

Malati

Mathematics learning and teaching initiative

Statistics

Data Handling

Grades 4, 5, 6 and 7

Teacher document

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Introduction and overview of Module 3

Activities in this module have been designed for Grades 4 to 7. The activities introduce important concepts and tools which are then revisited in later activities, for example, learners are introduced to a bar graph in the activity “Sandwich Survey” and are given opportunities to draw and interpret graphs in the later activities “When I Grow Up” and “Dumisani’s Petrol Station”.

We provide our suggestions on the use of these activities in the different grades, but this will depend on different learners’ prior experiences of activities of this nature. The teacher should thus select activities appropriate for different grades and different learners within a grade.

We suggest that the introduction of pie graphs be delayed until learners have had some experience of fractions. Furthermore, the scales on bar graphs should remain simple at first to allow learners to familiarise themselves with the interpretation and construction of these graphs.

Tally charts are labelled ‘charts’ as opposed to ‘tables’ or ‘graphs’ as they are used for recording data continuously rather than representing data once it has been collected.

The activities are designed to address the following aspects of data handling (Assessment Criteria for Specific Outcome 6 of Curriculum 2005 are given in brackets):

- Identify areas of concern in familiar settings for investigation (AC1)
- Make predictions about familiar people, events and settings (AC1)
- Suggest information to collect to answer certain questions (AC2)
- Decide how information should be collected (AC2)
- Design a questionnaire to collect information (AC2)
- Consider possible samples (AC2)
- Decide how measurements or frequencies should be measured (AC2)
- Accurately collect and record data in tallies or organised lists (AC2, 3)
- Suggest suitable categories for classification of responses (AC3)
- Sort, sequence and classify data (AC3)
- Represent data in pictograms, bar graphs (simple and multiple scales) and pie charts (AC5)
- Critically discuss merits of the different forms of representation (AC5)
- Interpreting and describing information presented in tables, bar graphs and pie charts, including use of *mode* and *average* (AC4, 6, 7)
- Comment on original predictions in the light of the results (AC6, 7).

This module provides exemplars of activities suitable for these grades and should not be seen as an exhaustive unit. Rather, the teacher can provide learners with similar activities for consolidation. The media is a particularly rich source of material for data handling activities. The above performance indicators can assist teachers in identifying and designing assessment activities.

We suggest that the activities be used as follows:

Note: It should be noted that these recommendations are based on the assumption that the learners study Data Handling from Grade 4 onwards. In the case where learners in Grades 5, 6 or 7 have not had any prior experience of data handling at school, the teacher should choose appropriate activities from those recommended for the previous grades.

GRADE 4

Car Colours

Additional data collection activities, for example, what is the most popular cooldrink amongst the children in the class?

GRADE 5

Yummyums Coffee Shop

Sandwich Survey

Yuk or Yum

Cakes at Yummyums *(if prior experience in fractions)*

Which Hand Do You Use? *(if prior experience in fractions)*

Dumisani's Petrol Station *(select question 2 and 3 for consolidation)*

GRADE 6

When I Grow Up

Cakes at Yummyums *(if not done in Grade 5)*

Which Hand Do You Use? *(if not done in Grade 5)*

Dumisani's Petrol Station

How Many People?

How Tall are You?

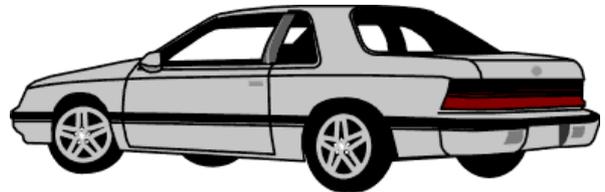
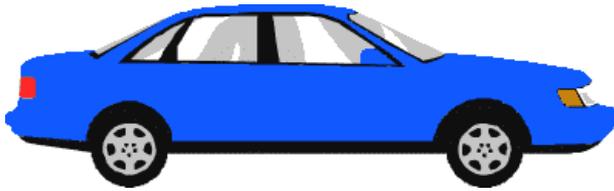
Averages

GRADE 7

A School Magazine (project)

The teachers can set projects and select examples of data handling from the media

Car Colours!



1. What colour car do you think is the most popular?
2. Bongani wanted to find out what is the most popular car colour so he stood outside his house and recorded the information about 50 cars going past.

The information he collected is also called *data*.

Bongani used a **tally chart** like this to record the data:

For each car Bongani counted he put a tally mark like this / in the correct row of the chart.

If there are five tally marks, the fifth one is shown like this ###.

The 8 red cars that Bongani counted are shown like this: ### ///.

Car colour	Number of cars
red	### ///
white	### ### //
yellow	### //
blue	### /
green	### ###
black	////
silver	///

Chart 1: Number of cars per colour

- (a) How many white cars did Bongani count?
- (b) How many green cars did Bongani count?
- (c) What is the most popular colour car that he counted?

3. Stand on the pavement of a fairly busy street and look at the next 50 cars that come past. Record the data you collect in a tally chart like this:

Car colour	Number of cars
red	
white	
blue	

Chart 2: Number of cars per colour

4. Now fill in your results in this table:

Colour	Number of cars
red	
white	
blue	

Table 1: Number of cars per colour

5. Make a graph like this for the wall or blackboard, and use stickers of pictures of cars or round stickers to represent the cars:



Graph 1: Number of cars per colour

This is type of graph is called a *pictogram*.

Use the pictogram to answer these questions:

- How many blue cars did you see?
- Which colour car is the most popular in your neighbourhood? How do you know?
- Which colour car did you see the least? How do you know?
- Compare the results of your survey with your answer in question 1 and Bongani's results. Try to explain any differences.
- You have now represented the data in two different ways: a table and a pictogram. Which method do you prefer? Why?

Teacher Notes: Car Colours

'Car colours' introduces learners to simple data collection and addresses the following aspects:

- *making predictions about people's preferences and then commenting on these predictions in the light of results of the study*
- *considering the sample used in the study. Learners should note that Bongani's results might differ from their own as only fifty cars were used for each study and Bongani might have collected his data in a different area*
- *Collecting the data and recording this in a tally chart*
- *Representing the data in the form of a table*
- *Representing the data in the form of a pictogram*
- *The use of the appropriate terminology, for example, 'data' and 'pictogram'.*

The data collected by each learner will not necessarily be the same. The teacher will have to select a set of data on the basis of which to draw the pictogram, but the differences between learners' data should be discussed in the class. Learners should be encouraged to discuss possible reasons for discrepancies, for example,

- *lack of clarity about the definition of the categories e.g. what constitutes a "car"? Learners may discuss whether they wish to include motorcycles, vans, taxis and lorries. Some learners may include parked vehicles while others may only include moving vehicles. Also what constitutes "yellow" – does the whole car have to be yellow?*
- *counting the same vehicles more than once – learners must discuss whether this is valid*
- *inaccuracies in recording of data*
- *bias*

All of these are important aspects of data collection and survey validity and could also account for differences between the learners' results and those of Bongani.

Teachers should remember that the LEAST popular colours in fact have a frequency of ZERO and may not appear on the pictogram at all.

In question 5(e) learners might note that it is easier to see the information when represented in the pictogram.

Yumyums Coffee Shop



The manager of Yumyums wants her shop to be the most popular coffee shop in town.

1. What information could help her make sure that she keeps her customer happy?
2. How should she collect this information?

Teacher Notes: Yumyums Coffee Shop

This activity has two focuses:

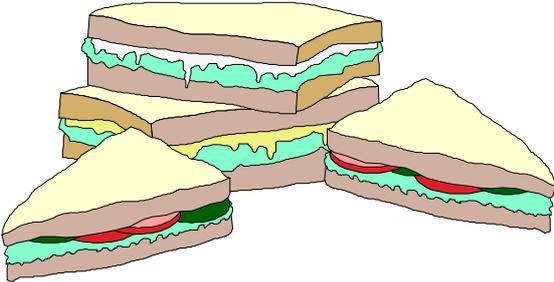
1. Learners **identify situations for investigation**. The following are possible responses:

- *What is the most popular kind of food, for example, sandwich, ice-cream or cake?*
- *What is the most popular time for visiting the coffee shop?*
- *Are the customers satisfied with the service?*
- *What opening / closing time would customers like?*

Learners could also comment on how the above information could be used by the manager.

2. Learners suggest **methods of data collection**. Learners might suggest that the manager ask customers as they leave the shop or that a questionnaire be used. In the latter case learners could suggest what questions should be asked and how responses should be classified, for example, rather than asking what type of sandwich a customer likes, the manager could ask whether the customer likes cheese, ham, egg or polony sandwiches. This could also lead to a discussion of **sample**: How many customers should the manager ask? How should she choose? At what time of day should she ask the customers?

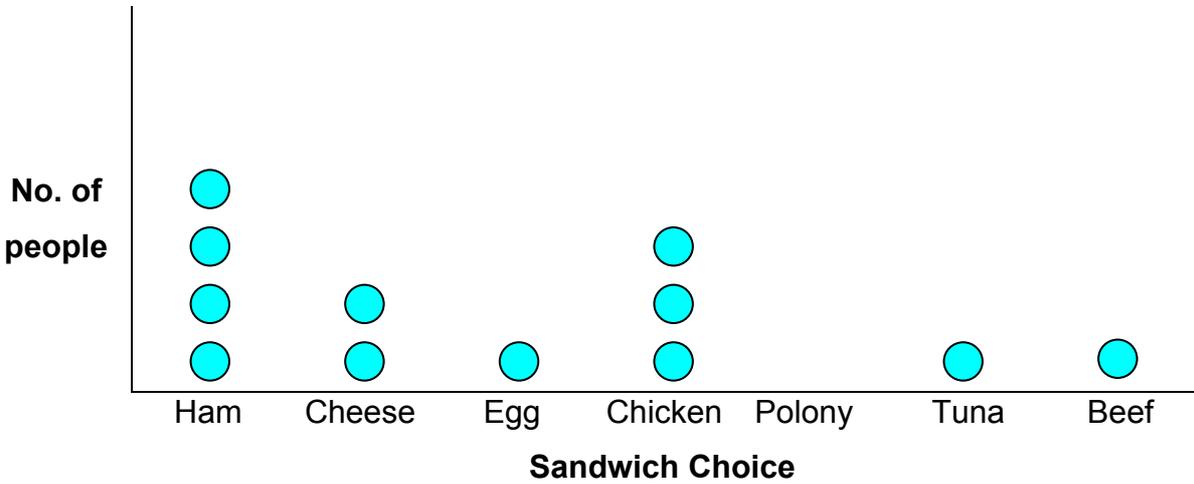
Sandwich Survey



The manager of Yumyums Coffee Shop does a *survey* to find out what people think of ALL the sandwiches she sells.

A survey is carried out to collect all the information.

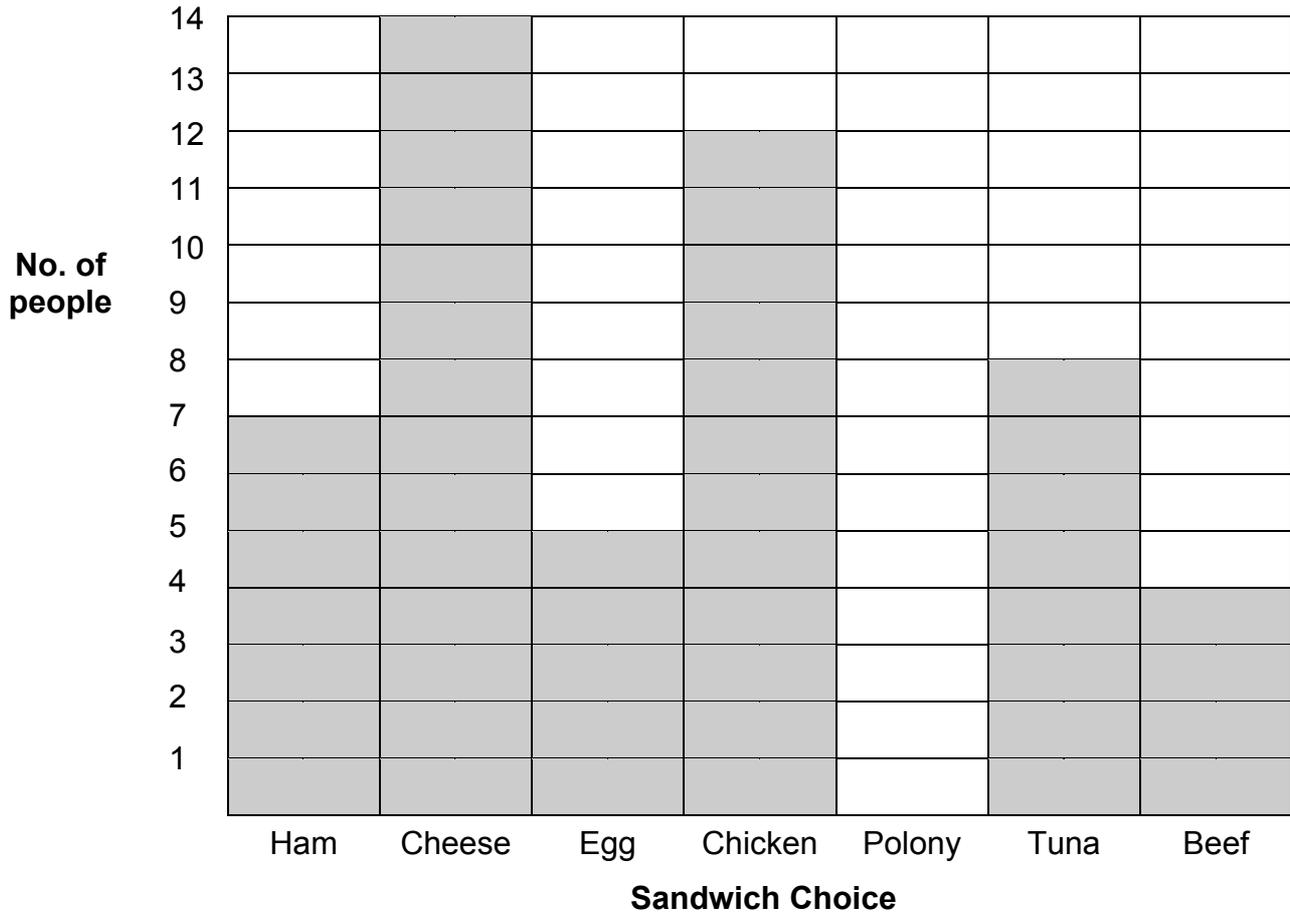
She interviews 50 people and asks them which sandwich is their favourite. She starts making a pictogram with the choices of the first 12 people:



Graph 2: 12 customers' favourite sandwiches

1. Which sandwich choice do you think is most popular? Explain how you got your answer.
2. Why do you think the manager has stopped doing her pictogram?

The manager now draws a *bar graph*, shown below:



Graph 3: 50 customers' favourite sandwiches

3. Use the bar graph to answer the following questions.

- How many people chose egg as their favourite sandwich?
- How many people chose chicken as their favourite sandwich?
- How many people chose polony as their favourite sandwich?
- Which sandwich is the most popular at Yummyums? Explain.

The most popular choice (the value that occurs the most) is called the *mode*.

- Which sandwich is the least popular at Yummyums? Explain.

(f) Is your answer to Question (d) the same as your answer to Question 1?

Explain why you think this is the case.

(g) Yummyums offers egg and cheese sandwiches for people who don't eat meat or fish. How many people chose these options as their favourite?

(h) Why do you think the manager drew a bar graph rather than a pictogram?

(i) Do you think this was a useful survey? Why?

Do a survey to find out which type of sandwich (ham, cheese, egg, chicken, polony, tuna or beef) is the most popular in your class.

4. Which type do you think will be the most popular in your class?

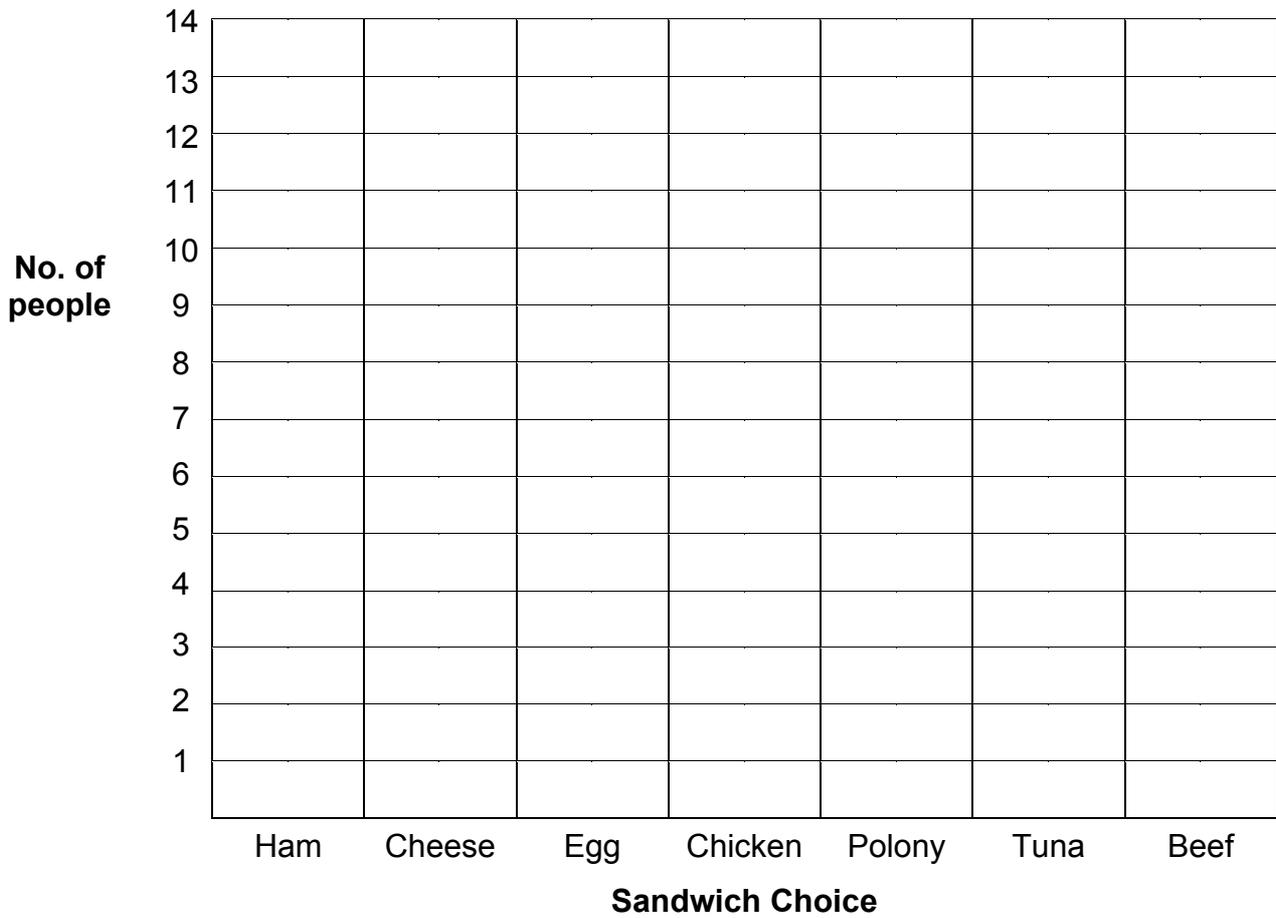
5. What is the best way to collect the data?

6. Use this tally chart to record your data:

Sandwich	Number of children	Total
Ham		
Cheese		
Egg		
Chicken		
Polony		
Tuna		
Beef		

Chart 3: My classmates' favourite sandwiches

7. Now use the grid on the next page to draw a bar graph. You can add rows or change the categories if necessary.



Graph 4: My classmates' favourite sandwiches

8. (a) Which is the most popular type of sandwich in your class? Does this agree with your answer for question 4? What do we call the most popular type?
- (b) Which is the least popular type of sandwich in your class?

Teacher Notes: Sandwich Survey

This activity introduces the bar graph as a more efficient way of representing the data when there is a lot of data. A simple scale is used initially.

The questions are intended to focus learners' attention on the comparison between a pictogram and bar graph and to acquaint them with the interpretation of a bar graph. The mode is introduced as one way of summarising the data. The mode, together with the mean (average) and median are measures of central tendency – they describe what is happening to the data “near the middle”.

Learners are required to reflect on the validity of the sample and the survey. To do this, they might suggest that not enough information is given to conclude whether or not this is a good survey (How were the 50 customers selected? When were they interviewed? Etc.)

Learners are given an opportunity to collect and represent the data on sandwich preferences of their classmates. This data could be collected by using a show of hands for the choice of the different sandwiches. Another opportunity to use a tally chart and a bar graph is provided.

When I Grow Up



1. What job would you like to have when you are an adult? Perhaps you might like to be a singer, a nurse or a taxi driver. Describe the job to your group.
2. What do you think is the most popular job amongst your classmates?

You are going to conduct a *survey* to find out what jobs your classmates would like to do when they are adults.

3. Collect the data and write the information in this table. You might need to add some more rows.

Job	Number of children

Table 2: My classmates' future career choices

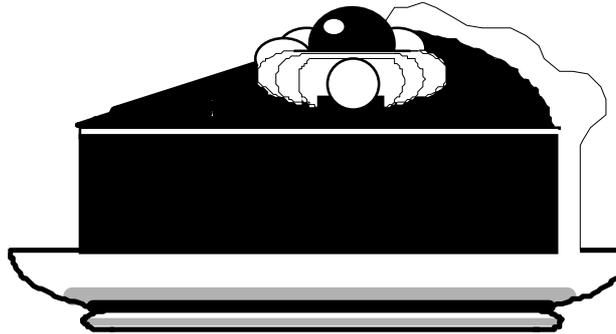
4. Which is the most popular job? How many children would like to do this job?
5. How many different jobs are shown in the table? Try to group those jobs that are similar. For example, you could group nurses, doctors, physiotherapists and paramedics as medical jobs.
6. Now use square paper to draw a bar graph using your new groups. Remember to give your graph a title.
7. What is the most popular type of job? Compare this to your answer in question 4.
8. Was it useful to group the data in this way? Explain.

Teacher Notes: When I Grow Up

This activity requires that learners classify the data they have collected. It is possible that there will be a range of jobs chosen by learners and it will be of little use to draw a bar graph showing this information – it could be just as easily read off from the table. The data can, however, be grouped so that more data falls into the categories. The teacher should provide assistance with the classifying where necessary. Learners should note that what the most popular job in question 4 might not be in the most popular category in question 7. In question 8 learners are required to reflect on the usefulness of the grouping technique.

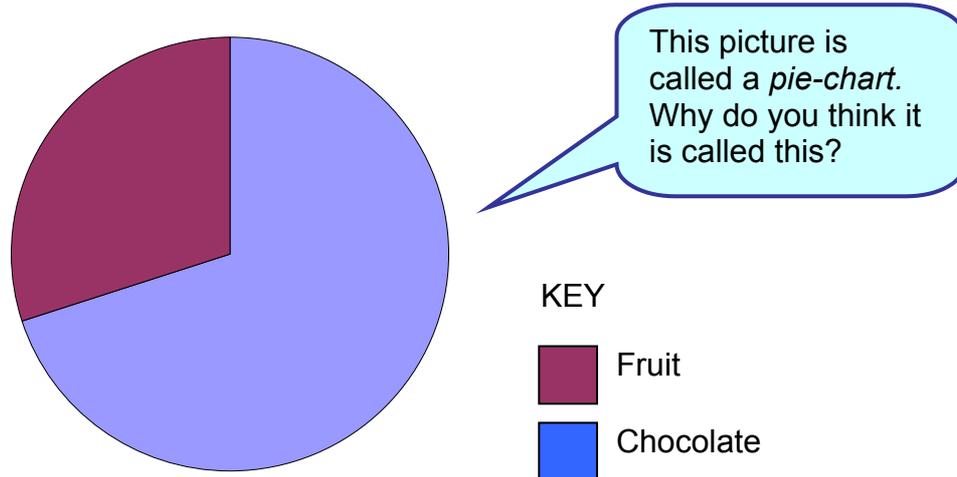
The activity also provides learners with the opportunity to practice the collection of data, representation of the data in a table and the drawing of a bar graph.

The Cakes at Yummyums



The owner of Yummyums coffee shop is trying to find out whether her chocolate cake or her fruit cake is more popular. One Tuesday over lunch time the staff of Yummyums asked 50 regular customers which of these two cakes they preferred.

Yummyums make a picture to show their findings to their customers:



Graph 5: Cake choices of 50 customers

1. Which cake do you think is more popular with Yummyums customers? Why?
2. How many people do you think said that they preferred chocolate cake? How did you make your estimate?
3. Why do you think Yummyums used this pie-chart to show the results of their survey?
4. What other methods could Yummyums have used to show their results? Which do you think is the best method, and why?

Teacher Notes: The Cakes at Yummyums

'The Cakes at Yummyums' introduces the pie-chart. No numerical data is provided about how many customers preferred each type of cake, so learners must make their conclusions based on this chart.

It is very important that learners understand that the circle represents 50 customers. In response to question 1, it is NOT acceptable to say that chocolate cake is more popular because "the chocolate cake is bigger" or "the slices are bigger". The relative sizes of the black and grey shaded areas of the pie-chart represent the NUMBER OF PEOPLE who preferred each type of cake.

In response to question 2, learners may immediately make a guess and come up with a fraction such as $\frac{2}{3}$, $\frac{3}{5}$ or $\frac{7}{10}$ and then calculate what this fraction of 50 would be.

They may even make divisions on the pie-chart to help them with their estimate. Other learners will reason (by picturing the corresponding pie-charts) that the number of people must be more than 25 ($\frac{1}{2}$) but less than 37,5 ($\frac{3}{4}$). Some older learners may even estimate percentages and then convert these to numbers.

Any reasonable estimates should be accepted and discussed. Learners should be required to justify their responses.

Learners should be encouraged to find examples of pie-charts in the local media.

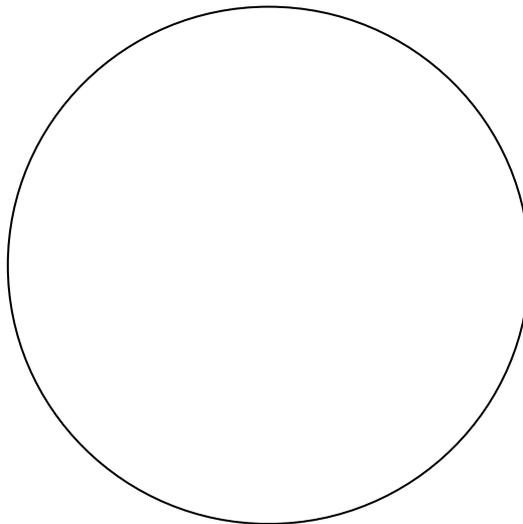
Which Hand Do You Use?



1. How many children in your class write with their right hands?

How many write with their left hands?

2. Sketch this information in a pie chart and complete the *key* to help other people to interpret your pie-chart. Compare your pie chart with that of a classmate.



KEY



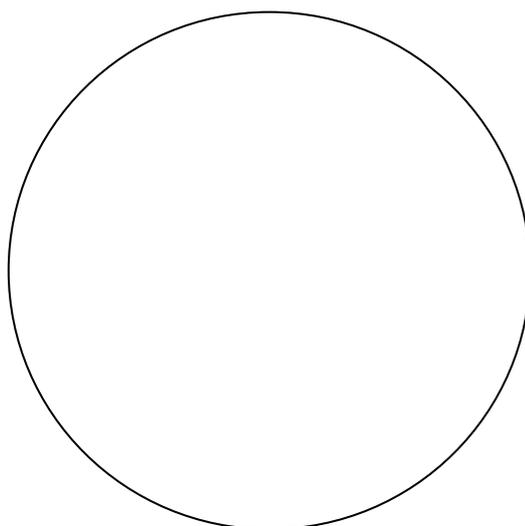
Graph 6: How many of my classmates are right handed and left handed

3. When Mike gathered information for this activity in his class, he discovered that there are some children who do some things with the right hand and others with the left, for example, Ian writes with his left hand but plays tennis with his right. Mike recorded the following information:

	No of children
Right Handed	30
Left Handed	7
Mixed	3

Table 3: How many of Mike's classmates are right handed, left handed and mixed

Sketch a pie chart to represent Mike's information (remember to give a key!). Compare your pie chart with that of a classmate.



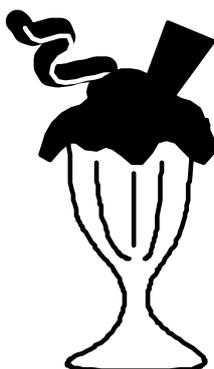
Graph 7: How many of Mike's classmates are right handed, left handed and mixed

Teacher Notes: Which Hand Do You Use?

*This activity requires that learners **sketch** their own pie chart using one division, and then two divisions. Learners will only be able to estimate the size of the sectors at this stage. It is important, however, that the relative sizes of the sectors are realistic. Learners should discuss whether or not their pie 'slices' may be an accurate representation of the fractions concerned.*

The teacher may have to help learners to understand how the key should be completed, but should emphasise the importance of this key for understanding the pie-chart.

YUK OR YUM



Yumyums coffee shop is now trying to find out whether their chocolate or strawberry milkshakes are more popular. One Tuesday over lunch time they asked 10 regular customers to rate these two milkshakes on a scale of 1 (*yuk, don't like it at all!*) to 10 (*yum, love it!*).

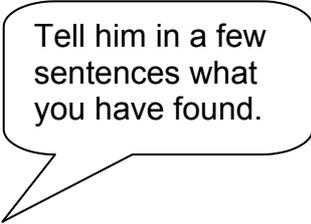
For example, if I really like chocolate milkshakes, I would *rate them* highly and given them a '9' or a '10'!

Here are the results:

Customer	Rating: chocolate milkshakes	Rating: strawberry milkshakes
Professor Mbala	10	5
Mr Lukhele	6	6
Dr Adonis	8	4
Rolene	7	5
Miss Hudson	3	6
Mrs Sasman	8	5
Louise	1	6
Mrs Jooste	6	4
Miss Abrahams	2	5
Prof. Mdlalose	7	5

Table 4: 10 customers' ratings of chocolate and strawberry milkshakes

1. Professor Mbala gave Yumyums strawberry milkshakes a rating of '5'. What does this mean?
2. Does Louise like chocolate milkshakes? Explain.
3. Which kind of milkshake does Rolene prefer?
4. Which kind of milkshake does Mr Lukhele prefer?
5. Write a short report to the manager of Yumyums, *summarising* these findings and making recommendations for future supply of chocolate and strawberry milkshakes.
6. Comment on this statement made by a shop assistant of Yumyums: "The customers like chocolate milkshakes more than strawberry milkshakes".
7. Do you think Yumyums collected this information (*data*) in a sensible way? Explain. How would you recommend that they collect information about the popularity of milkshakes in future?



Tell him in a few sentences what you have found.

Teacher Notes: Yuk or Yum

'Yuk or Yum' introduces data in the form of ratings, and the first few questions relate to interpretation of the ratings in the table. It is important that the teacher focuses carefully on the learners' responses to the first few questions, as learners may interpret the rating incorrectly e.g. that a rating of '6' means 6 strawberry milkshakes or 6%. Learners should be encouraged to discuss their REASONS for their answers.

In question 5 learners are then required to compare the two sets of data and make a conclusion about the popularity of milkshakes. Learners are likely to add the values in each column or count how many people preferred each milkshake.

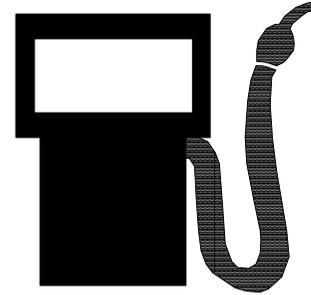
*In question 6 learners should note that his statement is not true for **all** the customers.*

This activity also encourages reflection and discussion on the validity of this survey. Learners may suggest that 10 people does not comprise a valid sample, that conducting the survey on Tuesday lunchtime only may bias the results, that certain milkshakes may be more popular with the customers who visit at lunchtimes than those who visit at other times etc. Discussion should be held about all of these aspects, and concepts such as 'sample' and 'validity' can be explored without formal terminology.

Dumisani's Petrol Station

Dumisani is wanting to make his petrol station bigger. He wants to gather information about the needs of his customers.

He has designed this *questionnaire* to help with his survey:



Please take time to fill in this questionnaire. This will help us to provide you with a better service. Please answer the question or place a cross in the space of your choice:

1. *What type of vehicle do you drive?*

motor cycle *car* *minibus* *bakkie* *heavy vehicle*

2. *How often do you buy petrol at Dumisani's Petrol Station?*

3. *How much do you usually spend on petrol each time you stop at Dumisani's?*

4. *What type of fuel do you buy at Dumisani's?*

97 octane *95 unleaded* *diesel*

5. *Are you happy with the service from the petrol attendants at Dumisani's?*

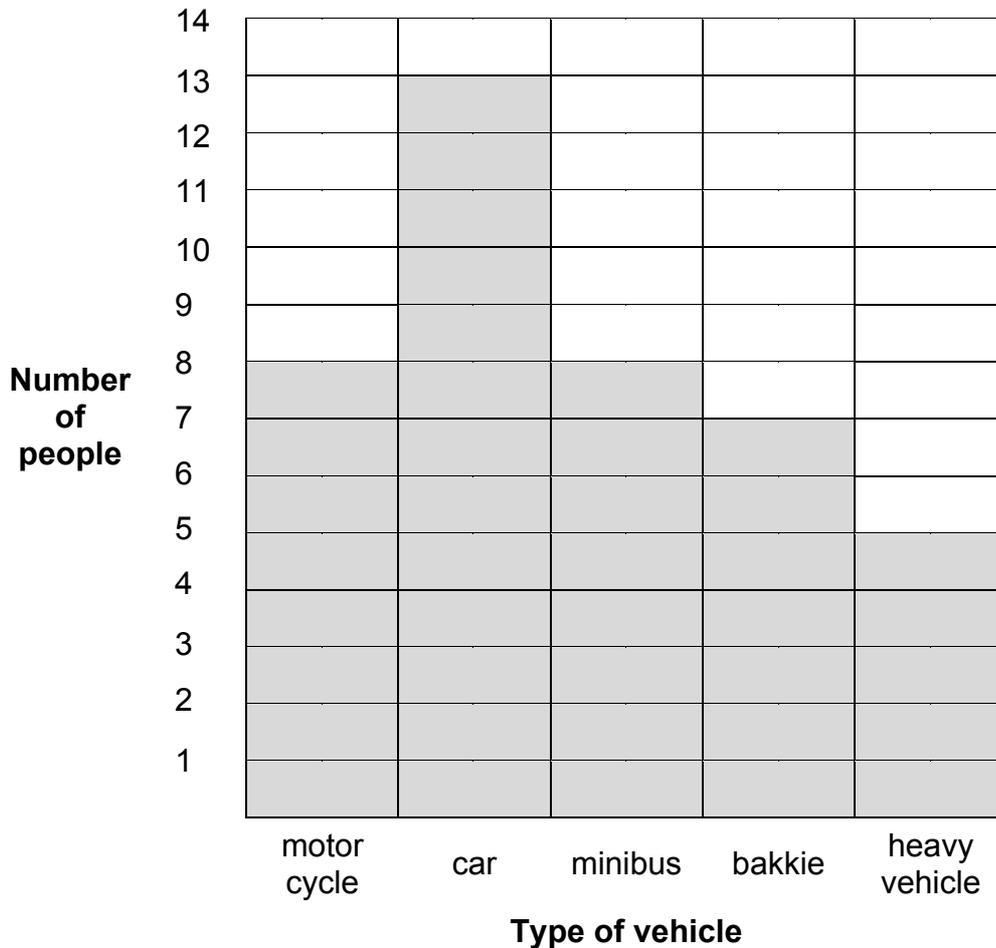
always *sometimes* *never*

6. *Would you make use of any of these services if they were available at the petrol station?*

a take-away *a sit-down restaurant* *a public telephone* *a grocery store* *a "playpark" for children*

1. Imagine that you own a vehicle and have stopped at Dumisani's Petrol Station. Fill in the questionnaire.

2. Dumisani has drawn this bar graph to represent the data of 40 customers for question 1:



Graph 8: Number of customers (out of 40) driving each kind of vehicle

Describe this data in words.

You could write about the most common type of vehicle or the least common type of vehicle. Is there anything else interesting about the data?

3. Dumisani has written the data of 40 customers for question 6 in this table. Draw a bar graph to represent the data.

Type of service	take-away	sit-down restaurant	public telephone	grocery store	“playpark” for children
Number of people	15	11	6	10	8

Table 5: Number of customers (out of 40) choosing each service

- (a) Which service do the most customers want?
 (b) Which service do the least number of customers want?
4. Dumisani says he is finding it difficult to organise the data he collected for question 2. Some customers say they buy petrol at Dumisani’s every day, some say they only stop at his petrol station once a month.
- (a) Can you suggest how Dumisani could classify the data?
 (b) Rewrite question 2 of the questionnaire so that Dumisani will not have this problem again.
5. Dumisani says he is also having a problem with the data for question 3. The amount spent at his petrol station ranges from R20 to R200. Suggest how Dumisani can reclassify the data and rewrite question 3 of the questionnaire so that it will be easier for him next time.
6. Dumisani decided that a sample of 40 customers was too small for him to make such big decisions about changes to his petrol station. He said he would rather ask 200 people.

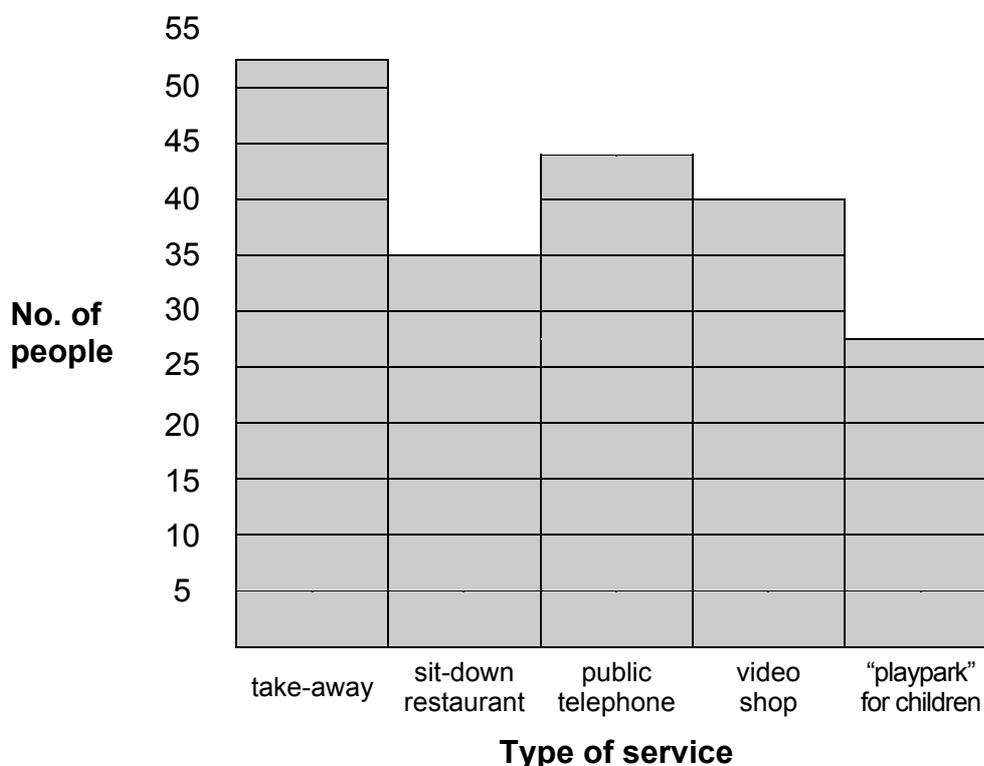
This is the data he collected for 200 customers for question 1:

Type of vehicle	motor cycle	car	minibus	bakkie	heavy vehicle
Number of people	20	79	55	12	34

Table 6: Number of customers (out of 200) driving each kind of vehicle

- (a) Dumisani says he needs help. How can he show all this information on a bar graph? Draw a graph to show Dumisani.
 (b) List the data from the most common type of vehicle to the least popular type of vehicle. Compare this data with the data Dumisani collected for 40 customers (question 1). Try to explain any differences.

7. Dumisani has drawn this bar graph to show the data for question 6 (from 200 questionnaires):

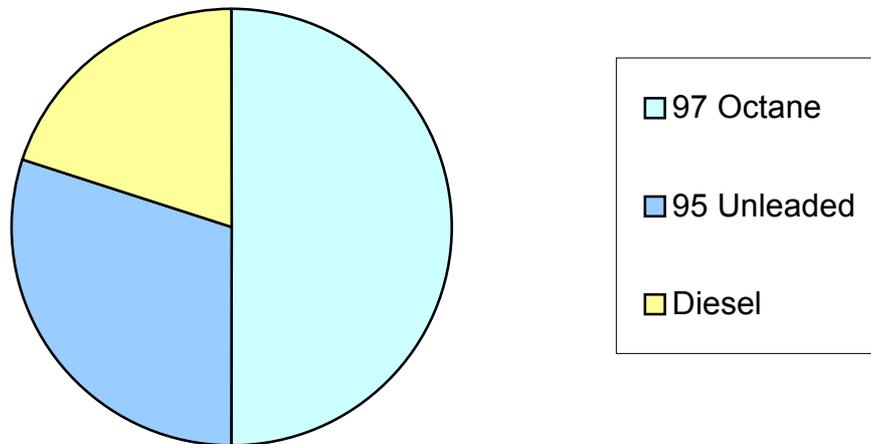


Graph 9: Number of customers (out of 200) choosing each service

Look carefully at Dumisani’s graph and answer these questions:

- (a) How many customers chose the sit-down restaurant?
- (b) 44 customers chose one type of service. What did they choose?
- (c) What did most of the customers choose? How many customers chose this service?
- (d) What was the least popular choice? How many customers made this choice?

8. Dumisani drew this pie graph to show what type of fuel his customers buy (question 4). This graph represents the data for 200 customers:



Graph 10: Number of customers (out of 200) buying each kind of fuel

- (a) What type of fuel do most of Dumisani’s customers buy?
- (b) What type of fuel do the least customers buy?
- (c) Estimate how many customers buy each type of fuel.

9. Dumisani collected this data from 200 customers on the service provided by the petrol attendants (question 5):

Response	Number of customers
“always”	80
“sometimes”	80
“never”	40

Table 7: Number of customers giving each response about the service

Draw a pie graph to represent this information. (Remember to include a key and a title!)

Teacher Notes: Dumisani's Petrol Station

This activity addresses a number of aspects of data handling – the teacher can select questions as appropriate.

This activity introduces learners to the use of a questionnaire for collecting data. Initially they must only complete the questionnaire and reword the questions for numbers 3 and 4. Learners are required to design their own questionnaires in a later activity.

In question 2 learners are required to describe the data – they should mention the mode and the least common type of vehicle as well as other interesting information, for example, that the same number of motorcycles and minibuses visited the petrol station.

In question 3 learners are given additional practice drawing bar graphs. The teacher can provide block paper for this purpose – this is provided at the end of this teacher package.

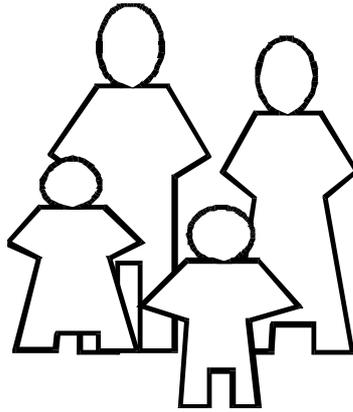
In questions 4 and 5 learners are required to consider methods of classification. In this case they must create categories (this differs slightly from the classification in “When I Grow Up” in which case learners had to collapse the categories). For number 2 on the questionnaire learners could suggest categories such as “once a week”, “more than once a week”, “once a month”, “less than once a month”. For number 3 they could suggest “R50 or less”, “R51-R100”, “R101-R150”, “151-R200” and “more than R200”. The different categories should be shared in a class discussion.

In question 6 learners should note that the use of a simple scale will result in very large graph. The use of a multiple scale on the vertical axis, for example, going up in fives or in tens will solve this problem. In question 6(b) learners are required to order the data in a list and compare this to the data for the smaller sample (40 customers). They should note that the order in the list has changed. They could note that the an increase in the sample size results in a more representative result.

In question 7 learners are given practice reading a bar graph with a multiple scale (going up in fives).

In questions 8 and 9 learners are required to interpret and draw pie graphs. The size of the sectors in the graphs should be estimated.

How Many People?



The number of people who live in a household can differ. For example:

Matthews lives with his mother and his sister, so there are **three** people in his household.

Siswe lives with his mother and father, two brothers, and his grandmother, so there are **six** people in his household.

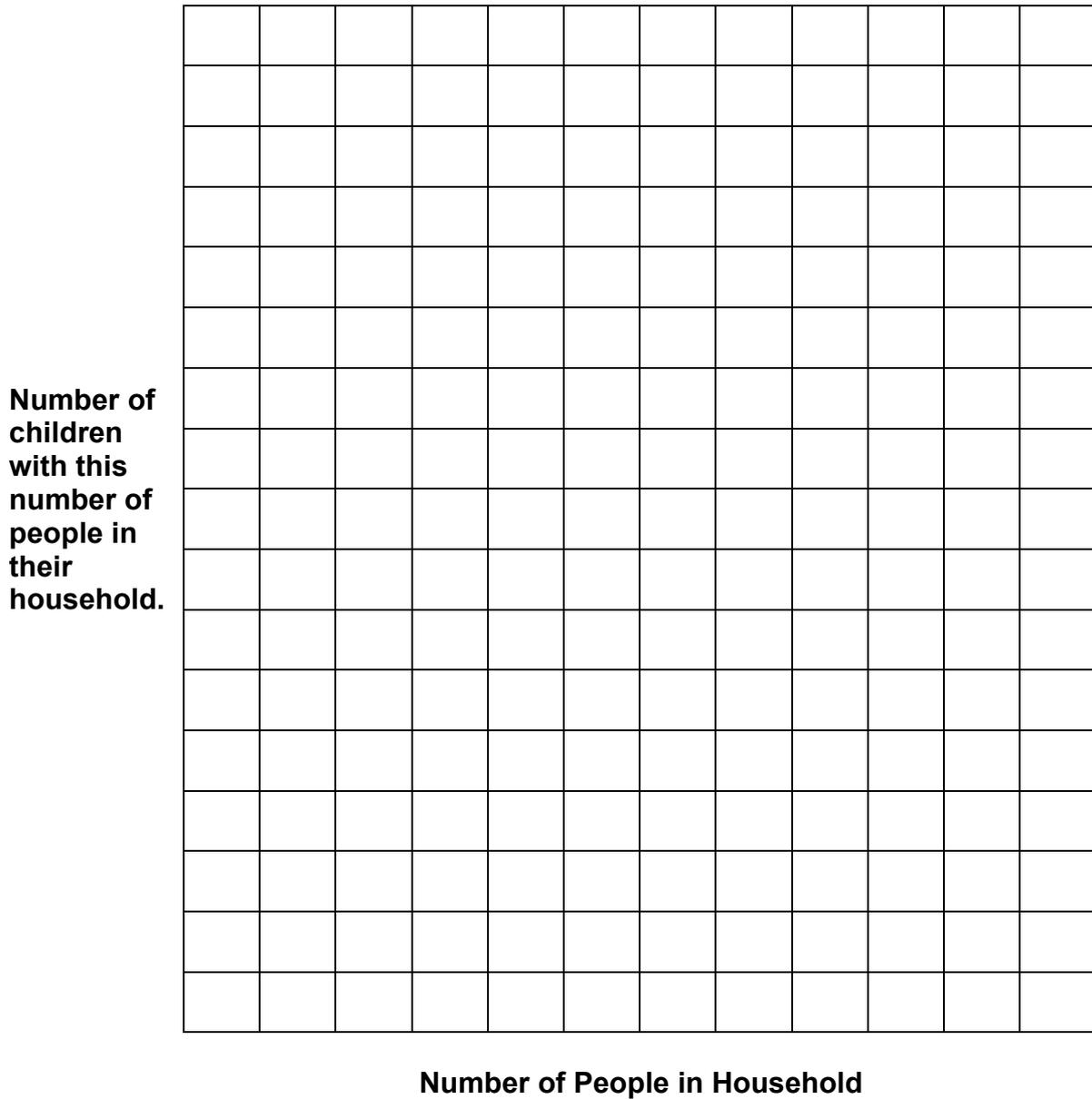
1. How many people live in your household?
2. Find out how many people live in your classmates' households. Use a tally chart to record the data.
3. Fill in all the information on the table below:

Number of people in the household	Number of children with this number of people in their households
2	
3	
4	

How many children have **two** people living in their households? Fill in this number here.

Table 8: Number of children with different number of people in their households

4. Use a bar graph to represent your results:



Graph 11: Number of children with different number of people in their households

5. Use the bar graph to answer these questions:

(a) What is the number of people in a household that occurs the most? What is the name we give to this number that occurs most often?

(b) How many children in your class have four people living in their household?

(c) What is the smallest number of people in a household? How many children have this number of people in their household?

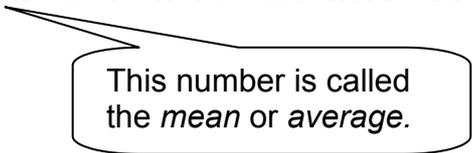
(d) What is the largest number of people in a household? How many children have this number of people in their household?

(e) If you had to describe this information about the number of people that live in your classmates' households, what would you say?

6. The city planners need to know how many people there are in a household so that they can plan how much water, electricity and other services an area will be needing.

(a) They say that knowing the mode is not enough information for their planning. Can you explain why? What other information do they need?

(b) The city planners would like to use a number which is **typical** of the number of people in a household. They use the number obtained by finding **the total number of people in all the households** and **divide this by the number of households**



This number is called the *mean* or *average*.

Calculate the average number of people in a household **for the children in your group**.

(c) Use your data to calculate your class's average number of people in a household. Compare this number to the mode.

(d) Use a coloured pen to draw this number in on your bar graph.

(e) Is the number of people in **your** household above or below the average?

Write down one number of people in a household that is below the average.

Write down one number of people in a household that is above the average.

Show how you got your answers.

What does it mean to say that the number of people in a household is below average? And above?

(f) The city planners prefer to use the **average** rather than the **mode** when planning how much electricity or water is required. Why do you think this is so?

Teacher Notes: How Many People?

This activity requires learners to firstly complete a table which might at first be confusing because there are numerical values in both columns. Learners should understand that the numbers in the first column are the various numbers of people who can live in a household, while the second column gives the number of children in the class who HAVE each number of people in their household.

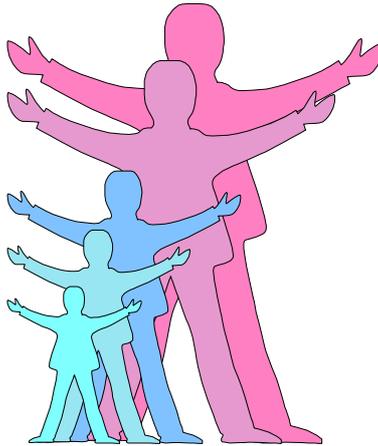
Learners are then required to draw a bar graph with their data. The teacher might have to help them number the axes if they are not able to resolve this by discussing it with each other. Depending on the nature of the data learners might need to use a multiple scale on the vertical axis.

The teacher can also add additional questions in Question 4, which is intended to help learners interpret the diagram and to encourage them to see that the data is spread out but has some sort of central tendency.

In Question 5, learners should note that the use of the mode for decision-making could result in over- or under-provision, because it assumes that ALL households have this most common number of people. A more representative number is thus required. Averages take the whole range of data into account, while the mode represents only the most common value. Learners can discuss the advantages and disadvantages of this.

Averages are discussed formally in this activity, and are actually calculated. Learners might need assistance when calculating the average for the first time and when marking the number off on the bar graph. Further practice with calculating averages is provided in the activities “[How Tall Are You?](#)” and “[Averages](#)”.

How Tall Are You?



Do you know how tall you are?

You are going to find out how tall each of the children in your group are.

1. Decide how you are going to measure your height.
2. Record the information in a table.
3. Use block paper to draw a bar graph showing the heights of all the children.
Remember to label the axes of your graph. You will have to decide on the scale you are going to use.
4. Use your graph to describe the data you have collected.
5. What is the average height of the children in your group? Show how you got your answer.
6. Now look at the heights of all the children in your class and calculate the average height. How does this compare to the average height for your group?

Teacher Notes: How Tall Are You?

In this activity learners are required to

- *Decide on the appropriate measurements to make and how these should be made*
- *Make accurate measurements*
- *Construct a table and record the data in the table*
- *Draw a bar graph to represent the information – selecting appropriate labels and scale for the axes*
- *Describe the data that has been collected*
- *Calculate averages for the group and the whole class*
- *Compare the effect of sample size on the results.*

AVERAGES

1. Mandisa's teacher gives the class a short maths test every week. Mandisa keeps a record of her marks for each test:

Date of Test	3 May	10 May	17 May	24 May	31 May	7 June
Mark (out of 10)	4	5	7	5	8	9

Table 9: Marks for 6 tests

- (a) What is Mandisa's average mark for these tests?
- (b) Mandisa obtained 7 for the test on 14th June. Without calculating, say what will happen to her average. Explain your answer.
- (c) Mandisa says she wants to have an average of 8 after the eighth test on 14th June. Is this possible? Explain.
2. A cricket player can calculate his average by adding up the runs he has made and then dividing by **the number of times he has been out**.
Lance scored these runs in four innings: 12, 43, 35 and 16. He was out in each innings.
- (a) What is Lance's average?
- (b) Lance scored 56 runs in his next innings and he was not out. What is his new average. (Hint: You will still need to divide by 4.)

3. A sport shop claims in television advertisement that it is *“not your average sports shop”*.

(a) What does this mean?

(b) Why does the shop use this slogan?

4. Thabo’s Art teacher wrote this in Thabo’s school report:

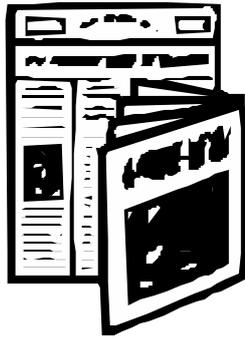
Thabo is an above average learner

What does this tell us about Thabo?

Teacher Notes: Averages

This activity provides learners with practice in calculating averages and explores the use of the word “average” in the media.

A School Magazine



Your class is going to write and produce a magazine for the children in your school. You want this to be a popular magazine so your group must find out what kind of magazine the children in the school would like.

1. What information do you need to know?
2. Design a questionnaire to gather the information.
3. Decide who is going to fill in the questionnaire. Explain your choice.
4. Collect your data.
5. Organise your data so that you can present it to the class.
6. Present the results of your group's survey to the class and explain what kind of magazine you think the class should design.

Teacher Notes: A School Magazine

This can be done as a group project. Learners are required to:

- *Identify factors influencing the popularity of a product and suggest information to collect to obtain information on these factors*
- *Design a questionnaire to obtain information*
- *Identify suitable methods of sampling*
- *Accurately collect and record data*
- *Sort, sequence and classify data*
- *Represent data in tables, pie charts and bargraphs with multiple scales*
- *Describe data in words*
- *Make suggestions based on results of survey.*

The teacher should provide guidance where necessary, for example, discussing questionnaires before these are used. Presentations can be in written and/or oral form.

