

My name



Data Representation

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First edition printed 2009 in Australia.

A catalogue record for this book is available from 3P Learning Ltd.

ISBN 978-1-921860-87-4

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Types of graphs 1 – picture graphs

Picture graphs are used to display large amounts of data. A symbol is chosen to represent a specific amount. Picture graphs have a title that tells us what data has been collected, category labels and a key to show the value of the symbol.

How many chocolate cupcakes were sold? 4 + 4 + 4 + 4 + 2 = 18

 Cupcakes Sold in a Day
 Key: = 4 cupcakes

 Strawberry
 Image: Chocolate

 Cherry
 Image: Cherry

W.

Key: = 10 buses

.....

At the bus terminal buses arrive and depart at regular intervals. This picture graph shows the number of buses that departed the bus terminal in one week. Use the graph and the key to answer the following:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0-0						
0						
			0			

Choc-chip

a On which day did 55 buses depart?

b Which is the terminal's busiest day?

c How many buses depart on this day?
 d How many buses leave on Tuesday?

e How many more buses depart on Friday than Saturday?

This graph shows the number of tickets bought at the local cinema.

Movie Classification	Tickets Bought		
Comedy	MOVIE E MOVIE MOVIE MOVIE MOVIE MOVIE		
Children	MOVIE E MOVIE E MOVIE E MOVIE E MOVIE E MOVIE E		
Horror			
Action/Drama	MOVIE MOVIE MOVIE MOVIE		
Key: MORE = 100 tickets			

- a How many tickets were bought for Comedy and Children movies?
- **b** What was the total amount of tickets bought?





Types of graphs 1 – picture graphs

3 5F put on their own version of "So You Think You Can Dance". Use the graph and key to answer the following:

	Ticket Sale	es			Key:	You Can Dance Ticket	20 tickets			
	Week 1	So You Think You Can Dance TICKET	So You Think You Can Dance Ticket	So You Think You Can Dance Ticket	So You Think You Can Dance Ticket					$M_{2}^{(1)}$
	Week 2	So You Think You Can Dance Ticket	So You Think You Can Dance Ticket	So You Think You Can Dance Ticket	So You Think You Can Dance Ticket	So You You Car		E.		\sim
	Week 3	So You Think You Can Dance TICKET	So You Think You Can Dance TICKET	So You Think You Can Dance TICKET	So You Think You Can Dance TICKET	So You Think You Can Dance TICKET	So You Think You Can Dance TICKET		Dis Co	
	Week 4	So You Think You Can Dance Ticket	So You Tilnik You Can Dance Ticket	So You Think You Can Dance TICKET	So You Think You Can Dance Ticket	you Car				
	Week 5	So You Think You Can Dance Ticket	SO YOU TÌÌÌÌÌK You Can Dance Ticket	So You Tillik You Can Dance Ticket	So You You Car					
	a How ma	any tickets	does each $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$	So You Think You Can Dance Ticket	epresent?					
	b How ma	any tickets	were sold i	n Week 1?						
	c How ma	any tickets	were sold i	n Week 5?						
	d In whic	h week wei	re the most	tickets sol	d?					
	e How ma	any tickets	were sold t	hat week?						
	f During	which two	weeks were	e the same	number of	tickets sol	d?			
	g How ma	any more ti	ckets were	sold in We	ek 3 than V	Veek 1?				
	h How ma	any tickets	were sold c	luring the e	entire sales	period?				
4	In a scanda attendees	al that rock for any one	ed the scho week was	ool, it was actually 6	found that 0.	ticket sale	s data wer	e fudged. Th	e maxim	um
	a How ma	any tickets	does each s	symbol nov	v represent	t?				
	b How ma	any tickets	were really	sold during	g the entire	e sales peri	od?			



Types of graphs 1 – picture graphs

Students sold chocolates to raise money for charity. This picture graph shows their collection for the first week. Use this graph to answer the following:

Week 1 C	hocolate Sale	Key: 🕢 = 4 bars
Ethan		
Claire		
Pablo		
Heba		
Reece		
Mia		
Rania		
Hassan		
a Who so	old 56 chocolate bars? b Who sold $\frac{1}{2}$	dozen bars?
c Mia so	d How many back	ars did Ethan sell?
e How m altoget	ther? f If each bar so money did th	ld for \$2, how much e group raise for charity?

Bars sold in Week 2 of the charity drive appear in the tally column of this table. Represent this information using symbols. The first student has been done for you:

Week 2 Chocolate Sale

••••

6

Kov	<i>.</i> .	825	_	Λ	harc
NC	/ · ·	5011	_	+	Dars

Student	Tally	Picture Graph
Ethan		
Claire		
Pablo		
Heba		
Reece		
Mia		
Rania		
Hassan		

- **a** During Week 2, how much money was raised altogether? Each chocolate bar is \$2.
- **b** A prize was given at the end of the two weeks to the student who raised the most money. Who won?



Types of graphs 1 – column graphs





Types of graphs 1 – column graphs

- The after care kids are staging a mutiny. They are over watching the same DVDs and making popcorn every day and want to do something new and exciting on Wednesdays. This table shows the activities they'd prefer.
 - **a** Help them present a case to the principal by completing the column graph:

Activity	Number of Students
No change	1
Swimming	30
Art	11
Football	18
Dancing	23



REMEMBER



b What are some key issues on the graph you'd point out? Work in a small team to come up with a solution. Pretend your teacher or another group is the principal and present your case.



Types of graphs 1 – column graphs

5 5D decide to run a recycling campaign and collect cans in and around the school. They recorded how many cans were collected each week and started constructing this column graph. In Week 3 they collected 40 cans and in Week 4 they collected 10 cans.



b If you ran a cinema and wanted to plan your weekly movie schedule, which graph would you prefer? Which type of graph makes it easier to analyse and compare data?



A pie chart, also known as a sector graph, shows data as parts of a whole. The circle represents the total amount while the segments are the parts. When we compare the parts to the whole, we're looking at proportion. This is often written as a fraction.

This pie chart shows the favourite ice cream flavours of 10 people.



The table below summarises the information displayed on this graph.

Category	Amount	Fraction
Vanilla	3	$\frac{3}{10}$
Strawberry	2	<u>2</u> 10
Mango	1	$\frac{1}{10}$
Choc-chip	4	4 10
Total	10	$\frac{10}{10}$

Colour and label this pie chart according to the information in the table:



Category	Amount	Fraction
Red	3	
Blue	2	
Yellow	5	
Total		

A group of students was surveyed to find out what they spend their pocket money on. This pie chart shows the results. Circle True or False next to each statement.

a More than half the students surveyed spent their money on a mobile phone.

True / False

2

b $\frac{4}{20}$ surveyed spent their money on food.

True / False

c 20 students were surveyed in total. True / False

What do students spend





Types of graphs 2 – pie charts

5F and 5H were planning a pizza party and conducted a survey of favourite toppings. This pie chart shows the results.



a Complete the summary table if there are 40 students altogether.

Category	Amount	Fraction
Chicken		
Ham		
Beef		
Total	40	$\frac{10}{10}$



b Their teacher said they could order 10 pizzas. How many of each flavour should they get?



To boost ratings, Radio Non-Stop-Hits ran a promotion where they gave away prizes every hour. This pie chart shows the distribution of 60 prizes that they gave away.



a How many of each prize were given out?



The radio station's accountant realised the pie chart was correctly divided but there'd been a miscalculation in the number of prizes given out. There'd actually been 25 money prizes given away. Calculate the actual amounts:





The total amount that this graph is representing is 40. What could this be about? Give this pie chart a title and describe it by completing the table below:

Category	Amount	Fraction
Total		



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Types of graphs 2 – pie charts

Create your own pie chart.

- **a** Ask 10 students to choose which of these gaming consoles they like best.
- **b** Use the table below to collect your data.
- c Show the results on a clearly labelled pie chart.

Gaming Console	Tally	Amount
Wii		
Xbox 360		
Playstation 3		
Nintendo Game Cube		



d What fraction of the group surveyed chose Wii?

Survey 10 children on the topic of favourites. You can ask about favourite foods, TV shows, music or whatever you like.

- **a** Write the topic at the top of the first column.
- **b** Write 4 options to choose from underneath.
- c Record your results in the frequency table below.
- **d** Transfer the data from the frequency table to the pie chart.
- e Label all sections correctly.

Tally	Amount





f Write a statement about what your pie chart shows:



Types of graphs 2 – divided bar graphs

A divided bar graph is used to show how a total is divided.

It's similar to a pie chart except it's a rectangle divided into parts that represent the information. This divided bar graph shows the favourite food of 10 children.

	Pizza 4			Ice cream 3			Chips 2 Pies 1		
Γ									

1

The Nicholls' family grocery budget is \$200 per week. This table shows how the money is spent:

Fruit	Vegetables	Meat	Snacks	Drinks
\$20	\$40	\$60	\$40	\$40

a Show the information in this table as a divided bar graph. Each space represents \$20.



This divided bar graph shows how Paula spent \$360 on her party. Answer the questions below about how much she spent on each category. You may use a calculator.



d How much was spent on entertainment? Show your workings below:



Types of graphs 2 – divided bar graphs

3

You want to try snowboarding and you need to ask your parents for \$1 000 to buy all the gear. Understandably, they want to know how their hard earned cash will be spent.



Complete a divided bar graph to show them. Colour in each category a different colour, label it clearly and include a title.





Line graphs show how something changes over time in relation to something else. In this topic, we'll look at different examples of line graphs. Look at the line graph below. See how the more time passed, the higher the water got?

In which hour was the water 8 metres deep? Look below for how we read this information:



Look carefully at this line graph and answer the questions:





How many square kilometres of forest was lost in 1996? а How many square kilometres of forest was lost in 2000? b In which year were 7 000 square kilometres of forest lost? С How much more forest was lost in 2000 than in 2008? d Use the graph to estimate the forest loss in 1999. е f Use the graph to estimate the forest loss in 2003.



Types of graphs 3 – reading line graphs

Polly and her friend Molly were practising reading a thermometer for homework. They boiled water in a kettle and then took turns measuring the temperature every minute as it cooled down. To make this more interesting, they made it a guessing game.

Look at the graph and answer the questions to see how they went:

a Polly guessed that after 1 minute the **Cooling Water** temperature would be 46 °C. Was she right? 70 60 **b** Molly guessed that after 2 minutes the Temperature (°C) 50 temperature would be 34 °C. Was she right? 40 30 20 Look closely at the graph they made showing the temperature of the water in the kettle. 10 **c** What is the value of each small division on the temperature axis? 3 5 0 2 4 1 6 Time (minutes) d By how much did the water cool down between 2 minutes and 4 minutes? e How long did the water take to cool to 19 °C? This graph shows a kite's height at different times. Answer the questions below: **a** What was the kite's height at 65 seconds? **Height of Kite** 60 **b** How long did the kite 50 take to rise from 25 metres to 40 metres? Height (metres) 40 30 c Estimate the height of the kite at 1 minute. 20 10 **d** If the kite continued to rise, how high do 0 10 20 30 40 50 60 70 80 you think it would be after 90 seconds? Time (seconds)



Types of graphs 3 – constructing line graphs

Let's see how to build a line graph from a data table. This data shows the rate of filling a fish tank with water.

Minutes	1	2	3	4	5
Litres	15	30	45	60	75

Step 1

Carefully plot the data from the table.



Step 2 Join the points with straight lines. Rate of Filling a Fish Tank \int_{0}^{4} \int_{0}^{4}

Usually, we join the

dots, but sometimes we don't.

The average rate that water evaporates from an indoor swimming pool is 6 mm a month.

a Complete this table to show how much water will evaporate over 6 months:

Millimetres	6					
Month	January	February	March	April	May	June

b Label the vertical axis with an appropriate scale, then plot the points and join the points with a ruler. What else do you need to add to make this graph complete?

c Write 2 questions about this graph and write the answers.

Types of graphs 3 – constructing line graphs

A car uses 8 litres of petrol for every 50 km travelled.

a Complete this table to show how much petrol is needed for a journey:

Litres	8	16	24	32	40	48	56	64	72	80
Kilometres	50									

b Complete this line graph:

- **c** How far can the car go on 32 litres of petrol?
- d How many litres of petrol are needed to travel 450 km?
- e How far would a car travel on 12 litres of petrol?
- f How far would you have travelled if you used 96 litres of petrol?
- **g** If this car's fuel tank had a capacity of 40 litres, how many times would you need to fill it if you wanted to travel 500 km?

Types of graphs 3 – travel graphs

This travel graph shows the journey of the Henderson family on a driving holiday.

- a What time did they leave home?
- **b** How long was their first rest stop?
- c How far had they travelled by 10 am?
- d At what speed were they travelling between 3 pm and 5 pm?
- **The Henderson Holiday** 350 300 250 Distance (km) 200 150 100 50 9 10 11 12 1 2 3 4 5 noon am pm Time (hours)
- e What could they have been doing at 2.30 pm?
- f How long was the journey, excluding rest stops?

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Data Representation

Types of graphs 3 – travel graphs

Collecting and analysing data – frequency tables

Raw data is often collected in a frequency table. Tally marks are a quick way to record numbers. When we're finished, we add the marks to find totals:

Car Types in Car Park	Tally	Frequency
4WD		20
Sedan	₩₩₩	17
Station wagon	$\mathbb{H} \mathbb{H} \mathbb{H}$	20
Hatchback	₩₩Ш	14

Charlie sold drinks at the beach for an hour each day. He wrote down the drinks he sold each day:

Monday	day Coke Lemonade Water		Water	Juice			
Tuesday	Juice	Juice	Coke	Coke			
Wednesday	Water	Juice	Juice	Juice	Coke	Lemonade	
Thursday	Water	Water	Water	Coke	Coke	Juice	Lemonade
Friday	Lemonade	Water	Juice	Coke	Coke	Juice	
Saturday	Coke	Coke	Coke	Juice	Juice	Water	Water
Sunday	Lemonade	Lemonade	Coke	Juice	Water	Coke	

 a This is a time-consuming way to record data.
 Show Charlie how to set up a frequency table to record the same data faster. The first one has been done for you.

Type of Drink	Tally	Frequency
Coke		13
Juice		
Water		
Lemonade		

 Image: selection of the se

b Represent your data in a column graph:

REMEMBER

When we say we're finding the 'average', we're finding the mean. To do so, we add all the scores then divide by the number of scores:

For example, the mean of 2, 3, 4, 5,
$$6 = \frac{2+3+4+5+6}{5} = 4$$

So if the numbers above represented eggs found by 5 children in an Easter egg hunt, it'd be fairest if each child received 4. Of course, in egg hunts, it's usually every person for themselves!

Find the mean in each set of data by adding the scores and then dividing by the number of scores:

The table below shows the number of goals scored over a 5 week period by 3 football teams:

	6/3	13/3	20/3	27/3	3/4	Total	Mean
Fantastic Footballers	2	0	2	8		16	
Serious Socceroos	3	2	4	1			3
Dangerous Dribblers	0	0	0	0	15		3

- a Complete the table by filling in the missing information.
- **b** Which team has scored the most goals?

- c Which team has the highest mean?
- d You're thinking of joining either the Serious Socerooos or the Dangerous Dribblers. They both have a mean of 3 goals per game. Which team do you think would be more competitive and why?

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Collecting and analysing data – mean

4 Emma has just moved into a new neighbourhood and wants to start babysitting. She asks the girls at school what they charge and records this information in a graph:

d Ruby decides to add a booking fee of 50¢ per hour. She reckons if online booking agencies can get away with it, so can she. How does this change the mean price charged by the group?

Here is a graph showing the temperature in London:

Temperature in London Over One Week in March

a Calculate the mean temperature for the week:

b If you were travelling to London for the week, what clothes would you pack?

E

Data Representation

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Collecting and analysing data – mean

You and a partner are going to record how many cubes land in a box. You will need 10 unifix cubes and an empty lunchbox.

- **1** Place the lunchbox 1 metre in front of you.
- 2 Sit on the floor.
- **3** Take turns throwing all 10 cubes at the same time.
- 4 Each record your results in the data table on the right.
- 5 Repeat the process 5 times.

|--|

Throw	Tally
1	
2	
3	
4	
5	

Create a column graph of your results. Label each axis.

Number of Cubes that Landed in the Box

Collecting and analysing data – collecting data

1 Study all the different types of graphs showing sales of chocolate bars. Match each graph to its main feature by completing the table below:

Main Feature	Name of Graph
Clear to see how big each category is compared to the whole. Sometimes has a key and looks like a pie.	
Shows an exact amount in each category and allows you to compare categories.	
Compares sizes of categories at a glance and takes up very little space.	
Shows numerical data using pictures. Has a key.	
Shows how data changes in relation to something – usually time.	

Collecting and analysing data – collecting data

Here are 3 different sets of data. Read over each table of data and decide which is the most appropriate graph to use.

Graph 1

Name	Number of Books
Blair	8
Charlie	4
Amity	5
Nicky	12

Graph 2							
Week	Height of Plant						
1	2.5 cm						
2	3 cm						
3	5 cm						
4	7.5 cm						
5	9 cm						
6	9.5 cm						

ltem	Profit
Hot food	\$40
Chips	\$30
Drinks	\$20
Fruit	\$10

Graph 3

Construct the graphs using the templates below. You must work out the scale, label the axes and remember a heading for each graph:

- **a** Show how many books each person read over the holidays. It should be clear to see who read the most and who read the least.
- **b** Show how much a plant has grown over 6 weeks. It should be clear to see where the biggest growth spurt was.
- c Show what the \$100 profit that the canteen made yesterday was made up of.

Data Representation

Whodunnit?

Many crimes are solved by grunt work. Detectives spend countless hours sifting through data. It can be one tiny fact that breaks a case open.

Read this next part very carefully. A bank was robbed during the month of May. Since it was the bank with all your savings, you have a vested interest in tracking down the offender.

An informant has told you that the crime was committed on the thief's birthday. They treated themselves to a shopping spree with your money! Apparently they crept in during a busy weekday and quietly cracked a safe.

The next three pages contain data about criminals in your area. Use the information to identify the thief and get your money back. You'll need to flick between graphs and clues to crack the case.

MAY						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 31	25	26	27	28	29	30

CLUE 1

CLUE 2

Birthdays of Local Criminals

	EG										
	FF		SK	HC					ΜН		
	NK		EW	PJ		BJ	LM		CW		
DC	MC	BT	FC	BB		EK	DK	LL	RB		SM
J	F	Μ	A	Μ	J	J	A	S	0	N	D

F 5

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Data Representation

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More clues on page 25.

Whodunnit?

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ,

CLUE 3

Birthdates by Gender

Males	Females
04.01.75	11.02.85
23.02.86	14.02.78
17.02.66	03.03.80
02.04.73	13.05.84
04.04.75	07.07.77
24.04.67	17.10.78
10.05.81	31.10.87
23.05.82	
18.07.81	
09.08.67	
18.08.63	
26.09.66	
13.10.72	
24.12.65	

CLUE 4

Gender Breakdown of Local Criminals

CLUE 5

Known Crims

Sam McNab	Earl Wyatt
Master Criminal	Frannie Fingers
Bobette Trimbole	Emma Getaway
Ned Kelly	Shifty Keys
Dan Kelly	Betty Balaclava
Ellen Kelly	Ron Biggs
Pretty-boy Jones	Buster Jones
Harry Cracker	Luke Moran
Mata Hari	Dan Cuffme
Light-fingered Larry	Carla Williams
Fred Capone	

You should know who the criminal is by now! Use the following data to find out more about them.

CLUE 6

More clues on page 26.

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CLUE 7

					На	ir Colo	bur					
SM	DC	BB	EK	EW	FF	MH	DK	FC	CW	BJ	PJ	нс
ΒT		LL			RB	MC	NK	LM	SK	EG		
black blonde						brown				red		

CLUE 8

rieight of Khown Chillinais							
	CW	PJ					
	BJ	EG	NK	LM			
FF	FC	RB	MC	НС			
EK	МН	DC	EW	DK			
SM	BB	BT	SK	LL			
150 - 159 cm	160 - 169 cm	170 - 179 cm	180 - 189 cm	190 - 199 cm			
Height							

Height of Known Criminals

Whodunnit? Give a name and a detailed description to the police superintendent:

Create a WANTED poster for the guilty party.

Data disaster

You work for the chocolate company Cocoa Delights. In less than an hour, you're presenting the annual report to the Board.

They're keen to know yearly sales figures, best selling lines, the breakdown of monthly expenses and how each product sells compared to the others.

Your team has slaved to prepare the following data. However, someone didn't bother to add titles and labels to the graphs.

You don't have time to hunt the culprit. You have to fix this yourself. Fast!

Look at the graphs below and come up with some believable information that would give each graph meaning and keep the Board happy. Think about which graph would best suit each set of data. They'll need titles, labels and numbers.

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Hello, holidays!

Follow the clues to correctly label each column with the appropriate symbol:

