

Mathletics

Series



Student



Chance and Data

My name _____



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Series D – Chance and Data

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Series Author:

Nicola Herringer

Chance – likelihood

Chance is the likelihood that something will happen.

If something will definitely happen, we say it is **certain**.

If something might happen, we say it is **likely**.

If something might not happen, we say it is **unlikely**.

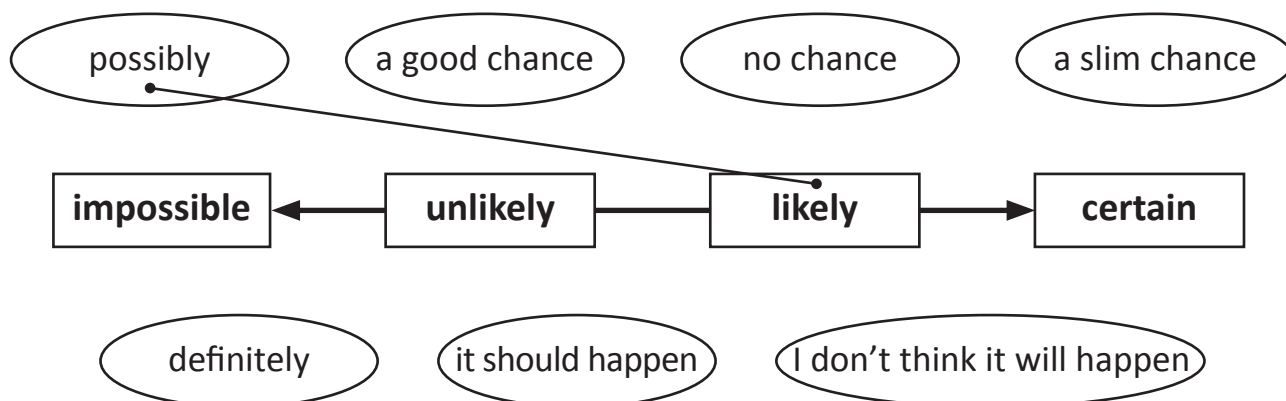
If something will definitely not happen, we say it is **impossible**. We can show these chance words on a chance arrow like this, where certain and impossible are opposites.



1 Often you will hear people using chance words in everyday conversation.

For example, on the news you might hear that there is a **good chance** of rain tomorrow. Or a friend might say to you there is a **slim chance** that they will make it to your party.

What do these chance words actually mean? Where do they fit on the chance arrow? Look at the words in the ovals below and connect them to where you think they should go on the chance arrow. The first one has been done for you.



2 Read each statement and circle the chance of it happening:

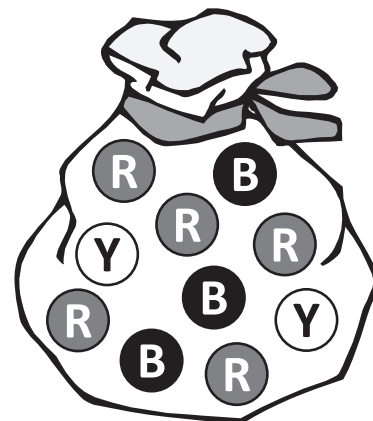
Event	Chance
It will rain sometime this month.	impossible / unlikely / likely / certain
Thursday will come after Wednesday.	impossible / unlikely / likely / certain
A tiger will be serving at the canteen.	impossible / unlikely / likely / certain
Every student in our class likes broccoli.	impossible / unlikely / likely / certain

Chance – likelihood

- 3** Look at this bag of different coloured counters.
R stands for red, B is for blue, and Y is for yellow.

- a If you reached in and grabbed a counter without looking, which colour do you think you would most likely grab?

- b Which colour do you think would be the most surprising to get?



- 4** What's in the bag?

This is an investigation for two students where you are going to use chance and likelihood to guess what is in the bag. You will need a paper bag as well as 4 red, 4 blue and 4 yellow counters.

First, you need to decide who is Player 1 and who is Player 2. Player 1 guesses first so Player 2 puts 10 of the 12 counters in the paper bag in any combination they like. Player 1's job is to guess the combination of colours that are in the bag. They do this by taking one counter out, recording it and then replacing it. Record the colour by writing R, B, or Y in the space below. Do this 20 times until you think you can guess which 10 counters are in the bag.

- a What I think is in the bag:

○	○	○	○	○	○	○	○	○	○
---	---	---	---	---	---	---	---	---	---

- b What was actually in the bag:

○	○	○	○	○	○	○	○	○	○
---	---	---	---	---	---	---	---	---	---

- c How close was your guess?

- d Swap turns so now Player 1 puts the counters in the bag and Player 2 guesses.

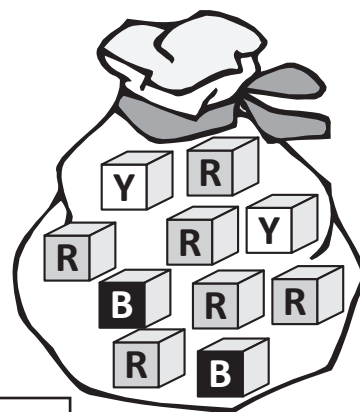
Chance – likelihood

- 5 Look at this bag of counters. Connect each colour to the chance arrow that you think best describes the chance of pulling out each colour:

Yellow

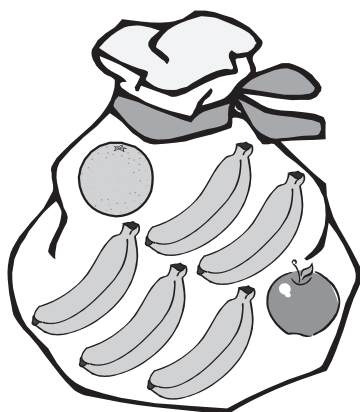
Blue

Red



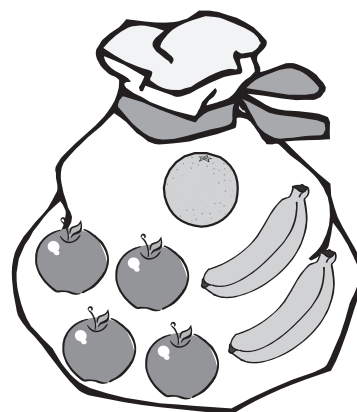
- 6 Look at these shopping bags of fruit. Select the best chance word for each shopping bag:

a The fruit I pick will be a banana.



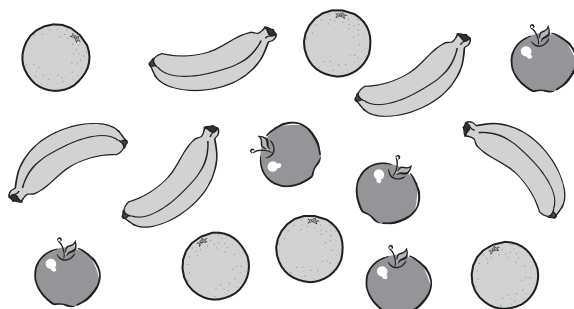
impossible / unlikely / likely

b The fruit I pick will be a strawberry.



impossible / unlikely / likely

- 7 Ten pieces of fruit are placed into this basket. Inside the basket is a mixture of bananas, oranges and apples. Circle the fruit that is inside the basket if a banana is most likely to be chosen without looking.



Chance – spinner investigation

- 1 Spin it!** This is an investigation where you are going to make a spinner and look at the chance of it landing on certain colours.

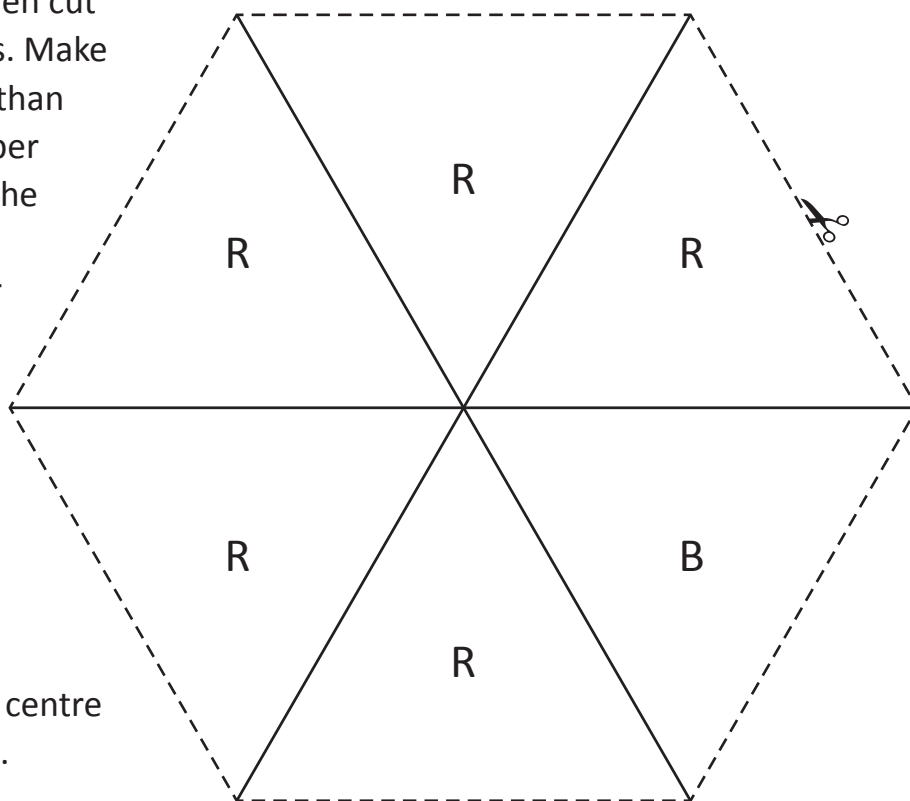


- a** For this activity you will need to copy this page and then cut out both the spinners. Make your spinners firmer than a regular piece of paper by pasting a copy of the spinner onto several sheets of scrap paper so it is firm.

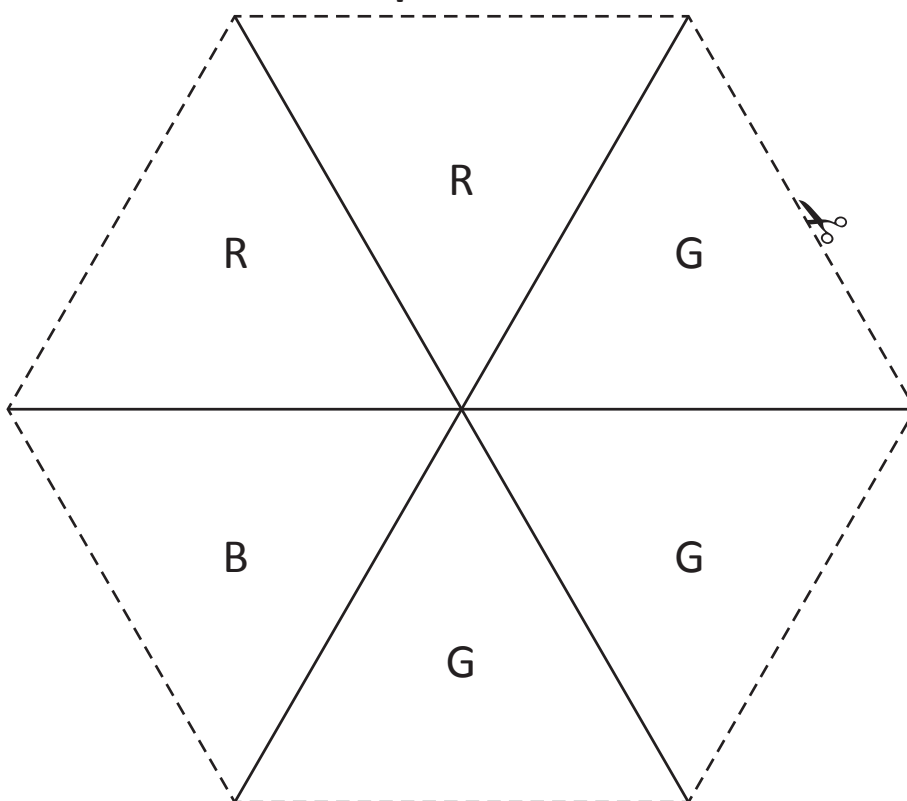
Now you need to colour in each section: R for red, B for blue and G for green.

Next, push a pencil carefully through the centre and practise spinning.

Spinner 1



Spinner 2



Continued on page 5.

Chance – spinner investigation

Continued from page 4.

- b** Now you can begin the investigation. First, write your prediction at the top of the table. Spin each spinner 20 times and tick where it lands each time.

My prediction: I think that the spinner will be most likely to land on _____. I think that the spinner will be least likely to land on _____.	
Spinner 1: Number of times the spinner lands on each colour.	
Red	Blue

My prediction: I think that the spinner will be most likely to land on _____. I think that the spinner will be least likely to land on _____.		
Spinner 2: Number of times the spinner lands on each colour.		
Red	Blue	Green

- c** Were your results as you would expect? Why or why not?

Chance – coin investigation

When you toss a coin, you call out heads or tails. There are two sides and two different possible results. That means there is an equal chance of landing on heads as there is on tails.



Tails



Heads

1 For this experiment, you will toss a coin 20 times and record your results. First, predict your results:

- a How many times do you think the coin will land on heads? _____
- b How many times do you think the coin will land on tails? _____
- c Now toss a coin 20 times and record your results below. Write H for heads and T for tails.

2 Repeat the above experiment.

- a Toss a coin 20 times and record your results:

- b What happened?
Fill in this table to show the results.

Number of times the coin landed on heads and tails		
	H	T
Experiment 1		
Experiment 2		

- c If your results changed, why do you think this is?

Chance – die investigation

We usually roll a die when we are playing a board game. Do you have a lucky number? Often 6 is the luckiest number in board games, but does it come up any more or less often than the other numbers? Let's investigate.

1 Complete this sentence:







If there are _____ different ways that a die could land and _____ different numbers, that means there is an even / uneven (circle one) chance of rolling each number.

2 Roll a die 18 times.
Write down the number you roll each time:

Roll	Number on die
1	
2	
3	
4	
5	
6	
7	
8	
9	

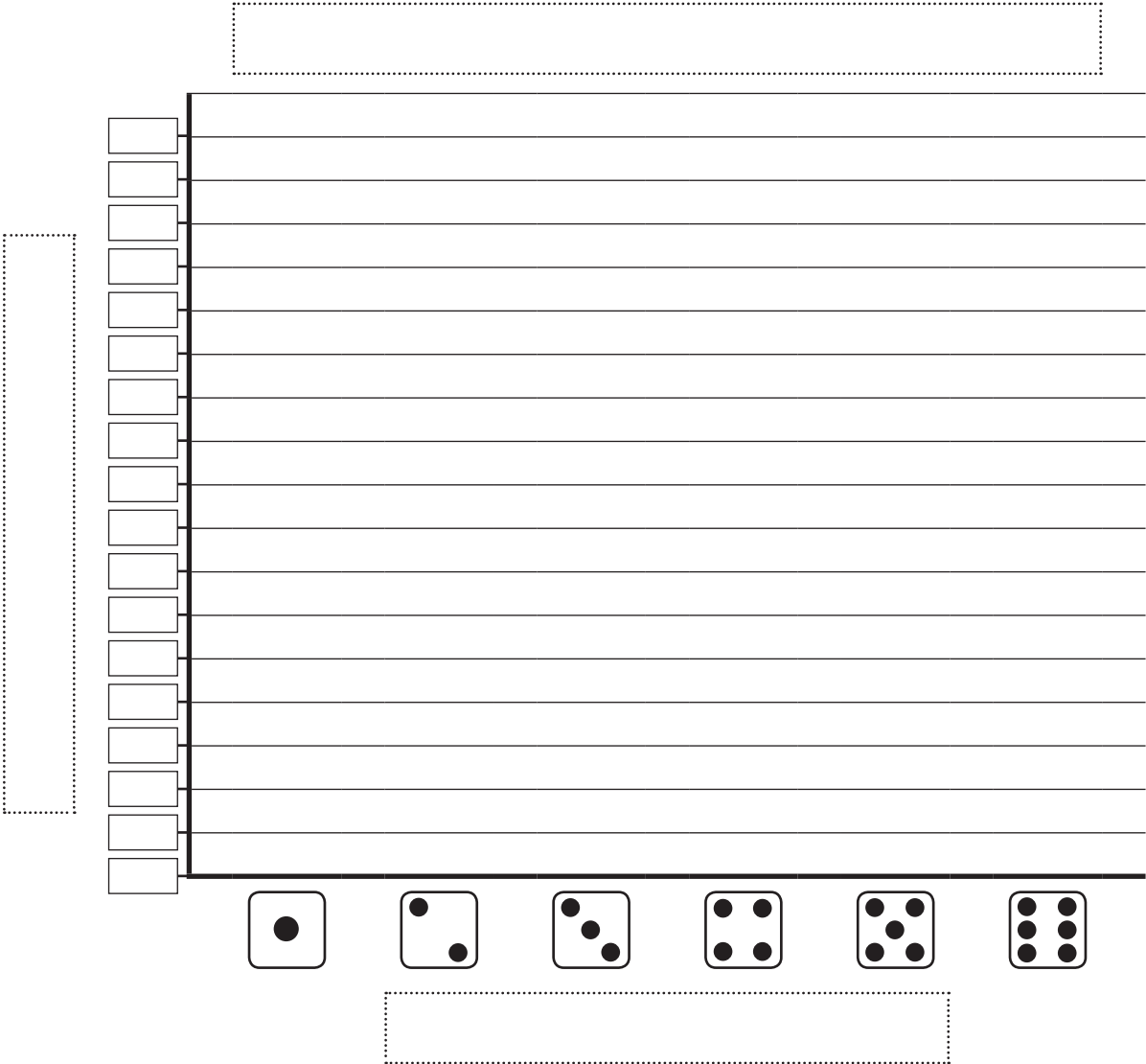
Roll	Number on die
10	
11	
12	
13	
14	
15	
16	
17	
18	

3 Complete this tally table for the number you rolled:

Number	Tally	Total
		
		
		
		
		
		

Chance – die investigation

4 Graph the data that you collected. Make sure you include a heading and the labels.



- a Which number was rolled the most?
- b Which number was rolled the least?
- c How many times was the number 6 rolled?
- d List each number in order of the most to least times it was rolled:
- e If you repeated this investigation, would you have the same results?



Getting ready



This is a game for two players. You will need a copy of this page to share and two dice. Each player will need their own coloured pencil. Make sure they are different colours.



copy



What to do



The aim of this game is to be the first player to colour 6 spaces in a column.

Player 1 rolls both dice, adds the numbers and then shades a space in that column. Player 2 repeats these steps. The players take turns rolling and recording the totals in their own colour. The winner is the player who has 6 spaces coloured. The colours do not have to be in a row.

2	3	4	5	6	7	8	9	10	11	12

Total of dice



What to do next



Which column got filled in the fastest? Why do you think this is?

Data – collecting data

Data is information. Data can be numbers or words.

Many different people use data in some way.

Teachers use data about their students, such as test scores, to help them improve. Your dentist keeps data about you, such as when you last had a checkup and which tooth might need filling. If you are planning your birthday party, you might collect data about your friends such as what they like to eat and drink.

1 Meet Harley. Here is some data about him:

- Harley's birthday is on the 9th of June.
- His lucky number is 3.
- His favourite colour is blue.

What questions was Harley asked to get this data?



2 Sometimes collecting data is to do with finding out peoples' preferences. For example, an ice cream shop might want data on which ice cream flavour their customers like the best so they can sell more ice cream. They might ask their customers some questions to find out about flavours. This is called a survey.

- a Put a ring around the question that will give the ice cream shop data that can help them sell more:

'Do you prefer chocolate or
caramel flavoured ice cream?'

or

'Do you like ice cream?'

- b Explain why:

Data – collecting data

- 3** 3H are talking about getting a classroom pet. Their teacher asked them ‘Which pet would you like to have in the classroom?’ This is the list they came up with:

turtle	cat	elephant	spider
guinea pig	chimpanzee	dog	snake

They discussed that they need to consider the suitability of these animals. For instance, the pet must be easy to care for and happy to live in the classroom during the week. Someone would have to care for it during the school holidays. Also, the pet must be harmless.

- a** Can you see which animals suggested in the list above may not be suitable? Cross them out.
- b** Write a new question for the class to decide on which pet they should have:

Question: _____

- c** How should this data on 3H’s classroom pet be collected? Pretend it is your class getting a pet. Survey 6 people in your class with the question you thought of in part **b**. Use this table to collect data:

1		
2		
3		
4		
5		
6		

I could write each choice at the top of each column and then use ticks for the votes.



Data – collecting data

The tally method is where we count in 5s. We put a stroke for each number and the fifth stroke is a line that goes diagonally through the set of 4.



However, we don't write down the numbers, we just use strokes like this:







4 Count these tallies and write the total in the box at the end:

a 

b 

5 Josie collected some data on favourite colours in her class.

a Show Josie how to represent this data using tallies:

Favourite colours in 4B	
Red	
Blue	
Green	
Yellow	

Favourite colours in 4B	
Red	
Blue	
Green	
Yellow	

b How many children are in 4B?

c Why do you think tallies are a good way of collecting data?

Data – column graphs

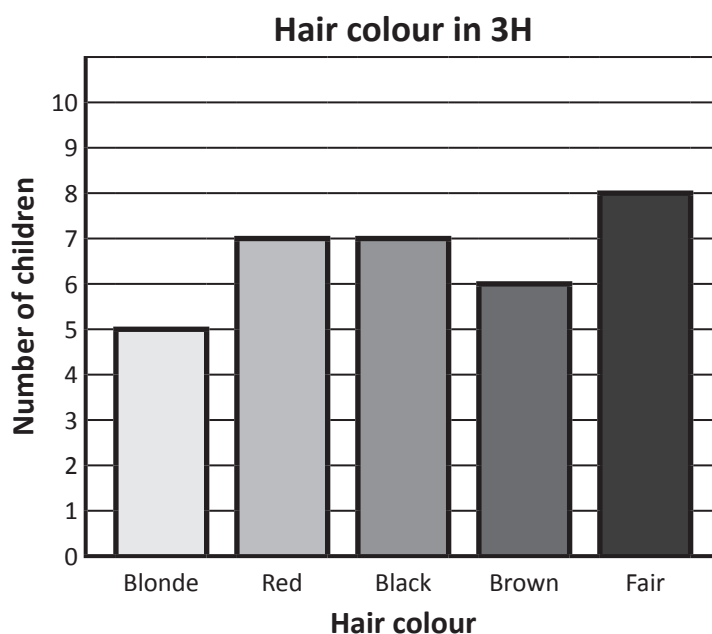
Column graphs are a clear way of showing data. There is a vertical line that has numbers, and is called the scale. The horizontal line has the different categories that are being counted. There should always be a heading at the top so it's easy to see what the data is about.

1 Answer the questions about the data shown on this column graph.

a How many children have brown hair?

b Which colour hair do the smallest group of children have?

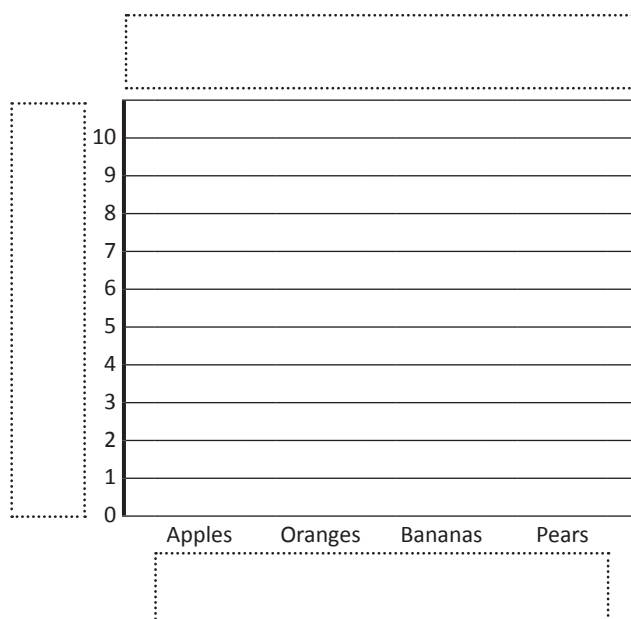
c Which colour hair do most children have?



d What do you notice about the number of children who have either red or black hair?

2 A group of people were surveyed about their favourite fruit. Make a column graph from the data collected in the table. First write the number of tallies in the table:

Favourite fruit		
Apples		
Oranges		
Bananas		
Pears		

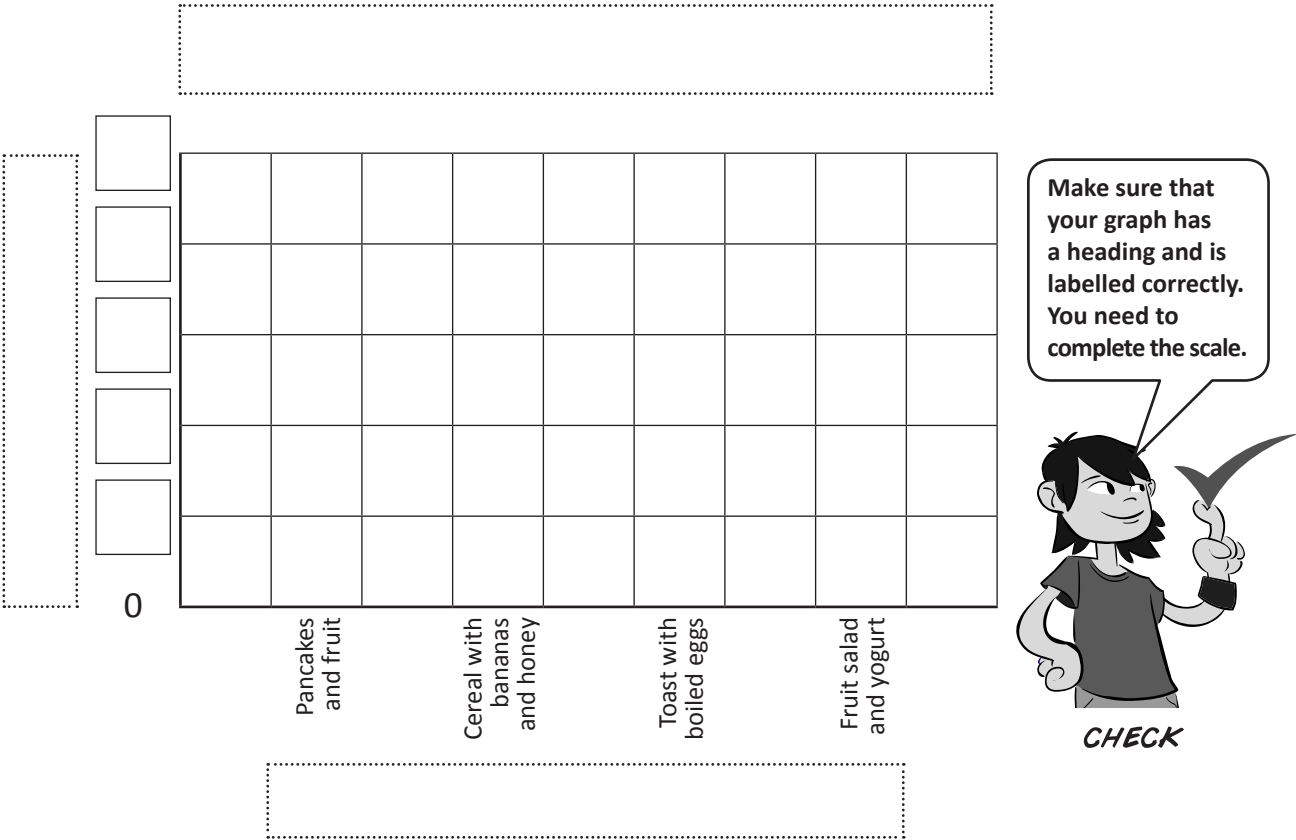


Data – column graphs

3 3L were planning a healthy breakfast morning. They conducted a survey to find out the most popular option. The data they collected is shown in the table below:

Breakfast options	Votes	Number of votes
Pancakes and fruit		
Cereal with bananas and honey		
Toast with boiled eggs		
Fruit salad and yogurt		

- a What question did they ask?
- _____
- _____
- b Work out the number of students from the tallies. Write this number in the last column in the table above.
- c Show this data on the column graph below:

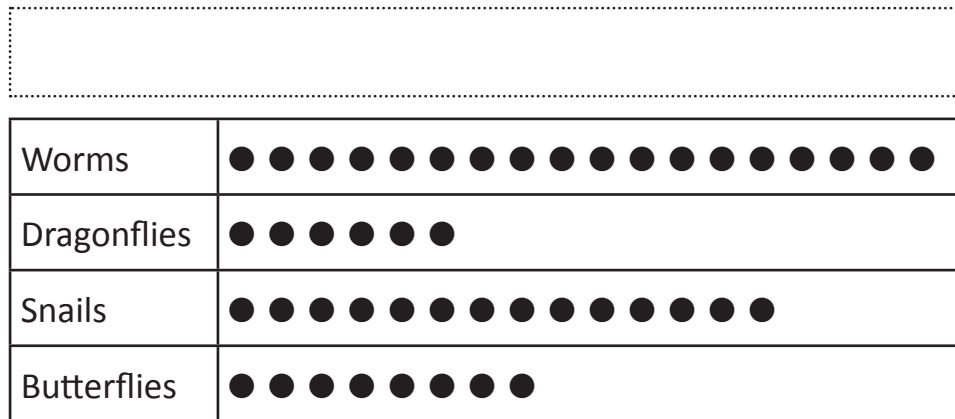


Data – picture graphs

Picture graphs use pictures to show how many items are in each category.

- 1** This picture graph shows what a group of children saw on a mini-beast hunt.

**A key shows
you what each
symbol is worth.**



CHECK

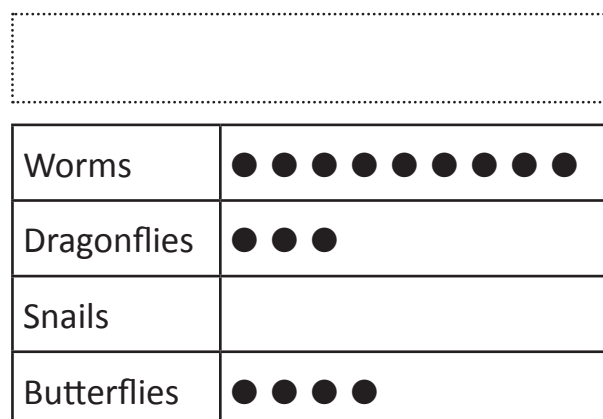
Key: ● = 1

- Give this picture graph a heading.
- How many butterflies did they see?
- How many more snails than dragonflies did they see?
- How many mini-beasts did they find in total?

11

11

- 2** This picture graph shows the same data as the one above, but this time it has a different key.

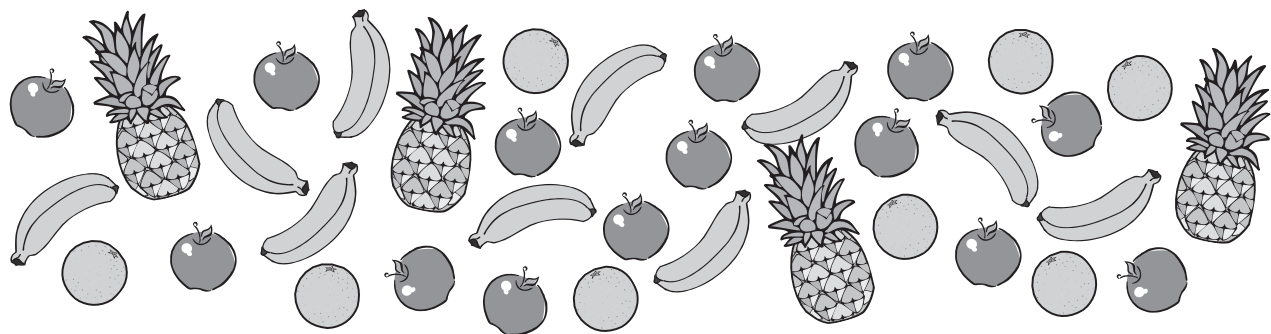


Key: ● = 2

- a** Give this picture graph the same heading as the first graph.
- b** Add the symbols for the number of snails. Look at the key.
- c** Why is the second version of the graph better?
- | | |
|-------------|-----|
| Dragonflies | ● ● |
| Snails | |
| Butterflies | ● ● |

Data – picture graphs


3 Josie runs a juice bar and has just received a fruit delivery. Help Josie create a picture graph of what she has for her records.



Heading:	
Bananas	
Apples	
Oranges	
Pineapples	


Key: ✓ = 2

4 This picture graph shows the birthdays in grade 3 for the first 4 months of the year. Complete the graph using all the clues below. What is the key?

Heading:	
January	
February	
March	
April	

Clues:

- 16 birthdays in January
- 8 birthdays in February
- 12 birthdays in March
- 20 birthdays in April

Key:  =

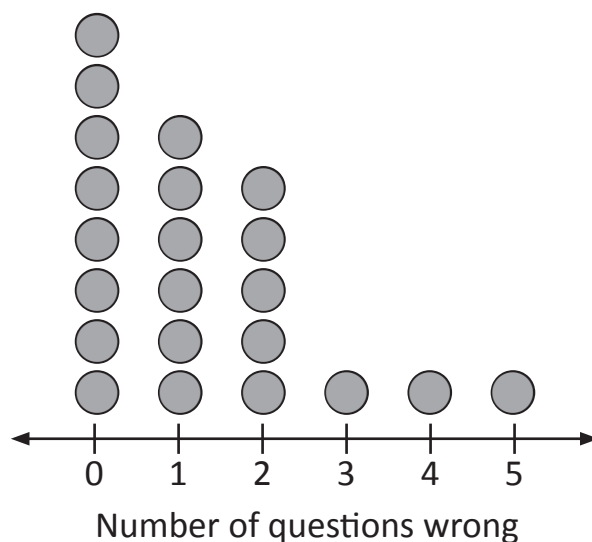
Data – dot plots

A dot plot uses a number line where the numbers are the categories.
The dots show the amount in each category.

1 Answer the questions about this dot plot:

- a How many students got two questions wrong?
- b How many students got only one question wrong?
- c How many students got all the questions correct?
- d What could you say about how well 3H know the 4 times table?

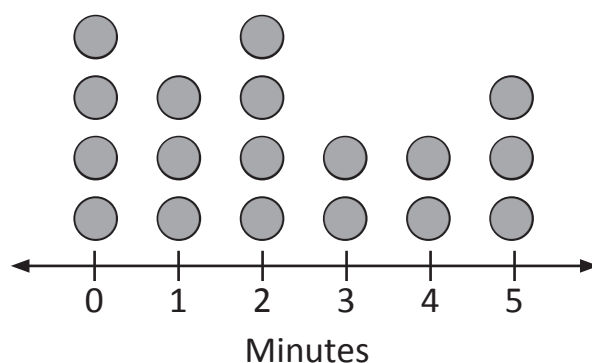
3H's 4 times table results



2 This dot plot shows the length of time a group of gymnasts can hold a hand stand. Answer these questions:

- a How many gymnasts can hold a hand stand for 1–3 minutes?
- b How many gymnasts can't do a hand stand yet?
- c How many gymnasts can hold a hand stand for more than 4 minutes?

Hand stands

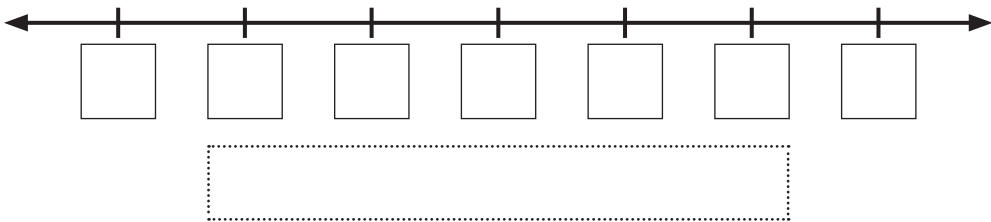


Data – dot plots

3 3H is looking at healthy eating habits. Each student kept a record of how many pieces of fruit they ate over 1 week. Here are the results:

Fruit eaten by 3H in 1 week	
Pieces of fruit	Number of students
1	2
2	3
3	4
4	5
5	5
6	9

Show these results in a dot plot below. You will need to draw the dots, label the number line and provide a heading.



Data – two-way tables

A two-way table can show a lot of information in a small space. Look at this two-way table about pets:

	Has a cat	Doesn't have a cat
Has a dog	Cam Ellie	Zoe
Doesn't have a dog	Tim	Sara Nick

Cam and Ellie both have a dog and a cat.



1 Answer questions about the two-way table above.

- a How many kids have a cat? _____
- b Name 2 kids who have neither a cat or a dog. _____
- c What pet does Tim have? _____

2 Lee had a fancy dress party where her guests had to wear a hat, glasses or both. Sort this data by writing the names into the two-way table below:

- Yvette found a hat in her dressing-up box.
- Simon wore his brother's hat and glasses.
- Ben bought a pair of fake glasses.
- Lee wore her beach hat and sunglasses.
- Arki just wore a large floppy hat.
- Mel lost her cowboy hat and sunglasses on the way to the party so ended up with neither.

	Yvette	Simon	Ben	Mel	Arki	Lee
	Glasses			No glasses		
Hat						
No hat						

Data – two-way tables

3 Put these numbers into the two-way table:

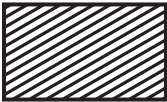
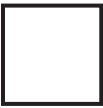
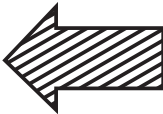

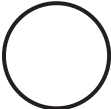


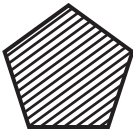
a 21 6 9 16 19 20

	Even	Not even
Less than 10		
Not less than 10		

b 12 20 32 15 40 18 35 34 25 45 28

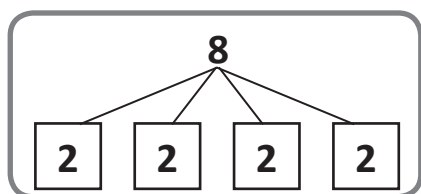
	Divisible by 5	Not divisible by 5
Greater than 30		
Not greater than 30		

4 Mel sorted some shapes into a two-way table but made some mistakes. Where did she go wrong? Ring the shapes that are in the wrong space and draw an arrow to the correct space it should be:

	Quadrilateral	Not quadrilateral
Striped	 	 
Not striped	 	 

Data – surveys

- 1 Mathletics is testing out an idea for an activity and they need your help. They want to find out which operation most people think of when they see the picture in the box, \times or $+$ or \div .



Multiplication $4 \times 2 = 8$

Addition $2 + 2 + 2 + 2 = 8$

Division $8 \div 4 = 2$

- a You need to survey 10 kids. What question will you ask them?

Question: _____

- b Collect your data in this table:

Operation	Tally	Total
\times		
$+$		
\div		

- c Present the data as a column graph:



Conclusion:
