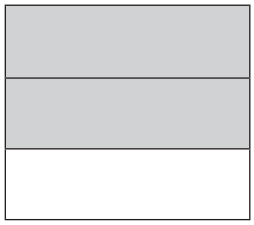

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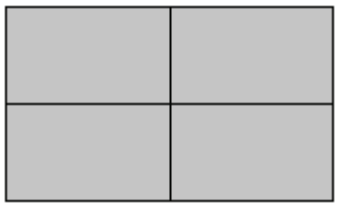

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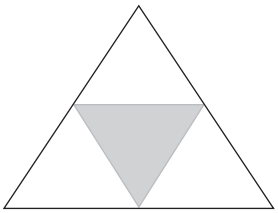

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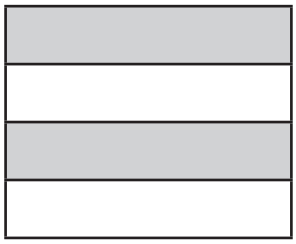

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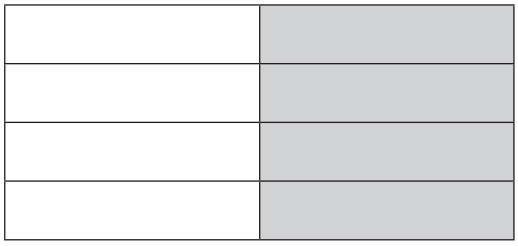
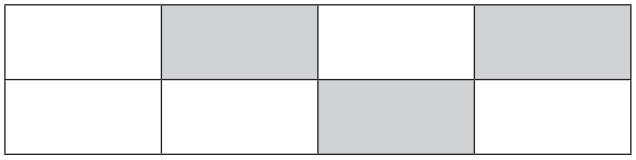
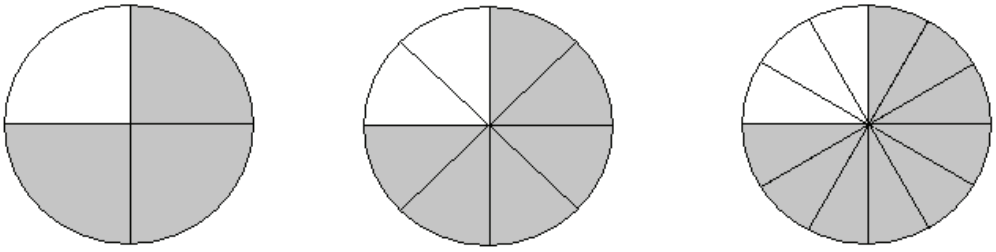


g)

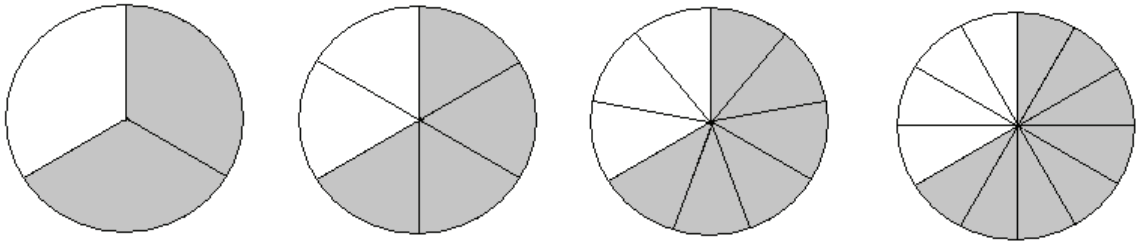


Annexure 3

An example of a worksheet on equivalent fractions



Set a)



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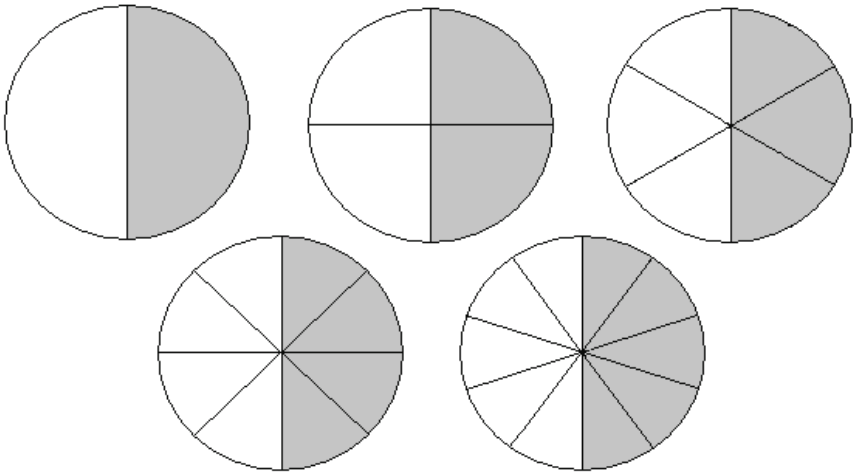

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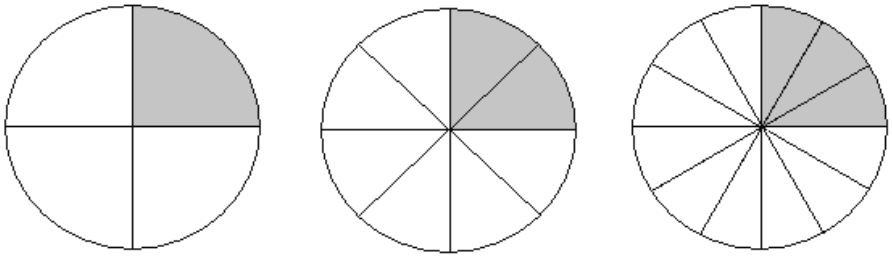

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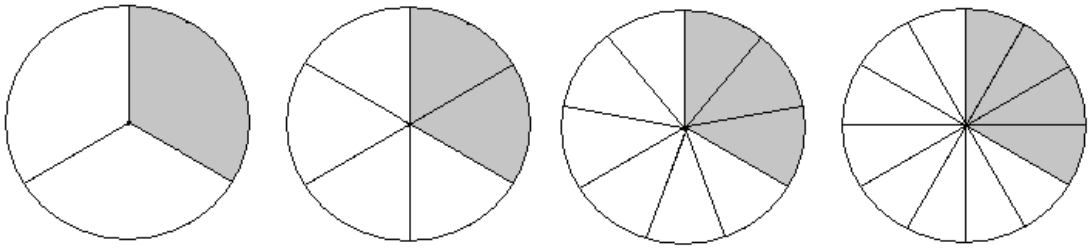

Set e)

Annexure 4

Questionnaire on Your Community

Name: _____

Address: _____

How old are you?

Tick off the box that applies to you.

What population group do you belong to?	
African	
Coloured	
Indian/Asian	
White	
Other, specify _____	
Are you male or female?	
Male	
Female	
How long have you been part of your community? Give Number of years_____	
What population groups are represented in your community?	
African	
Coloured	
Indian/Asian	
White	
Other, specify _____	
Which languages are commonly spoken in your community	
Afrikaans	
English	
Is Ndebele/south Ndebele/north Ndebele	
isiXhosa/Xhosa	
Isizulu/Zulu	
Sepedi/Northern Sotho	

Sesotho/Southern Sotho/Sotho	
Setswana/Tswana	
Siswati/Swazi	
Tshivenda/Venda	
Xitsonga/Tsonga	
Other Specify_____	
Do you regard your community as crowded?	
Yes	
No	

	Yes	No
Does your community experience any of the following?		
Littering problems		
Bad air quality/air pollution		
Heavy traffic		
Noise from traffic		
Noise from airplanes		
Noise from factory/factories		
Noise from other sources		
Bad smell		
Violent crimes		
Gangsterism		
Homeless people		
Street children		
Accidents involving motor vehicles or pedestrians		

Question	Number of learners that said Yes	Number of learners that said No
Does your community experience any of the following?		
Littering problems		
Bad air quality/air pollution		
Heavy traffic		
Noise from traffic		
Noise from airplanes		
Noise from factory/factories		
Noise from other sources		
Bad smell		
Violent crimes		
Gangsterism		
Homeless people		
Street children		
Accidents involving motor vehicles or pedestrians		
	Number of Learners that said Yes	**Number of Learners that said No**
Does the community have recreational space?		
Is there a shopping centre in your community		
Are there playgrounds or parks?		