

5

A picture of health

Coverage

This unit is about collecting, presenting and analysing data.
It covers reading tables, charts, diagrams and line graphs and presenting data in the forms of tables, charts, diagrams and line graphs.
This unit introduces learners to some statistical analysis of data. They will calculate and compare three types of average: the mean, median and mode. They will also be introduced to the idea of the range and spread of data.
The unit also covers calculating one number as a percentage of another number.
Learners will estimate and measure temperatures. They will compare temperatures and use conversion tables.
The unit also demonstrates that there is more than one measurement of temperature.

Skills

HD1/L2.1 extract discrete and continuous data from tables, diagrams, charts and line graph
HD1/L2.2 collect, organise and represent discrete and continuous data in tables, charts, diagrams and line graphs
HD1/L2.3 find the mean, median and mode, and use them as appropriate to compare two sets of data
HD1/L2.4 find the range and use it to describe the spread within sets
N2/L2.9 evaluate one number as a percentage of another
MSS1/L2.4 estimate, measure and compare temperature, including reading scales and conversion tables

Resources needed for effective teaching of this unit:

Demonstration	Group	Pair	Individual
Bus or train timetables A range of thermometers	Extra questions on creating line graphs	Thermometer (Celsius)	Calculator Squared paper

Reminder

In the Links, H means Help, E means Extension and M means Mini-project.

Remember

- Throughout the unit, be aware of the reading needs of learners.
- You may need to read out parts of the text.
- Words **highlighted** in **bold** will need particular clarification.

Context

- Discuss the scenario with the group.
- All members of the group will probably be aware of what a fitness centre is and what we mean by healthy eating and lifestyle.

Stimulus questions

- Does anyone in the group belong to a fitness centre?
- What kinds of activities do you do in a fitness centre?
- Which kinds of food are healthy or unhealthy?
- Where are numbers involved? Do you need maths skills to measure heart rate, speed, weight etc?

Pages 2–5

Preparing to exercise 1

Introduction to activity 1

- Discuss with the group why it is important to check your health before you start any form of exercise.
- This activity involves reading tables and entering data into tables within the scenario of the connection between height, weight and sex.
- Discuss why it is dangerous to be severely overweight. (Be sensitive of the weights of the learners in your group.)
- Where else do learners see tables of information? (Bus timetables, etc.)

Activity 1

- Learners should work individually on this activity.

Question 1

- Ensure learners understand how to read the table.
- Ensure learners understand that the dash between numbers means 'from ... to'.
- Work through the examples. Use further examples if required.
- Allow learners to do parts a and b and then discuss their answers before completing the activity.

Question 2

- This should be straightforward if learners have clearly understood question 1.

Question 3

- Ensure learners understand that the data that they enter into the table should include dashes, as in the original table on page 2.

Introduction to activity 2

- This activity concerns data about the nutritional content of different foods, presented in tabular and diagrammatic forms.
- Work through the examples.
- Use further examples where necessary to ensure learners' understanding.

Activity 2

- Learners should work individually on this activity.
- Do learners ever consider the nutritional information given on food products?

Question 1

- Ensure learners understand what is meant by the phrase 'in every 100 grams'.

Question 2

- This question is straightforward, but ensure that learners understand what is meant by 'most' and 'least'.

LINKS: H1, E1, M1

Pages 6–9

Preparing to exercise 2

- This section continues the work covered in 'Preparing to exercise 1' and progresses to obtaining data from charts and line graphs.

Introduction to activity 3

- This activity introduces obtaining information from bar charts and pie charts and the construction of bar charts.
- Has anyone in the group seen bar charts and/or pie charts in newspapers etc?
- Why are they called pie charts?

Activity 3

- Learners should work individually on this activity.

Question 1

- Work through the example.
- Ensure learners understand the connection between the data in the table and how it is presented in the bar chart.
- Discuss how to represent the data accurately and how learners can improve on their attempt if necessary.

Question 2

- Ensure learners understand that the largest sector in the pie chart represents the largest item from the given data.

Question 3

- This question should be straightforward if learners have understood the previous question.

Introduction to activity 4

- This activity introduces line graphs. The second question introduces the concept of a line graph as a conversion aid.
- Learners should work individually on this activity.

Activity 4

Question 1

- Work through the examples.
- Ensure learners understand that each point on the line represents two pieces of data (heart rate and time).
- Learners may need help with reading the graph.
- Discuss all aspects of what the graph shows and what may be deduced, e.g. Why is his heart rate 120bpm? What is he likely to have been doing? (He could have been running or he may have been walking uphill or faster.)
- Ensure, by pointing, that all learners understand the information from the graph, and to eliminate left-right confusion.

Question 2

- This question should be straightforward if learners have understood the previous question.

LINKS: H2, E2, M2

Pages 10 and 11

Joining the fitness centre

Introduction to activity 5

- This section covers the differences between discrete and continuous data and gives some practice in drawing line graphs.
- Explain that continuous data are obtained from measurements and as such can only be quoted to a certain degree of accuracy (only as good as the person/instrument measuring) but that discrete data are particular values.
- Learners should work individually on this activity.

Activity 5

Question 1

- This simple question checks that learners remember how to read tables.

Question 2

- Work through the examples.
- Discuss other examples until learners are competent.
- This question introduces the idea of discrete and continuous data. Learners may find this concept difficult. Be prepared to discuss this topic with the whole group.

Introduction to activity 6

- This activity gives learners the opportunity to create a line graph. More practice may be required and you should be prepared with other examples and squared paper.
- Learners should work individually on this activity.

Activity 6

Question 1

- Work through the example.
- Give learners more help with plotting points on a graph if necessary. 'Along the corridor and up the stairs' is a useful reminder.

LINKS: H3, E3, M3

Pages 12–15

Exercising 1

- This section covers calculating and using different types of averages.

Introduction to activity 7

- Has anyone in the group heard the word 'average' used and in what context (cricket averages, an average child etc.)?
- This activity introduces the concepts of the mean and median.
- Calculators should be available.
- Learners should work individually or in pairs.

Activity 7

Question 1

- This revision of extracting information from the table should be straightforward.

Question 2

- This involves simple addition of the data from question 1 or reading from the table.
- Work through the example – get the group to discuss what an average of 4.5 could be referring to.

Question 3

- Work through the examples of calculating the mean.
- Practise calculating the mean of other sets of numbers until learners are competent.

Questions 4 and 5

- Work through the examples on how to calculate the median.
- Ensure that learners know what is meant by the 'middle' number.
- Practise calculating the median with other sets of numbers until learners are competent with both odd and even sets of numbers.

Question 6

- Work through the examples on how to calculate the mode.
- Learners practise calculating the mode with other sets of data, including more than one mode.
- Explain why there are three averages.
- Discuss applications for all averages.

- Show that the mean is needed even when it seems odd. For example, the average number of children per household may be 2.45, a silly number of children, but in a city of a million households there are 2 450 000 school places. How many children would not have a place if the median (2) were used? How many spare places would there be if the median (3) were used?
- The mean of four household incomes where one gets £20 000 and another gets £1000 is £2900, nearly three times what the four household's earn – median or mode are more appropriate.
- No one wears size 6.4793 shoes, but shoe-shop owners want to order most of the most popular size, i.e. the mode.

Question 7

- A simple final question on the mode.

Introduction to activity 8

- This activity covers the range of sets of data.
- Discuss what knowing the range of data tells you.
- Learners should work individually on this activity.

Activity 8

- Revise how to calculate the mean, mode, median and range of a set of data.
- You may need to remind learners that 'no.' is a shortened form for number.
- Discuss how the data such as the answers found here might influence learners' decisions about when to go to the fitness centre.

LINKS: H4, E4, M4

Pages 16 and 17

Exercising 2

- This section covers expressing one number as a percentage of another.
- Remind learners what percentage means ('out of one hundred').

Introduction to activity 9

- A fraction can be expressed as a number 'out of' another number.
- Learners should work individually or in pairs on this activity.

Question 1

- Work through the example.
- Learners practise changing fractions into percentages by changing the denominator into 100.

Question 2 (calculators required)

- Work through the example.
- Revise 'rounding' to two decimal places.
- Practise changing fractions into percentages by multiplying them by 100.

Question 3

- Work through the example.
- Introduce further examples of expressing one number as a percentage of another if needed.

LINKS: H5, E5, M5

Pages 18 and 19 Exercising 3

- This section covers estimating, measuring and comparing temperatures.
- Provide each pair of learners with a Celsius thermometer.

Introduction to activity 10

- This practical exercise involves measuring and comparing temperatures; it may not be suitable for all settings/groups.
- Learners should work in pairs.
- Discuss Fahrenheit and Celsius scales.

Activity 10

- Question 1 checks that learners can interpret scales. It may be necessary to complete an example as a group activity.
- The practical questions should not prove difficult but be aware that some learners may be wary of using any type of instrument.

- You may need to complete an example of reading a scale as a group activity.

Introduction to activity 11

- This activity involves conversion between Fahrenheit and Celsius temperatures.
- Learners should work individually.

Activity 11

- Work through the examples.
- Work through more examples of necessary.

LINKS: M6

Pages 20 and 21 Help

H1

- Remind learners how to read and complete a table.
- Learners work individually or in pairs.

H2

- Remind learners about the important features of a bar chart.
- Learners work individually or in pairs.

H3

- Remind learners how to decide whether data are discrete or continuous.
- Learners work individually or in pairs.

H4

- Remind learners how to calculate the mean, median, mode and range of lists of numbers.
- Learners work individually or in pairs.

H5

- Remind learners how to calculate one number as a percentage of another number.
- Learners work individually or in pairs.

Page 22

Extension

↑ E1

- Remind learners how to read a table (in this case a bus timetable).

↑ E2

- Remind learners how to interpret a pie chart.

↑ E3

- Remind learners how to identify discrete and continuous data.

↑ E4

- Remind learners how to calculate the range.

↑ E5

- Remind learners how to calculate one number as a percentage of another.

Page 23

Mini-projects

- Learners work individually or in groups; they could work at home.
- The projects involve application of the skills covered in this unit
- Make sure learners understand exactly what they are to do.

M1

- Encourage learners to research different establishments and compare prices etc.
- Useful websites include www.sainsburystoyou.com, <http://online.shopping.uk.pamscomsuperstore.com> and www.littlewoods.com

M2

- It would be useful to have a sample of cuttings from newspapers to illustrate what learners are looking for.

M3

- Discuss how the data are obtained and recorded.

M4

- Discuss how to collect and record data.

M5

- Discuss how to collect the data.

M6

- Discuss equipment required and how to record the data.

Pages 24 and 25

Check it

Use these questions to assess how learners have coped with the skills in this unit. Ask learners to indicate the areas in which they would like help.

How am I doing?

Learners should complete this individually, with teacher support.