●●○○○ **Level 2 · Mathematics** **M2.7**

Tables and charts

Count, sort and draw what you find, then say what it shows.

Collect facts with tallies, show them in pictograms, bar charts and line graphs, sort them in tables and Venn diagrams, and run your own survey.

YOU ARE READY FOR THIS BOOK IF

You can keep a tally of 15 things and read it back.

One step up	M3.7 Statistics and chance
This book	**M2.7 Tables and charts**
One step down	M1.7 Sorting and counting

Contents

M2.7.1 Tally and frequency tables

M2.7.2 Pictograms with a key

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M2.7.6 Line graphs

M2.7.7 Your own survey

Key words, A to Z

Written and drawn by attnom. Free to read, print and share.

M2.7.1 CHAPTER 1

Tally and frequency tables

> **My friends all shout their answers at once. How do I keep count?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Remember each number in my head.
- ☐ **B** Draw a stroke for each answer, and cross every fifth stroke.
- ☐ **C** Draw one long line of strokes, with no groups.

BY THE END YOU CAN

- Record data in a tally and frequency table
- Find totals and differences from a frequency table

Amina asks 20 friends which fruit they like best. The answers come fast.

She draws a mark for each answer. A mark you draw to count is a **tally**.

Four strokes go down. The fifth stroke crosses them. That is one gate of five.

DRAW IT FIRST

Tally the favourite fruit

Fruit
mango
banana
orange
apple

1 Write the fruits down the page. Leave room for the marks.

Fruit	Tally
mango	𝍸 | | |
banana	𝍸
orange	| | | |
apple	| | |

2 Draw one stroke for each answer. Make every fifth stroke cross four.

Fruit	Tally	Frequency
mango	𝍸 | | |	8
banana	𝍸	5
orange	| | | |	4
apple	| | |	3

3 Count each row. Write the number in the frequency column.

The number of times something happens is its **frequency**. Mango has a frequency of 8.

Count a tally in fives. Count the gates first, then the single strokes.

4 

5 

8 

13 

Each gate is 5. The strokes after the last gate are single ones.

Here is a longer tally. Count it in fives.



WORKED EXAMPLE

How many are in this tally? It has 3 gates and 2 strokes.

1. Count the gates in fives: 5, 10, 15.
2. Now count the strokes: 16, 17.
3. The tally is 17.

Answer: 17

A table with a frequency for each thing is a frequency table. Add the frequencies to get the **total**.

Fruit	Frequency
mango	8
banana	5
orange	4
apple	3
Total	20

The total is the number of friends Amina asked.

WORKED EXAMPLE

How many friends did Amina ask?

1. Add all the frequencies.
2. 8 + 5 + 4 + 3 = 20.
3. She asked 20 friends.

Answer: 20 friends

WORKED EXAMPLE

How many more friends chose mango than orange?

1. Find the two frequencies. Mango is 8. Orange is 4.
2. Take the smaller from the bigger. 8 − 4 = 4.

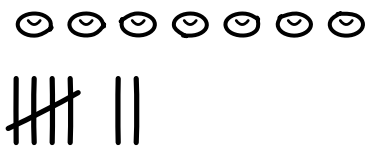
Answer: 4 more friends

SEE IT THREE WAYS

With things

Put out 7 beans, one for each answer. Lay them in a line.

As a picture



In symbols

One gate is 5. Two more strokes make 7. 5 + 2 = 7. The frequency is 7.

TRY IT

Tally the vowels in a line of writing

You need: a line of writing from a book or a sign, a pencil and paper.

1. Write a, e, i, o and u down the page. Leave room beside each.
2. Go along your line. For each vowel, draw a stroke in its row.
3. Cross the fifth stroke in a row. Then start a new gate.
4. Write the frequency at the end of each row.

What you will see: The five frequencies add up to all the vowels in your line. Count the vowels again to check.

If you cannot try it, this is what happens.

Ravi and Joseph carry water to the house

a		4
e		4
i		1
o		3
u		1

total 13

A WRONG IDEA MANY PEOPLE HAVE

~~The crossing stroke does not count. A gate is only 4.~~

Why it feels right: The cross comes last. It looks like a line that ties the strokes.

The test that breaks it: Tally five friends, one stroke for each. After four friends there are four strokes. The fifth friend still needs a mark. That mark is the cross.

What is true: The crossing stroke is the fifth answer. A gate is 5.

KEY WORDS

tally
a mark you draw to count one thing. Every fifth mark crosses four.

frequency
the number of times something happens.

total
all the numbers added together.

BACK TO YOUR GUESS

The answer is B: Draw a stroke for each answer, and cross every fifth stroke.

Draw one stroke for each answer. Cross the fifth stroke, so each gate is 5. Groups of five are quick to count and hard to get wrong.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Count the tally. How many is it?



Answer at the back of the book.

2. Which tally shows 6?

A 

B 

C 

A Tally A

B Tally B

C Tally C

Answer at the back of the book.

3. Tariq saw these animals on a walk. How many animals did he see in all?

Animal	Seen
hen	9
goat	6
dog	4
cat	3

Answer at the back of the book.

4. How many more hens than dogs did Tariq see?

Animal	Seen
hen	9
goat	6
dog	4
cat	3

Answer at the back of the book.

5. Ten friends choose a colour. First five: red, blue, red, red, green. Next five: blue, red, green, red, blue. Make a frequency table.

Answer at the back of the book.

6. Priya made a tally of the birds she saw. How many birds is that?



A 13

B 4

C 16

Answer at the back of the book.

7. Yusuf asked friends which sport they like best. How many friends did he ask?

Sport	Frequency
football	7
running	5
swimming	3

A 15

B 7

C 3

Answer at the back of the book.

8. Joseph tallies how friends get to school. He has 4 strokes for bus. Another friend says bus. What does he draw?

bus 

A Nothing. A gate is only 4.

B A fifth stroke across the four.

C A new stroke on its own, away from the four.

Answer at the back of the book.

9. Hana asked 20 friends which pet they like best. The total is 20. How many friends chose bird?

Pet	Frequency
cat	9
dog	6
fish	2
bird	
Total	20

A 20

B 17

C 3

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Draw one stroke for each answer. Cross the fifth stroke. The number in each row is its frequency. Add the frequencies to get the total.

Draw: A tally chart with three rows. Write the frequency for each row, and the total.

M2.7.2 CHAPTER 2

Pictograms with a key

> **The chart has a half circle in it. What does half a circle count?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** It counts 1, because each whole circle is 2.
- ☐ **B** It counts 2, the same as every other circle.
- ☐ **C** It counts 0. It is only a mistake.

BY THE END YOU CAN

- Read a pictogram where one picture stands for 2 or 5
- Draw a pictogram with a key, using half pictures where needed

Tariq counts the pets in his street. There are cats, dogs and hens.

A **pictogram** shows counts with small pictures. One picture can stand for more than one pet.

The **key** says what one picture is worth. Read the key first.

DRAW IT FIRST

Draw a pictogram of the pets

cat	
dog	
hen	

each ● = 2

1 Write the key. One circle stands for 2 pets.

cat	●●●
dog	
hen	

each ● = 2

2 Cats: 6 pets. 6 ÷ 2 = 3, so draw 3 circles.

cat	●●●
dog	●●●●◗
hen	

each ● = 2

3 Dogs: 9 pets. Draw 4 circles for 8. Draw half a circle for 1 more.

cat	●●●
dog	●●●●◗
hen	●●

each ● = 2

4 Hens: 4 pets. 4 ÷ 2 = 2, so draw 2 circles.

A half circle is half of the key. The key is 2, so half a circle is 1.

WORKED EXAMPLE

How many dogs are there? The dog row has 4 circles and half a circle.

1. Read the key. Each circle is 2.
2. Four circles: 4 × 2 = 8.
3. Half a circle is half of 2. That is 1.
4. 8 + 1 = 9.

Answer: 9 dogs

The key can change. Here are two charts. Each has 3 stars.



Same 3 stars. In the top chart they are 6. In the bottom chart they are 15.

Now four friends and the books they read. Each star is 5 books.



Count in fives to read a row: 5, 10, 15, 20, 25.

WORKED EXAMPLE

How many books did Ravi read? His row has 4 stars.

1. Read the key. Each star is 5 books.
2. Count in fives, one for each star: 5, 10, 15, 20.
3. Ravi read 20 books.

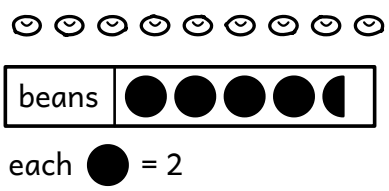
Answer: 20 books

SEE IT THREE WAYS

With things

Put 9 beans in a line. Make pairs. Each pair is one circle. One bean has no partner.

As a picture



In symbols

9 = 2 + 2 + 2 + 2 + 1. That is 4 circles and half a circle.

TRY IT

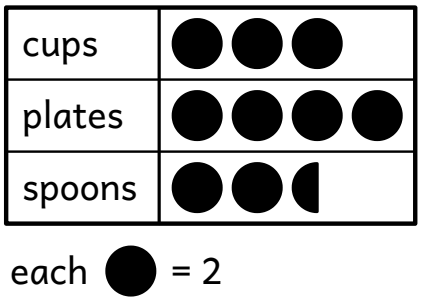
Draw a pictogram of things in your home

You need: things to count in your home, such as cups, plates and spoons, a pencil and paper.

1. Count your cups, your plates and your spoons. Write each number.
2. Choose a key. Let one circle stand for 2.
3. Draw one circle for every 2. If one is left over, draw half a circle.
4. Write the key under your chart.

What you will see: An odd number ends with a half circle. Count your circles in twos, then add 1 for the half. You get your number back.

If you cannot try it, this is what happens.



A WRONG IDEA MANY PEOPLE HAVE

~~Every picture in a pictogram stands for 1.~~

Why it feels right: You count one picture as one thing when you count objects.

The test that breaks it: A row has 3 circles. The key says each circle is 2. Put out 6 beans. Make pairs. You get 3 pairs, so 3 circles. The row is 6, not 3.

What is true: Read the key. Each picture is worth the number in the key.

KEY WORDS

pictogram
a chart that uses small pictures to show counts.

key
the note that says what one picture is worth.

BACK TO YOUR GUESS

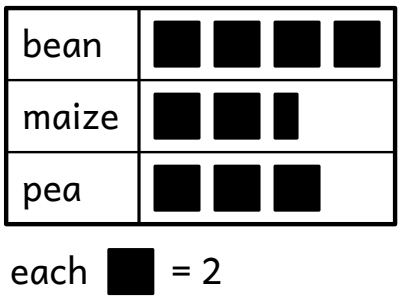
The answer is A: It counts 1, because each whole circle is 2.

The key says what one whole picture is worth. Here it is 2. A half picture is half of that, so it is 1.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Seeds were planted and some sprouted. How many maize seeds sprouted?



Answer at the back of the book.

2. Each star is 5 books. How many books did Ana read?



A 4

B 20

C 9

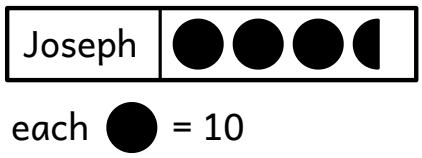
Answer at the back of the book.

3. How many more books did Kofi read than Mei?



Answer at the back of the book.

4. Each circle is 10. A row has 3 circles and half a circle. How many is that?



Answer at the back of the book.

5. Draw a pictogram with a key of 2. Bananas 8, oranges 6, mangoes 5. How many circles in each row?

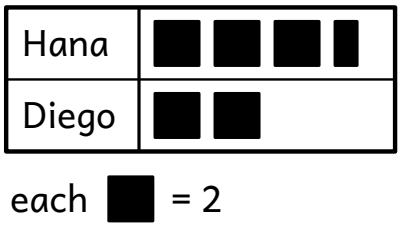
Answer at the back of the book.

6. **From an earlier chapter**

The tally for banana is 3 gates and 4 strokes. What is the frequency?

Answer at the back of the book.

7. How many cups does Hana have?



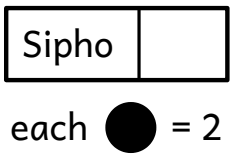
A 7

B 4

C 8

Answer at the back of the book.

8. Sipho has 11 stones. Each circle is 2 stones. What should his row show?



A 5 circles and half a circle

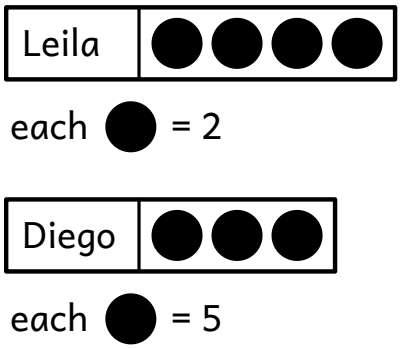
B 6 circles

C 11 circles

D 5 circles

Answer at the back of the book.

9. Leila and Diego collected shells. Who has more shells?



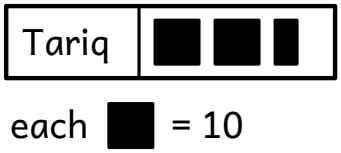
A You cannot tell. The keys are different.

B Leila has more. Her row has more symbols.

C Diego has more.

Answer at the back of the book.

10. Tariq counted his stones. His row has 2 squares and a half square. What is the half square worth?



A 10

B 5

C 1

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Read the key first. It says what one picture is worth. Count the pictures, then multiply by the key. A half picture is half the key.

Draw: A pictogram with three rows and a key of 2. Add one half circle.

M2.7.3 CHAPTER 3

Bar charts

The bar for Ball reaches the third line above 0. Is Ball 3?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Yes. The bar reaches the third line, so it is 3.
- ☐ **B** No. I read the number on the scale where the bar stops.
- ☐ **C** Yes, if it is the third bar along.

BY THE END YOU CAN

- Draw a bar chart with a scale going up in 5s
- Read a bar chart to compare groups

Mei asks 50 children for their best game. She counts each answer.

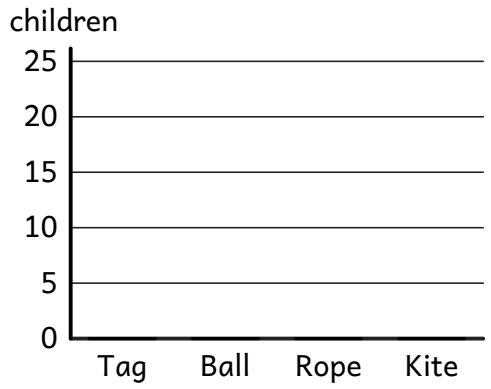
A **bar chart** shows each count as a bar. A taller bar means more.

The **scale** is the row of numbers up the side. Here it goes up in 5s.

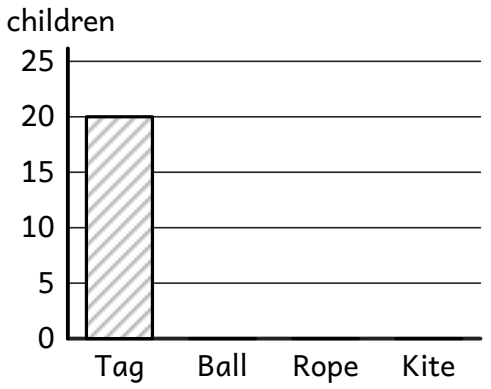
A scale starts at 0. It goes up by the same amount every time.

DRAW IT FIRST

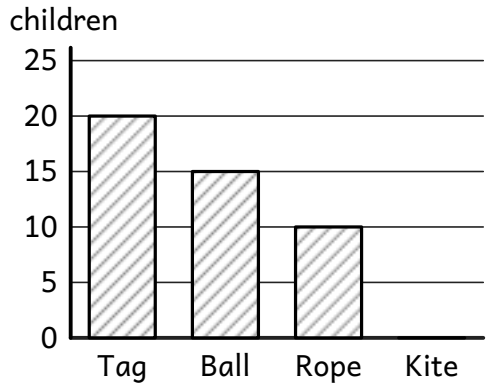
Draw a bar chart of the games



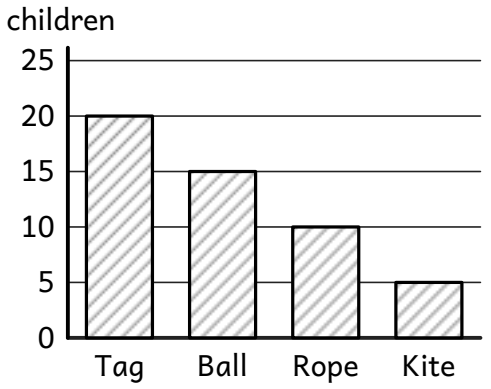
1 Draw a line up the side. Write 0 at the bottom. Then 5, 10, 15, 20 and 25.



2 Tag has 20. Draw a bar up from 0 to the line for 20.



3 Ball has 15 and Rope has 10. Draw bars of the same width.



4 Kite has 5. Draw the last bar. Write each name under its bar.

To read a bar, find the top of it. Look across to the scale.

WORKED EXAMPLE

How many children chose Rope?

1. Find the Rope bar.
2. Look at the top of the bar. Read across to the scale.
3. The top is at 10.

Answer: 10 children

WORKED EXAMPLE

How many more children chose Tag than Kite?

1. Tag reaches 20. Kite reaches 5.
2. Take the smaller from the bigger. 20 − 5 = 15.

Answer: 15 more children

WORKED EXAMPLE

How many children did Mei ask?

1. Add the four bars. 20 + 15 + 10 + 5.
2. 20 + 15 = 35. 35 + 10 = 45. 45 + 5 = 50.

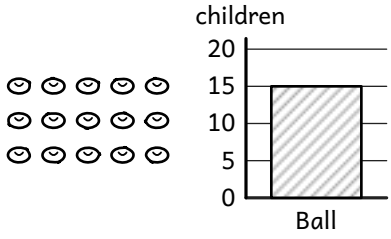
Answer: 50 children

SEE IT THREE WAYS

With things

Put 15 beans in lines of 5.
You make 3 lines.

As a picture



In symbols

3 × 5 = 15. The bar climbs 3 jumps of 5. It stops at 15.

TRY IT

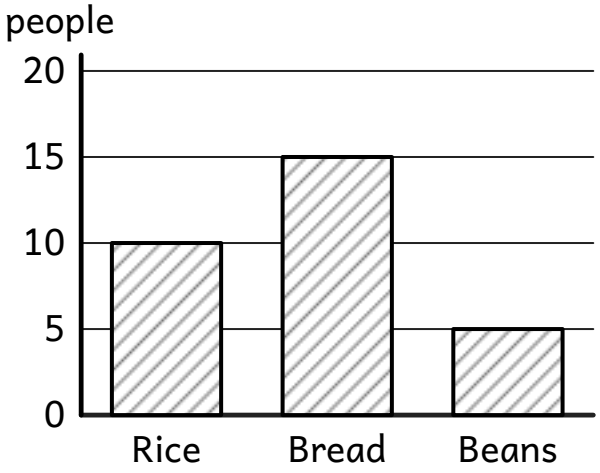
Ask people and draw a bar chart

You need: a pencil and paper, a few people to ask.

1. Ask people which they like best: rice, bread or beans. Make a tally.
2. Draw a line up the side. Start at 0 and go up in 5s.
3. Draw one bar for each food. Make the bars the same width.
4. Stop each bar at its frequency. Write each name under its bar.

What you will see: The tallest bar is the food most people chose. If a count is between two lines, stop the bar between them.

If you cannot try it, this is what happens.



A WRONG IDEA MANY PEOPLE HAVE

~~A bar that reaches the third line above 0 is worth 3.~~

Why it feels right: In many charts the lines go 1, 2, 3. Counting lines works there.

The test that breaks it: Look at the numbers beside the lines. They go 0, 5, 10, 15. Put out 3 lines of 5 beans and count them. You get 15, not 3.

What is true: Read the number beside the line. On a scale in 5s, the third line above 0 is 15.

KEY WORDS

bar chart
a chart that shows each count as a bar.

scale
the numbers up the side of *a* chart.

BACK TO YOUR GUESS

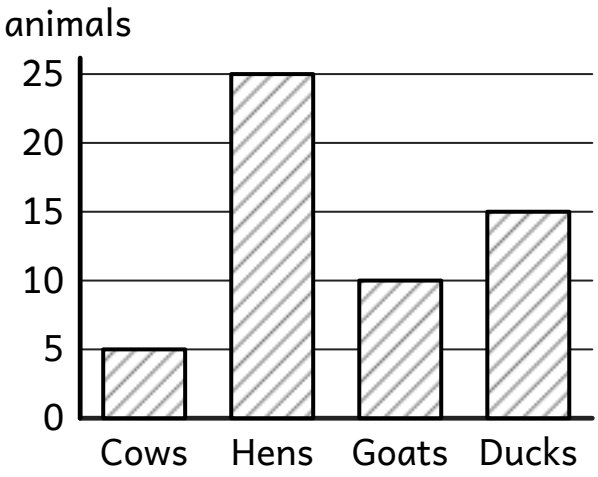
The answer is B: No. I read the number on the scale where the bar stops.

Read the number written beside the line where the bar stops. The scale goes up in 5s. The third line above 0 is 15, not 3.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. How many ducks are on the farm?



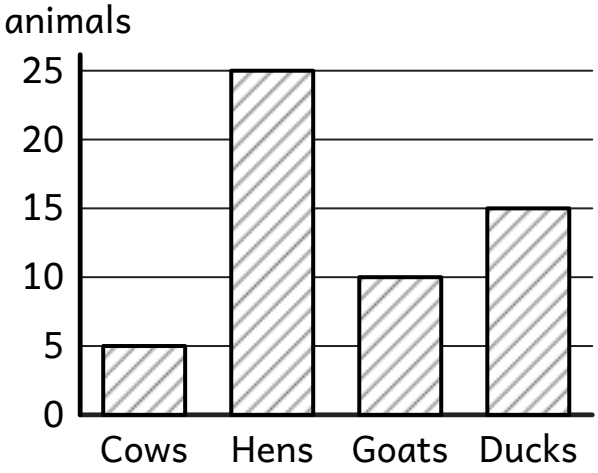
A 3

B 15

C 25

Answer at the back of the book.

2. Which animal is there the most of?



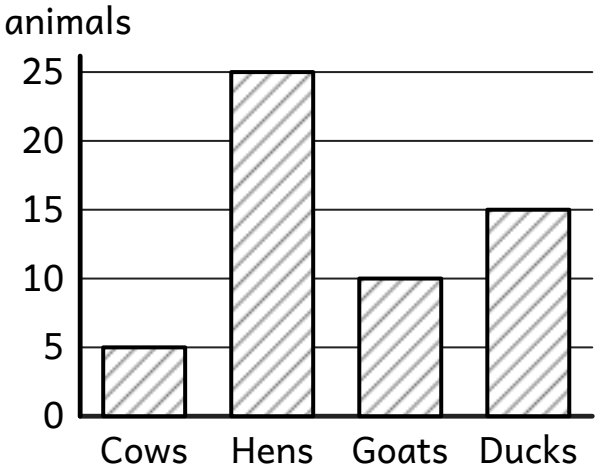
A Cows

B Ducks

C Hens

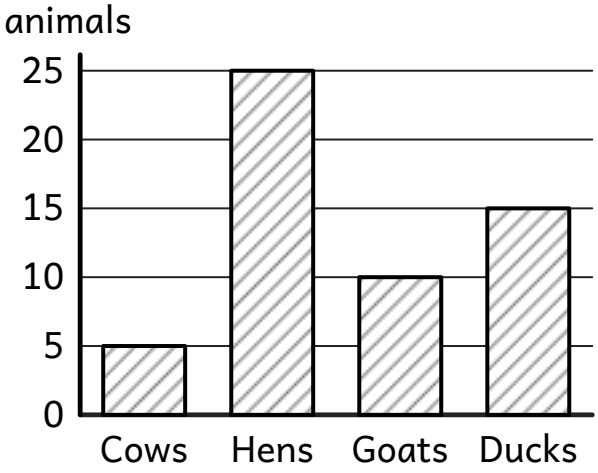
Answer at the back of the book.

3. How many more ducks than goats are on the farm?



Answer at the back of the book.

4. How many animals are on the farm in all?



Answer at the back of the book.

5. Draw a chart of rice 15, bread 10 and maize 20. What scale do you use?

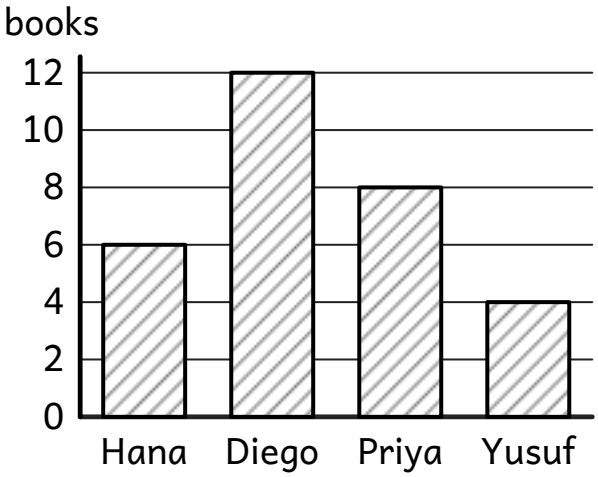
Answer at the back of the book.

6. **From an earlier chapter**

In a pictogram each circle is 2. A row has 4 circles and half a circle. How tall is its bar?

Answer at the back of the book.

7. How many books did Hana read?



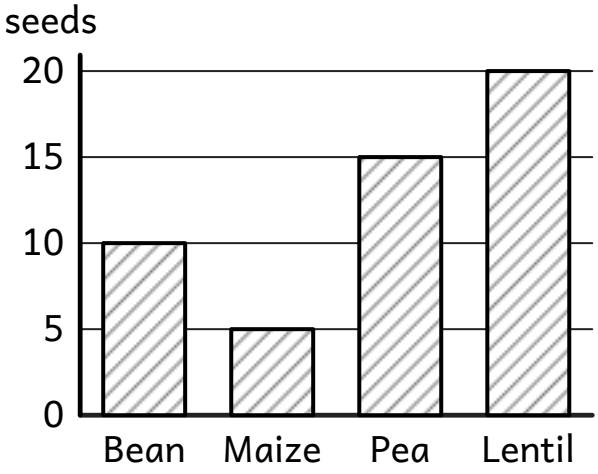
A 6

B 3

C 8

Answer at the back of the book.

8. How many seeds sprouted in all?



A 4

B 20

C 50

Answer at the back of the book.

9. Kofi writes a scale for his chart. It reads 0, 5, 10, 20, 25. What is wrong?

   A It should start at 1.

   B It skips 15. A scale goes up by the same amount each time.

   C Nothing is wrong. The numbers go up.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

A scale starts at 0 and goes up evenly, here in 5s. Read the number beside the top of the bar. Do not count lines. A taller bar means more.

Draw: A bar chart with three bars. Write the scale 0, 5, 10, 15.

M2.7.4 CHAPTER 4

Tables with rows and columns

> **The bus timetable is full of numbers. How do I find the one I need?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Add up all the numbers in the table.
- ☐ **B** Find the row and the column. Read the cell where they meet.
- ☐ **C** Read only the top row.

BY THE END YOU CAN

- Read a table with rows and columns
- Fill in a two way table from a list
- Read a bus timetable and find how long a trip takes

A table packs many facts into a small space. Here are 8 children.

Each child lives in East or West. Each child walks or takes the bus.

Name	Village	Way
Amina	East	walk
Ravi	West	bus
Mei	East	walk
Kofi	West	walk
Ana	East	bus
Tariq	West	bus
Joseph	East	bus
Lucía	West	bus

A list. We want to know how many children are in each group.

A **row** goes across the page. A **column** goes down the page.

A two way table sorts each child two ways at once. Here it is village and way.

Each child goes in one cell only. A cell is where a row and a column meet.

DRAW IT FIRST

Fill in *a* two way table

Way	East	West	Total
walk			
bus			
Total			

1 Draw the table. The rows are the ways. The columns are the villages.

Way	East	West	Total
walk	2	1	
bus			
Total			

2 Go down the list. Put each child in one cell. Walkers: 2 from East, 1 from West.

Way	East	West	Total
walk	2	1	
bus	2	3	
Total			

3 Now the bus riders: 2 from East and 3 from West.

Way	East	West	Total
walk	2	1	3
bus	2	3	5
Total	4	4	8

4 Add each row and each column. The corner total is 8, the number of children.

To read *a* table, find the row. Then find the column. Read the cell where they meet.

Way	East	West	Total
walk	2	1	3
bus	2	3	5
Total	4	4	8

The shaded cell is in the bus row and the West column. 3 West children take the bus.

WORKED EXAMPLE

How many West children walk?

1. Find the row for walk.
2. Find the column for West.
3. They meet at 1.

Answer: 1 child

WORKED EXAMPLE

How many children take the bus?

1. Look at the bus row.
2. 2 from East and 3 from West.
3. 2 + 3 = 5. The total column says 5 too.

Answer: 5 children

A **timetable** is a table of times. Each row is a stop. Each column is a bus.

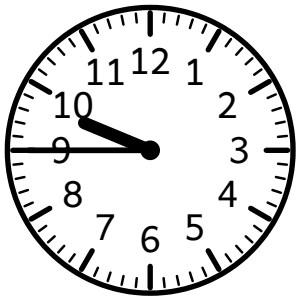
It uses 24 hour time. 09:45 is 45 minutes past 9 in the morning.

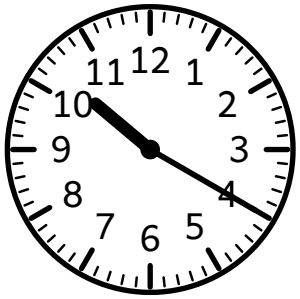
The hours go on after noon. 13:10 is 10 past 1 in the afternoon.

Stop	Bus 1	Bus 2	Bus 3
Market	08:45	09:45	13:10
School	09:20	10:20	13:45
Clinic	09:40	10:40	14:05
River	10:05	11:05	14:30

Read down a column to follow one bus. Read along a row to see one stop.

Bus 2 leaves Market at 09:45. It reaches School at 10:20.





The start and the end of the trip.

Minutes stop at 60. Count to the next hour first. Then count on.

WORKED EXAMPLE

Bus 2 leaves Market at 09:45 and reaches School at 10:20. How long is the trip?

1. 09:45 to 10:00 is 15 minutes.
2. 10:00 to 10:20 is 20 minutes.
3. 15 + 20 = 35.

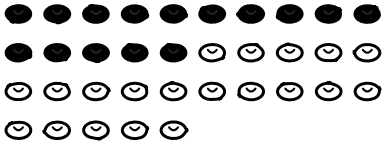
Answer: 35 minutes

SEE IT THREE WAYS

With things

Put out 35 beans, one for each minute. Move 15 to one side. They are the minutes up to 10:00. The other 20 come after it.

As a picture



In symbols

15 + 20 = 35. The trip takes 35 minutes.

TRY IT

Make a two way table with beans and stones

You need: about 12 beans and stones, some big and some small, a pencil and paper.

1. Gather the beans and stones. Count them.
2. Draw a table. The rows are beans and stones. The columns are big and small.
3. Sort the things. Put each one in one cell. Write the counts.
4. Add each row and each column. Add the totals in the corner.

What you will see: The corner total is the number of things you began with. Each thing sits in one cell only.

If you cannot try it, this is what happens.

Kind	Big	Small	Total
beans	3	4	7
stones	2	3	5
Total	5	7	12

A WRONG IDEA MANY PEOPLE HAVE

~~A child who walks and lives in East goes in two cells.~~

Why it feels right: The child has two facts, so you may write the child twice.

The test that breaks it: Count the children on the list. There are 8. Add up all the cells in your table. A sum above 8 means a child went in two cells.

What is true: Each child makes one mark, in one cell. The cells add up to the number of children.

KEY WORDS

row

a line of cells going across a table.

column
a line of cells going down a table.

timetable
a table of times.

BACK TO YOUR GUESS

The answer is B: Find the row and the column. Read the cell where they meet.

Every cell sits in one row and one column. Find both, then read the cell where they meet.

CHECK YOURSELF

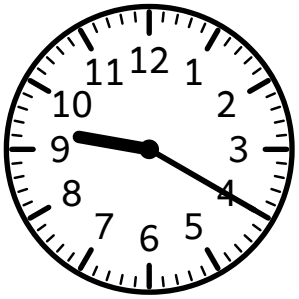
Try each one before you look. A wrong answer tells you where to go next.

1. What time does Bus 2 reach Clinic?

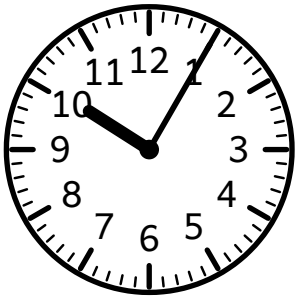
Stop	Bus 1	Bus 2	Bus 3
Market	08:45	09:45	13:10
School	09:20	10:20	13:45
Clinic	09:40	10:40	14:05
River	10:05	11:05	14:30

Answer at the back of the book.

2. Bus 1 leaves School at 09:20 and reaches River at 10:05. How long is the trip?



09:20



10:05

A 45 minutes

B 15 minutes

C 85 minutes

Answer at the back of the book.

3. Bus 3 leaves Market at 13:10. It reaches Clinic at 14:05. How long is the trip?

Answer at the back of the book.

4. Fill in a two way table for these 7 pets. The rows are cat and dog. The columns are black and white.

Pet	Colour
cat	black
dog	white
cat	white
dog	black
dog	white
cat	white
dog	white

Answer at the back of the book.

5. A table for 8 children has cells that add up to 11. What went wrong?

A Some children went in two cells.

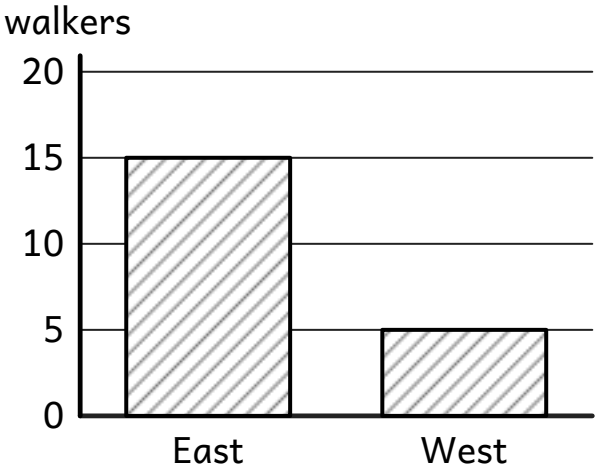
B Three children are missing.

C The table needs more rows.

Answer at the back of the book.

6. **From an earlier chapter**

This chart is for a big school. It shows children who walk. How many more walk from East than from West?



Answer at the back of the book.

7. What time does Bus 3 reach School?

Stop	Bus 1	Bus 2	Bus 3
School	09:20	10:20	13:45
Clinic	09:40	10:40	14:05

A 09:20

B 14:05

C 13:45

Answer at the back of the book.

8. What does the shaded box count?

Way	East	West
walk	2	1
bus	2	3

A Children who take the bus and live in East.

B Children who walk and live in East.

C Children who walk and live in West.

Answer at the back of the book.

9. A child lives in West and takes the bus. Which box does the child go in?

A Both the bus row and the West column, one mark in each.

B The box where the bus row meets the East column.

C The box where the bus row meets the West column.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Read a table by its row and its column. The answer is in the cell where they meet. Each count goes in one cell. For a trip, count to the next hour, then on.

Draw: A two way table with 2 rows and 2 columns. Add the totals.

M2.7.5 CHAPTER 5

Sorting diagrams

A number fits neither circle. Where do I put it?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Leave it out. It does not belong.
- ☐ **B** Outside both circles, but still on the page.
- ☐ **C** In the middle, where the circles cross.

BY THE END YOU CAN

- Sort numbers in a Venn diagram with two circles
- Sort numbers into a 2 by 2 table using two rules

Mei has ten cards. They show the numbers 1 to 10.

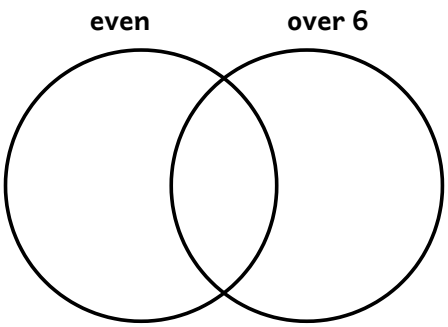
She sorts them with two rules. Rule one: the number is even. Rule two: the number is over 6.

Over 6 means 7 and up. The number 6 is not over 6.

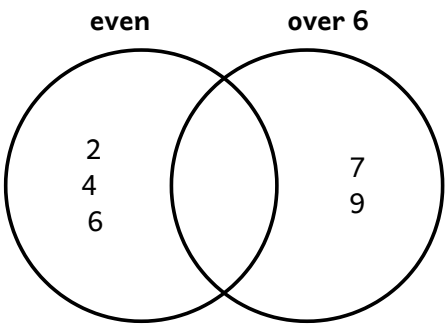
Some cards fit one rule. Some fit both. Some fit neither. A **Venn diagram** sorts them. It is two circles that cross.

DRAW IT FIRST

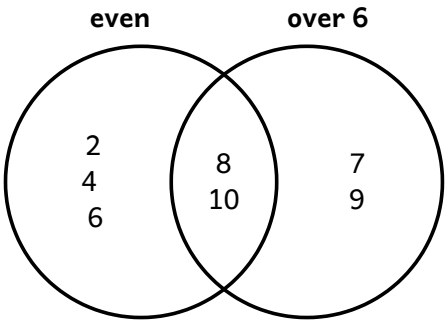
Sort the cards with two circles



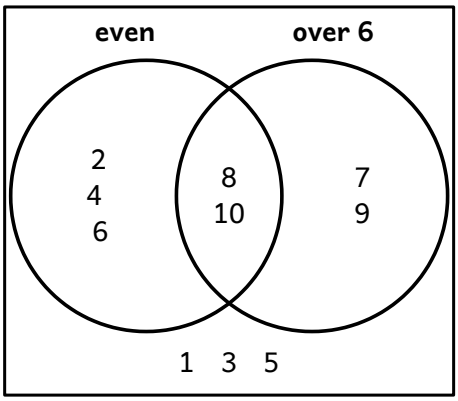
1 Draw two circles that cross. Write one rule on each. Write even on one and over 6 on the other.



2 A card that fits one rule goes in that circle only. 2, 4 and 6 are even. 7 and 9 are over 6.



3 A card that fits both rules goes where the circles cross. 8 and 10 are even and over 6.



4 Draw a box round the circles. 1, 3 and 5 fit neither rule. They go outside the circles, inside the box.

The part where the circles cross is the **overlap**. A card in the overlap fits both rules.

A card that fits neither rule still has a place. It goes outside both circles, inside the box. Do not leave it out.

WORKED EXAMPLE

Where does the card 6 go in Mei's diagram?

1. Is 6 even? Yes.
2. Is 6 over 6? No. Over 6 means 7 and up.
3. It fits one rule only. It goes in the even circle, outside the overlap.

Answer: In the even circle only.

You can sort the same cards in a **2 by 2 table**. It has two rows and two columns. Each card gets one box.

Numbers	even	odd
over 6	8, 10	7, 9
6 or less	2, 4, 6	1, 3, 5

The shaded box matches the overlap. These cards are even and over 6.

A number that is not even is odd. Look at 1, 3 and 5. They fit neither rule. In the table they share one box. It is the box for odd and 6 or less. In the Venn diagram they sit outside.

WORKED EXAMPLE

Where does the card 7 go in the 2 by 2 table?

1. Is 7 even? No. It is odd. Use the odd column.
2. Is 7 over 6? Yes. Use the over 6 row.
3. Read the box where the odd column meets the over 6 row.

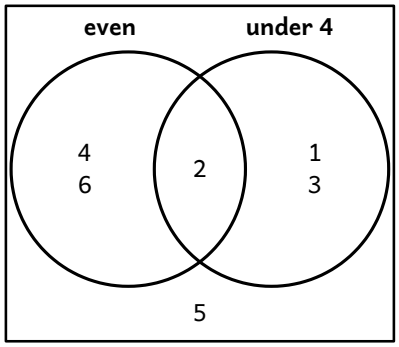
Answer: In the box for odd and over 6.

SEE IT THREE WAYS

With things

Write 1 to 6 on six scraps. Lay two loops of string that cross. Name the loops even and under 4. Place each scrap.

As a picture



In symbols

2 is even and under 4, so it is in the overlap. 5 is odd and not under 4, so it is outside. Count the places: 2 + 1 + 2 + 1 = 6. All six cards are there.

TRY IT

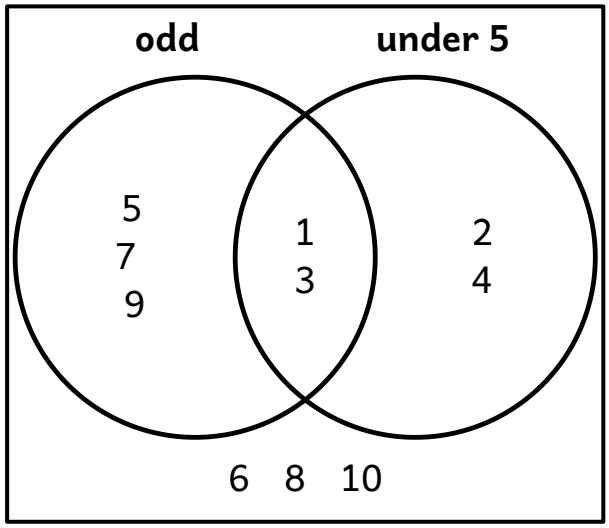
Sort number cards in two loops

You need: 10 scraps of paper, a pencil, string, or a stick to draw loops in the dirt.

1. Write the numbers 1 to 10 on the scraps. Put one number on each.
2. Make two loops that cross. Use string, or draw them in the dirt.
3. Name the loops. One loop is odd. The other loop is under 5.
4. Put each card in its place. Cards that fit both rules go where the loops cross.
5. Put the cards that fit neither rule outside both loops.

What you will see: All 10 cards have a place. 1 and 3 are in the overlap. 6, 8 and 10 are outside both loops.

If you cannot try it, this is what happens.



A WRONG IDEA MANY PEOPLE HAVE

~~A number that fits neither rule can be left out.~~

Why it feels right: The circles are where the rules are. A number with no rule seems to have no place.

The test that breaks it: Sort all 10 cards. Count the cards inside the circles. Count the cards still in your hand. You must place 10 cards. The box holds the rest.

What is true: Every number has a place. One that fits neither rule goes outside both circles, inside the box.

KEY WORDS

Venn diagram
two circles that cross. It sorts things by two rules.

overlap
the part where the two circles cross. It holds what fits both rules.

2 by 2 table
a table with two rows and two columns. It sorts things by two rules.

BACK TO YOUR GUESS

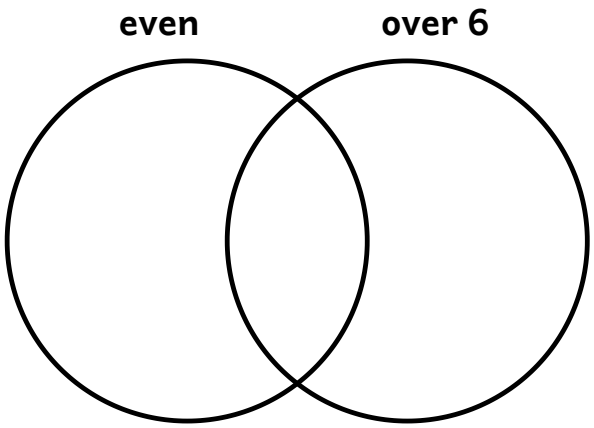
The answer is B: Outside both circles, but still on the page.

Every number goes somewhere. One that fits neither rule goes outside both circles, inside the box.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Mei has the card 8. The rules are even and over 6. Where does 8 go?



   A In the even circle only.

   B In the overlap.

   C Outside both circles.

   Answer at the back of the book.

2. Mei has the card 3. The rules are even and over 6. Where does 3 go?

   A In the overlap.

   B Outside both circles, inside the box.

   C Leave it out.

   Answer at the back of the book.

3. The rules are odd and over 8. The numbers are 5, 8, 9, 12 and 15. Which numbers go in the overlap?

   Answer at the back of the book.

4. Sort 2, 3, 4, 6, 7, 8 and 9 into this table. Which numbers go in the shaded box?

Numbers	even	odd
under 5		
5 or more		

   Answer at the back of the book.

5. Joseph sorts the cards 1 to 12. The rules are even and over 8. How many cards go outside both circles?

   Answer at the back of the book.

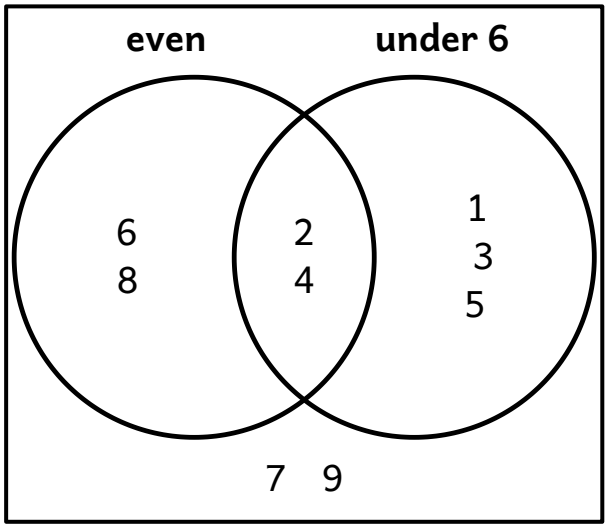
6. **From an earlier chapter**

   Amina picks mangoes and limes. Use the table. How many mangoes did she pick in all three days?

fruit	Mon	Tue	Wed
mango	4	6	5
lime	3	2	7

   Answer at the back of the book.

7. Look at the diagram. How many numbers are inside the under 6 circle?



   A 3

   B 7

   C 5

   Answer at the back of the book.

8. Where does the number 5 go in this table?

Numbers	even	odd
under 5		
5 or more		

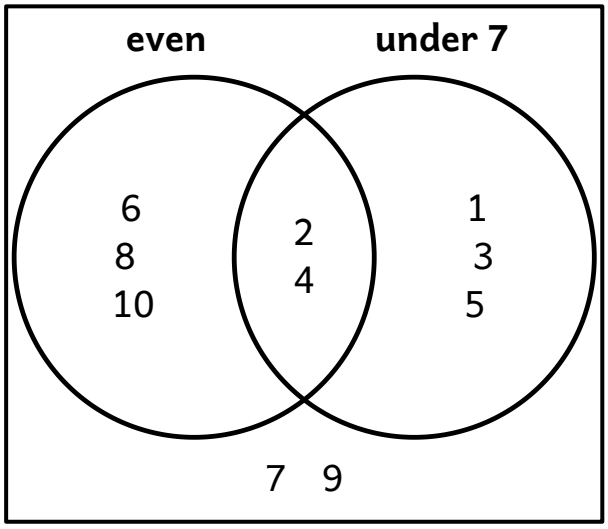
A In the box for odd and 5 or more.

B In the box for odd and under 5.

C In the box for even and 5 or more.

Answer at the back of the book.

9. The rules are even and under 7. The cards are 1 to 10. One card is in the wrong place. Which one?



A 7

B 6

C 8

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

A Venn diagram sorts by two rules. A number that fits both goes in the overlap. A number that fits neither goes outside both circles, inside the box. A 2 by 2 table sorts the same way.

Draw: Two crossing circles in a box. Write even and over 6 on them. Put the numbers 1 to 10 in.

M2.7.6 CHAPTER 6

Line graphs

I measured my plant every day. How do I show it growing?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Draw a tally mark for each day.
- ☐ **B** Put a point for each day and join them in order.
- ☐ **C** Draw the plant once, as tall as it is now.

BY THE END YOU CAN

- Read values from a line graph that shows change over time
- Draw a line graph of a seedling's height each day

Amina grows a bean plant. Each day she measures it. She writes the height in cm.

After seven days she has seven numbers. A list of numbers is hard to see.

A **line graph** shows change over time in one look. It has a point for each day. A line joins the points in order.

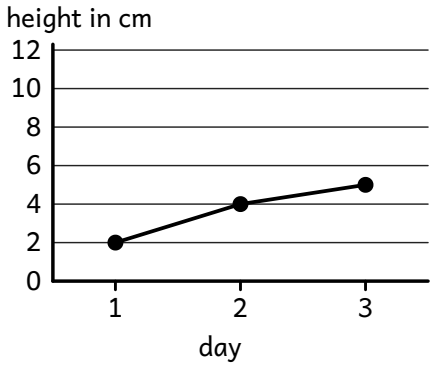
The line along the bottom is an ***axis***. So is the line up the side.

DRAW IT FIRST

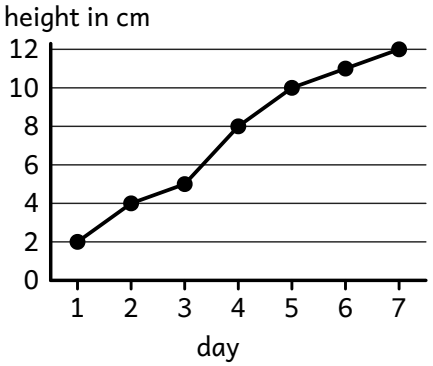
Draw Amina's line graph

day	height in cm
1	2
2	4
3	5
4	8
5	10
6	11
7	12

1 Write the day and the height in a table.

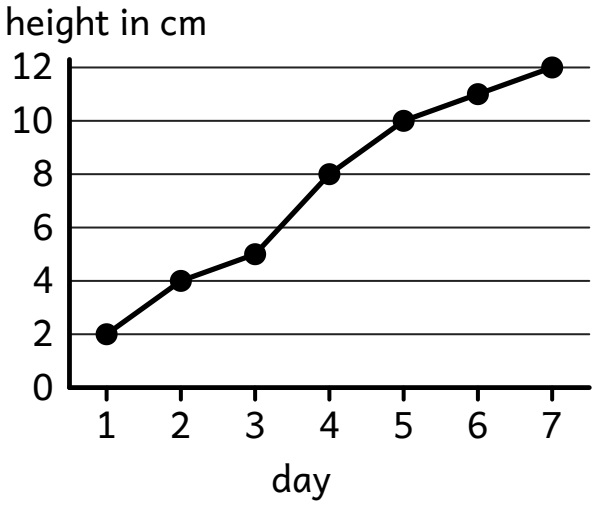


2 Draw the two axes. Mark a point for days 1, 2 and 3. Join them with a ruler.



3 Mark every day. Join the points in order. The line shows the plant growing.

Here is the finished graph. Let us read it.



Each point is one measurement. The line climbs as the plant grows.

To read day 4, find 4 along the bottom. Go up to the point. Then look across to the side.

WORKED EXAMPLE

How tall was the plant on day 4?

1. Find 4 along the bottom.
2. Go up to the point above 4.
3. Look across to the side. The point is at 8.

Answer: 8 cm

Now find the day the line climbs the most. It is the steepest part of the line.

WORKED EXAMPLE

How much did the plant grow from day 3 to day 4?

1. Read day 3. It is 5 cm.
2. Read day 4. It is 8 cm.
3. Take away. 8 − 5 = 3.
4. No other day grows 3 cm. This is the steepest part.

Answer: 3 cm

Amina did not measure between the days. How tall was the plant halfway between day 4 and day 5? The line can tell you.

A point is a real measurement. The line between two points is an **estimate**. An estimate is a good guess, close to the real answer.

WORKED EXAMPLE

How tall was the plant halfway between day 4 and day 5?

1. Day 4 is 8 cm. Day 5 is 10 cm.
2. Find the middle of the line between the two points.
3. The middle is halfway between 8 and 10. It is 9.

Answer: About 9 cm. This is an estimate.

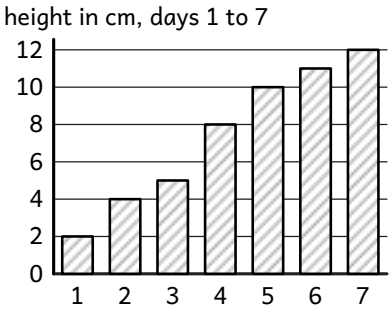
The plant may not grow in a straight line. So 9 cm is not a measurement. It is a good guess.

SEE IT THREE WAYS

With things

Cut a paper strip as tall as the plant each day. Stand the strips side by side.

As a picture



In symbols

Day 1 is 2 cm. Day 7 is 12 cm. 12 – 2 = 10. In 6 days the plant grew 10 cm.

Bars show each day on its own. A line graph joins the days. You see the change from one day to the next.

TRY IT

Grow a seed and graph it

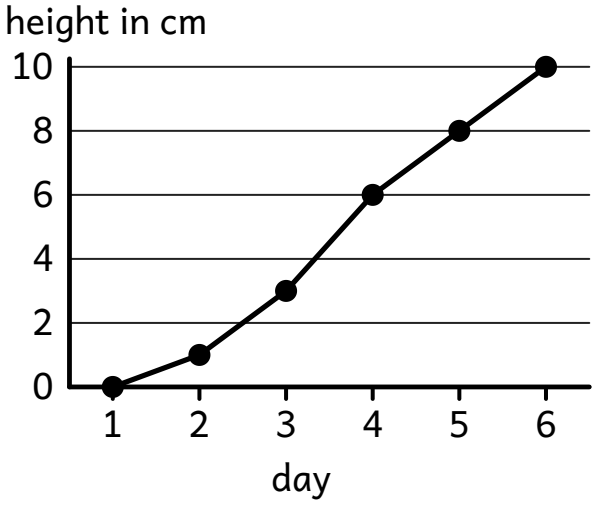
You need: a bean or maize seed, or any plant near you, a cup, a cloth and water, a ruler, or a paper strip marked in cm, paper and a pencil.

Be safe: Do not eat the seed or the shoot. Wash your hands afterwards.

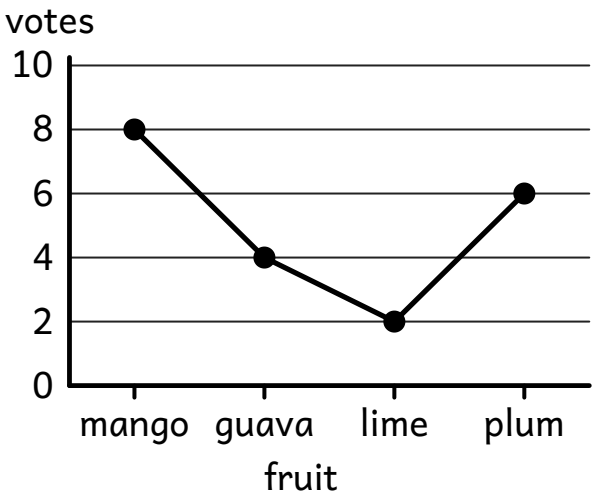
1. Put the seed on a damp cloth in a cup. Keep the cloth damp.
2. Each day, measure the shoot. Use a ruler or a paper strip.
3. Write the day and the height in cm. Do this for six days.
4. Draw two axes. Put the days along the bottom and cm up the side.
5. Mark a point for each day. Join the points in order with a ruler.

What you will see: The line climbs. The steeper the line, the faster the shoot grew that day.

If you cannot try it, this is what happens.



Here is a line graph of favourite fruits. It looks neat. But it is wrong.



Do not draw this. A line between two fruits means nothing.

A WRONG IDEA MANY PEOPLE HAVE

~~**Any chart can have a line joining its points.**~~

Why it feels right: A line looks neat. Many graphs in books have lines.

The test that breaks it: Write the four fruits in a new order. Draw the line again. The votes are the same, but the line has a new shape. Days cannot swap like that. Day 3 always comes after day 2.

What is true: Join points only when they go in an order, such as days. For fruits, use a bar chart.

KEY WORDS

line graph
a graph that joins points in order to show change over time.

axis
a line along the bottom or up the side of a graph.

estimate
a good guess that is close to the real answer.

BACK TO YOUR GUESS

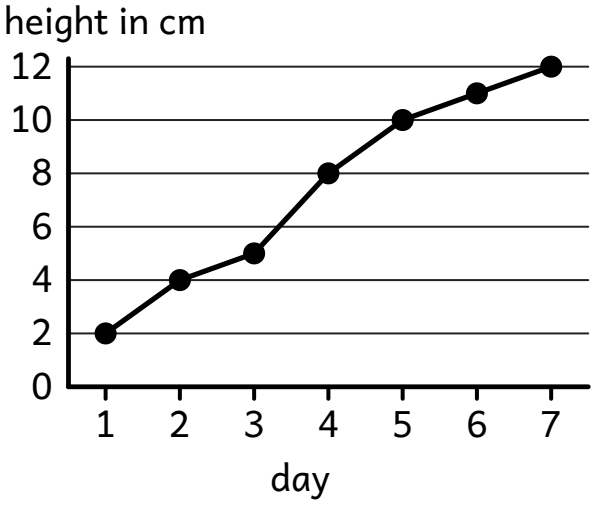
The answer is B: Put a point for each day and join them in order.

A line graph shows change over time. The points go in order of day. The line shows the plant growing.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Use Amina's graph. How tall was the plant on day 6?



   Answer at the back of the book.

2. Use Amina's graph. How much did the plant grow from day 1 to day 7?

   Answer at the back of the book.

3. Which one needs a line graph?

   A Favourite games in a class

   B The depth of water in a rain bucket each hour

   C Kinds of bird seen in a park

   Answer at the back of the book.

4. Use Amina's graph. Estimate the plant's height halfway between day 1 and day 2.

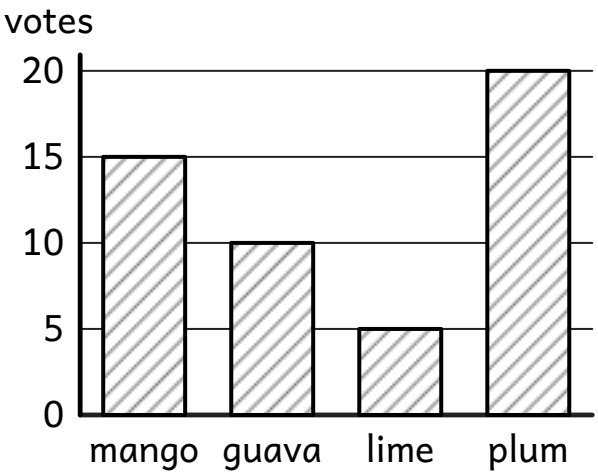
   Answer at the back of the book.

5. Kofi measures the water in a rain bucket each hour. After hour 1 it is 2 cm. After hour 2 it is 4 cm. After hour 3 it is 7 cm. After hour 4 it is 8 cm. Draw a line graph. How much did the water rise from hour 2 to hour 3?

   Answer at the back of the book.

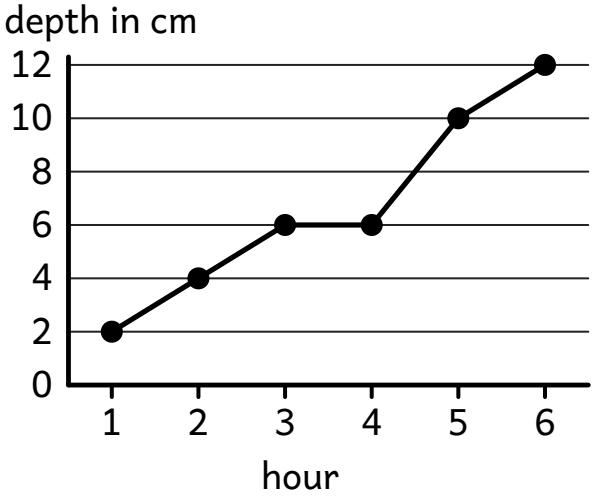
6. **From an earlier chapter**

   Use the bar chart. How many more children chose mango than lime?



   Answer at the back of the book.

7. Kofi measures rain in a bucket. How deep is the water after hour 5?



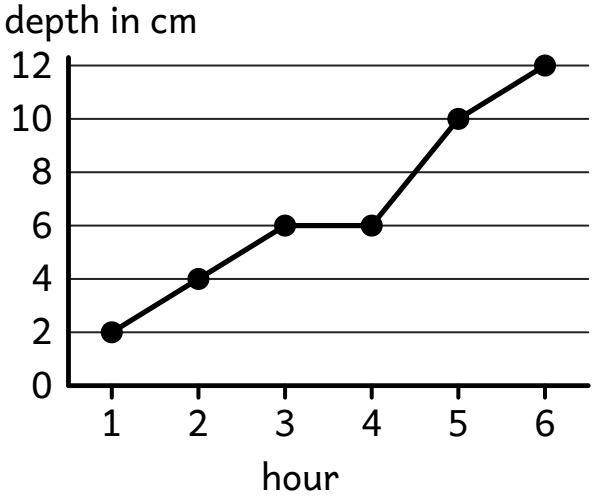
   A 10 cm

   B 5 cm

   C 12 cm

   Answer at the back of the book.

8. Use the same graph. About how deep is the water halfway between hours 4 and 5?



A About 6 cm

B About 10 cm

C About 8 cm

Answer at the back of the book.

9. Ravi measures a shoot each day. He draws a line graph. Where do the days go?

A Up the side, with the heights along the bottom.

B Along the bottom, in order.

C Along the bottom, in any order.

Answer at the back of the book.

10. On day 3 Ravi's shoot is 3 cm. On day 4 it is 6 cm. Where is the point for day 4?

A Above 4 along the bottom, level with 6 on the side.

B Above 6 along the bottom, level with 4 on the side.

C Above 4 along the bottom, level with 4 on the side.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

A line graph shows change over time. Put a point for each day and join them in order. A point is a measurement. The line between points is an estimate. Do not join fruits or games.

Draw: Draw two axes. Put days along the bottom and height up the side. Mark three days and join them.

M2.7.7 CHAPTER 7

Your own survey

> **I asked my friends a question. What do I do with their answers?**

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Write them in a list and stop.
- ☐ **B** Tally them, then draw the chart that fits.
- ☐ **C** Draw any chart. They all show the same thing.

BY THE END YOU CAN

- Ask a question, collect data and choose a chart to show it
- Write two true sentences about what a chart shows

Mei wants to know how people get to school. She asks 20 people one question.

This is a **survey**. You ask many people the same question. Their answers are **data**.

A good question has a few clear choices. Each person picks one choice.

DRAW IT FIRST

From *a* question to *a* chart

How do you get to school?

walk

bus

bike

car

1 Ask one question. Give *a* few choices, such *as* walk, bus, bike and car.

How do you get to school?

walk 𝍸 ||||

bus 𝍸

bike ||||

car ||

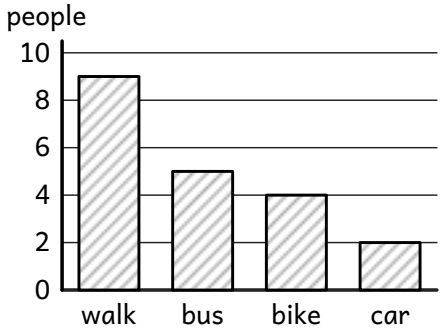
2 Ask each person. Make one tally mark for each answer.

How do you get to school?

travel	people
walk	9
bus	5
bike	4
car	2
total	20

3 Count the tallies. Write the counts in *a* table. Add them to find the total.

How do you get to school?



4 Draw *a* bar chart. Each bar shows how many people chose that way.

Check your counts. They must add up to the number of people you asked.

WORKED EXAMPLE

Mei asked 20 people. Do her counts add up to 20?

1. Add the counts. 9 + 5 = 14.
2. Then 14 + 4 = 18.
3. Then 18 + 2 = 20.

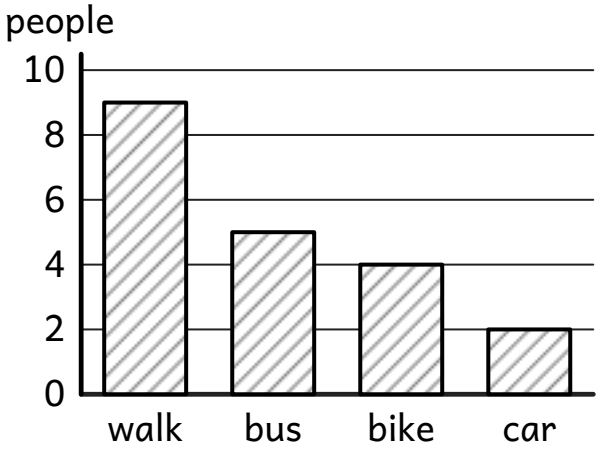
Answer: Yes. The counts make 20, and 20 people were asked.

Now pick the chart. Look at your data first. The data tells you which chart fits.

data about	best chart
choices	bar chart
over time	line graph
two rules	2 by 2 table

A pictogram also shows choices. It works well when the counts are small.

Mei asked about choices. So she uses a bar chart. Here it is.



Mei's chart. Use it to write sentences.

Now say what the chart shows. Write only what you can see. Use a name and a number from the chart.

WORKED EXAMPLE

Write two true sentences about Mei's chart.

1. Find the tallest bar. It is walk, with 9.
2. Compare two bars. Walk is 9. Bike is 4. 9 − 4 = 5.
3. Write what you see. Use the names and numbers.

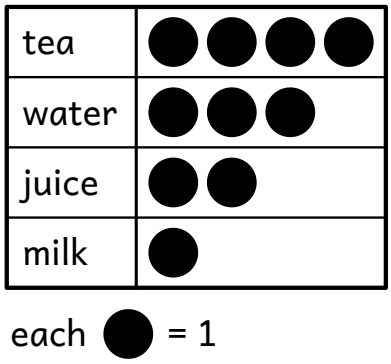
Answer: More people walk than use any other way. 5 more people walk than ride a bike.

SEE IT THREE WAYS

With things

Ask 10 people: tea, water, juice or milk? Put a stone in a row for each answer.

As a picture



In symbols

4 + 3 + 2 + 1 = 10. Tea has 4. Milk has 1. Tea has 3 more than milk.

TRY IT

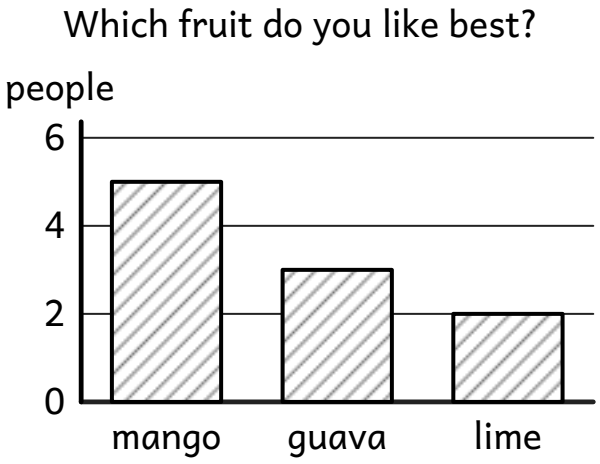
Run *a* survey of 10 people

You need: paper and a pencil, 10 people to ask, at home or nearby.

1. Pick a question with 3 or 4 choices. Write the choices on paper.
2. Ask 10 people. Each person picks one choice. Make a tally mark.
3. Count each tally. Add the counts. The total must be 10.
4. Pick a chart that fits. Choices fit a bar chart.
5. Draw it with a title. Write two true sentences under it.

What you will see: Your counts add up to 10. Your sentences use only names and numbers from the chart.

If you cannot try it, this is what happens.



A WRONG IDEA MANY PEOPLE HAVE

~~My chart shows why people choose each way.~~

Why it feels right: You know your friends. You may want to fill in the reason yourself.

The test that breaks it: Ask three of the nine walkers why they walk. You may get three different reasons. The chart has none of them.

What is true: A chart shows what people chose and how many. It does not show why. Write only what the chart shows.

KEY WORDS

survey
asking many people the same question.

data
the answers you collect.

BACK TO YOUR GUESS

The answer is B: Tally them, then draw the chart that fits.

Tally the answers and check the total. Then pick the chart that fits the data. Say only what it shows.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Tariq measures the water in his tank each day. Which chart fits best?

   A A pictogram

   B A line graph

   C A Venn diagram

   Answer at the back of the book.

2. Lucía asks 30 people which colour they like best. Which chart fits best?

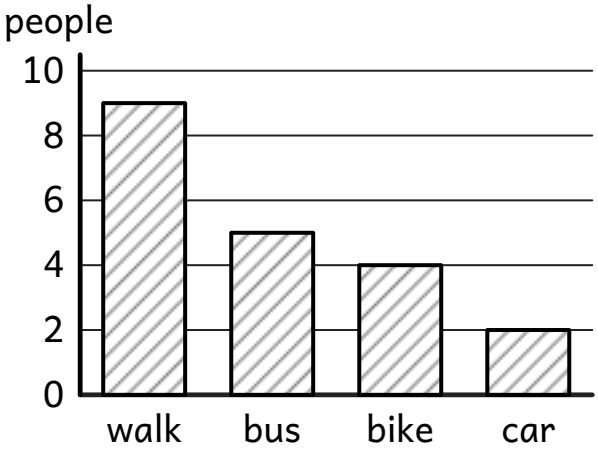
   A A line graph

   B A 2 by 2 table

   C A bar chart or a pictogram

   Answer at the back of the book.

3. Look at Mei's chart. Which sentence is true?



A More people walk than ride the bus.

B People walk because the bus is full.

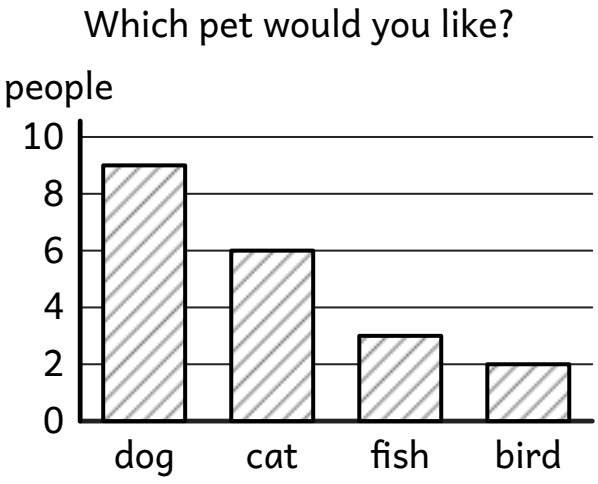
C Four people ride the bus.

Answer at the back of the book.

4. Ana asks 12 children their favourite colour. Her tally says red 5, blue 4, green 2. How many answers are missing?

Answer at the back of the book.

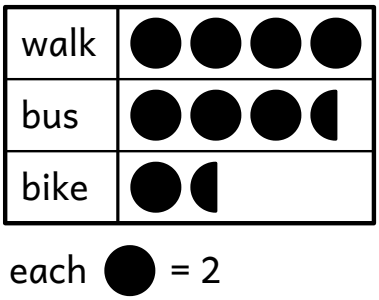
5. Look at the chart. Write two true sentences about it.



Answer at the back of the book.

6. **From an earlier chapter**

Each symbol is worth 2 people. A half symbol is worth 1 person. How many people take the bus?



Answer at the back of the book.

7. Ravi wants to survey his class about games. Which is the best question to ask?

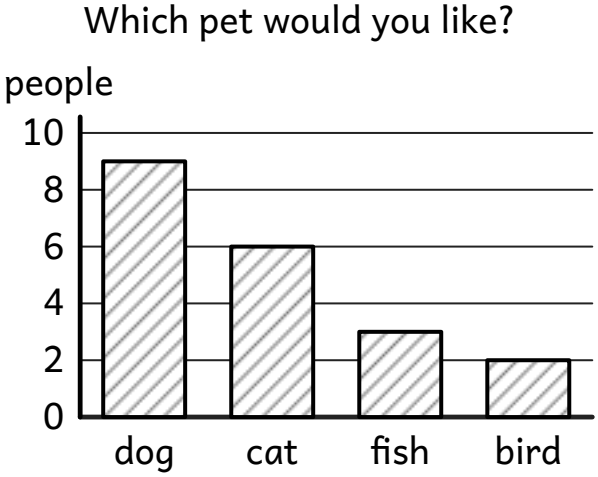
A What do you like?

B Which game do you like best, and why?

C Which game do you like best: tag, ball or rope?

Answer at the back of the book.

8. Look at the pet chart. Which sentence is true?



A Nine people were asked in all.

B 3 more people chose dog than cat.

C Dogs are the top choice because they are friendly.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Ask one question with clear choices. Tally the answers. Check the counts add up to the people asked. Pick the chart by the data. Bars fit choices. A line fits time. Write only what the chart shows.

Draw: A table of counts, then a bar chart with a title. Write two true sentences under it.

Key words, A to Z

Every key word in this book, what it means, and the chapter that teaches it.

2 by 2 table
a table with two rows and two columns. It sorts things by two rules. M2.7.5

axis
a line along the bottom or up the side of a graph. M2.7.6

bar chart
a chart that shows each count as a bar. M2.7.3

column
a line of cells going down a table. M2.7.4

data
the answers you collect. M2.7.7

estimate
a good guess that is close to the real answer. M2.7.6

frequency
the number of times something happens. M2.7.1

key
the note that says what one picture is worth. M2.7.2

line graph
a graph that joins points in order to show change over time. M2.7.6

overlap
the part where the two circles cross. It holds what fits both rules. M2.7.5

pictogram
a chart that uses small pictures to show counts. M2.7.2

row
a line of cells going across a table. M2.7.4

scale
the numbers up the side of a chart. M2.7.3

survey
asking many people the same question. M2.7.7

tally
a mark you draw to count one thing. Every fifth mark crosses four. M2.7.1

timetable
a table of times. M2.7.4

total
all the numbers added together. M2.7.1

Venn diagram
two circles that cross. It sorts things by two rules. M2.7.5

Answers

M2.7.1. Tally and frequency tables

1. **13**

   There are 2 gates. 5, 10. Then 3 single strokes. 11, 12, 13.

2. **Tally B**

   B is one gate and one single stroke. 5 + 1 = 6.

   - **If you chose A:** A is one gate. A gate is 5. The cross is the fifth stroke, not a sixth.
   - **If you chose C:** C is a gate and two strokes. That is 5 + 2 = 7.

3. **22**

   Add all the frequencies. 9 + 6 + 4 + 3 = 22.

4. **5**

   Hens are 9 and dogs are 4. Take 4 from 9. 9 − 4 = 5.

5. **red 5, blue 3, green 2. The total is 10.**

   Count each colour. Red comes 5 times, blue 3 times and green 2 times. 5 + 3 + 2 = 10, the number of friends.

6. **16**

   There are 3 gates. Count in fives: 5, 10, 15. One more stroke makes 16.

   - **If you chose A:** You may have counted each gate as 4. The cross is the fifth stroke, so a gate is 5.
   - **If you chose B:** You may have counted each gate as 1. A gate holds 5 strokes, so count in fives.

7. **15**

   Add all the frequencies. 7 + 5 + 3 = 15. Each friend gave one answer.

   - **If you chose B:** That is the biggest frequency, for football. To find all the friends, add every frequency.
   - **If you chose C:** That counts the rows. Each friend made one answer, so add the frequencies.

8. **A fifth stroke across the four.**

   The fifth stroke crosses the four. Now the gate shows 5 friends, and it is quick to count.

   - **If you chose A:** That friend would not be counted. The cross is the fifth stroke, so a gate is 5.
   - **If you chose C:** Single strokes are slow to count. Cross the four, so the gate shows 5 at a glance.

9. **3**

   Cat, dog and fish make 9 + 6 + 2 = 17. The total is 20. 20 − 17 = 3 chose bird.

   - **If you chose A:** That is the total for all four pets. Bird is only one row of the table.
   - **If you chose B:** 17 is what cat, dog and fish make together: 9 + 6 + 2. Bird is what is left of 20.

M2.7.2. Pictograms with a key

1. **5**

   Maize has 2 whole squares and half a square. 2 × 2 = 4. Half of 2 is 1. 4 + 1 = 5.

2. **20**

   Four stars, each worth 5. Count in fives: 5, 10, 15, 20.

   - **If you chose A:** You counted the stars. Read the key: each star is 5, not 1.
   - **If you chose C:** You added 4 and 5. Each star is worth 5, so multiply. 4 × 5 = 20.

3. **15**

   Kofi has 5 stars, which is 25. Mei has 2 stars, which is 10. 25 − 10 = 15.

4. **35**

   Three circles: 3 × 10 = 30. Half of 10 is 5. 30 + 5 = 35.

5. **Bananas: 4 circles. Oranges: 3 circles. Mangoes: 2 circles and half a circle.**

   Divide each count by 2. 8 ÷ 2 = 4 and 6 ÷ 2 = 3. For 5, 2 circles make 4. Draw half a circle for the 1 left.

6. **19**

   Count the gates in fives: 5, 10, 15. Then add the 4 strokes. 15 + 4 = 19.

7. **7**

   Hana has 3 whole squares and a half square. 3 × 2 = 6, and half of 2 is 1. 6 + 1 = 7.

   - **If you chose B:** You counted each picture as 1. Each square is worth 2. Half a square is worth 1.
   - **If you chose C:** You counted the half square as a whole one. Half a square is half of 2, which is 1.

8. **5 circles and half a circle**

   11 ÷ 2 is 5, with 1 left over. Draw 5 circles for 10 stones. Add half a circle for the 1 left.

   - **If you chose B:** 6 circles show 12 stones, and Sipho has 11. The last symbol is only half a circle.
   - **If you chose C:** That counts each circle as 1 stone. Each circle is 2 stones, so you need fewer circles.
   - **If you chose D:** 5 circles show 10 stones. One stone is left over, so add half a circle.

9. **Diego has more.**

   Leila has 4 symbols of 2. 4 × 2 = 8. Diego has 3 symbols of 5. 3 × 5 = 15. 15 is more than 8.

   - **If you chose A:** You can tell. Use each key. 4 × 2 = 8 for Leila, and 3 × 5 = 15 for Diego.
   - **If you chose B:** You counted the symbols. Their worth is different in each chart, so read each key first.

10. **5**

    A half square is half of the key. Half of 10 is 5.

    - **If you chose A:** That is a whole square. A half square is half of the key.
    - **If you chose C:** Half a symbol is 1 only when the key is 2. Here the key is 10, so find half of 10.

M2.7.3. Bar charts

1. **15**

   The top of the Ducks bar is at the line marked 15.

   - **If you chose A:** You counted the lines. The scale goes up in 5s, so read the number: 15.
   - **If you chose C:** 25 is the Hens bar. Ducks is the bar on the right, and it is shorter.

2. **Hens**

   The Hens bar is the tallest. It reaches 25.

   - **If you chose A:** Cows is the first bar, but it is the shortest. The tallest bar is the most.
   - **If you chose B:** Ducks is the last bar. The last bar is not always the tallest. Compare the heights.

3. **5**

   Ducks are 15 and goats are 10. 15 − 10 = 5.

4. **55**

   Add the four bars. 5 + 25 + 10 + 15 = 55.

5. **Start at 0. Go up in 5s: 0, 5, 10, 15, 20. The bars stop at 15, 10 and 20.**

   Every count is in the 5 times table. The biggest is 20. A scale in 5s up to 20 fits them all.

6. **9**

   Four circles are 4 × 2 = 8. Half a circle is 1. 8 + 1 = 9.

7. **6**

   The top of the Hana bar is on the line marked 6. The scale goes up in 2s: 0, 2, 4, 6.

   - **If you chose B:** You counted the lines. This scale goes up in 2s. Read the number beside the line.
   - **If you chose C:** You read the next line up. The top of the Hana bar stops on the line marked 6.

8. **50**

   Add the four bars. 10 + 5 + 15 + 20 = 50.

   - **If you chose A:** That counts the bars. Read each bar and add them.
   - **If you chose B:** That is the tallest bar, for Lentil. The total needs every bar added. Go to M2.7.1.

9. **It skips 15. A scale goes up by the same amount each time.**

   The jumps should all be 5. Between 10 and 20 the scale needs 15.

   - **If you chose A:** A scale starts at 0. A bar with nothing in it is at 0.
   - **If you chose C:** The jumps are not the same. 5 to 10 is a jump of 5. 10 to 20 is a jump of 10.

M2.7.4. Tables with rows and columns

1. **10:40**

   Find the Clinic row. Find the Bus 2 column. They meet at 10:40.

2. **45 minutes**

   09:20 to 10:00 is 40 minutes. 10:00 to 10:05 is 5 minutes. 40 + 5 = 45.

   - **If you chose B:** You took 05 from 20. Minutes stop at 60. Count to the hour first: 09:20 to 10:00, then on.
   - **If you chose C:** You took 0920 from 1005 as plain numbers. An hour has 60 minutes, not 100.

3. **55 minutes**

   13:10 to 14:00 is 50 minutes. 14:00 to 14:05 is 5 minutes. 50 + 5 = 55.

4. **cat: 1 black, 2 white. dog: 1 black, 3 white. The total is 7.**

   Put each pet in one cell. Count each cell. 1 + 2 + 1 + 3 = 7, the number of pets.

5. **Some children went in two cells.**

   The cells should add up to 8. A sum of 11 means 3 extra marks, from children counted twice.

   - **If you chose B:** Missing children would make the sum smaller than 8, not bigger.
   - **If you chose C:** More rows do not fix the sum. Each child goes in one cell only.

6. **10**

   East reaches 15. West reaches 5. 15 − 5 = 10.

7. **13:45**

   Find the School row. Find the Bus 3 column. They meet at 13:45.

   - **If you chose A:** That is the School row, but the Bus 1 column. Bus 3 is the last column.
   - **If you chose B:** That is the Bus 3 column, but the Clinic row. Find the School row.

8. **Children who walk and live in East.**

   The shaded box is in the walk row and the East column. It counts children who walk and live in East.

   - **If you chose A:** That is the bus row. The shaded box is in the walk row.
   - **If you chose C:** That is the West column. The shaded box is in the East column.

9. **The box where the bus row meets the West column.**

   The way is bus, so use the bus row. The village is West, so use the West column. Mark the box where they meet.

   - **If you chose A:** Each child makes one mark, in one box. The bus row and the West column meet in a single box.
   - **If you chose B:** That box is for bus riders from East. This child lives in West.

M2.7.5. Sorting diagrams

1. **In the overlap.**

   8 is even. 8 is over 6. It fits both rules, so it goes where the circles cross.

   - **If you chose A:** You checked one rule. Is 8 over 6 too? Yes, so it fits both rules.
   - **If you chose C:** 8 is even, so it fits a rule. Outside is for cards that fit neither rule.

2. **Outside both circles, inside the box.**

   3 is odd, so it is not even. 3 is not over 6. It fits neither rule.

   - **If you chose A:** The overlap is for cards that fit both rules. 3 is odd and not over 6.
   - **If you chose C:** Every card has a place. Such a card goes outside both circles, inside the box.

3. **9 and 15**

   5 is odd, but not over 8. 8 and 12 are even. 9 and 15 are odd and over 8.

4. **6 and 8**

   The shaded box is for even numbers that are 5 or more. 6 and 8 are even and 5 or more.

5. **4**

   A card goes outside if it is odd and 8 or less. Those cards are 1, 3, 5 and 7.

6. **15**

   Read along the mango row. 4 + 6 + 5 = 15.

7. **5**

   The under 6 circle holds 1, 3 and 5. The overlap holds 2 and 4. 3 + 2 = 5.

   - **If you chose A:** You left out the overlap. 2 and 4 are inside the under 6 circle too.
   - **If you chose B:** You counted the overlap twice. It is already inside the circle.

8. **In the box for odd and 5 or more.**

   5 is odd, so use the odd column. 5 is not under 5, so use the 5 or more row.

   - **If you chose B:** Under 5 means less than 5. The number 5 is not less than 5.
   - **If you chose C:** An even number shares into pairs with none left. 5 leaves one over, so it is odd.

9. **6**

   6 is even and 6 is under 7. It fits both rules, so it belongs in the overlap.

   - **If you chose A:** Under 7 means 6 and less, so 7 is not under 7. It is odd too, so it is outside.
   - **If you chose C:** 8 is even, but it is not under 7. So the even circle only is the right place.

M2.7.6. Line graphs

1. **11 cm**

   Find 6 along the bottom. Go up to the point. Look across to the side. It is at 11.

2. **10 cm**

   Day 7 is 12 cm. Day 1 is 2 cm. 12 − 2 = 10.

3. **The depth of water in a rain bucket each hour**

   The water changes as the hours pass. A line graph shows change over time.

   - **If you chose A:** This counts choices. No time passes. A bar chart fits better. Go to M2.7.3.
   - **If you chose C:** These are kinds, not times. Tally them and use a bar chart. Go to M2.7.3.

4. **About 3 cm**

   Day 1 is 2 cm. Day 2 is 4 cm. Halfway between 2 and 4 is 3. It is an estimate.

5. **3 cm. Mark 2, 4, 7 and 8 over hours 1 to 4. Join the points.**

   After hour 2 it is 4 cm. After hour 3 it is 7 cm. 7 − 4 = 3.

6. **10**

   Mango has 15. Lime has 5. 15 − 5 = 10.

7. **10 cm**

   Find 5 along the bottom. Go up to the point. Look across to the side. It is at 10.

   - **If you chose B:** That is the hour. Go up from 5 to the point. Then read the side.
   - **If you chose C:** That is the point for hour 6, the last one. Hour 5 is one point before it.

8. **About 8 cm**

   Hour 4 is 6 cm. Hour 5 is 10 cm. Halfway between 6 and 10 is 8. It is an estimate.

   - **If you chose A:** That is the depth at hour 4. The line climbs after it, so the water was deeper.
   - **If you chose B:** That is the depth at hour 5. Halfway comes before the end of the climb.

9. **Along the bottom, in order.**

   Time goes along the bottom, from the first day to the last. The heights go up the side.

   - **If you chose A:** The heights go up the side, in cm. The days go along the bottom.
   - **If you chose C:** The days must be in order. Day 3 comes after day 2. Mixed days give a wrong line.

10. **Above 4 along the bottom, level with 6 on the side.**

    Find day 4 along the bottom. The height is 6 cm. Go up to 6 on the side and mark the point.

    - **If you chose B:** You swapped the two axes. The day goes along the bottom. The height goes up the side.
    - **If you chose C:** You used the day number for the height too. The height on day 4 is 6 cm.

M2.7.7. Your own survey

1. **A line graph**

   The water level changes as the days pass. A line graph shows change over time.

   - **If you chose A:** A pictogram counts choices. The water changes day by day. Use a line graph. Go to M2.7.6.
   - **If you chose C:** A Venn diagram sorts by two rules. It does not show change over time. Go to M2.7.5.

2. **A bar chart or a pictogram**

   Colours are choices. Either one shows how many people chose each colour.

   - **If you chose A:** A line graph shows change over time. Colours are choices, not days. Go to M2.7.6.
   - **If you chose B:** A 2 by 2 table sorts by two rules. Lucía has one question with many choices. Go to M2.7.5.

3. **More people walk than ride the bus.**

   Walk is 9 and bus is 5. 9 is more than 5.

   - **If you chose B:** The chart does not show why. Write only what you can see on it.
   - **If you chose C:** Read the bus bar again. It reaches 5. The bike bar is 4. Go to M2.7.3.

4. **1**

   5 + 4 + 2 = 11. She asked 12. 12 − 11 = 1. Find the missing answer and count again.

5. **Dog is the top choice, with 9 people. 3 more people chose cat than fish.**

   Any sentence is right if you can check it on the chart. Use a name and a number. Do not say why.

6. **7**

   3 whole symbols are 3 × 2 = 6. The half symbol is 1. 6 + 1 = 7.

7. **Which game do you like best: tag, ball or rope?**

   It is one question with a few clear choices. Each person picks one, so you can tally the answers.

   - **If you chose A:** People could answer about anything: food, games, colours. The answers will not sort into a few rows. The tally tells you little.
   - **If you chose B:** That is two questions. Ask one question, so each person gives one answer.

8. **3 more people chose dog than cat.**

   Dog is 9 and cat is 6. 9 − 6 = 3. The four bars add to 20, not 9. The chart does not say why.

   - **If you chose A:** The dog bar is 9, but that is one bar. Add all four bars to find how many were asked.
   - **If you chose C:** The chart shows what people chose. It does not show why they chose it.

About this book

For learners who can count to 100 and keep a tally. In many schools this fits children of about 8 to 10, and older learners can start here too. Activities need only paper, a pencil and things to count. A learner can work alone: every exercise has its answer and the reason for it.

Written and drawn by attnom. Edition 1.0, 2026-11-08.

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