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Maths

Entry Level 3, Book 11

GLH 4

Handling Data

Name	
Number	
Location	
Date Issued	



➤ Introduction

This booklet is part of your learning programme.

Remember to read carefully and try your best. Don't worry if you get stuck, make a note on the booklet and move on to the next task. Try coming back to it later, see if you can work it out then.

If you are still stuck, remember to make a note at the end of the booklet.

Throughout the booklet, you will see that some words have been printed **blue and bold**. You will find more detailed explanations of each of these words in the 'Glossary' at the back of the booklet.



Glossary is a list of often difficult or specialised words with their definitions, placed at the back of a book. You may also know this as a word bank.

By working through this booklet, you will become confident using different tables, graphs and charts to represent data in a clear and concise manner.

What Do the Symbols in this Booklet Mean?



Where you see this symbol, there is a skills practice or activity for you to complete.



Information, explanations and case studies are shown with this icon.



This shows you there is a glossary or word bank with the meaning and correct spelling of key words.



This icon shows where to write comments for your tutor to read.



This symbol lets you know there are some key points to remember.




The Big Picture



You are studying Entry Level 3 Maths, which is taught over 55 Guided Learning Hours (GLH).

The programme covers the units listed below. The unit that you're working on today is ticked.

Booklet		GLH	
1	Place Value and Sequencing		
2	Addition and Subtraction		
3	Multiplication		
4	Division		
5	Fractions		
6	Decimals and Money		
7	Rounding		
8	Time		
9	Shape and Space		
10	Measure		
11	Handling Data	4	
12	Recap and Summary		

Outcomes

These are the outcomes you can achieve by completing the learning activities in this booklet.

1

Extract information from lists, tables, diagrams and charts and create frequency tables.

2

Interpret information to make comparisons and record changes, from different formats including bar charts and simple line graphs.

3

Organise and represent information in appropriate ways including tables, diagrams, simple line graphs and bar charts.



Recap



A **recap** is an effective way of helping you to remember and apply what you have learnt. If this is your first booklet, it may help you to think about what you know already about this subject. Can you answer the following questions?



What was the last booklet you completed?



Can you remember what you learnt about?



Can you remember three key points from the booklet?

1

2

3

Organising Data – Tally Charts

There are many ways of recording information but, in work and everyday life, one of the most commonly used is a **tally chart**.

Here is a tally representing how many people took each activity at the sports centre on Monday.

Activity	Tally	Frequency
Swimming		12
Aerobics		6
Circuits		18
Spin		18
Total		54

The different things we are recording.

A mark for each time it happens. 4 vertical lines and then a line through them to make a group of 5.

The **frequency** is the number of times an event or a value occurs. To work this out, each set of tallies has been added up.

A final total of all tallies is at the bottom of the chart.

The tally chart lets us record each instance of activity by putting a simple mark on the chart.



Task
1

Do you know of any jobs where you might be asked to use a tally chart? Write a list below.



Organising Data – Tally Charts

There are probably far more than you realise.

1. **Warehouse** – stock control
2. **Builder's yard** – recording materials in and out
3. **Traffic control** – recording the numbers and types of vehicles that use a road at any given time
4. **Night club** – controlling numbers to prevent overcrowding



Task 2

Look at the tally chart below. It represents some of the clothing donated to a charity shop in one week.

- Some of the information is missing. Complete the chart below. Remember to make groups of 5 (4 lines with a cross through them).
- Look back at the previous page to remind you how to set out the tally chart.

Item donated	Tally	Frequency
Trousers		
T-shirts		
Jumpers		18
Shorts		7
Total		

1. Which item was donated most often?
2. Which item was donated least often?
3. How many items of clothing were donated in total?



Tables



Tables are used to make it easier to read and compare information.

A table is a way of representing information.

We use the rows and columns to organise our data.

A table has one row of **categories** (in this case colours) and the next row contains the **corresponding data** (numbers).

Can you think of a time when you have had to use a table?

- What about train or bus timetables?
- Or holiday brochures showing hotel costs at different times of the year?

Below is a table of 23 people's favourite colour.

By using the table, we can show a quick and easy **visualisation** of what 23 people's favourite colour is.

Red	Blue	Green	Pink	Purple
4	8	3	6	2

How many people's favourite colour is red?

The table shows us that four people say **red** is their favourite colour.



Task
3

Six people have the same favourite colour.
What colour is it?

.....

Tables

Below are 11 images. Each image represents a person and their favourite colour.



Task
4

Complete the table to show what these workers' favourite colours are.

Colour	Frequency (how many)
Purple	2

Tables

A café sells 4 different types of sandwiches: chicken, beef, egg and salad. The frequency or number of sandwiches ordered in one morning are below:



Chicken
8



Beef
5



Egg
3



Salad
6



Task
5

Create a table to show the sandwich fillings ordered in one morning.

Sandwich	Frequency (how many)



➤ Analyse the Information in a Table

Using information in tables, we can **analyse** data to help us to make decisions.

Just like the previous tables, the table below shows a range of data, this time the number of sandwiches sold by a coffee shop over two weeks:

	Chicken	Ham	Tuna
Week 1	4	8	3
Week 2	6	3	2

Can you help Jon, the owner of the shop, to analyse his sales?

Let's have a look at some questions and how we can use the table to answer them.

1. Which sandwich sold the best in week 2?

Look at week 2.

How many chicken were sold? **6**

How many ham were sold? **3**

How many tuna? **2**

The largest number is 6, so chicken sandwiches sold best in week 2.

2. Which sandwich sold the best overall?

Look at each type of sandwich.

Chicken sold 4 and 6 so **10 in total.**

Ham sold 8 and 3 so **11 in total.**

Tuna sold 3 and 2 so **5 in total.**

11 is the highest total, so ham sold best over the 2 weeks.

Regular or Irregular?

3. Jon, the owner of the shop, is thinking of replacing a sandwich. Which type should he get rid of?

Which sandwich would you stop selling?

It would be the one that is least popular.

As only 5 tuna sandwiches were sold, it is the least popular so Jon should remove it.

4. Jon needs to add the week 3 and 4 totals on to the table.

a) The chicken sandwich sold double its week 1 total in both weeks 3 & 4.

Week 1 had 4 chicken sandwiches. **Double 4 is 8.**

8 chicken sandwiches were sold in both weeks 3 and 4.

b) The ham sandwich sold 6 in week 3, and **half that in week 4.**

c) The tuna sandwich only sold 1 in week 3 and was **removed for week 4.**



Task
6

Using the information above, complete the rest of the table.

	Chicken	Ham	Tuna
Week 1	4	8	3
Week 2	6	3	2
Week 3	8		
Week 4	8		

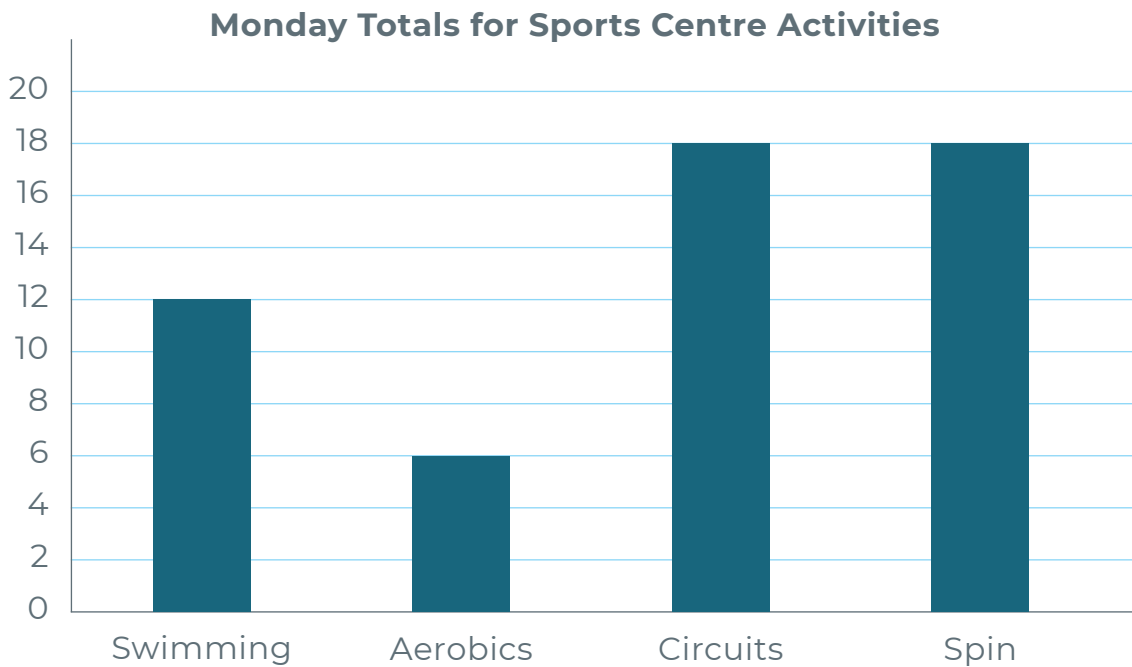
Graphs and Charts

Another useful way of presenting information, so it is easy to understand and read, is by using a graph or chart.

There are different types of graphs and charts, each with a specific use. The two we will look at are bar charts and line graphs.

Bar Charts

This bar chart shows the data collected from the example tally on page 9:



We use the frequency totals worked out from the tally to make the chart:

Activity	Frequency (how many)
Swimming	12
Aerobics	6
Circuits	18
Spin	18

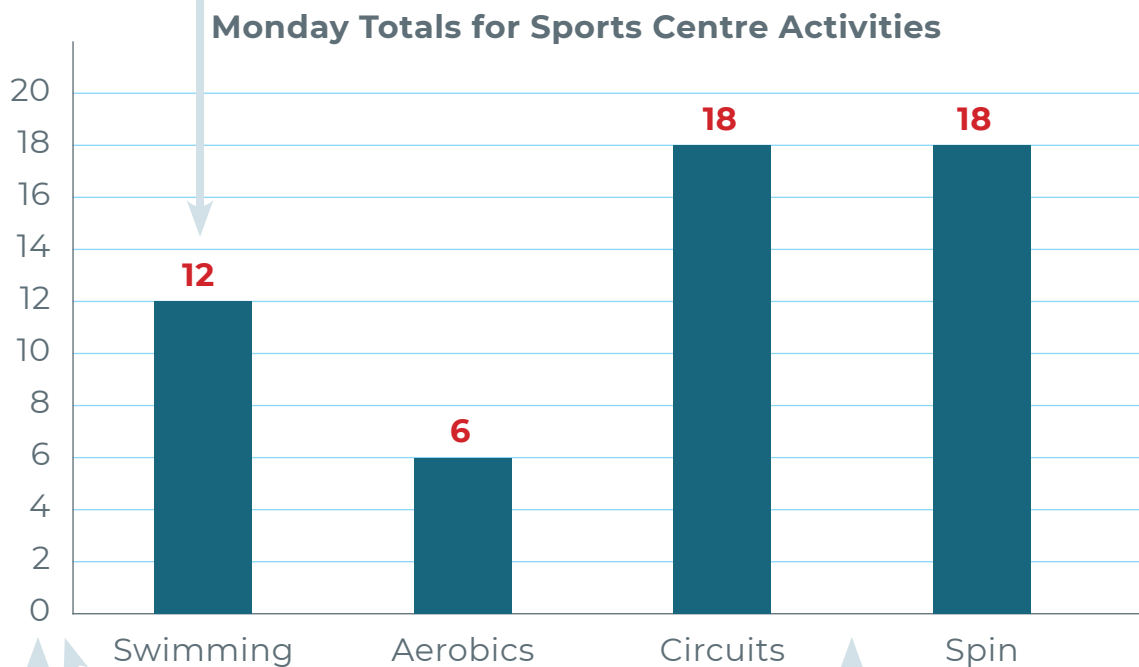
Let's have a look at how we made the chart on the next page.

Setting Out Your Chart

The numbers from the tally chart have been added onto the chart. Here are some important points to remember about how the chart was made:

The height of each bar will match up with the numbers shown on the Y-axis. The numbers in **red** show the values of each bar.

The title tells people what the graph is about. This only needs to be one sentence.



Scale starting at zero.

Y-axis (the line going **straight up**).

This shows us how many there are of each activity.

There is an interval (gap) between numbers of 2.

X-axis (the line going **across the bottom** of the graph).

This tells us what we are comparing. We have listed the four activities: Swimming, Aerobics, Circuits and Spin.



To help you remember the Y-axis, think of 2 arms reaching up to the sky. It is the scale for the **numerical** value. The numerical value is also called the frequency.

Setting Out Your Chart

Let's look at the sports centre data again:

Activity	Frequency (how many)
Swimming	12
Aerobics	6
Circuits	18
Spin	18

If we were representing this data in a bar chart, what scale would we use? Let's show how we worked this out for the Y-axis:

We know the **scale** starts at zero. Look at your highest value. You need to make sure this fits on the scale. We start at **zero** and our highest value is **18**. We have made the highest scale on the graph 20 to help show clearly where the highest values are on the graph.

If we make our scale move up two numbers at a time, this means that less numbers are displayed. Too many numbers on the Y-axis can sometimes look too crowded and confusing. The gap between the numbers is called the **interval**.

For example, we used an interval of 2:

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

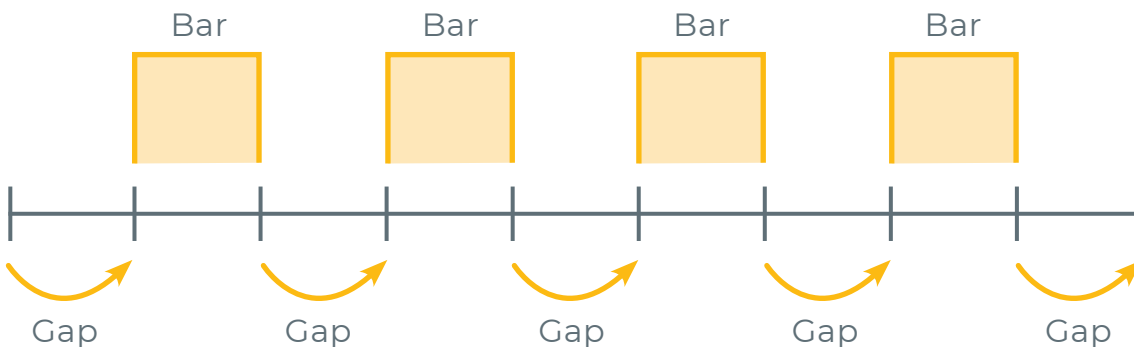
The interval gap between each number is always kept the same on this axis.

What about the X-axis?

There are 4 activities. So, we need 4 bars.

How wide will the bars be?

We need 4 bars with a gap between each one.



So, on the X-axis each bar will only be one interval wide.

Checklist for Creating Bar Charts

Title: This provides details of the subject and content.

Scale: Is your scale suitable? Are the jumps too big/small?
Are they equal? Does it start at zero?

Labels: What do the bars represent?

Bars: Are they all the correct height?

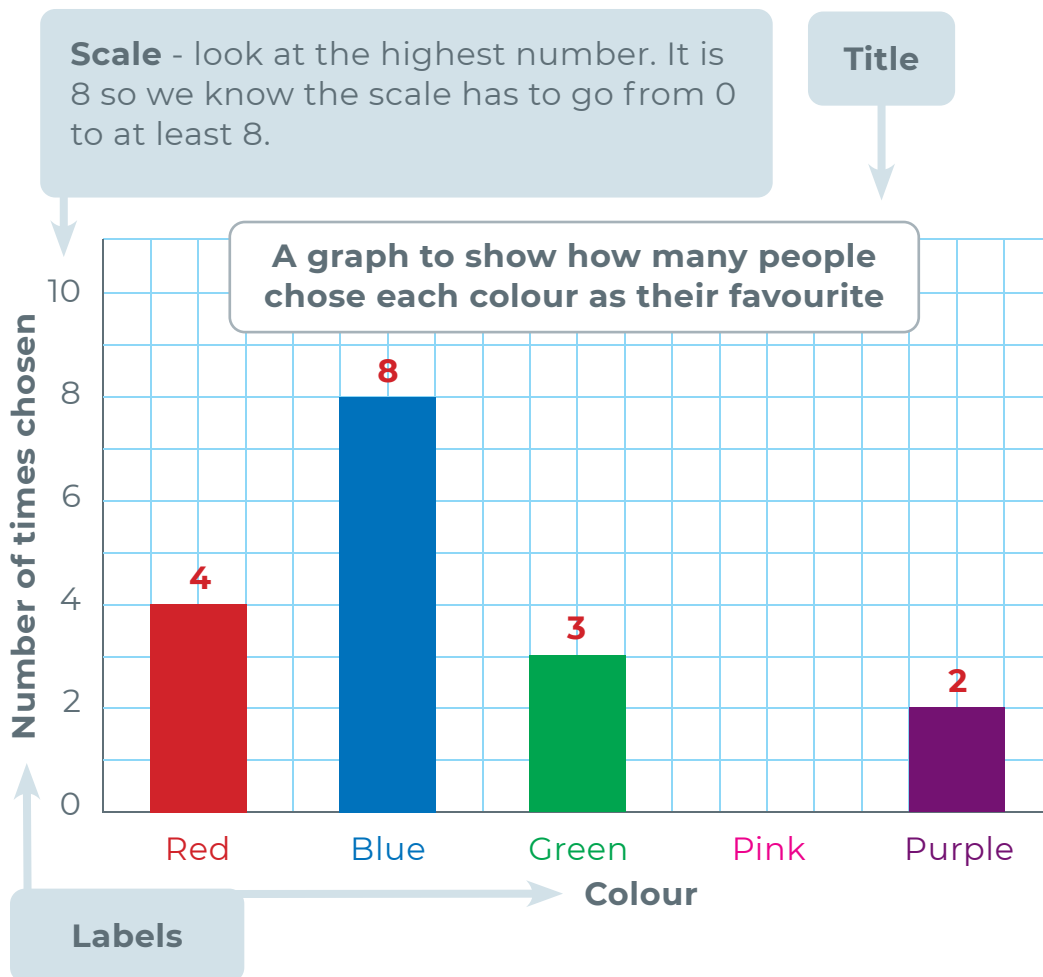
Using our table of favourite colours from earlier, we can create a bar chart using this data.

Red	Blue	Green	Pink	Purple
4	8	3	6	2



Task
7

Can you add the data for the pink colour to the chart below?



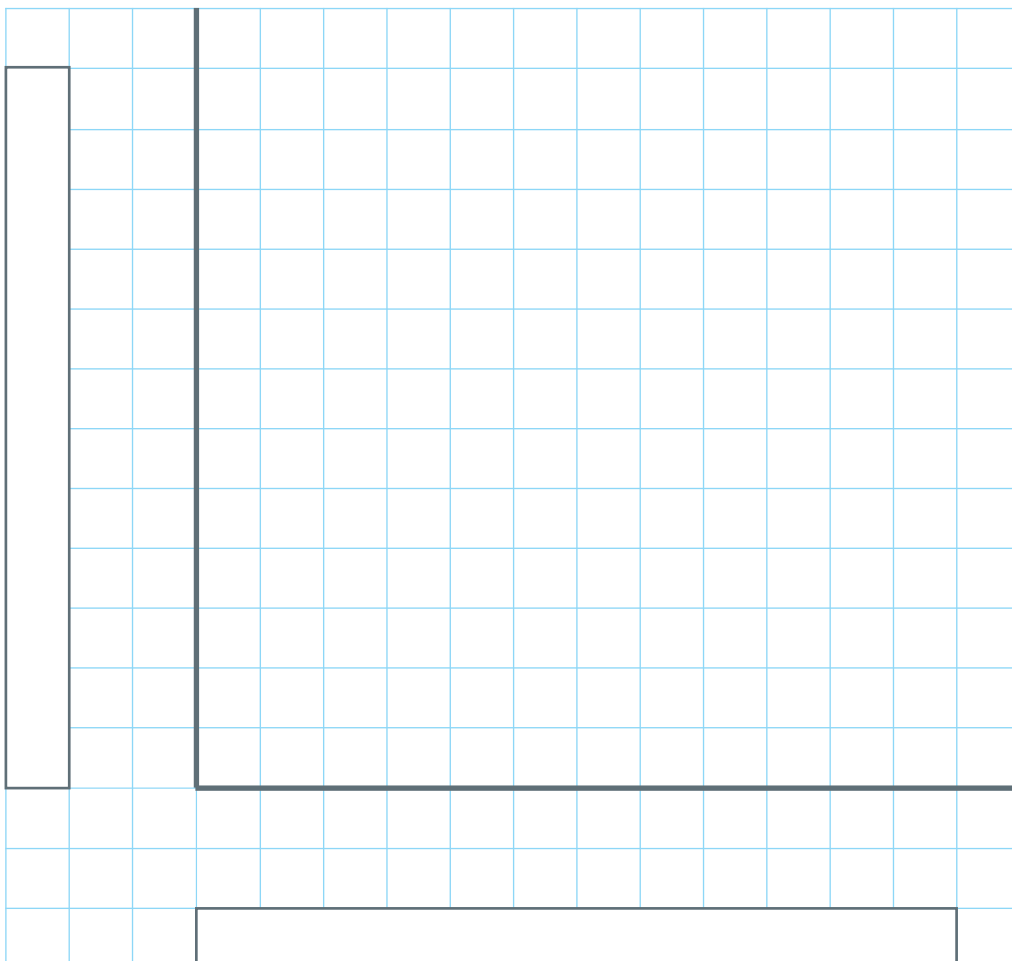
Bar Charts



Task
8

Using the information below, work out what scale you will use, then create a bar chart (make sure you include everything on the checklist from page 17).

Transport type	Number of employees
Walk	13
Bus	9
Car	21
Cycle	4
Taxi	16

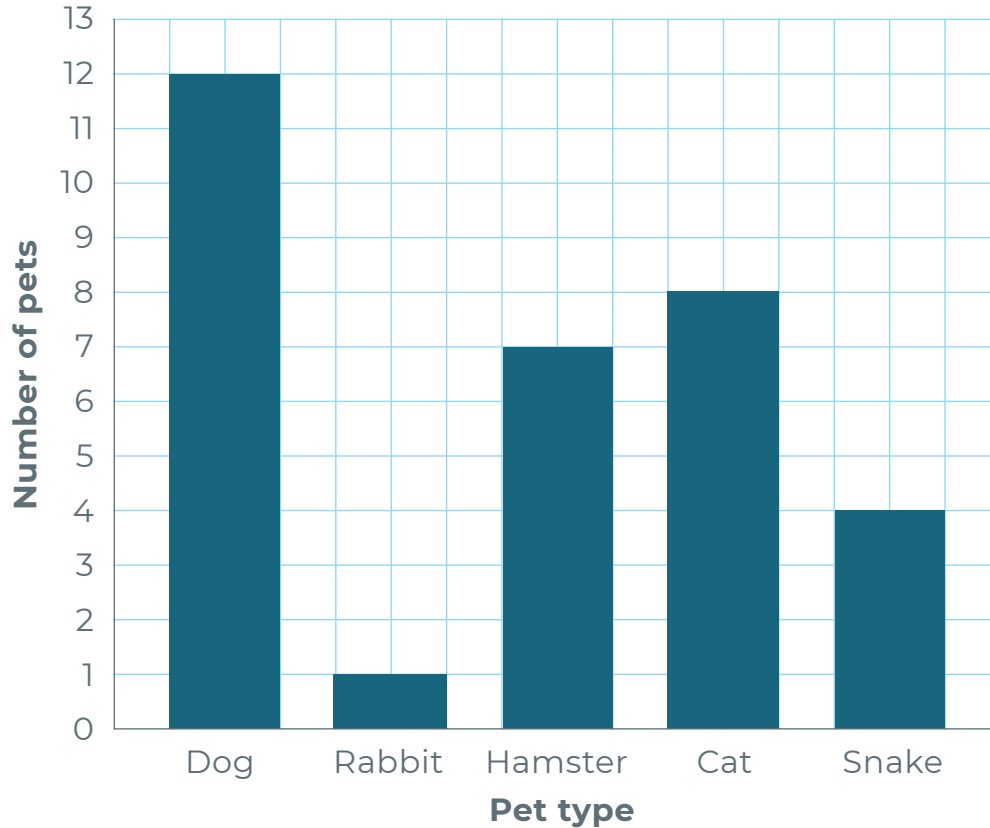


Analyse a Graph



Task
9

Can you analyse the graph and answer the questions below?



Which pet is most popular?	Dog
Which pet is least popular?	
How many more cats are there than snakes?	
How many pets are there in total?	
Why can't we say how many pet owners in total took part in this survey? (Explain your answer)	
Add anything that's missing from this graph to it.	



Notes



Notes





Let's keep going

FOLLOW



WWW (What Went Well)

EBI (Even Better If)

Next steps

Learner feedback (Please provide some feedback for your tutor following the comments that you have just made on your work.)

Line Graphs

Another way of presenting information is by using a line graph. Other than the way they look, line graphs differ from bar charts because of the data they can display. Line graphs are also known as frequency diagrams.

Line graphs/frequency diagrams are useful for presenting data that involves time because it is much easier to see how the data has changed.

This could be temperature change throughout the year, monthly profit/loss, or sandwich sales from Jon's shop on pages 14 and 15.

	Cheese sandwiches
Week 1	4
Week 2	6
Week 3	3
Week 4	5
Week 5	9
Week 6	2

Here is a line graph showing the sales of a new range of cheese sandwiches over 6 weeks, based on the data from the table above.

1. To plot your data, first find your category. This goes on the X-axis.
2. Next find your frequency (or number). This goes on the Y-axis.
3. Move straight across from the frequency and straight up from the category. Mark where the 2 lines meet.



You can see where these lines meet for Week 1 on this graph.

Line Graphs

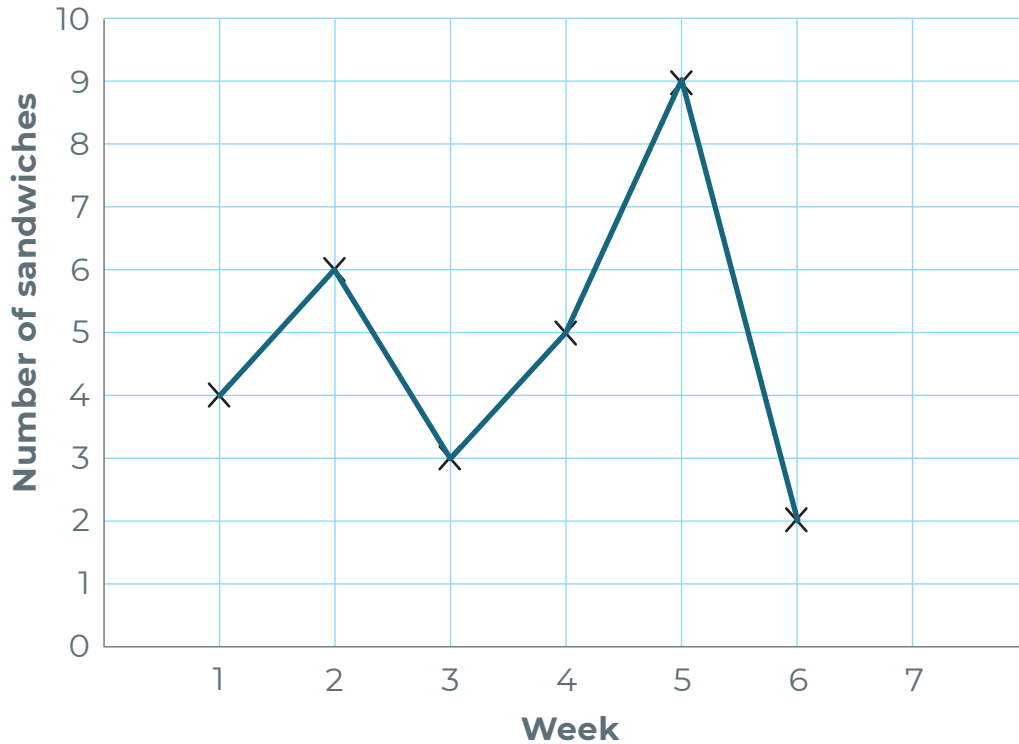


Task
10

Jon has decided to plot the sales for 7 weeks onto the graph. Complete the line graph for Jon by adding in the data for week 7.

	Cheese sandwiches
Week 1	4
Week 2	6
Week 3	3
Week 4	5
Week 5	9
Week 6	2
Week 7	3

Cheese sandwiches sold over 7 weeks



Analysing a Line Graph

Analyse the line graph on page 26 to answer the following questions.

What is the difference between the highest and lowest number of sales?

How do you think you could answer this question?

Use a ruler and pencil to draw a faint line across the graph, from the lowest plotted point to the frequency (**number 2**)

Next do the same for the highest plotted point (**9**)

The difference between 2 and 9 is 7 (**$9 - 2 = 7$**)



Task
11

Jon's sales of his cheese sandwiches were at their lowest point in one week because of a delivery problem. He thinks his sales are now getting better. Do you agree? Why?



Task
12

Jon wants to compare the cheese sales with the sales for ham sandwiches. Plot this information onto the line graph on page 26.

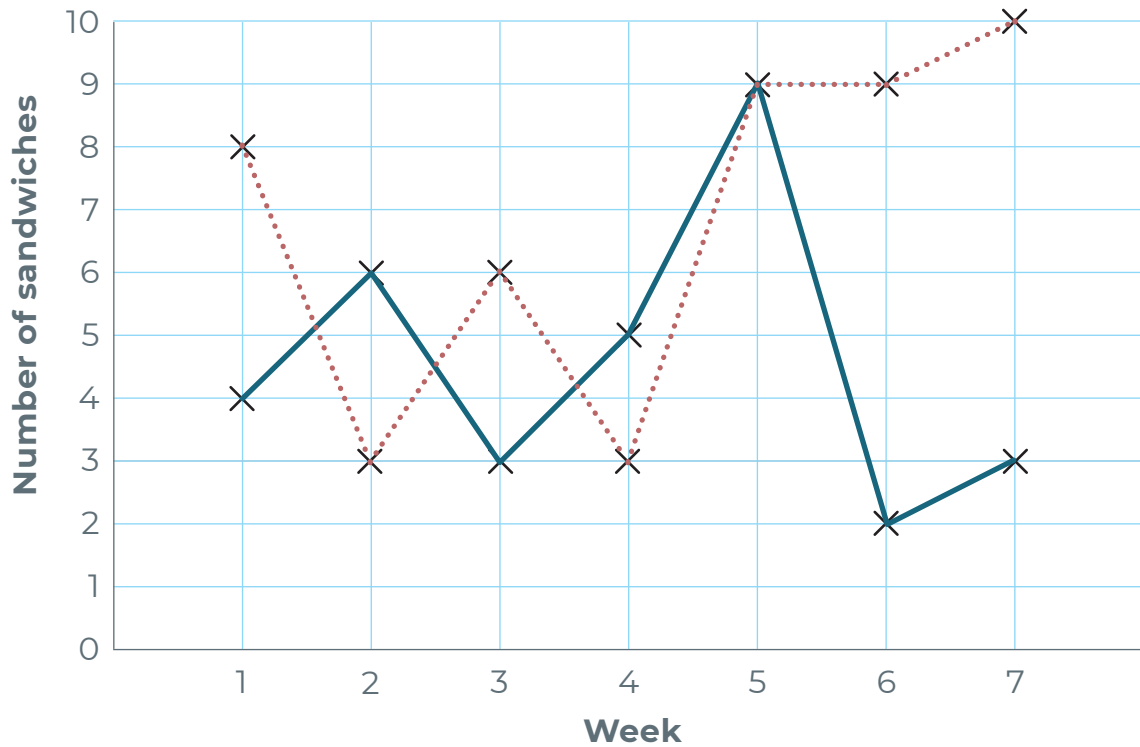
	Ham sandwiches
Week 1	8
Week 2	3
Week 3	6
Week 4	3
Week 5	9
Week 6	9
Week 7	10



For this you will need to make sure you use a different coloured line so that you can tell which is which.

Analysing a Line Graph

Line graph comparing the number of cheese sandwiches and ham sandwiches sold over 7 weeks



This is the **key**. It tells you what each line represents.

— Cheese
..... Ham

On which week did Jon sell the same number of cheese sandwiches as he sold ham sandwiches?

Look at the plotted Xs. Can you see where both lines meet at an X? **On week 5 he sold 9 chicken and 9 ham.**

Creating a Line Graph

When creating a line graph, you need to:

- Draw a suitable scale on the graph.
- Plot the points first by putting a little cross.
- Join the points with a straight line between each cross.

As with the bar chart, the Y-axis (think of 2 arms reaching up to the sky) has the scale for the numerical value. The numerical value is also called the **frequency**.

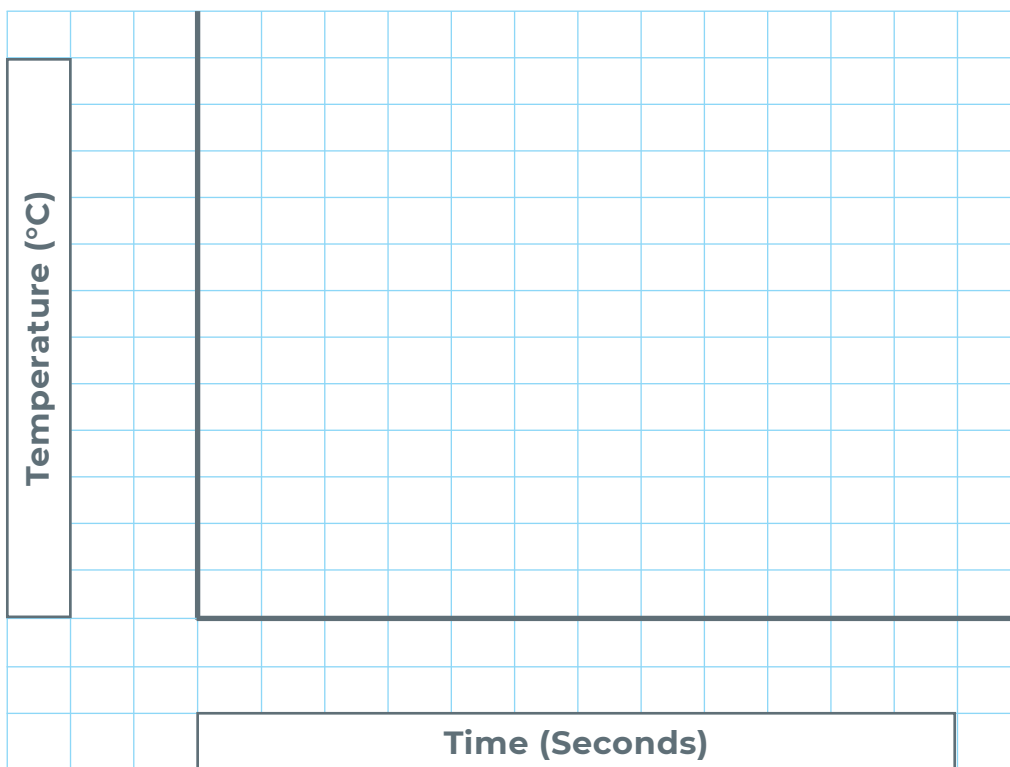
The X-axis (remember an x is a cross) displays what is being compared.



Task
13

This table shows how long it took a kettle to heat water to different temperatures. Plot the information on the line graph below.

Seconds	Temp (°C)	Seconds	Temp (°C)
0	10	80	70
20	20	100	90
40	30	120	100
60	50		

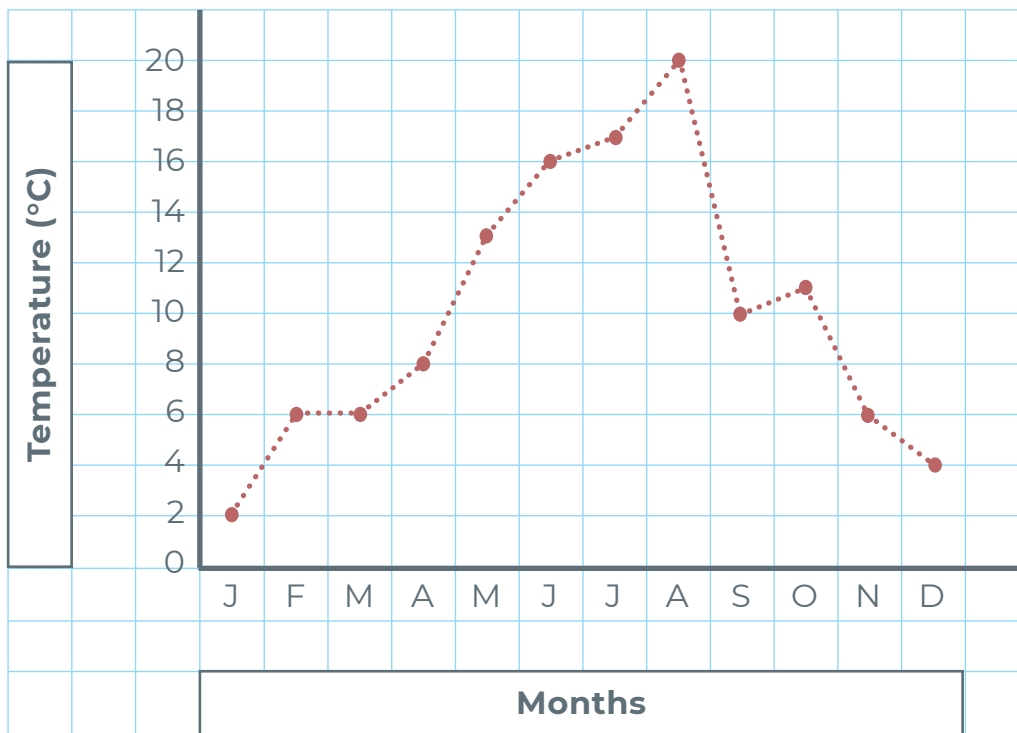


Analysing a Line Graph



Task
14

A graph to show the average temperature in the UK throughout last year



1. What months have the same temperature?
2. Between which months is the biggest **increase** in temperature?
3. Between which months is the biggest **decrease** in temperature?
4. Which three months are the hottest?



Analysing a Line Graph



Task
15

This table shows the average temperature in New Zealand.

Month	Temp (°C)	Month	Temp (°C)
January	19	July	2
February	14	August	0
March	13	September	4
April	8	October	7
May	6	November	9
June	5	December	15

1. Plot this information onto the graph in task 14 on page 30.
2. What comparisons can be made between the UK's and New Zealand's temperatures?
3. John says the climate in the UK is similar to that in New Zealand. Is he right? Explain your answer using information from the table and graph.
4. **Stretch and Challenge.** Suggest a possible reason for the shape of the New Zealand line.

Recap

In this booklet you have looked at:

How to create your own bar chart and analyse the data shown.	✓
How to create line graphs.	✓





Analyse	To study or examine something in detail to discover more about it.
Frequency	The number of times an event or a value occurs.
Numerical	Relating to or expressed as a number or numbers.
Scale	A set of numbers or amounts used to measure or compare. A graduated range of values that make up a system for measuring something.
Tally Chart	A way of recording data by filling in a chart with a vertical dash each time something happens. 4 vertical lines and then a line through them make a group of 5.
Visualisation	Information shown as a chart or other image.

Next Steps

Now you have completed Booklet 11, please return this to your tutor/trainer.

Your tutor/trainer will mark the work and provide you with some feedback showing what you have done well and suggestions on improvements.

The next booklet will be provided to you.





WWW (What Went Well)

EBI (Even Better If)

.....
Next steps

.....
Learner feedback (Please provide some feedback for your tutor following the comments that you have just made on your work.)

Have Your Say



We would be interested in your opinion of this booklet.

- 1. Was there anything you found easy in this workbook?** Yes No
If you answered yes, what did you find easy?

- 2. Was there anything you found hard?** Yes No
If you answered yes, what did you find hard?

- 3. Is there anything that you would like your tutor to go over again?** Yes No
If you answered yes, what is this?

- 4. If your tutor provided learning aids, did you use them?** Yes No
If you answered yes, how were they useful?

- 5. Would you like more support?** Yes No
If you answered yes, one of our Support Staff will get in touch with you.
.....

- 6. Do you have any questions?**

- 7. What have you learnt from this booklet?**



Notes



