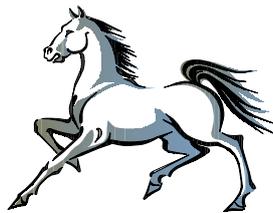


Mathematical Literacy, Mathematics, and Mathematical Sciences Illustrative Learning Programme

Grade 7

Module 1: FARMING AND GROWTH

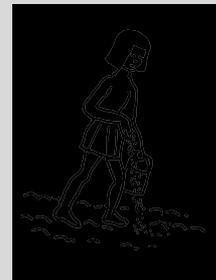


LEARNER'S MATERIAL

UNIT 1: LET US FIND OUT ABOUT FARMING

Did you know?

- The word *agriculture* comes from two Latin words "agri" which means "land" and "cultura" which means "cultivation".
- Agriculture is the world's oldest industry. It began to develop about 11 000 years ago.
- Farmers made it possible for civilisation to develop. While farmers produced food, non-farmers could spend their time developing crafts and manufacturing things which they could trade with other people.



Activity 1.1 *WHAT IS NEEDED TO GROW CROPS SUCCESSFULLY*

In this activity you discuss what farmers need to consider in order to produce good crops.

- Read the information in the box.
 - Then work with your group to answer the following questions.
1. Spend about 10 minutes discussing and writing down all the things that farmers need to consider in order to produce good crops.
 2. When you have finished, share your list with the rest of the class.
 3. As the rest of the groups report back, write down any points that your group did not consider.
 4. If you don't agree with any points on the other groups' lists, discuss with the class why you disagree with them.

Activity 1.2

WORKING WITH LARGE NUMBERS

In this activity, you do calculations to work out facts regarding the area of land used for farming, and the number of people who work on farms in Africa.

- Work with your group
 - Use your own methods to work out the answers
 - Be prepared to explain to the rest of the class how you worked out your answers.
1. About $\frac{1}{3}$ of the earth's surface is used for farming.
If the surface of the earth is 510 100 000 square kilometres, what area is used for farming? Write your answer correct to 1 decimal place.
 2. About $\frac{1}{2}$ of the workers in the world are involved in farming.
Suppose there are 1 812 617 000 workers in the world, how many of them are involved in farming?
 3. In Africa, 67 people out of every 100 work on farms.
Suppose the population of Africa is 749 000 000. How many of them work on farms?
 4. There are large deserts and tropical rain forests in Africa, and only $\frac{1}{3}$ of Africa is suitable for farming.
If the area of Africa is 30 340 000 square kilometres, what area is available for farming? Give your answer correct to 1 decimal place.

Activity 1.3

WHAT IS FARMED IN SOUTH AFRICA

In this activity, you

- *find out what a subsistence farmer is*
- *write down a list of crops and livestock raised by farmers in South Africa*
- *share your information with the rest of your group.*



Work out these answers on your own.

1. Most farmers in Africa are *subsistence farmers*. Look this up in your dictionary, and write down what it means to be a subsistence farmer.

2. South Africa has one of the best climates in Africa for farming, and has large, fertile farmlands.
- Write down a list of all the crops that you can think of that are grown in South Africa.
 - Write down a list of all the animals (or livestock) that you can think of that are raised by farmers in South Africa.
 - Share your information with the rest of your group. Add things to your list that are missing if you think they are correct.
 - Some of the information that you share might be wrong or incomplete. Discuss with the rest of the members of your group how you could check your answers.

Activity 1.4 *CROP ROTATION*

In this activity, you

- find out what is meant by crop rotation*
 - find out about root vegetables, brassicas and legumes*
 - do an activity involving crop rotation.*
-
- Read the information given in the box.

Did you know?

- Farmers practise *crop rotation*. This means that they change the crops they grow in each field every few years.
- Soil contains food and nutrients that the crops need in order to grow. Each crop has different food requirements, so to prevent the food supply in the soil from being used up, the farmers make sure that each year they grow crops with different food requirements in each field.

Did you also know ... ?

- Vegetables can be divided into 3 groups:
 - i **root vegetables** - e.g. radish, carrots, beetroot, sweet potatoes
 - ii **brassicas** - e.g. cabbage, cauliflower, brussels sprouts
 - iii **legumes** - e.g. beans, peas, lentils



- Now work with your group to answer the following questions.
 1. Why do you think that radishes, carrots and beetroot are called *root vegetables*?
 2. Look up the word *brassicas* in the dictionary, and write down what it says.
 3. Look up the word *legumes* in the dictionary, and write down what it says. Why do you think beans and peas are called legumes?
 4. Look at the diagrams on the next page of a farmer's 3 garden plots.

Each of the garden plots has been divided into 3 sections.

- In Plot 1, in the first season, the farmer has planted three root vegetables i.e. radish, carrots and beetroot.
 - She wants to rotate her crops so, in the second season, she decides to grow three different brassicas in the three different sections of Plot 1.
 - In the third season she grows three legumes in the three different sections of Plot 1.
- a) Copy the diagrams of the 3 garden plots.
 - b) Fill in the vegetables grown over the three seasons in Plot 1.

- c) Then fill in the vegetables grown over the three seasons in Plot 2 and Plot 3. Show how you would rotate the vegetable crops so that, in each season, you grow a different crop from a different group in each of the sections.

	Plot 1			Plot 2			Plot 3		
Season 1	Roots Radish	Roots Carrots	Roots Beet-root	Brassica Cabbage	Brassica Cauli - flower	Brassica Brussels Sprouts	Legume Beans	Legume Peas	Legume Lentils
Season 2									
Season 3									

UNIT 2: THE HISTORY OF FARMING

In this unit, you

- *find out about the history of farming*
- *do calculations with dates on a time-line which shows dates before and after the birth of Jesus*
- Read the information given in the box.

Did you know?

- Before about 9 000 BC, people hunted, fished and gathered their food.
- They then started sowing seeds, and waiting for the harvest.
- Dogs were the first animals to be tamed, usually to help in hunting.
- Early people then started domesticating other animals.

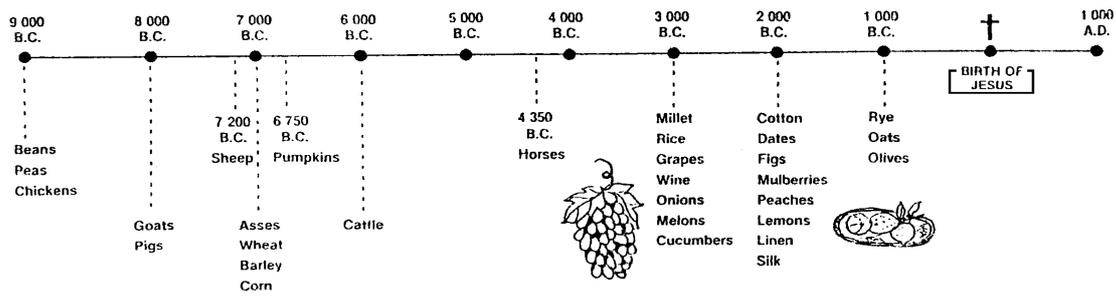


Did you also know this ... ?

- In South Africa we use the Christian calendar. In this calendar, BC stands for "*before Christ*". This calendar is also called the Gregorian calendar.
- AD stands for "*anno Domini*" which means "in the year of our Lord".
- In AD 532, a Christian monk worked out a system for dating events starting with the year he believed Jesus was born.

- The time-line on the next page shows us when some of our crops were first planted, and approximate times when various animals were domesticated.
- Work on your own to answer the questions on the next page.

- Use the time-line to answer the following questions



- Calculate the number of years between 9 000 BC and 5 000 BC.
- Calculate the number of years between 100 BC and 100 AD.
- Discuss how you would find out for how many years farmers have been growing beans.
- Use your method to find out how many years farmers been growing the following crops:
 - grapes
 - cotton
 - oats
 - pumpkins



- Name three kinds of material used for clothing before the birth of Jesus.
 - What is another name for an ass?
 - What is a mule?
 - What is the relationship between a mule and a horse?
 - For how many years have farmers raised the following animals:
 - cattle?
 - goats?
 - horses?
 - sheep?
 - Name the different kinds of grain which farmers grew before the birth of Jesus.
- When you have finished, compare your answers and the methods you used with the rest of the class.

UNIT 3: DIFFERENT CALENDARS

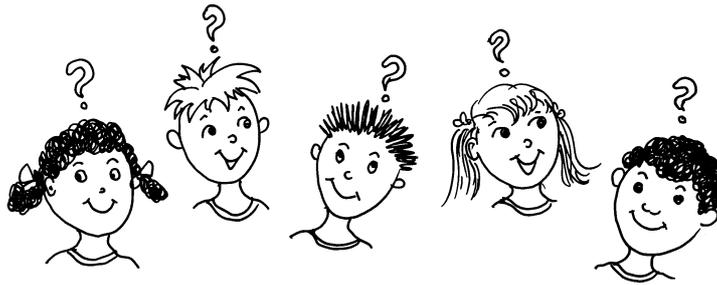
In this unit, you

- *find out about the Gregorian calendar, the Hebrew calendar, the Islamic calendar and the Chinese calendar*
 - *find out how long a century and a millennium are*
 - *do calculations involving time.*
-
- Read the information given in the box.

Did you know?

- Most people in the Western world use the **Gregorian** calendar, worked out in the 1580's by Pope Gregory the 13th.
- The **Hebrew** calendar, according to tradition, was supposed to have started with the Creation, at a moment 3 760 years and 3 months before the beginning of the Christian era.
- The **Islamic** calendar began with Mohammed's flight from Mecca to Medina. This flight, took place in AD 622 according to the Christian calendar. The year is much shorter than the solar year, with only 354 days. As a result, the Islamic New Year moves backwards through the seasons.
- The **Chinese** calendar began in 2 637 BC, the year in which the legendary Emperor Huang-Ti supposedly invented it.
- Century means 100 years. The word comes from the Latin word "centuria" which means one hundred. The years from 1 to 100 are called the first century; from 101 to 200 are called the second century; etc

- Work together with your group to answer these questions:



1. If the second century was from the year 101 to the year 200, what century started in 801 and ended in the year 900?
2. What century started in 1601 and ended in the year 1700?
3. When did the 20th Century start, and when does it end?
4. When will the next century begin?
5. Draw a time-line that you could use to show the Hebrew calendar, the Islamic calendar and the Chinese calendar relative to the Gregorian calendar.

Points to consider:

- make sure that you use the correct scale
 - write the dates above the time-line, and write a brief description of why the date is important below the time-line.
6. South Africa had its first Democratic Elections in 1994. What would the year have been on the
 - a) Hebrew calendar?
 - b) Islamic calendar?
 - c) Chinese calendar?
 7. If it is the year 5 740 in the Hebrew calendar, what would the year be on the Gregorian calendar?
 8. If it is the year 1 354 in the Islamic calendar, what would the year be on the Gregorian calendar?

9. If it is the year 5 000 on the Chinese calendar, what would the year be on the Gregorian calendar?
10. The word *millennium* means "one thousand years".
If the first millennium in the Gregorian calendar started in the year 1 AD,
- a) When did the first millennium end?
 - b) When did the second millennium begin, and when did it end?
 - c) When did the third millennium begin, and when did it end?

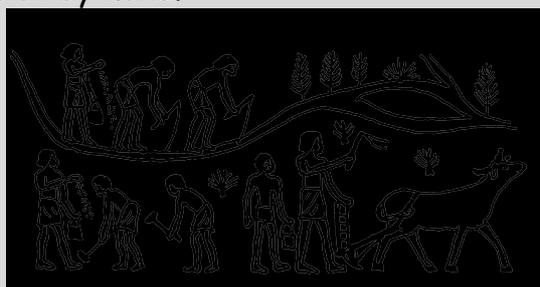
UNIT 4: DIFFERENT NUMERATION SYSTEMS

Activity 4.1 THE EGYPTIAN NUMERATION SYSTEM

In this activity, you work with numbers written as the Ancient Egyptians used to write them

- Read the information given in the box.

In this Egyptian mural from 1 500 BC, you can see people using hoes and a plough. The seed is sown by hand.



- In about 3 000 BC, the Ancient Egyptians used hieroglyphics (i.e. picture writing) to write numerals.
- The symbols they used were:

1		Stroke
10		Arch
100		Coiled Rope
1 000		Lotus Flower
10 000		Finger
100 000		Tadpole
1 000 000		A man throwing up his hands in amazement

- They wrote 324 as



- But, sometimes they wrote it as

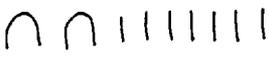


- And other times, they wrote it as



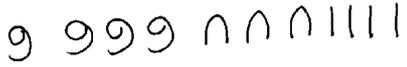
- Now work on your own to answer the following questions.
- Use the information in the table to help you.

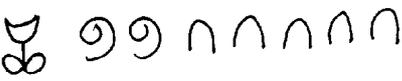
1. Write each of the following Egyptian numerals in the way we would write them

a 

b 

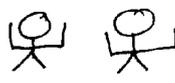
c 

d 

e 

f 

g 

h 

2. Write each of the following as Egyptian numerals:

a. 45

b. 96

c. 425

d. 1 833

e. 6 000

f. 22 343

g. 614 003

h. 1 230 005

3. a. Write the 123, 213 and 321 using Egyptian numerals

b. We use the same 2 to represent 2 units, 2 tens and 2 hundreds. How did the Ancient Egyptians represent 2 units, 2 tens and 2 hundreds?

4. When we write the number *four hundred* using digits, we write 400. The zeros tell us that there are no tens and no units, only four hundreds.

How did the Ancient Egyptians write four hundred?

5. Write down two differences between our numeration system, and the Ancient Egyptian numeration system.

Activity 4.2

THE HINDU-ARABIC NUMERATION SYSTEM

In this activity, you

- find out about Hindu-Arabic numerals
 - compare numbers written as the Ancient Egyptians wrote them, and as we write them today
 - do some calculations which make use of the place value property of numbers.
- Read the information given in the box.

- The number system we use today is called the Hindu-Arabic Numeration System.
- Hindu Mathematicians around 300 BC used a system based on 10.
 - They had symbols for each number from one to nine.
 - They had a name for each power of ten.
- By about 600 AD, the Hindu mathematicians had invented the symbol ***sunya*** (meaning empty) which we call zero.
- During the 700's, the Arabs learned Hindu arithmetic from the Hindus in India that they traded with.
- In about 1100 AD, Hindu-Arabic numerals were introduced to Europe. Up until then, Roman numerals had been used.

- Now work with your group to answer the questions below:
1. Write down the number *seventeen thousand five hundred and ninety-eight* using
 - a) Egyptian numerals
 - b) Hindu-Arabic numerals.
 2. Which one took the shortest time to write down?
 3. Why did it take the shortest time?

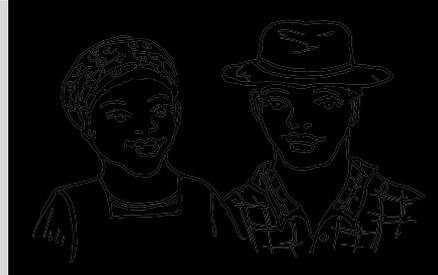
4. In which one is the position of the numbers important?
5. Why do you think the Hindu-Arabic system is now the one used around the world?
6.
 - a) Make as many numbers as you can from the digits 5, 3 and 6. Each number should use all three digits.
 - b) Which is the largest of these numbers?
 - c) Which is the smallest of these numbers?
7.
 - a) Choose any 3-digit number and write it down.
 - b) Write the number backwards.
 - c) Decide which number is larger.
 - d) Subtract the smaller number from the larger number.
 - e) Write the answer to d) backwards.
 - f) Add your answers to d) and e) together
 - g) Choose another 3-digit number and work through this question again.
What do you notice?
 - h) Write down why you end up with the answer that you do.
Compare your answer with other learner's answers.

UNIT 5: HELPING TWO FARMERS USING DECIMALS AND MEASUREMENT

In this unit, you

- *are introduced to Mrs Dlomo and Mr Mbatha*
 - *do perimeter and area examples*
 - *work out how much water is wasted by a dripping tap.*
- Read the information given in the box.

- Mrs Dlomo and her working partner, Mr Mbatha, are two small scale farmers who farm on Naledi Farm.



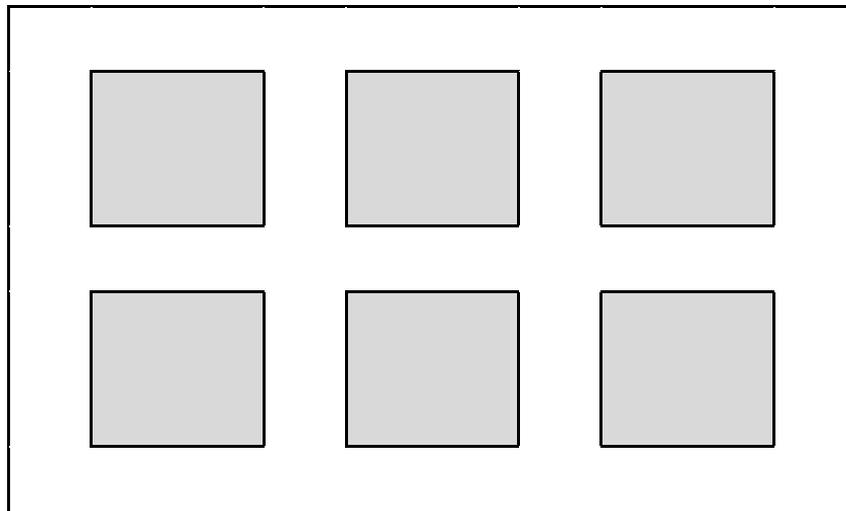
- Naledi Farm lies in the North-West of Gauteng Province, near the border of the North West Province.



- Naledi Farm once belonged to the farmer for whom their families used to work.
- With the help of the Government, a large portion of the land has since been given to the workers' families.
- These families have now begun to farm for themselves.
- Mrs Dlomo and Mr Mbatha have been farming on this piece of land for the last four years.
- They grow crops, and then sell them.
- They also raise chickens, cows and goats that they sell in the area.
- Many customers come from neighbouring farms to buy from them.
- Their dream is that Naledi Farm will one day become one of the best farms in the area

- Work with your group to answer the following questions:

The piece of land which they own is 53,6 m long and 25,4 m wide.
This is what their piece of land looks like:

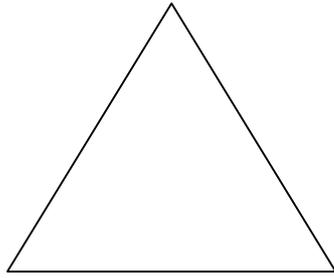


1. Draw this diagram of their piece of land, and fill in the dimensions on it.
2. Find the perimeter of the piece of land.

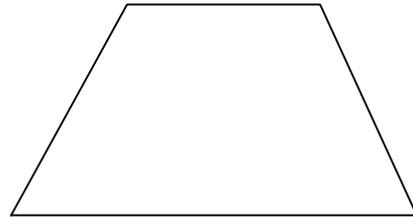
3. Mrs Dlomo and Mr Mbatha decide to put a fence around their land. They will need to have a gate in the fence so that they can get in and out.
- The fence costs R 40,00 per metre.
 - The gate costs R300,00, and is 1 metre wide.
- a) Decide where you think they would put the gate. Draw it in on your diagram.
- b) Calculate how much Mrs Dlomo and Mr Mbatha would have to pay to fence their land.
- c) Would the position of the gate make any difference to the cost of fencing the property?
- d) If Mrs Dlomo and Mr Mbatha decide to share the costs of the fencing equally, what would they each have to pay?
- e) Why do you think Mrs Dlomo and Mr Mbatha decide to fence the land?
4. They decide to divide the land up into 6 smaller pieces, each the same size. The paths are all 50 cm wide.
- a) Use your diagram to help you work out what the dimensions of each of the smaller pieces of land would be?
- b) If they decide to fence each of the smaller pieces of land, rather than the large piece of land, how much would the fencing cost? (Remember the gates.)
- c) This time, Mrs Dlomo said that she would pay $\frac{2}{3}$ of the costs of the fencing, if Mr Mbatha would pay the rest of the cost of the fencing. How much did they each pay?

5. Find the perimeters of these shapes. You will need to measure the sides.

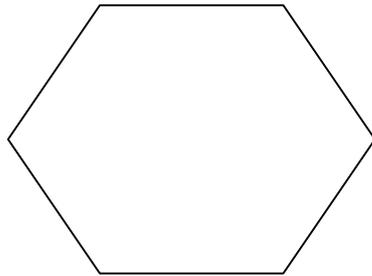
a)



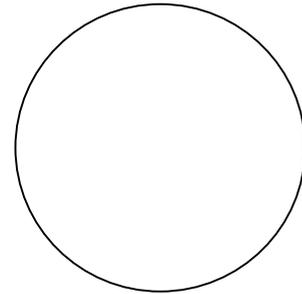
b)



c)



d)



6. There is a water tap on the piece of land. This tap is leaking, and water is constantly running from the tap.

- Mrs Dlomo puts a measuring cup under the tap, and finds out that 15 ml of water drips into the cup in 1 minute.

a.) How much water is wasted in 1 hour? How many cups of water is that?

b.) How much water is wasted in 1 day? How many cups of water is that?

c.) How much water is wasted in 1 month of 30 days? How many cups of water is that?

d.) How much water is wasted in a year?

e.) If water costs R2,50 per kilolitre, how much money has been wasted in a year?

f.) How does one repair a leaking tap?



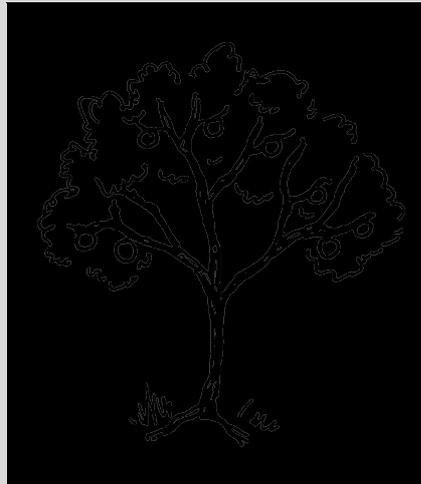
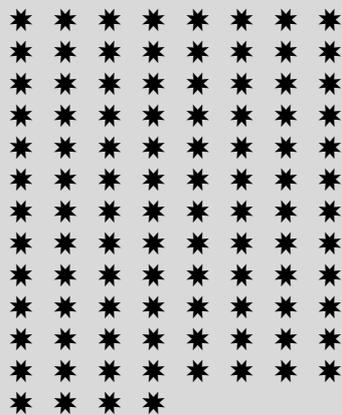
UNIT 6: HELPING THE NALEDI FARMERS USE PERCENTAGE

Activity 6.1 *INTRODUCING PERCENTAGE*

In this activity, you are asked to arrange trees on pieces of land with different shapes.

- Read some more information about Mrs Dlomo and Mr Mbatha.

- Mrs Dlomo and Mr Mbatha manage to buy another piece of land next to their first piece of land.
- They want to plant 100 fruit trees on it.
- If the piece of land they had bought was square, they could arrange the fruit trees like this:



- Now work on your own to answer the following questions:
- Suppose Mrs Dlomo and Mr Mbatha could choose the shape of their piece of land.
 1. Suppose they chose a rectangular piece of land.
Work out as many ways as possible of arranging 100 trees on a rectangle.

2. Choose another shape.
Work out how to arrange 100 trees on that shape.

Activity 6.2 **CONVERSIONS**

In this activity, you

- write fractions as a percentage
- write percentages as fractions

- Work with your partner.
- Read through the information in the box below.
- Make sure that both of you understand what is in the box.

- Mrs Dlomo and Mr Mbatha plant the trees, and after a few months, they discover that 6 of the 100 trees have died.
 - In other words, $\frac{6}{100}$ **of the trees have died.**
- A few months later, they find that 8 of the 100 trees have died.
 - In other words, $\frac{8}{100}$ **of the trees have died.**
- We sometimes use a short-hand symbol to represent $\frac{\dots}{100}$, and that is **%**.
- This means that $\frac{6}{100} = 6\%$ and we say **6 percent**
- And, $\frac{8}{100} = 8\%$, and we say **8 percent.**

1. Write each of the following as a percentage:

a. $\frac{9}{100}$ b. $\frac{25}{100}$ c. $\frac{80}{100}$ d. $\frac{99}{100}$ e. $\frac{2}{100}$

2. Write each of these as a fraction out of 100:

a. 33 % b. 71 % c. 20 % d. 1 % e. 102 %

Activity 6.3

WRITING A FRACTION AS A PERCENTAGE

In this activity, you change more fractions into percentages.

- Work with your partner
- Read through the information in the box below.
- Make sure that both of you understand what is in the box.

Example 1:

- Suppose Mrs Dlomo and Mr Mbatha had planted 50 trees in the orchard and 7 trees died.

➤ This means that $\frac{7}{50}$ of the trees had died

- Suppose they want to find out what percentage of the trees had died. To do so, they would have to write this as a fraction out of 100.

$$\frac{7}{50} = \frac{7}{50} \times \frac{2}{2} = \frac{14}{100} = 14\%$$

Example 2:

- Now, suppose Mrs Dlomo and Mr Mbatha had planted 25 trees in the orchard and 2 died.

➤ This means that $\frac{2}{25}$ of the trees died.

- Suppose they wanted to find out what percentage of the trees had died. To do so, they would have to write this as a fraction out of 100.

$$\frac{2}{25} = \frac{2}{25} \times \frac{4}{4} = \frac{8}{100} = 8\%$$

- Now answer the following questions:

1. Write each of these fractions as a percentage:

- a) $\frac{23}{50}$ b) $\frac{43}{50}$ c) $\frac{7}{25}$ d) $\frac{12}{25}$ e) $\frac{25}{25}$
f) $\frac{6}{10}$ g) $\frac{2}{5}$ h) $\frac{5}{5}$ i) $\frac{1}{2}$ j) $\frac{6}{20}$

2. Compare your answer to those in the rest of the group.
Discuss the ones where you have different answers.

Activity 6.4 *CHANGING A PERCENTAGE BACK TO A FRACTION*

In this activity, you write percentages as fractions in their simplest form.

- Work on your own.
- Read through the information in the box below.
- Make sure that you understand what is in the box.

- Look at this example: $20\% = \frac{20}{100}$
- When we simplify, we get $\frac{20}{100} = \frac{2}{10} = \frac{1}{5}$
- This means that $20\% = \frac{1}{5}$

1. Write each of the following as a fraction in its simplest form:
a. 10% b. 20% c. 30% d. 40% e. 50% f. 60%

g. 70% h. 80% i. 100% j. 25% k. 75% l. 200%
2. Write down any patterns that you notice amongst the answers.
3. Compare your answers with those in the rest of the group.
Discuss the ones where you have different answers.

Activity 6.5 **CHANGING A PERCENTAGE INTO A DECIMAL**

In this activity, you write percentages as decimals.

- Work on your own
- Read through the information in the box on the next page.
- Make sure that both of you understand what is in the box.

- Look at this example: $20\% = \frac{20}{100}$

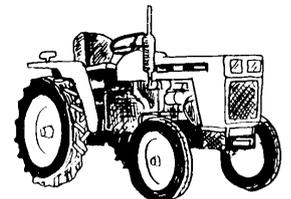
Now $\frac{20}{100} = 0,20$

This means that $20\% = 0,20$. (We can also write this as $20\% = 0,2$)

1. Write each of the following as a decimal:

a. 35 % b. 74 % c. 97 % d. 7 %

e. 3 % f. 100 % g. 103 % h. 305 %



2. Write down any patterns that you notice amongst the answers.

3. Compare your answers to those in the rest of the group.
Discuss the ones where you have different answers.

UNIT 7: FINDING OUT ABOUT STATISTICS

Activity 7.1 **ASKING QUESTIONS**

In this activity you

- read an explanation of what statistics is
- read about facts, opinions and trends.

- Read the information given in the box.

Statistics is a way of collecting and looking at information which involves numbers.

- It is a branch of mathematics that deals with ways of simplifying masses of numbers and facts and of presenting them in an understandable form.
- Another word that is used instead of information is **data**.
- We say that people collect data.

a) When we collect data, we often collect information about **FACTS**.

For example:

"I wonder which farmer in our area has the biggest herd of cattle?"



- To find out the answer to this question, we can go and count the cattle.
- We get an answer that we can prove is right (or wrong).

b) When we collect data, we sometimes collect information about **OPINIONS**.

For example:

"I wonder what everybody's favourite porridge is?"

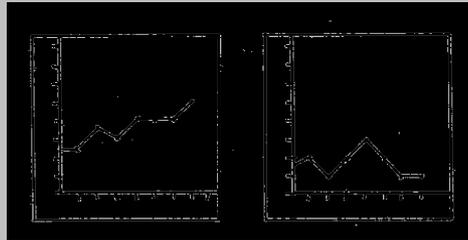


- To find out the answer to this question, we ask everyone what their *opinion* is. There is no right or wrong answer to the question.

c) When we collect data, we sometimes collect information about **TRENDS**.

For example:

"I wonder if the soybean price will go up or down next year?"



- What will happen to the price will depend on whether there are too many soybeans at the moment, or whether there is a shortage of them.
- We can look at the conditions around us, and try to use these conditions to predict what is going to happen to the price of soybeans

- Now answer these questions:
 - Are these asking questions about **FACTS, OPINIONS, or TRENDS?**
1. What is your favourite colour?
 2. Where is the biggest mealie growing area in South Africa?
 3. Do you think we will have good rains this summer?
 4. Which is the fastest selling fruit yoghurt in the supermarket?

Activity 7.2 **DOING A SURVEY**

In this activity you

- *find out what it means to do a survey*
- *complete two frequency tables.*

- Read the information in this box.

One way of collecting statistical information is by doing a **survey**.

- Mrs Dlomo and Mr Mbatha usually grow potatoes and onions on their farm.
- They decide that they also want to grow Tomatoes, carrots and cabbage.
- Before they plant these new vegetables, They decide to do a survey.



- They ask the people who usually buy their vegetables which of the new vegetables they would buy
- They decide to fill in the information on a **frequency table**

Let's look at how they drew up a frequency table:

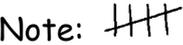
A They drew up a table with three columns and four rows

The first column shows what is being surveyed

Types of vegetables		
Tomatoes		
Carrots		
Cabbages		

B They asked their customers which of the vegetables they would buy.

They wrote the results in the second column.

Note:  means 5. This makes it easier to count.

Types of vegetables	Tallies	
Tomatoes		
Carrots		
Cabbages		

C They then wrote the tallies as numbers in the third column. They then added up the frequencies to get a total.

Types of vegetables	Tallies	Frequency
Tomatoes		7
Carrots		12
Cabbages		8
		27

- **Frequency** means the number of times something happens.

Use the method that Mrs Dlomo and Mr Mbatha used to draw up a frequency table to answer the following.

- Grade 7C were asked which their favourite vegetables are.
The results were: Mary - potatoes; Nontobeko - rice; Penny - cabbage; Paul - carrots; Mpho - rice; Deena - potatoes; David - tomatoes; Dorianne - cabbage; Siphon - rice; Andy - potatoes; Meg - potatoes; Elly - cabbage; Mosa - cabbage; Mantombi - potatoes; Adele - rice; John - rice; James - tomatoes; Jabu - carrots; Joseph - doesn't like vegetables; Phoka - cabbage; Andrew - cabbage; Ann - tomatoes; Abdul - rice

- Copy and complete the frequency table.

Type of vegetable	Tallies	Frequency
potatoes		
rice		
cabbage		
carrots		
tomatoes		
none		
TOTAL		

- Then answer the following questions:
 - Which was the Grade 7C's favourite vegetable?
 - Which was the Grade 7C's least favourite type of vegetable?

- Dumi, who is Mrs Dlomo's niece, had to do a survey for school. She decided to ask the farmers in the area how many times a week they listen to the Farmer's Report on the radio.

- She asks 40 people, and writes down their answers.

- This is her data:

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

- a) Copy the frequency table, and fill it in.

Number of times people listen to the Farmer's Report in a week	Tally	Frequency
0		
1		
2		
3		
4		
5		
TOTAL		

- b) Use the frequency table to answer the following questions:
- i) How many people didn't listen to the Farmer's Report at all?
 - ii) How many people listened to the Farmer's Report five times a week?
 - iii) How many more people listened twice a week than people who listened three times a week?

Activity 7.3 *DOING YOUR OWN SURVEY*

In this activity you do a survey.

- Work in small groups for this activity.
1. Conduct a survey among twenty learners in your class to find out what

everybody's favourite vegetable is.

- You need to consider whether you are going to make up a list of say 5 vegetables, and then ask the learners which of these they prefer; OR whether you are going to give them freedom to say any vegetable that they want.
2. Draw a frequency table and fill in the information on it.
 3. Use the frequency table to answer the following questions:
 - a. What was the learner's favourite vegetable?
 - b. What was the learner's least favourite vegetable?
- Keep this survey as you will need it for Activity 8.4.

Activity 7.4 REPRESENTING DATA

In this activity you look at different ways of recording data.

- Read the information given in the box.

There are many different ways of recording data.

One way is a frequency table, or tally chart

Farm A	
Farm B	
Farm C	

Number of people working on the farms

Here are some other ways:

2. A list

Carrots	✓
Peas	✓
Broccoli	✗

Beans	✗
Peas	✓
Lentils	✓

Cabbage	✓
Sprouts	✓
Caiflower	✓

Vegetables planted in the year 1998

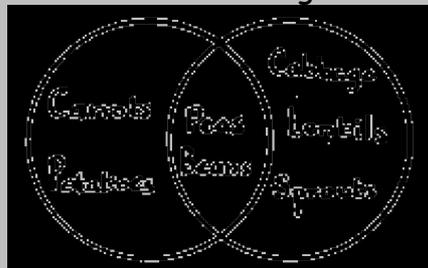
3. A table

SUMMER	WINTER	SUMMER & WINTER
Beans	Peas	Lettuce
Potatoes	Cabbage	Carrots

Seasons when vegetables should be planted

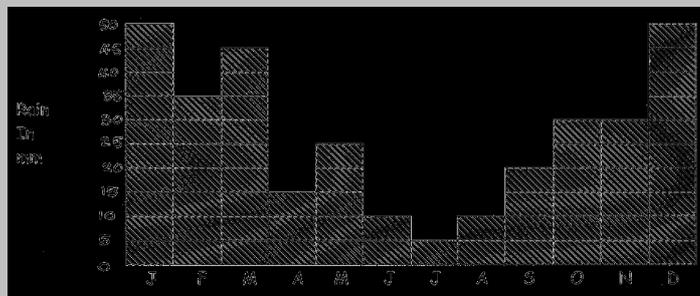
4. A Venn diagram

Dan Angie



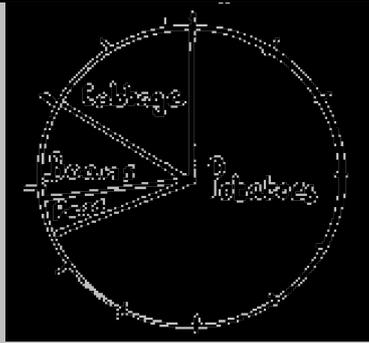
Vegetables liked by Dan and Angie

A bar graph



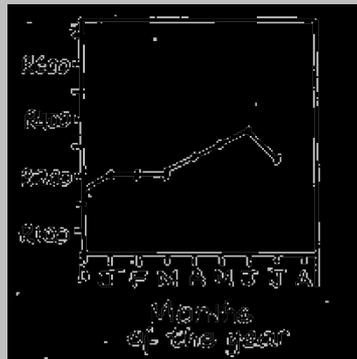
Rainfall during 1999

A pie graph



Amount of crops grown

A line graph



Amount spent on fertilizer

- Work with your partner
 - Look at the ways of recording data shown in the boxes on the last three pages
1. Discuss what information is given by each way of recording data.
 2. Write down a description of each graph.

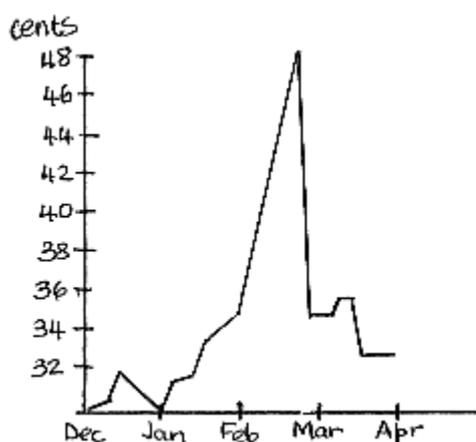
Activity 7.5 DATA IN THE NEWS

In this activity you

- sort examples of tables or graphs into various categories
 - make up a story to describe a graph
- Look in newspapers, advertising brochures, and magazines for examples of tables or graphs.
 - Cut them out to use for this activity.
1. Work with your group.
 - a) Sort your examples into the different formats e.g. tables, pictographs, block graphs, pie charts, etc.

- b) Now re-sort them according to whether they record facts, opinions or trends.
- c) Look at each example that you cut out. Decide whether it tells you about the present, the past or the future (or maybe all or more than one of these).
- d) Sort the tables and graphs into different topics e.g. those that are about money; those that are about people's choices; those that are about different products; etc.
- e) Write down anything else that you notice about them.

- Study this graph:



- Look at the way the line goes up and down.
 - The graph has no label, so it could be about anything!
Perhaps it is about
 - » the rise and fall in the price of potatoes!
 - » the changing value of the rand.
 - Work with a partner.
2. a. Make up your own story that would explain the graph, and write it down in a few sentences.
 - b. Think of a heading that best describes your explanation of the graph.

- c. Label the horizontal and the vertical axes

Remember:



horizontal



Vertical

- d. Compare your story with the stories that the other groups made up.

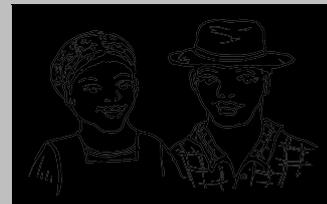
UNIT 8: DRAWING GRAPHS

Activity 8.1 *KEEPING RECORDS*

In this activity you

- read a bar graph showing rainfall figures
- draw a bar graph showing rainfall
- Read the information given in the box

- Mrs Dlomo and Mr Mbatha work very hard to keep Naledi Farm going.
- The Government has promised to renew their annual subsidy each year if they can show that their farm is being well managed.
- To help them, the two farmers keep records of everything they produce, buy and sell.
- They have started to use their records to help them plan and to keep better control over all their farming activities.
- Over the last three years, they have started to show an increase in profits, and most areas of production are running very well.



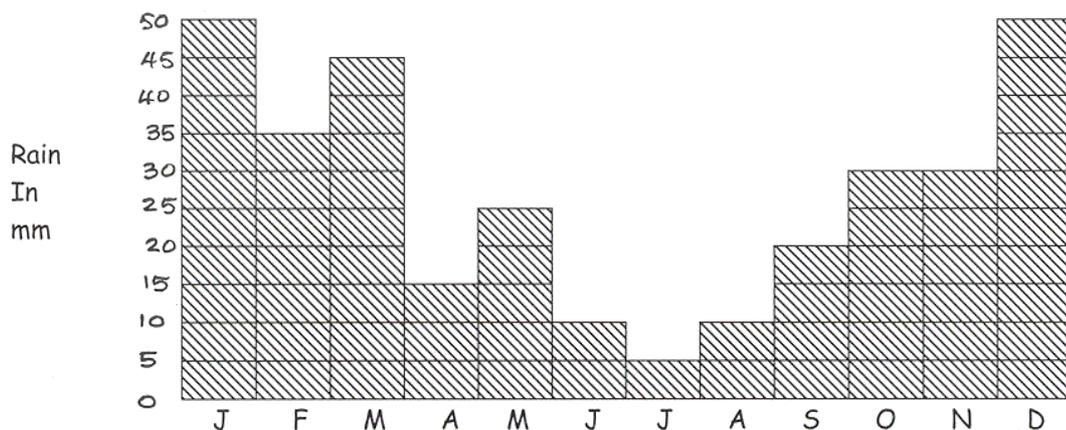
"I wonder what sorts of records farmers need to keep?"

"Yes, and how do they collect their information?"



- One of the things that it is important for farmers to know, is whether it is likely to rain in a particular month or not.
- Work with your partner to answer these questions

- The Naledi farmers are wondering whether it is likely to rain this August. They have a record of monthly rainfall figures for the last four years. In your group, discuss how you think they would collect this information.
- Here is the rainfall chart that the Naledi farmers drew to show the number of millimetres of rain that fell on their farm last year.



- In which month did the least rain fall?
 - In which month(s) did the most rain fall?
 - How do you know, from looking at the graph, that the farm was not near Cape Town?
 - How much rain fell in August?
 - Do you think that it is likely that some rain will fall in August on the Naledi Farm?
- Suppose the rainfall in the second week of January was as follows:

Mon	Tues	Wed	Thurs	Fri	Sat	Sun
13 mm	25 mm	-	8 mm	14 mm	-	20 mm

In pairs, draw a rainfall chart that shows the above information.

Things to think about as you draw the rainfall chart:

- >> what you would show on your vertical axis.
- >> what you would show on your horizontal axis.

Activity 8.2 **DRAWING A PICTOGRAPH**

In this activity you read information off a pictograph

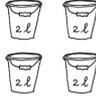
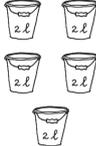
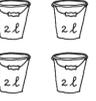
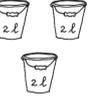
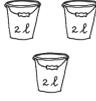
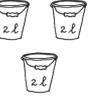
- Read the information given in the box.

- Mrs Dlomo and Mr Mbatha own five milk cows. Their names are Luleka, Mambo, Thandi, Grace and Pheta.
- They milk their cows twice a day - in the early morning, and in the evening.
- Between them, the five cows produce over 250 litres of milk a week.
- One of their cows used to produce an average of 64 litres of milk a week. This year she has only been able to produce three quarters of that amount.
- One of the cows is feeding her calf, so she is only milked in the morning.



- Mrs Dlomo and Mr Mbatha record the milk production for one week on a pictograph.
- When we draw a pictograph, we use a symbol to which we give a certain value.

- In this graph, they use the picture of the bucket to represent 2 litres of milk.

	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Luleka							
Mambo							
Thandi							
Grace							
Pheta							

Pictograph showing the amount of milk produced by the cows on Naledi Farm in the first week of March 2000.

- Work on your own
 - Study the above pictograph, and answer the following questions.
- How much milk was produced in that week by
 - Luleka ?
 - Mambo ?
 - Thandi ?
 - Grace ?
 - Pheta ?
 - Arrange the names in order, from the cow that produces the most milk, to the cow that produces the least milk.
 - How much more milk does Luleka produce than Mambo?

4.
 - a) On which day is the most milk produced?
 - b) On which day is the least milk produced?
5. How much milk is produced by all five cows in the first week of March, 2000?
6. If Mrs Dlomo and Mr Mbatha sell the milk for R1,20 per litre, how much do they earn from the milk in that week?
7. We are told that one of the cows is still feeding her calf, and is only milked once a day.
 - a) Which cow do you think this is?
 - b) Explain why you selected her.
8. One of their cows used to produce an average of 64 litres a week. We are told that her milk production is now only three quarters of that amount.
 - a) Which cow are we talking about?
 - b) Explain why you selected her.
9. Make up your own questions about the pictograph. Give them to another group to answer.

Activity 8.3 THE TWO FARMERS DRAW A BAR GRAPH

In this activity you

- read about how many litres milk a healthy cow should produce in a year
- read information off a bar chart
- Read the information given in the box

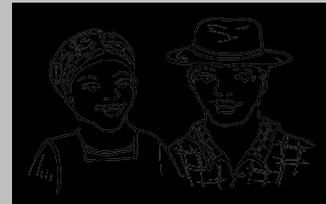
- Mrs Dlomo and Mr Mbatha recently bought two milking machines to help speed up the milking of their cows.
- They read a report in the "Farmer's Bulletin" about milk production. They are curious to know how much milk each of their cows *should* be producing.
- The article says that, by the year 2000, a healthy cow should produce about 5 000 litres of milk a year.



- It also says that the amount of milk produced by a cow has increased over the years. It says that in 1960 the expected amount was 3 000 litres; in 1970 the expected amount was 3 500 litres, and in 1980 the expected amount was 4 000 litres.

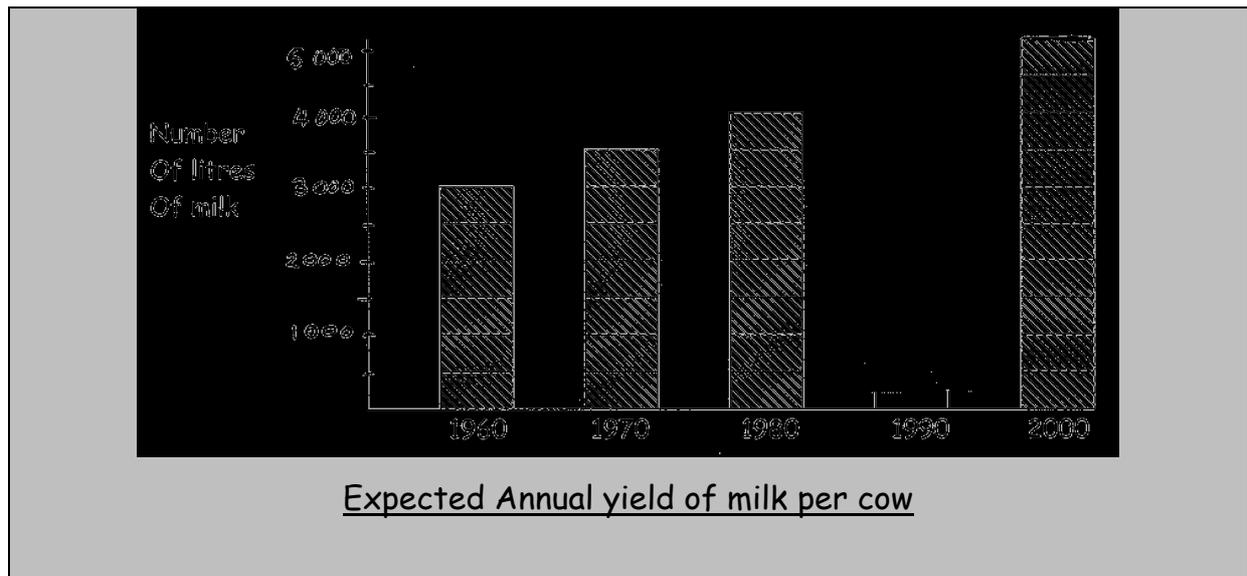
"If this is what other farmers are getting, we need to do something about our lazy cows!" says Mrs Dlomo.

"They are still not used to the machines" says Mr Mbatha. "But I wonder how long it will take them to get used to them?"



- Work on your own to answer these questions.
 1. The article says that a healthy cow should produce about 5 000 litres of milk a year. (Give the answers correct to 1 decimal place)
 - a) How many litres of milk would this be per day?
 - b) How many litres of milk would this be per week?
 - b) How much milk would it produce in 5 years?
 2. Look at the pictograph in Activity 8.2. Are any of the five cows producing this amount per day?
 3. If the cows continued producing milk at their current rate,
 - a) How many litres of milk would Luleka produce in a year?
 - b) How many litres of milk would Pheta produce in a year?
 - c) How many litres of milk would Thandi produce in a year?

The two farmers decide to draw a bar graph to show the information about the *expected annual yield of milk per cow over the years from 1960 to 2000* that they read in the "Farmer's Bulletin".



4. Study the bar graph, and then answer the following questions.
- The article about milk production did not give a figure for 1990. How do you think the farmers worked out the amount of milk that a cow was expected to produce in 1990?
 - What is plotted along the horizontal axis (\leftrightarrow)?
 - What is plotted along the vertical axis (\updownarrow)?
 - What scale is used on the vertical axis? (In other words, what does each space on the vertical axis represent?)
 - What is the title of the bar graph?

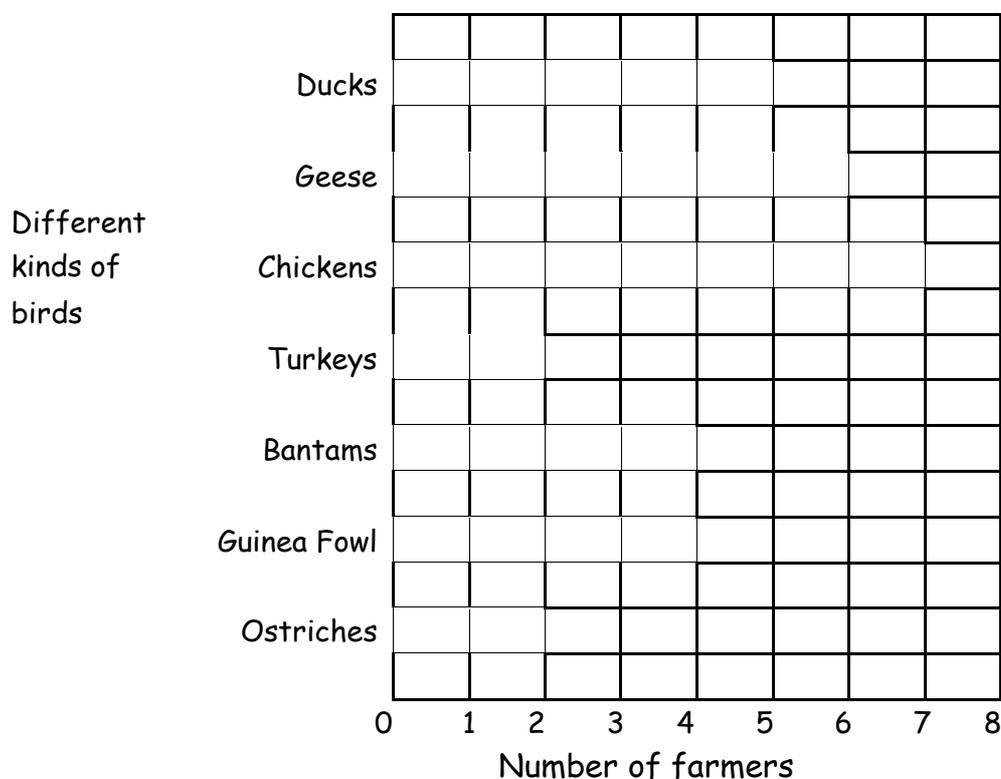
Activity 8.4 **WORKING WITH BAR GRAPHS.**

In this activity you

- answer questions about a horizontal bar graph
- draw your own bar graph.

Kevin, who lives next door to Mr Mbatha, saw the graph that the two farmers had drawn, and decided to do a survey to find out which birds were being bred by the farmers in the area. He draws a bar graph, and decides to draw it with horizontal bars.

Birds that are bred by the farmers in the area



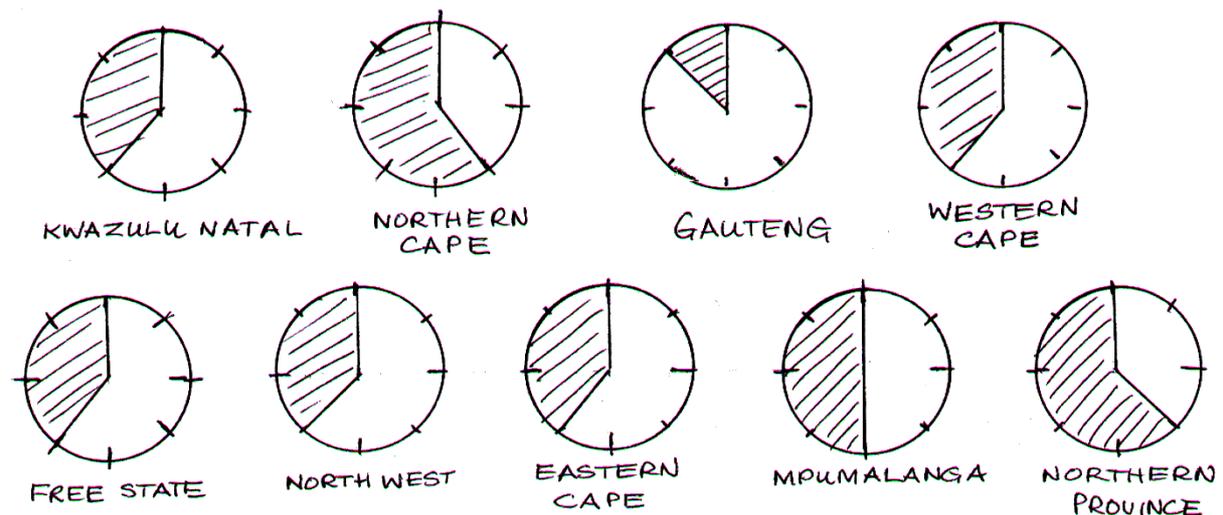
- Work with your group
- Use the graph to answer these questions:
 1. a) Which type of bird is bred by most of the farmers?
b) How many farmers breed geese?
c) How many more farmers breed chickens than turkeys?
d) How many more farmers breed bantams than guinea fowl?
e) Which birds were bred by the least number of farmers?
f) How many farmers did Kevin's survey?
 2. In Activity 7.3, you conducted a survey amongst 20 learners in your class to find out what their favourite vegetable is.

- a) Draw a bar graph to illustrate the information you collected in the survey. It could be a vertical bar graph, or a horizontal bar graph.
- b) Don't forget to include the title (or description of what the graph is showing); a list of the categories that are being looked at along one axis and numbers and a description on the other axis.

Activity 8.5 *READING INFORMATION OFF A PIE GRAPH*

In this activity you read information off pie graphs

- Study the following nine pie graphs.
- The shaded-in part represents the number of people who work on farms in each province.



- Work with your partner
 - Use these pie graphs to answer the following questions:
1. Write down the names of the provinces.
 - Start with the one which has the greatest fraction shaded in, and end with the one which has the smallest fraction of the circle shaded in.
 - Write the names of the provinces with the same fractions shaded in, in alphabetical order
 2. Next to the name of the province, write down the fraction of the circle

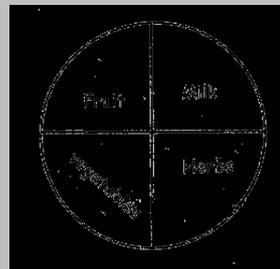
that has been shaded in.

3. Discuss the following points with your group:
 - a) What are some of the important crops that grow in each of the provinces?
 - b) Why do you think the number of farm workers in each province varies?

Study the information in the box:

At the end of the year, the two farmers sit down and work out what proportion of their income comes from

- Fruit
- Milk
- Vegetables
- Herbs



They used a pie chart to show this.

- In this year, it was very simple - each activity brought in one quarter of the income.

- Now answer the following questions:
4.
 - a) If their total income was R120 000 for the year, how much was earned by each activity?
 - b) Suppose their total income for the year was R215 000,00, what would each sector have earned? (Write your answer correct to the nearest cent)

Activity 8.6 DRAWING A PIE GRAPH

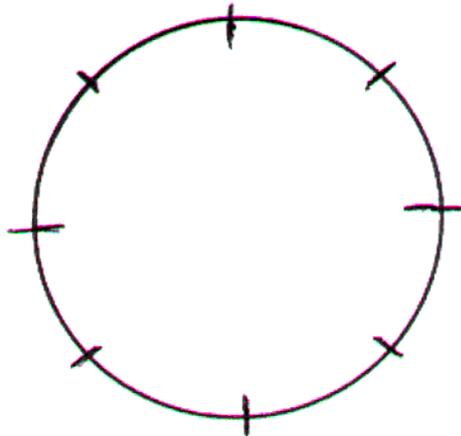
In this activity you

- finish drawing a pie graph
- use the information on the graph to do calculations

- Study the information in the box below

- But, the amount they earn from each different activity is not always so evenly distributed.
- In the following year, they calculated that their income for the year was made up like this:
 - one quarter from fruit
 - three eighths from vegetables
 - one eighth from milk
 - the rest from herbs.

1. Trace the following circle in your books.



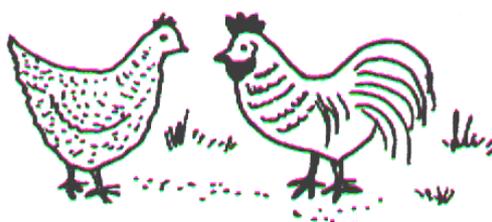
- On the circle show the fraction of their income that comes from fruit, vegetables, milk and herbs.
- Use this key when shading in the four areas:

<input type="checkbox"/>	fruit	<input type="checkbox"/>	vegetables	<input type="checkbox"/>	milk	<input type="checkbox"/>	herbs
--------------------------	-------	--------------------------	------------	--------------------------	------	--------------------------	-------

2. If the total income for the year was R168 000, how much money did each sector earn?

- Use the second method on the previous page to work out the following averages:
 1. Use the information given on the pictograph in Activity 8.2 which shows the amount of milk produced by the cows on Naledi Farm in the first week of March 2000.
 2. a) You've already worked out the average amount of milk produced by the cows in that week. Now work out the average amount of milk produced by each cow per day. (Give your answer correct to 1 decimal place)
 - b) Work out the average amount of milk produced per day by all 5 cows.
 2. The Naledi Farmers sell vegetables to their friends and neighbours. They keep a record of the amounts of money they make each day. On Monday they make R145,89; on Tuesday they make R156,98; on Wednesday they make R278,90; on Thursday they make R98,56; on Friday they make R135,05, and on Saturday they make R256,12.

What is the average amount of money they make per day? (Give your answer correct to the nearest cent)



3. The Farmers keep a record of the number of dozen eggs they sell per month.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No of doz eggs sold	46	78	34	56	23	56	72	27	64	48	62	57

- Work out the average number of dozen eggs sold per month. (Give the answer correct to 1 decimal place.)

UNIT 10: EXCHANGE RATES

Activity 10.1 **EXCHANGE RATES**

In this activity you

- *read about a herb farmer*
 - *read about exchange rates*
 - *do calculations involving exchange rates*
-
- Read the information given in the boxes:

- Three years ago, Mrs Dlomo and Mr Mbatha's Italian neighbour, Antonio Toscana asked them whether they would like to grow herbs for him.



- He was growing herbs like sage, mint, thyme and dill. These plants have leaves or seeds which can be used to flavour foods or as medicines.
- He had started selling his herbs overseas, and his fields were too small to cater for the demand for the herbs in England. In other words, he found that "the demand outstripped the supply".
- Antonio offered to pay his neighbours a good price for whatever they could grow
- Antonio ships his herbs to England, where he is paid in English Pounds. The amount he receives in Rands fluctuates according to the **exchange rate** at the time.

- In the first year that he sold herbs, the Rand/Pound exchange rate was 8,00.
- This means that for every pound, Antonio received R8,00.
- It also means that it would cost R8,00 to buy one pound.

- In the second year that he sold herbs, the Rand/Pound exchange rate was 8,50.
- This means that for every pound, Antonio received R8,50.
- It also means that it would now cost R8,50 to buy one pound.

- In the third year that he sold herbs, the Rand/Pound exchange rate was 9,25.
- This means that for every pound, Antonio received R9,25.
- It also means that it would now cost R9,25 to buy one pound.

- Work on your own to answer these questions:

1. If the Rand/Pound exchange rate is 9,00,
 - a) How many Rand would Antonio receive for each Pound?
 - b) How many Rand would he receive for ten Pounds?
 - c) How many Rand would he receive for fifty Pounds?
 - d) How many Rand would he receive for seventy-five Pounds?
 - e) How much would it cost him to buy five Pounds?
 - f) How much would it cost him to buy twenty Pounds?



2. Suppose the Rand/Pound exchange rate is 10,25.
 - a) How many Rand would Antonio receive for each Pound?
 - b) If a book is marked four Pounds (£4,00), how much would it cost in Rand?
 - c) If a tractor is on sale for £1 000,00, how much would it cost in Rand?
3. Find current exchange rates in the financial section of the newspaper.
 - a) Work out how many Rand you would get for £10,00 at the current exchange rate.

- b) Work out how many Rand you would get for 10 United States dollars (\$10,00).
- c) Choose another currency, and work out how many Rand you would get for 10 of their units of money.

Activity 10.2 *A CUP OF TEA*

In this activity you do an investigation involving the cost of a cup of tea in England

- If you go to England and order a cup of tea, you will pay round about one pound (£1,00).per cup
1. Suppose the Rand/Pound exchange rate was 11, how much would a cup of tea cost in Rand?
 2. Suppose you bought tea in England for 11 of your friends, how much would the tea cost in Rand?
 3. Suppose you bought tea in England for 111 of your friends, how much would the tea cost in Rand?
 4. What would the cost be in Rand if you bought tea for 1 111 people?
 5. Look at the pattern developing.
 - a) Predict how much it would cost in Rand if you bought tea for 11 111 people?
 - b) Work out the answer and check whether your prediction was correct.
 6. Explain how you would use the pattern to predict how much it would cost in Rand if you bought tea for 1 111 111 people

By the end of this module, you should know something about the following mathematical concepts:

1. Working with a time-line showing dates in BC and AD.
2. Working with different calendars.
3. Working with the Egyptian Numeration System.
4. The differences between the Egyptian Numeration System and the Hindu-Arabic Numeration System.
5. Finding the perimeter of various shapes.
6. Working out the dimensions of pieces of land.
7. Working with capacity (i.e. how much water is wasted by a leaking tap).
8. Working with percentage
 - >> writing a fraction as a percentage
 - >> writing a percentage as a fraction
 - >> writing a percentage as a decimal
9. Doing a survey and filling in the information on a frequency table.
10. Various ways of representing data.
11. Working with a rainfall chart.
12. Reading information off a pictograph.
13. Reading information off a bar graph.
14. Drawing a bar graph.
15. Reading information off a pie graph.
16. Drawing a pie graph.
17. Working with averages.
18. Working with exchange rates
19. Doing an investigation which looks at patterns of numbers.