



# MATHEMATICS GRADE 6

DATE: .....

## 1. TOPIC: MULTIPLICATION, DIVISION

### 2. CONCEPTS & SKILLS TO BE ACHIEVED:

• By the end of the lesson learners should know and be able to:

- multiply at least whole 4- digit by 3-digit numbers
- use multiple operations with or without brackets
- use calculations techniques and record calculations with the vertical column method.

### 3. RESOURCES:

DBE Workbook 1, Sasol-Inzalo book 1, Textbooks

## 4. INTRODUCTION

### MENTAL MATHS: DO 10 ITEMS ON THE ANNEXURE WITH MENTAL MATHS

#### Extending multiplication facts – Refreshing exercises:

A multiplication fact that you know can often help you to build knowledge of another multiplication fact. Here are some examples:

If you know that  $2 \times 7 = 14$ , you also know that  $7 \times 2 = 14$ .

You can easily see that

$2 \times 70 = 140$	and	$70 \times 2 = 140$
$2 \times 700 = 1400$	and	$700 \times 2 = 1400$
$2 \times 7000 = 14\ 000$	and	$7\ 000 \times 2 = 14\ 000$

If you know that  $2 \times 70 = 140$  and  $70 \times 2 = 140$ ,

you can also easily see that

$20 \times 70 = 1400$	and	$70 \times 20 = 1400$
$200 \times 70 = 14\ 000$	and	$70 \times 200 = 14\ 000$
$20 \times 700 = 14\ 000$	and	$700 \times 20 = 14\ 000$
$200 \times 700 = 140\ 000$	and	$700 \times 200 = 140\ 000$ , and so on.

Display the table on the screen and complete as a class:

1. Complete the table

Facts that can be easily formed by building on $2 \times 7 = 14$				
$\times$	7	70	700	7 000
2	14	140	1 400	14 000
20		1 400	14 000	
200		14 000	140 000	
2 000				
4	28			
40				
400				
4 000				

#### 4. CLASSWORK

**ACTIVITY 1: Day 1: Estimated time 30 mins**



**2. Now complete this tables :**

Now complete this table.

$\times$	4	90	60	7	30	8	5	20	10
50									
3									
6									
70									
40									
9									
80									
4									
10									

## 5. CONSOLIDATION / CONCLUSION & HOMEWORK

### Emphasise the following:

- Multiplication facts of:
  - units and tens by multiples of 10
  - units and tens by multiples of 100
  - units and tens by multiples of 1 000

### Homework:

#### 3. Complete:

- |                      |                     |
|----------------------|---------------------|
| (a) $900 \times 40$  | (b) $940 \times 70$ |
| (c) $320 \times 800$ | (d) $110 \times 30$ |
| (e) $540 \times 90$  | (f) $170 \times 80$ |

## 4. CLASSWORK

### ACTIVITY 2: Day 2: Estimated time 45mins

#### PRODUCTS AND FACTORS:

1. (a) Siba buys 4 boxes of beads. In each box there are 10 packets and every packet has 15 beads. How many beads does she buy? Write down your calculation plan to calculate the number of beads.  
  
(b) Marie buys 10 boxes of beads. In each box there are 15 packets and every packet has 4 beads. How many beads does she buy? Write down your calculation plan to calculate the number of beads.  
  
(c) Jeff buys 15 boxes of beads. In each box there are 10 packets and every packet has 4 beads. How many beads does he buy? Write down your calculation plan to calculate the number of beads.
2. Compare your three calculation plans for question 1. What do you notice?

**When you have to multiply three or more numbers, you may rearrange the numbers to make the calculation easier.**

#### THIS IS A PROPERTY OF MULTIPLICATION

3. Calculate the following. Rearrange the numbers to make it easier.  
  
(a)  $50 \times 37 \times 2$   
  
(b)  $4 \times 68 \times 25$

Read what Lindiwe did to find all the factors of 900.

Lindiwe started with  $10 \times 6 \times 15$  as factors of 900.

She noticed that 10 can be written as  $2 \times 5$

and that 15 can be written as  $3 \times 5$ .

$$\begin{aligned} 900 &= 10 \times 6 \times 15 \\ &= 2 \times 5 \times 6 \times 3 \times 5 \quad (\text{Then she noticed that } 6 = 2 \times 3) \\ &= 2 \times 5 \times 2 \times 3 \times 3 \times 5 \end{aligned}$$

What Lindiwe did here was to **break a number down into factors**.

4.

Now break down each of the following numbers into factors. Start by writing the number as a product of two factors. Then see if you can break down these two factors into more factors, like Lindiwe did. Continue in this way until none of the factors can be broken down any further.

(a) 90

(b) 136

(c) 150

(d) 59

(e) 57

(f) 144

**What happened when you wanted to break down the number 59 in question 12(d)?**

**You probably found  $59 = 1 \times 59$  but could not continue. This is because some numbers, such as number 59, have no factors other than the number itself and 1.**

**NUMBERS WITH ONLY TWO DIFFERENT FACTORS, NAMELY 1 AND THE NUMBER ITSELF, ARE CALLED PRIME NUMBERS.**

**A FACTOR THAT IS A PRIME NUMBER, IS CALLED A PRIME FACTOR.**

5.. Which of the following numbers are prime numbers?

15	51	59
57	43	91
42	27	101

## CLASSWORK

### ACTIVITY 3 & 4: Day 3 & 4: Estimated time 1 ½ hour

## RECORDING CALCULATIONS OF MULTIPLICATION OF WHOLE 4-DIGIT BY 3-DIGIT NUMBERS

In Grade 6 we record our calculations when multiplying in the vertical column method as illustrated in the example below:

$$\begin{array}{r} 378 \\ \times 284 \\ \hline 1512 \quad (4 \times 378) \\ 30240 \quad (80 \times 378) \\ +75600 \quad (200 \times 378) \\ \hline 107352 \end{array}$$

1. Try to write as little as possible when you do the following calculations.

(a)  $23 \times 76$

(b)  $38 \times 53$

(c)  $457 \times 46$

(d)  $583 \times 454$

(e)  $3\,856 \times 267$

2. Ntabi calculates  $346 \times 457$  like this:

$$300 \times 400 = 120\,000$$

$$40 \times 50 = 2\,000$$

$$6 \times 7 = 42$$

$$\text{So, } 346 \times 457 = 120\,000 + 2\,000 + 42 = 122\,042$$

Explain where Ntabi went wrong and make the corrections

3. truck uses diesel at a rate of about 274 ml for each kilometre travelled. How much diesel will it use for each of the following distances?

(a) 3 478 km

(b) 9 278 km

4. Last summer, The Little Corner Shop ordered 2 453 boxes of fruit juice. In each large box there were 144 small boxes of 125 ml fruit juice each. How many small boxes of fruit juice were ordered?

5. A small national airliner made 1 273 trips last year. If it carried 167 passengers each time, how many people made use of this airliner last year?

6. A T-shirt factory produces 2 745 T-shirts a day. If the factory has a five-day work week, how many T-shirts are manufactured in 46 weeks?

7. Hendrik's fishing licence allows him to catch 1 255 kg of fish every day. How many kilograms of fish is he allowed to catch in 124 days?
8. A technician has worked 4 838 hours on a building project. His rate of pay is R286 per hour. How much should he be paid in total?
9. A shop bought 697 printers at R1 090 each and sold them for R2 394 each. Calculate the difference between what they paid in total and what they received.

## CLASSWORK

### ACTIVITY 5: Day 5: Estimated time 45mins DIVISION;

#### Introduction:

You will study a method of division in the next section.

To do division, you have to be good at **forming multiples** of the numbers that you divide by, for example the number 64 in  $3\,829 \div 64$ .

The number by which you divide another number is called the **divisor**.

To form a multiple of a number, you multiply the number by another number. For example:

$10 \times 64$  is 640, so 640 is a multiple of 64.

$100 \times 64$  is 6 400, so 6 400 is a multiple of 64.

**Doubling** may be used in some cases to find multiples.

For example, if you know that  $40 \times 53 = 2\,120$ , you can double 2 120 to find  $80 \times 53$ .

**Halving** may also be useful to find multiples.

For example, if you know that  $100 \times 68 = 6\,800$ , you can halve 6 800 to find  $50 \times 68$ .

## DIVIDING BY BUILDING UP METHOD:

$$6\ 150 \div 73$$

$6\ 150 \div 73$  can be calculated like this:

Thinking	Writing	Thinking
		$100 \times 73 = 7300$
Half of that:	$50 \times 73 = 3\ 650$	<b>3 650</b> is more than 1 000 away from 6 150.
	$10 \times 73 = 730$	$60 \times 73 = 3650 + 730 = \mathbf{4380}$ So there is room for 730 more.
	$10 \times 73 = 730$	$70 \times 73 = 4380 + 730 = \mathbf{5110}$ There is room for 730 more.
	$10 \times 73 = 730$	$80 \times 73 = 5110 + 730 = \mathbf{5840}$ Still 160 + 150 to go!
	$3 \times 73 = 219$	$83 \times 73 = 5840 + 219 = \mathbf{6059}$ So I can add another 73.
	$1 \times 73 = 73$	$84 \times 73 = 6059 + 73 = \mathbf{6132}$
Altogether:	$\underline{\quad} 84 \times 73 = \underline{\quad} 6\ 132$	

$$6\ 150 - 6\ 132 = 18, \text{ so } 6\ 150 \div 73 = 84 \text{ remainder } 18.$$

The work can be set out more briefly by leaving out the descriptions of the thinking:

$50 \times 73 = 3\ 650$	3 650
$10 \times 73 = 730$	4 380
$10 \times 73 = 730$	5 110
$10 \times 73 = 730$	5 840
$3 \times 73 = 219$	6 059
$\underline{1} \times 73 = \underline{73}$	6 132
$84 \times 73 = 6\ 132$	

$$6\ 150 - 6\ 132 = 18, \text{ so } 6\ 150 \div 73 = 84 \text{ remainder } 18.$$

Do the following using the recording method illustrated above:

1. Peppy wants to buy a skateboard that costs R1 875. He washes cars in the neighbourhood and earns R28 for every car he washes. How many cars must he wash to earn enough money so that he can buy the skateboard?

2. A supermarket donates 4 698 boxes of wax crayons to nursery schools. The boxes of wax crayons are divided equally between 27 nursery schools. How many boxes of wax crayons does each nursery school get?

**SOME PEOPLE FIND IT USEFUL TO SUBTRACT EVERY NOW AND AGAIN WHEN DOING DIVISION. THEY DO THIS IN ORDER TO KNOW MORE ACCURATELY WHAT THE REMAINDER IS.**

For example, while calculating  $6\ 150 \div 73$ , first 3 650 and later 5 840 are subtracted from 6 150. The blue frames below show you where this is done:

	<b>Remainder</b>
$50 \times 73 = 3\ 650$	<div style="border: 1px solid blue; padding: 2px; display: inline-block;"><math>6\ 150 - 3650 = 2500</math></div>
$20 \times 73 = 1\ 460$	
$10 \times 73 = 730$	
$4 \times 73 = 292$	<div style="border: 1px solid blue; padding: 2px; display: inline-block;"><math>6\ 150 - 5840 = 310</math></div>
$84 \times 73 = 6\ 132$	$6\ 150 - 6132 = 18$

$6\ 150 - 6\ 132 = 18$ , so  $6\ 150 \div 73 = 84$  remainder 18.

3. Use the above technique to calculate the following.

(a)  $5068 \div 36$

(b)  $9274 \div 26$

**Emphasise that:**

- In working with multiples and factors, learners need to understand that multiplication and division work hand in hand in both finding of factors and in multiples,
- Division and multiplication cannot be detached from each other, as they are inverses of each other

## CLASSWORK

### ACTIVITY 6: Day 6: Estimated time: 45 mins:

#### THE LONG DIVISION METHOD OF RECORDING

Study the following way to record their work when doing division. The explanations are normally left out.

$\begin{array}{r} 254 \\ 34 \overline{) 8\,649} \\ \underline{6\,800} \\ 1\,849 \\ \underline{1\,700} \\ 149 \\ \underline{136} \\ 13 \end{array}$	<b>Explanation</b>
	$200 \times 34$
	$50 \times 34$
	$4 \times 34$
	254

So  $8\,649 \div 34 = 254$  remainder 13.

The work was done in stages as shown below.

The zeros were not written, to keep the space for the other figures.

<b>Stage 1</b>	<b>Stage 2</b>	<b>Stage 3</b>
$\begin{array}{r} 200 \\ 34 \overline{) 8\,649} \\ \underline{6\,800} \\ 1\,849 \end{array}$	$\begin{array}{r} 250 \\ 34 \overline{) 8\,649} \\ \underline{6\,800} \\ 1\,849 \\ \underline{1\,700} \\ 149 \end{array}$	$\begin{array}{r} 254 \text{ remainder } 13 \\ 34 \overline{) 8\,649} \\ \underline{6\,800} \\ 1\,849 \\ \underline{1\,700} \\ 149 \\ \underline{136} \\ 13 \end{array}$
$200 \times 34$	$200 \times 34$	$200 \times 34$
	$50 \times 34$	$50 \times 34$
		$4 \times 34$

Calculate the following using the recording method that you find more suitable:

- (a) 8 028 books are wrapped in bundles of 36 for distribution to schools. How many bundles of 36 books will there be?

(b) A school has R9 200 available to buy books at R88 each. How many books can the school buy?

2. A water tank has a capacity of 150 ℓ. The capacity of a small measuring cup is 100 ml. How many full measuring cups will fill the tank (provided that no water is spilled)?

3. To make a chocolate drink, 10 ml of chocolate powder has to be used for every 200 ml of milk used.

(a) How much milk should be used with 5 ml chocolate powder?

(b) How much chocolate powder do you need for  $\frac{1}{2}$  ℓ of milk?

(c) If 3 ℓ of chocolate drink is shared equally among 8 children, how much does each child get? Answer in millilitres.

4. 1 728 small *cubic* building blocks are stacked to form a bigger *cube*. If the height of the bigger cube is 12 blocks, how many blocks are needed for the length and how many are needed for the width?

5. A total of 1 400 square tiles are laid in the shape of a square and a rectangle. The square consists of 144 tiles.

(a) How many rows of tiles are there in the square, and how many tiles are there in one row?

(b) How many tiles are there in the rectangle?

(c) The short side of the rectangle consists of 8 tiles. How many rows of 8 tiles each are there?

**Emphasise that:**

- In working with multiples and factors, learners need to understand that multiplication and division work hand in hand in both finding of factors and in multiples,
- Division and multiplication cannot be detached from each other, as they are inverses of each other

## CLASSWORK

**ACTIVITY 7: Day 7: Estimated time: 45 mins:**

### **USING A CALCULATOR TO CHECK ANSWERS AND THE SKILL OF ESTIMATION IN CHECKING THE CALCULATOR.**

From Grade 6 you are allowed to use a calculator to check your answers. But because we tend to type digits wrong we need to have the skill of estimating answers. Complete the tables below to see how accurate you are able to estimate a possible answer

Calculation plan	Estimated answer	Calculator answer	Difference between estimation and calculator answer
$3\ 456 \times 2\ 345$			
$3\ 456 \times 678$			
$1\ 250 \times 45$			
$2\ 345 \times 3\ 456$			
$6\ 804 \div 324$			
$3\ 584 \div 32$			
$8\ 118 \div 66$			
$5\ 705 \div 163$			

## CLASSWORK

**ACTIVITY 8: Day 8: Estimated time: 45 mins:**

**RATIO:** can be described as comparing two or more quantities of the same kind

**Consider the following situation:**

*30 learners from a school are going on a school camp. They are divided into two groups: one group has 20 learners and the other group has 10 learners. When the food is handed out, the group of 20 learners is given a box with 60 apples, and the group of 10 learners is also given a box with 60 apples.*

**Do you think this is fair? Discuss and explain to a friend**

Now that you have read the story and thought about it, answer these questions.

- How many apples will each learner get, if each group is given one box of apples?
- How do you think the apples should have been divided between the two groups?

**Apply your knowledge of comparing two or more quantities of the same kind and solve the following problems:**

1. A farmer keeps his goats in two camps. He keeps 20 goats in Camp A and 30 goats in Camp B.

(a) One day, he has 100 scoops of food for the goats. How many scoops of food should he put in each camp? Explain.

(b) On another day he has 150 scoops of food for the goats. How many scoops of food should he now put in each camp?

(c) One day the farmer has 5 buckets of food for his goats. How many buckets of food should he put in each camp?

(d) On another day the farmer puts 180 scoops of food in Camp B. How many scoops of food should he put in Camp A?

2. When Hilary bakes bread, she always uses the same recipe. So she always mixes 5 cups of white flour with 2 cups of whole-wheat flour.

(a) How many cups of whole-wheat flour must she mix with 20 cups of white flour?

(b) How many cups of whole-wheat flour must she mix with 35 cups of white flour?

(c) How many cups of white flour must she mix with 20 cups of whole-wheat flour?

(d) How many cups of white flour must she mix with 70 cups of whole-wheat flour?

(e) If Hilary uses 42 cups of flour in total to bake bread, how many cups of white flour does she use?

(f) If Hilary buys 240 kg of whole-wheat flour, how much white flour should she buy?

**Emphasise that:**

- **RATIO:** can be described as comparing two or more quantities of the same kind

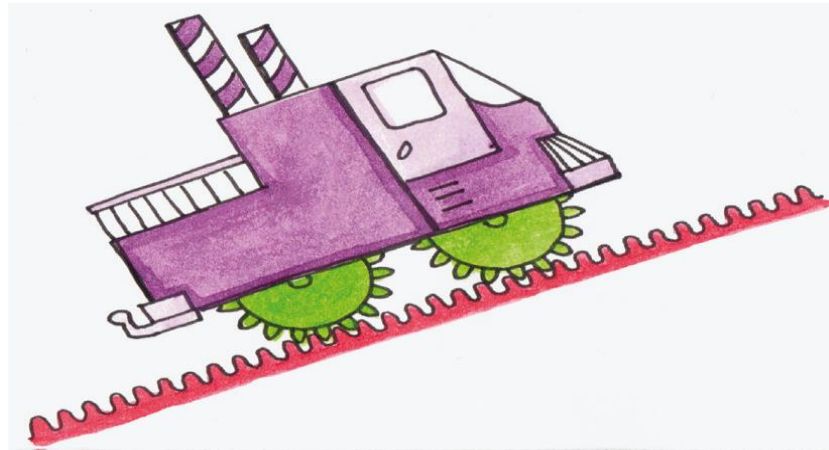
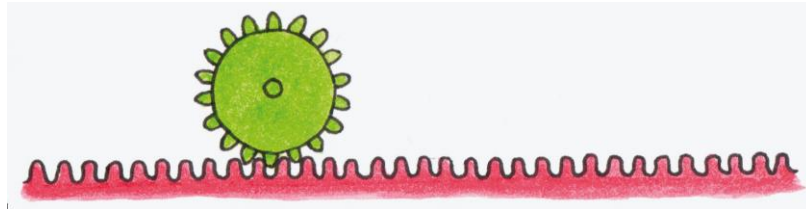
## CLASSWORK

### ACTIVITY 9: Day 9: Estimated time: 45 mins:

**RATE can be described as comparing two quantities of different kinds**

Study the following pictures and answer the questions:

1.



1. How many teeth does this cogwheel have?
2. How many notches will the locomotive in the diagram move forward when the wheels turn around once?
3. (a) How many notches will the locomotive move forward when the wheels turn around 6 times?  
(b) How many notches will the locomotive move forward when the wheels turn around 54 times?
4. How many full turns of the wheels are needed so that the locomotive will move forward by each of the following numbers of notches?  
(a) 1 800 notches (b) 6 372 notches  
(c) 6 381 notches (d) 6 390 notches  
(e) 801 notches (f) 1 602 notches

**Day 10: Informal test**

## MEMORANDUM: DAY 1: ACTIVITY 1

1.

<b>Facts that can be easily formed by building on <math>2 \times 7 = 14</math></b>				
$\times$	7	70	700	7 000
2	14	140	1 400	14 000
20	140	1 400	14 000	140 000
200	1400	14 000	140 000	1 400 000
2 000	14000	140 000	1 400 000	14 000 000
4	28	280	2 800	28 000
40	280	2 800	28 000	280 000
400	2 800	28 000	280 000	2 800 000
4 000	28 000	280 000	28 00 000	28 000 000

2.

$\times$	4	90	60	7	30	8	5	20	10
50									
3									
6									
70									
40									
9									
80									
4									
10									

3. Complete:

- |   |  |
|---|--|
| <p>(a) <math>900 \times 40 = 3\ 600</math></p> <p>(c) <math>320 \times 800 = 25\ 6000</math></p> <p>(e) <math>540 \times 90 = 4\ 860</math></p> | <p>(b) <math>940 \times 70 = 65\ 800</math></p> <p>(d) <math>110 \times 30 = 3\ 300</math></p> <p>(f) <math>170 \times 800 = 136\ 000</math></p> |
|---|--|

**MEMORANDUM:  
DAY 2: ACTIVITY 2**



**MEMORANDUM:  
DAY 3 & 4: ACTIVITY 3**

**MEMORANDUM:  
DAY 5: ACTIVITY 5**

**MEMORANDUM:  
DAY 6: ACTIVITY 6**

**MEMORANDUM:  
DAY 7: ACTIVITY 7**

**MEMORANDUM:  
DAY 8: ACTIVITY 8**

**MEMORANDUM:  
DAY 9: ACTIVITY 9**