UNIT 7

STUDENT BOOK 1 LESSON

Using a Questionnaire to Gather Data

Quick Review

At Home At School

Here are some guidelines for writing questions for a questionnaire.

➤ The question should be understood in the same way by all people.

Instead of asking: Do you play video games a lot? ☐ Yes ☐ No
Ask: How many hours a week do you spend playing video games? _____

➤ Each person should find an answer he would choose.

Instead of asking: What's your favourite subject? ☐ Math ☐ Science
Ask: What's your favourite subject?
☐ Math ☐ Science ☐ Other _____

➤ The question should be **fair**. It should not influence a person's answer. If it does, it is a **biased question**.

Instead of asking: Do you prefer boring documentaries or hilarious sitcoms?
Ask: What kind of TV shows do you prefer? ☐ Documentaries
☐ Sitcoms ☐ Dramas ☐ Reality Shows ☐ Other _____

Try These

1. Write better questions.

a) Do you get a lot of sleep on school nights? ☐ Yes ☐ No

_____

b) What is your favourite reality show? ☐ Survivor ☐ The Amazing Race

_____

_____

c) Do you prefer greasy potatoes or healthy carrots?

_____

_____

Practice

1. Which question is unbiased? Explain.

a) Which beverage do you prefer to drink with lunch?
☐ Juice ☐ Water ☐ Other (please specify) _____

b) Do you prefer drinking refreshing juice or plain water with your lunch?

_____

_____

2. Which question would not be understood in the same way by all people? Explain.

a) Do you get up early on the weekend?

b) What time do you get up on the weekend?

_____

_____

3. Suppose you want to know what winter activity your classmates like best.

a) Write a question you could ask.

b) How do you know if your question is a fair question?

_____

_____

_____

_____

_____

Stretch Your Thinking

A radio station wants to find out what kind of music they should play.
Write a questionnaire the station could use to help them make their decision.

_____

_____

UNIT 7

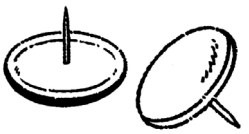
STUDENT BOOK 2 LESSON

Conducting Experiments to Gather Data

Quick Review

At Home At School

➤ Solomon wanted to answer this question:
Is a thumbtack more likely to land pointed end up or pointed end sideways?



To find out, Solomon dropped 10 thumbtacks a total of 10 times. He recorded the results in a tally chart.

Pointed End Up	Pointed End Sideways
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 | | |	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 | |

From the data, Solomon concluded that a thumbtack is more likely to land with the pointed end up than with the pointed end sideways.

Try These

1. a) Repeat Solomon's experiment.
Record your results in the tally chart.

b) How do your results compare with Solomon's?

Pointed End Up	Pointed End Sideways

2. Is a penny more likely to come up heads or tails?
Flip a penny 30 times. Record the results in the tally chart.

Heads	Tails

What conclusion can you make?

Practice

1. Rudy and Janet experimented with 3 different wind-up cars to answer this question: Which car travels the greatest distance?
They wound up each car 4 times and measured how far each went.

Car	Trial 1	Trial 2	Trial 3	Trial 4
Car #1	4.2 m	5.1 m	4.8 m	5.0 m
Car #2	6.3 m	6.8 m	7.0 m	6.7 m
Car #3	5.9 m	5.7 m	6.4 m	5.9 m

What answer would you give to the question above? Explain.

2. How long does it take a Grade 6 student to multiply 27×49: less than 30 s, 30–60 s, or more than 60 s?

a) Predict the answer to the question above. Explain.

b) Design an experiment you can use to check your prediction.

c) Conduct the experiment. Record the results in a chart.

d) What conclusions can you make from your data?

Stretch Your Thinking

Write a question you would like answered. Which method would you use to collect data to answer your question?

UNIT 7

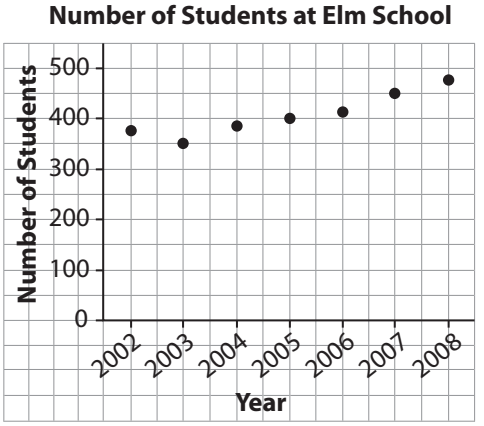
STUDENT BOOK 3 LESSON

Interpreting Graphs

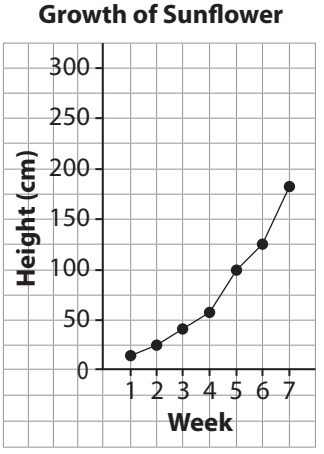
Quick Review

At Home At School

➤ This graph is a series of points that are not joined.
It shows **discrete data**.
There are gaps between values.
Usually, discrete data represent things that can be counted.



➤ This graph shows consecutive points joined by line segments.
This is called a **line graph**.
It shows **continuous data**.
Continuous data can include any value between data points.
Time, money, temperature, and measurements are continuous.



Try These

1. Would you use a series of points or a line graph to display each set of data?

a) the diameter of a maple tree over 10 years _____

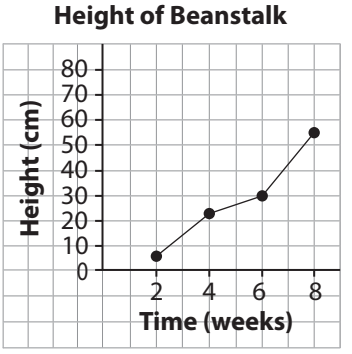
b) the number of hot dogs sold on Hot Dog Day _____

c) the length of a snake as it grows _____

d) the population of Richmond, BC, from 2005 to 2008 _____

Practice

1. a) What does this line graph show?



_____

b) About how tall was the beanstalk at each time?

•2 weeks _____ •4 weeks _____

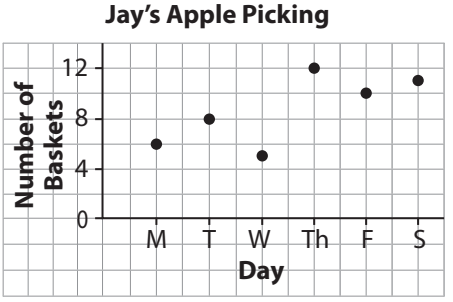
•6 weeks _____ •8 weeks _____

c) What conclusions can you make from the graph?

_____

_____

2. a) Use the graph. How many baskets of apples did Jay pick on each day?



• Monday ___

• Thursday ___

• Altogether ___

b) What conclusions can you make from the graph?

_____

_____

_____

Stretch Your Thinking

Describe a set of data for which you would use:

a) a line graph _____

b) a series of points _____

_____

UNIT 7

STUDENT BOOK 4 LESSON

Drawing Graphs

Quick Review

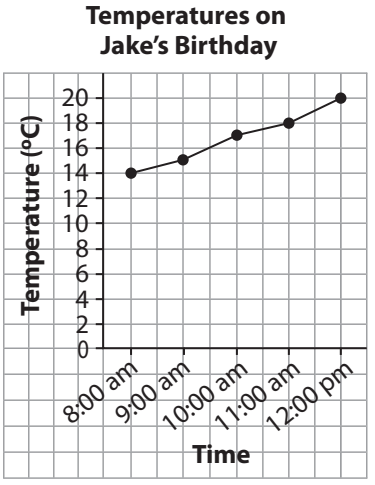
At Home At School

➤ This table shows the changes in temperature from 8:00 am to 12:00 pm on Jake's birthday.

Time	Temperature (°C)
8:00 am	14
9:00 am	15
10:00 am	17
11:00 am	18
12:00 pm	20

To display these data:

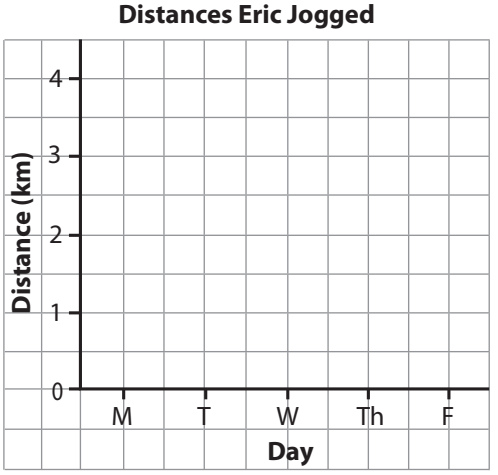
- Draw and label 2 axes.
- Choose an appropriate scale for each axis.
- Mark points for the data.
- Both time and temperature are continuous. So, join consecutive pairs of points.
- Give the graph a title.



Try These

1. Eric jogged every day from Monday to Friday. He recorded the distances in a chart. Display these data in a graph.

Day	Distance (km)
Monday	1.0
Tuesday	1.5
Wednesday	2.0
Thursday	2.5
Friday	3.5

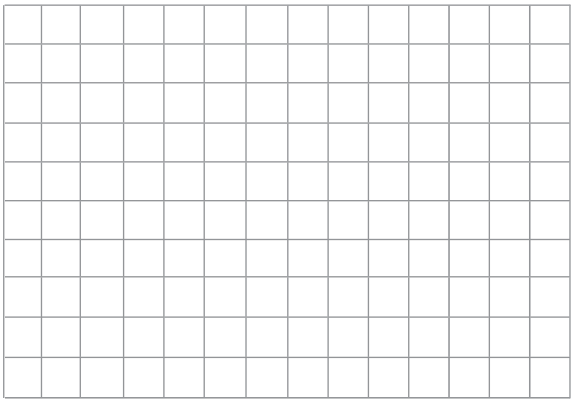


Practice

1. Sammi measured the mass of her dog on the first of the month for 6 months.

Month	January	February	March	April	May	June
Mass (kg)	3	3.5	4	5	5.5	6

a) Draw a graph to display these data.



b) How did you choose the scale on the vertical axis?

_____

_____

_____

c) Did you join the points? Explain.

_____

d) What do you know from looking at the graph?

_____

_____

Stretch Your Thinking

Would you use a line graph or a series of points to display each set of data? Explain your choices.

a) The number of lunches sold in the school cafeteria every day for a month

_____

b) The volume of water in a bathtub as it fills

_____

UNIT 7

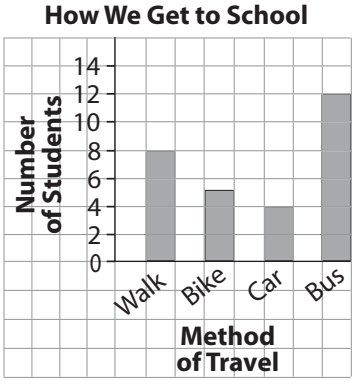
STUDENT BOOK 5 LESSON

Choosing an Appropriate Graph

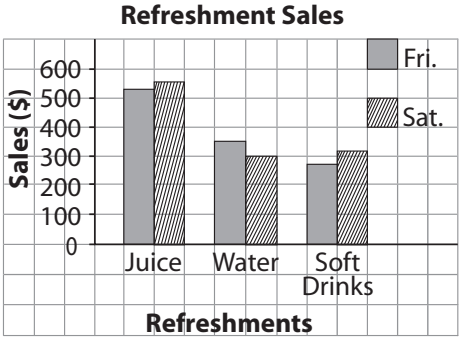
Quick Review

At Home At School

When you decide which type of graph to use, choose a graph that best represents the data.



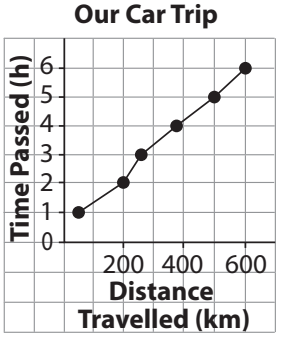
Bar Graph



Double Bar Graph

Favourite Kinds of TV Shows	
Comedy	
Sports	
Reality	
Drama	
	= 10 votes

Pictograph



Line Graph

Try These

1. Draw a graph to display these data.

Our Favourite Seasons

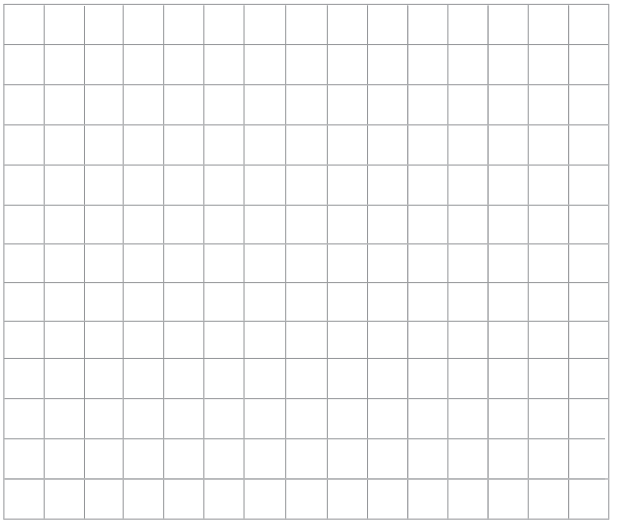
Season	Number of Girls	Number of Boys
Spring	6	4
Summer	9	12
Fall	6	7
Winter	5	6

Practice

1. Draw a graph to display each set of data.

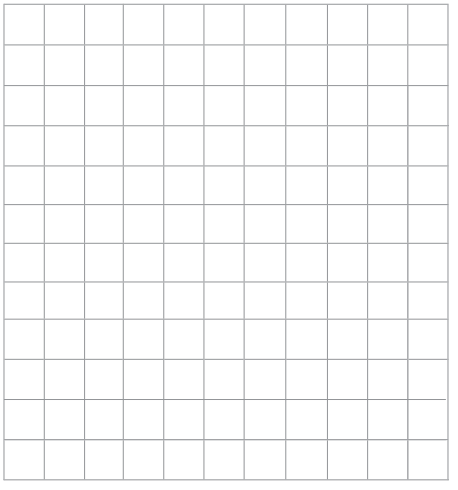
a) Students Who Wear Glasses

Grade	Number of Students
1	2
2	4
3	8
4	7
5	3
6	9



b) Albert's Height

Age (years)	Height (cm)
2	80
3	89
4	94
5	100
6	108
7	114



Stretch Your Thinking

How do you decide which type of graph to use to display data?

UNIT 7

STUDENT BOOK 6 LESSON

Theoretical Probability

Quick Review

At Home At School

➤ This table shows the possible outcomes when 2 dice are rolled and the numbers are added.

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

From the table:
- There are 36 possible outcomes.
- 18 outcomes are odd sums.
- 18 outcomes are even sums.

We say: The **probability** of getting an odd sum is 18 out of 36.
We write the probability of an odd sum as a fraction: $\frac{18}{36}$

This probability is a **theoretical probability**.

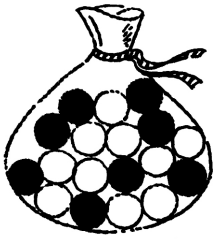
Theoretical probability = $\frac{\text{Number of favourable outcomes}}{\text{Number of possible outcomes}}$

The probability of an odd sum is $\frac{18}{36}$. The probability of an even sum is $\frac{18}{36}$.

Since $\frac{18}{36} = \frac{18}{36}$, the probability of getting an odd sum or an even sum is equally likely.

Try These

1. A bag contains 10 white marbles and 8 black marbles.
A marble is picked at random.
What is the probability
that a black marble is picked? _____



2. 16 girls and 13 boys put their names in a bag.
One name is drawn from the bag. What is the probability
that a boys name will be drawn? _____

Practice

1. A box contains 8 red apples, 10 green apples, and 12 yellow apples. Without looking, you pick an apple from the box.

a) What are the possible outcomes?

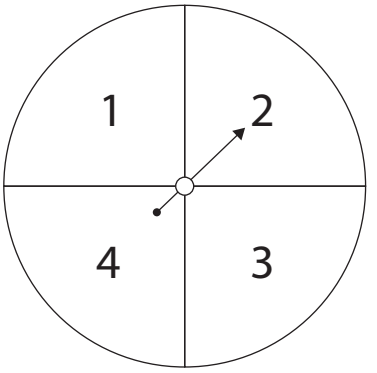
_____

b) How many apples are in the box? _____

c) What is the theoretical probability that the apple is:

i) red? _____ **ii)** green? _____ **iii)** yellow? _____

2. Suppose you spin the pointer on this spinner. What is the probability of each outcome?



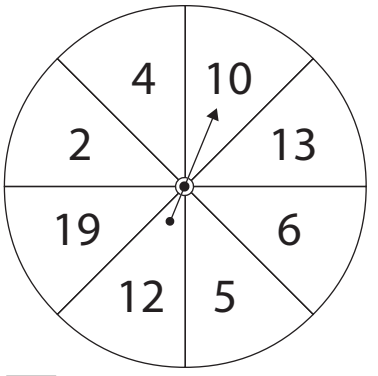
a) The pointer lands on 1. _____

b) The pointer lands on 2. _____

c) The pointer lands on 3 or 4. _____

d) The pointer does not land on 3. _____

3. Rafik spins the pointer on this spinner.



a) List the possible outcomes. _____

b) What is the probability of each outcome?

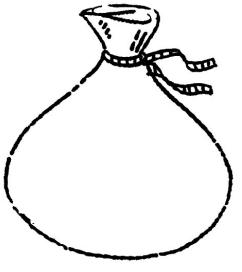
i) The pointer lands on a prime number? _____

ii) The pointer lands on a composite number? ___

iii) The pointer lands on a number greater than 10? ___

Stretch Your Thinking

Draw and colour marbles in the bag so that the probability of picking a green marble is greater than the probability of picking a red marble, but less than the probability of picking an orange marble.



UNIT 7

STUDENT BOOK 7 LESSON

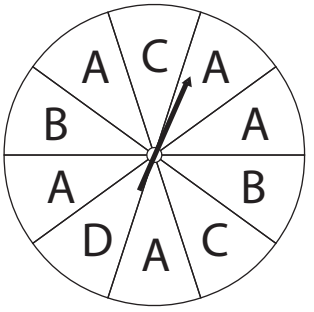
Experimental Probability

Quick Review

At Home At School

➤ Saul spun the pointer on this spinner 10 times.
The theoretical probability of landing on the letter A is $\frac{5}{10}$, or $\frac{1}{2}$.
Here are Saul's results.

Letter	A	B	C	D
Number of Times	6	1	2	1



The **experimental probability** is the likelihood that something occurs based on the results of an experiment.

$$\text{Experimental probability} = \frac{\text{Number of times an outcome occurs}}{\text{Number of times the experiment is conducted}}$$

The experimental probability of landing on the letter A is $\frac{6}{10}$, or $\frac{3}{5}$.
This is different from the theoretical probability.

➤ Saul combined the results from 10 experiments.

Letter	A	B	C	D
Number of Times	51	19	8	22

The experimental probability of landing on the letter A is $\frac{51}{100}$.
The experimental probability is close to the theoretical probability.
The more trials we conduct, the closer the experimental probability may come to the theoretical probability.

Try These

1. Look at the table of Saul's individual results.
What is the experimental probability of landing on:

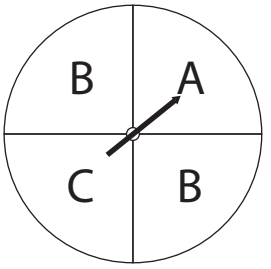
i) B? _____ **ii)** C? _____ **iii)** D? _____ **iv)** B or C? _____ **v)** A or D? _____

2. Look at the table of Saul's combined results.
What is the experimental probability of landing on:

i) B? _____ **ii)** C? _____ **iii)** D? _____ **iv)** B or D? _____

Practice

1. Tatiana spins the pointer on this spinner several times.
Here are her results.



A	B	C
𝍸 𝍸 ||	𝍸 𝍸 𝍸 𝍸	𝍸 |||

a) How many times did Tatiana spin the pointer? _____

b) What fraction of the spins were A? _____ B? _____ C? _____

2. A coin is tossed 100 times.
Heads showed 43 times and tails showed 57 times.

a) What are the possible outcomes? _____

b) What is the experimental probability of the tosses showing:

i) heads? _____ **ii)** tails? _____

c) What is the theoretical probability of the tosses showing:

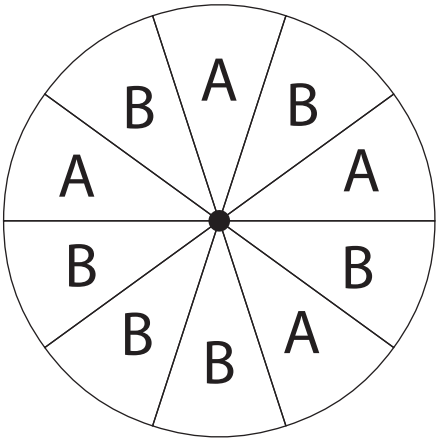
i) heads? _____ **ii)** tails? _____

Stretch Your Thinking

a) What is the theoretical probability of the pointer landing on:

i) A? _____ **ii)** B? _____

b) Use an opened paper clip as a pointer.
Spin it 100 times. Record the results.



A	B

c) What is the experimental probability of the pointer landing on:

i) A? _____ **ii)** B? _____