Maths Trek

Exploring maths in the real world

6

Sample Student Book Pages

Firefly EDUCATION

Your Introduction to Maths Trek

Maths Trek is a whole-school numeracy program that provides everything you and your students need to explore maths in real-world contexts.

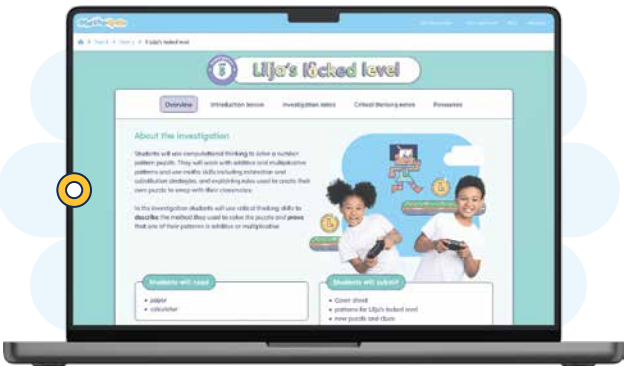
To maximise the benefits of the program, use the Student Book with the explicit teaching resources at Maths Trek Online to build, develop and strengthen each student's ability to work mathematically.

An adventure in maths for every student from Foundation to Year 6!

Maths Trek Online

Maths Trek Online is home to lesson guides, teaching slides, interactive teaching tools, videos, printable differentiation tasks and mid-term assessments.

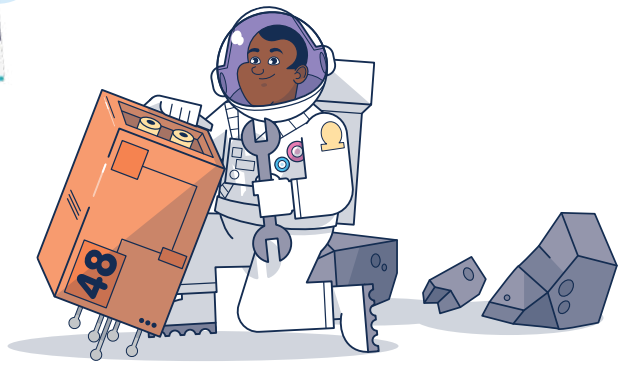
You will also find investigation notes, Student Book answers, and preparation and planning documents at Maths Trek Online.



Maths Trek Student Book

The Student Book is packed with modelled examples, as well as teacher-guided and independent activities for every topic and problem-solving strategy.

Students will also find plenty of practice problems, revision activities, application questions and investigation pages in the Student Book.



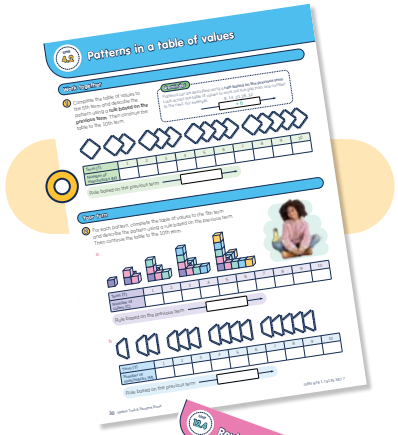
Using the Student Book with Online

Topics

Use the online lesson guides and teaching slides to explicitly teach each topic.

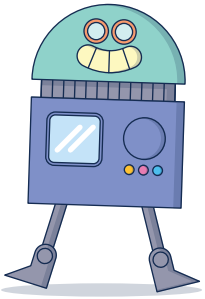
Discuss any modelled examples and complete the *Work together* activities with your students. Then students move on to the *Your turn* activities for independent practice.

The Student Book is an integral part of the consolidation process. Once you have explicitly taught each concept, it is essential that students apply what they have learned to the activities.



Revision

Use the revision activities throughout the Student Book to consolidate each student's learning and identify strengths and weaknesses.



Problem-solving

Use the teaching slides and modelled examples in the Student Book to teach each problem-solving strategy.

Students consolidate their skills throughout the year by independently completing practice problems. These build confidence in choosing appropriate strategies to solve a variety of unfamiliar problems.

Investigations

Investigations provide students with opportunities to apply maths concepts learned in previous weeks to unfamiliar, extended mathematical problems.

Use the online teaching notes, exemplars, videos and printable resources to introduce and guide students through each step of the investigation.

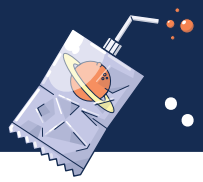
Use the online critical thinking lessons to ensure students can reflect, reason and communicate their understanding of what they have discovered.

Download the *Cover sheet* and use the formative assessment checklist to record each student's progress.

Assessment

Download the four mid-term assessments at Maths Trek Online to assess each student's understanding of the preceding topics. Each assessment includes graded C to A level questions.

Contents



Term 1

Term 2

Term 3

Want more investigations?

You'll find extra investigations at Maths Trek Online — a great way to round off a year of maths!

Planning made easy

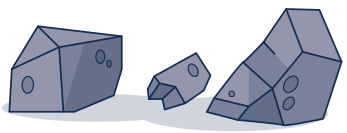
Maths Trek guides you and your students through a sequence of topics, problem-solving, revision and investigations. As the year progresses, your students consolidate their learning and revisit concepts. They also have ample opportunity to apply what they've learned to unfamiliar, extended maths problems.

You'll find four assessments in the yearly plan too — one for each term. They assess each student's understanding of the preceding topics and are available to print at Maths Trek Online.

Extra investigations

Why not conclude the year with an extra investigation? Teachers can log in to Maths Trek Online to access the printable pages and resources.

- Investigation: Clever containers
- Investigation: Educational entrepreneur
- Investigation: Octi-origami
- Investigation: Weird or wonderful weather



* Log in to Maths Trek Online to download and print assessments.

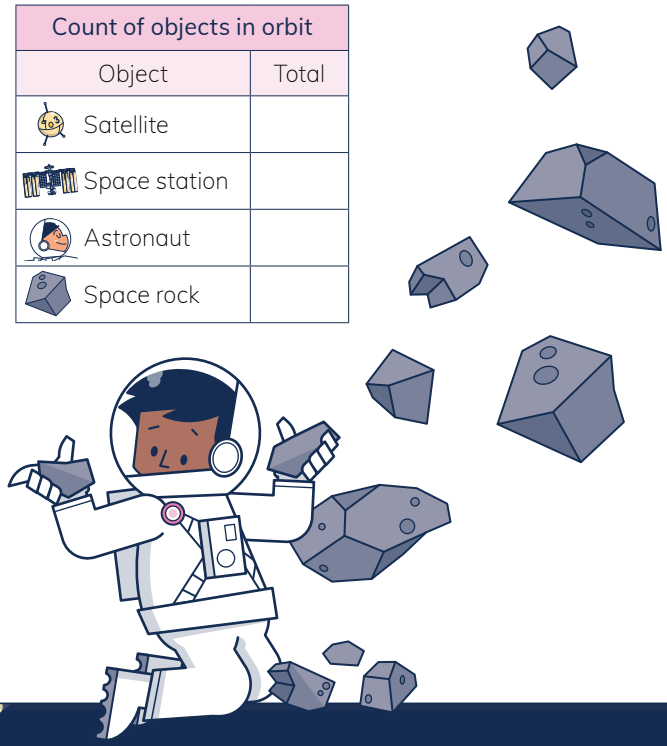
Unit 1.1

Maths is everywhere

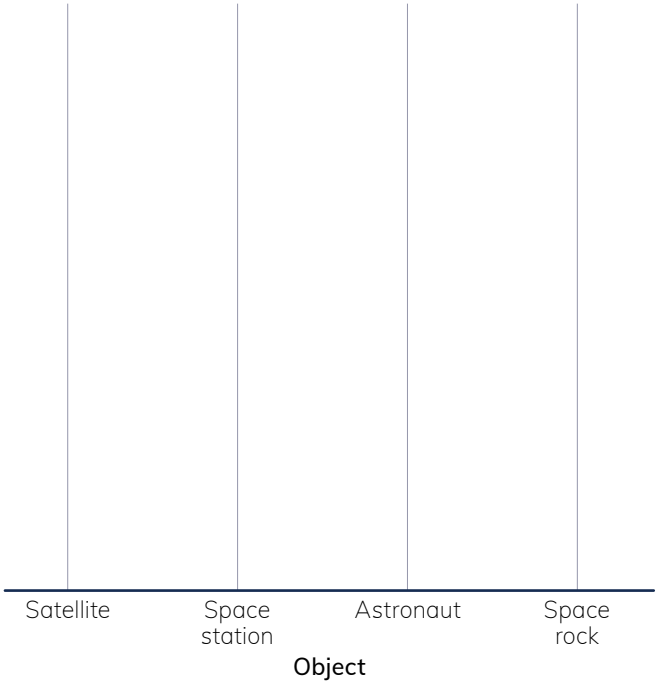
Cover hunt

Look at the front cover of your book. Count the number of objects you can see in Earth's orbit, then write the totals.

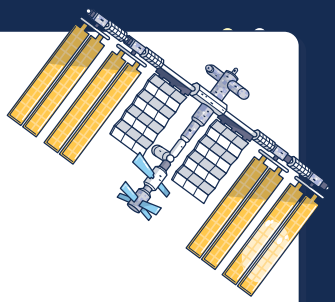
Count of objects in orbit	
Object	Total
Satellite	
Space station	
Astronaut	
Space rock	



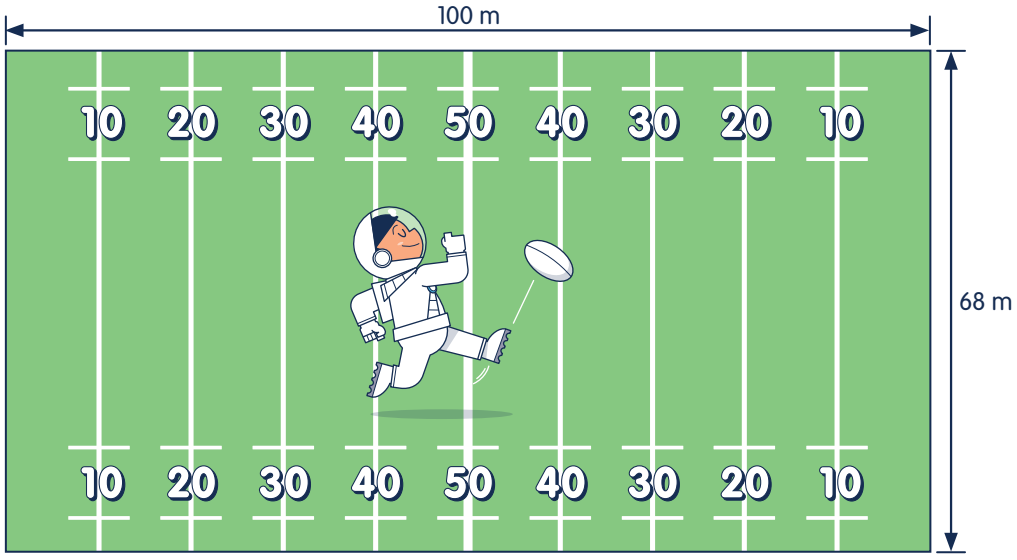
Use the data from the table to complete the dot plot.



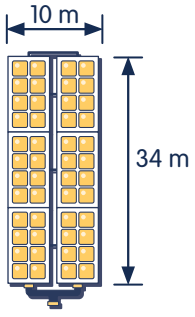
A football field of solar panels!



The International Space Station is powered by eight massive solar arrays. If all eight solar arrays were placed on a rugby league field, what fraction of the field would they cover? Write your answer in twentieths.



rugby league field



solar array

$\frac{}{20}$ would be covered.

Engaging activities from day one

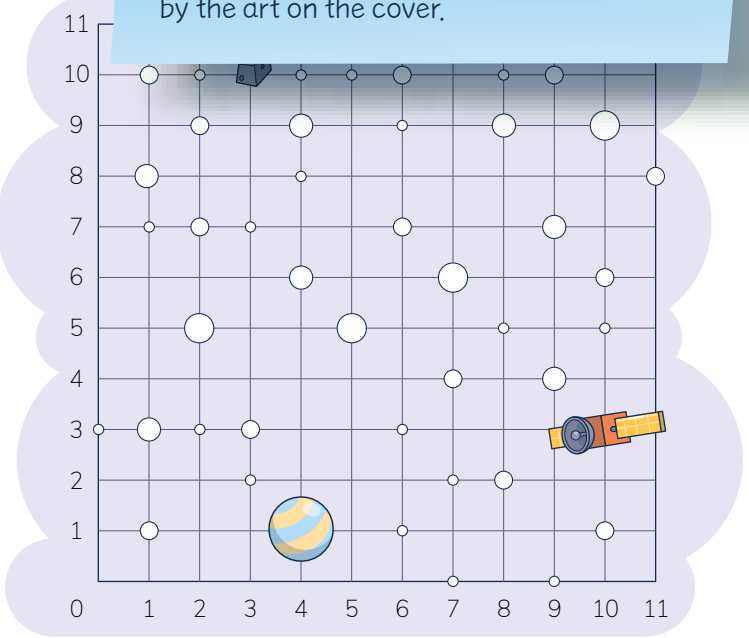
Get your students excited about maths as they apply skills learned in the previous year to these fun activities — all cleverly inspired by the art on the cover.

Mapping stars

These stars form a mystery constellation. Colour each star and connect them as you go.

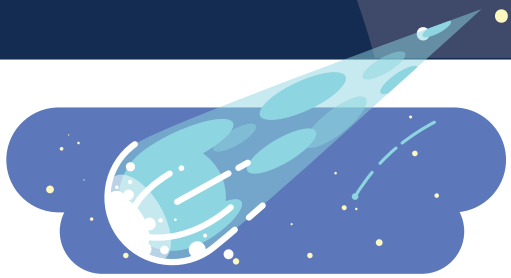
Work down the columns

START	(9, 7)
(1, 3)	(7, 6)
(3, 3)	(4, 6)
(5, 5)	(2, 5)
(6, 7)	(1, 3)
(8, 9)	STOP
(10, 9)	



Meteor shower

During a meteor shower, you saw three shooting stars in two minutes. Predict how many shooting stars you will see in one hour.

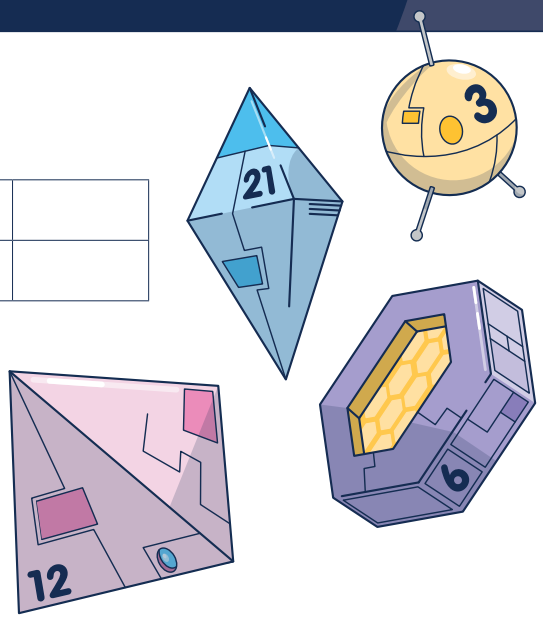


_____ shooting stars

Speedy satellites

A satellite orbiting Earth can travel 410 km every minute! How far will it travel in 5 minutes?

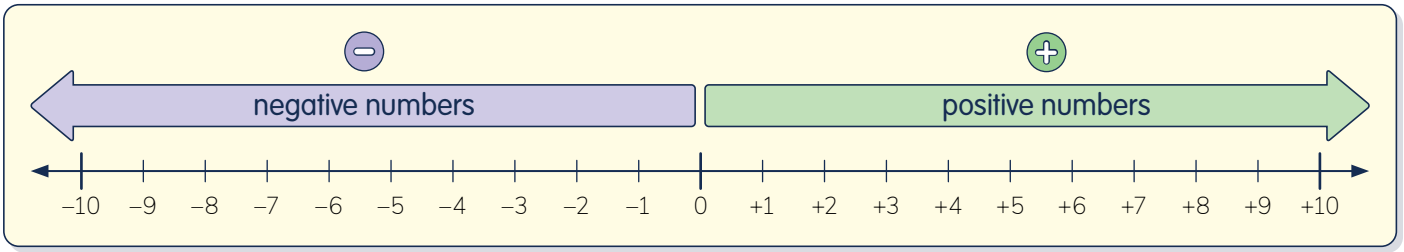
Time (minutes)	1	2	3		
Distance travelled (kilometres)	410				



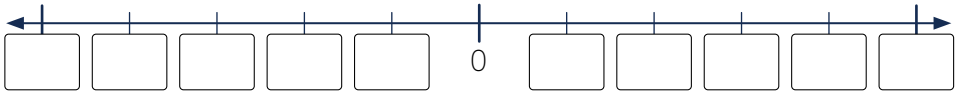
Unit 1.2

Positive and negative numbers

Work together



1 Label the number line from –5 to +5.



Reminder

We read **+4** as **positive four**.

We read **–4** as **negative four**.

2 Use the number line in question 1 to count the jumps between each pair.

a –1 to –2 ☐ **b** –3 to 0 ☐ **c** +5 to –4 ☐ **d** 0 to +2 ☐ **e** +3 to –4 ☐

f –1 to +1 ☐ **g** +4 to –1 ☐ **h** +5 to –5 ☐ **i** 0 to –3 ☐ **j** –2 to +2 ☐

Your turn

3 Colour the bubble to show the larger number in each pair.

a ◯ –3 ◯ +3 **b** ◯ –5 ◯ +3 **c** ◯ +1 ◯ –4 **d** ◯ +2 ◯ –5 **e** ◯ –2 ◯ –1

f ◯ +1 ◯ –1 **g** ◯ –5 ◯ +5 **h** ◯ –4 ◯ –5 **i** ◯ –3 ◯ –2 **j** ◯ 0 ◯ –1

4 Use the *Seabreeze Apartments* lift panel to answer the questions.

a Jin parks at –2. She lives on the 5th floor. How many floors does she travel? ☐

b Zane lives on the 3rd floor. He parked his car on –3. How many floors does he travel? ☐

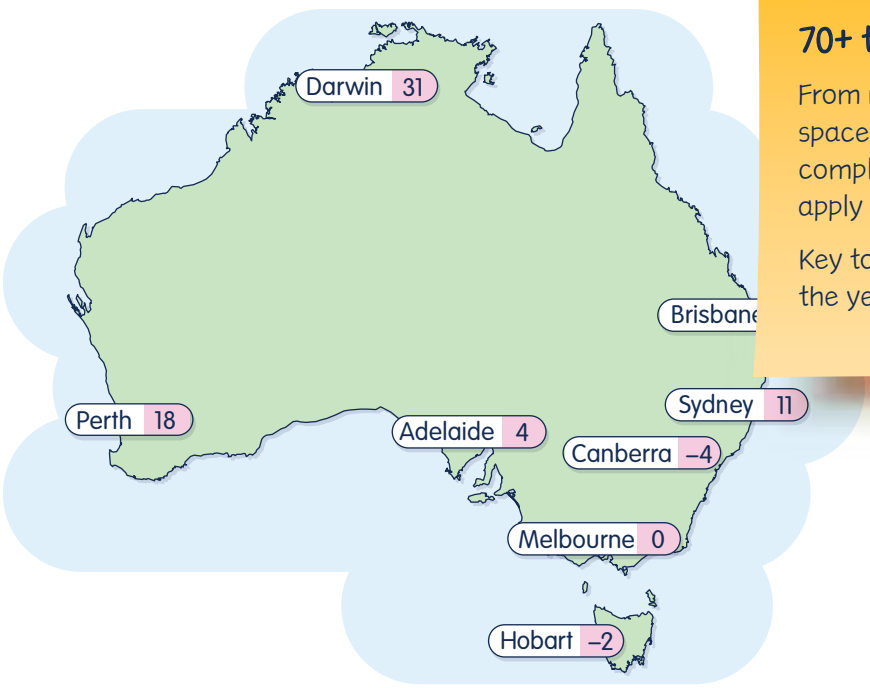
c How many floors would Zane travel from car park –3 to the 3rd floor and back to car park –3? ☐

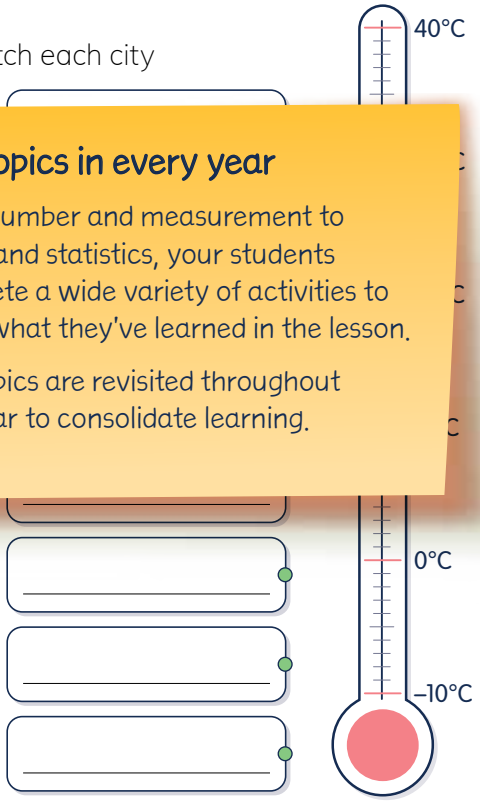
d How many floors does the lift travel from car park –3 to the top floor? ☐

Seabreeze Apartments

5 Apartments 501–504
4 Apartments 401–404
3 Apartments 301–304
2 Apartments 201–204
1 Apartments 101–104
0 Ground floor
–1 Car park
–2 Car park
–3 Car park

5 Write the Australian capital cities in order from hottest to coldest. Match each city to its temperature on the thermometer. The first one is done for you.





6 Riddle time: Use the thermometer in question **5** to find the city in each pair with the colder temperature. To solve the riddle, write the matching letters in the boxes below. The first one is done for you.

a	Perth	E	b	Canberra	O	c	Hobart	N	d	Melbourne	S	e	Sydney	R
	Sydney	F		Adelaide	P		Canberra	O		Hobart	T		Adelaide	S
f	Brisbane	T	g	Melbourne	E	h	Adelaide	O	i	Darwin	R			
	Darwin	U		Sydney	F		Hobart	P		Canberra	S			

The more you make, the more you leave behind. What are they?

a	b	c	d	e	f	g	h	i
F								

7 Use the map and the thermometer in question **5** to work out the temperatures of the capital cities if the temperature dropped by 5 °C.

a Perth ____ b Melbourne ____ c Hobart ____ d Canberra ____ e Adelaide ____

Reminder

To abbreviate **10 degrees Celsius**, write **10°C**.

Challenge

What is the difference in temperatures between each pair of cities in question **6**?

a ____ b ____ c ____ d ____ e ____

f ____ g ____ h ____ i ____

What is the greatest difference in temperatures between any pair of cities? ____

Unit 4.2

Patterns in a table of values

Work together

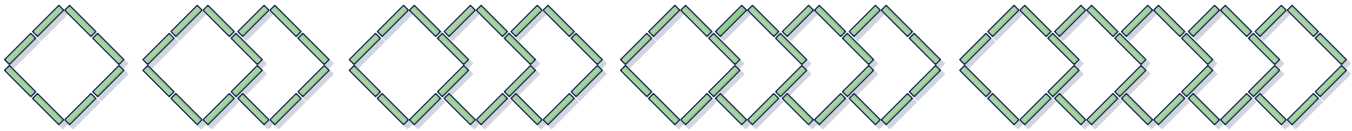
1 Complete the table of values to the 5th term and describe the pattern using a **rule based on the previous term**. Then complete the table to the 10th term.

Reminder

Patterns can be described using a **rule based on the previous term**. Look across the table of values to work out the gap from one number to the next. For example,

8, 14, 20, 26, 32

→ + 6 →



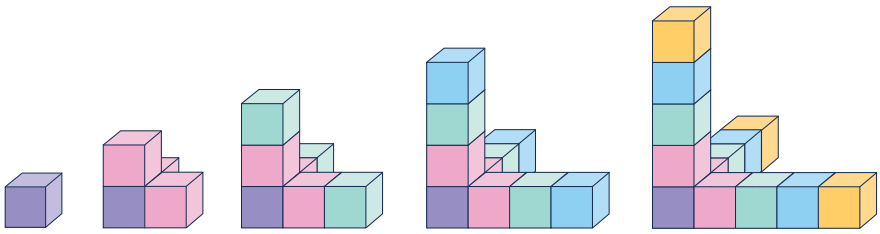
Term (T)	1	2	3	4	5	6	7	8	9	10
Number of matchsticks (M)										

Rule based on the previous term → ☐ →

Your turn

2 For each pattern, complete the table of values to the 5th term and describe the pattern using a rule based on the previous term. Then complete the table to the 10th term.

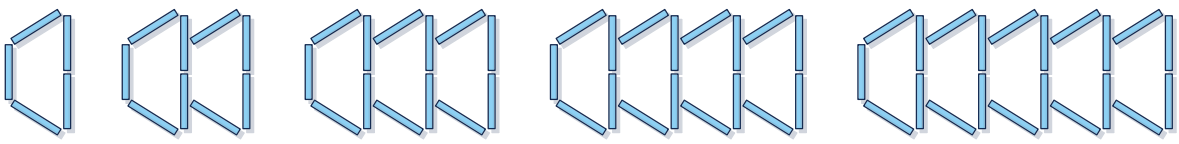
a



Term (T)	1	2	3	4	5	6	7	8	9	10
Number of cubes (C)										

Rule based on the previous term → ☐ →

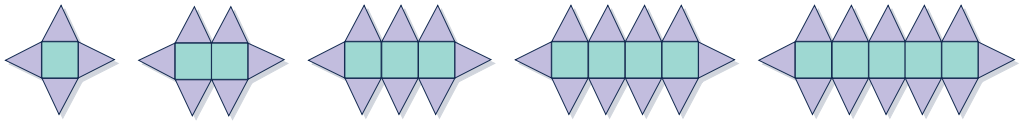
b



Term (T)	1	2	3	4	5	6	7	8	9	10
Number of matchsticks (M)										

Rule based on the previous term → ☐ →

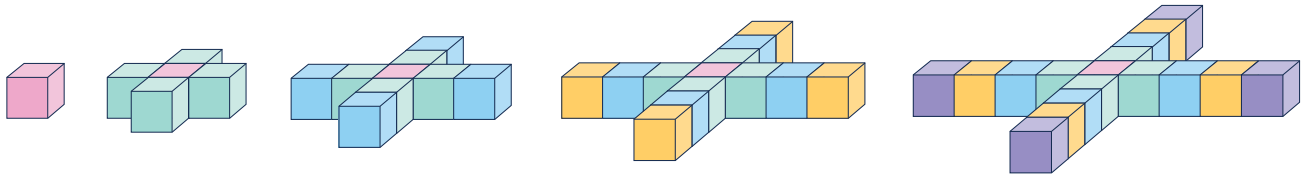
c



Term (T)	1	2	3	4	5	6	7	8	9	10
Number of triangles (N)										

Rule based on the previous term → ____

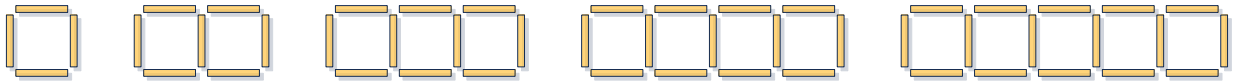
d



Term (T)	1	2	3	4	5	6	7	8	9	10
Number of cubes (C)										

Rule based on the previous term → ____

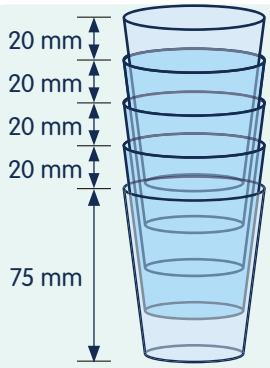
e



Term (T)	1	2	3	4	5	6	7	8	9	10
Number of matchsticks (M)										

Rule based on the previous term → ____

3 Complete the table of values for the stack of glasses to the 5th term and describe the pattern using a rule based on the previous term. Then complete the table to the 10th term.



Term (T)	1	2	3	4	5	6	7	8	9	10
Height of stack in mm (H)										

Rule based on the previous term → ____

Challenge

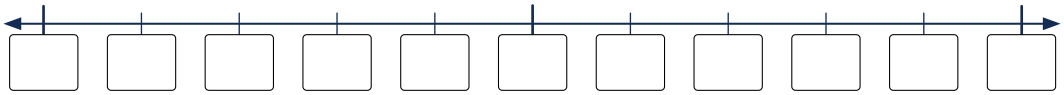
City Mall Car Park charges \$5.45 for the first $\frac{1}{2}$ hour, \$6.85 for the first hour and \$8.25 for $1\frac{1}{2}$ hours. Design a table to display the charges for parking from $\frac{1}{2}$ hour to 5 hours.

City Mall
Car Park Fees
$\frac{1}{2}$ hour \$ ...
1 hour \$ ...

Unit 4.4

Revision Units 1–4

1 Label the number line from −5 to +5.

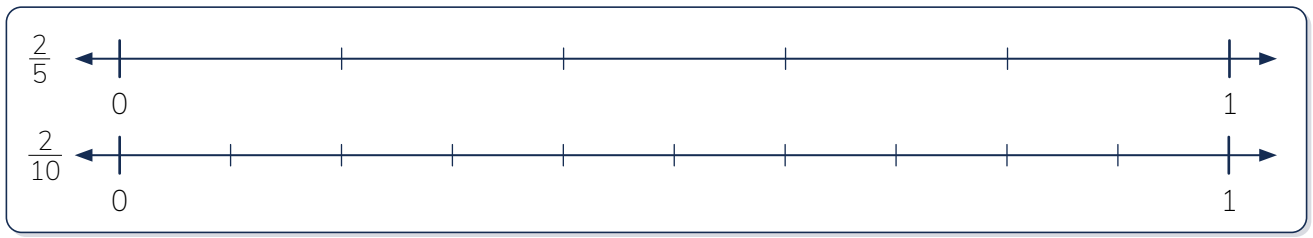


2 Use the number line in question 1 to count the jumps between each pair.

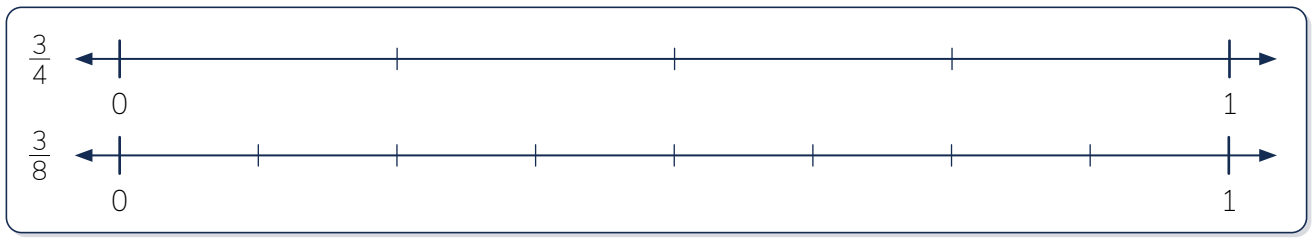
a −1 to +2 ☐ **b** −5 to +5 ☐ **c** −3 to +4 ☐ **d** +5 to −1 ☐ **e** +1 to −3 ☐

3 Mark the fractions on the number lines. Circle the larger fraction in each pair.

a



b



4 Complete the table.

	We say	We write	Answer
a	one third of 21	or $\frac{21}{3}$ or	
b		$\frac{1}{6}$ of 30 or or $30 \div 6$	
c	one fifth of 40	or or $40 \div 5$	

5 Calculate the square numbers.

a 5^2 = ☐ **d** 20^2 = ☐ **g** 300^2 = ☐

b 10^2 = ☐ **e** 90^2 = ☐ **h** 600^2 = ☐

c 7^2 = ☐ **f** 80^2 = ☐ **i** 400^2 = ☐

6 Colour the bubble to show if the number is prime or composite.

a 12 ◯ prime ◯ composite

b 19 ◯ prime ◯ composite

c 7 ◯ prime ◯ composite

d 30 ◯ prime ◯ composite

e 9 ◯ prime ◯ composite

7 Draw factor trees, then circle and write the prime factors.

a 50

50 = ☐

b 24

24 = ☐

36 = ☐

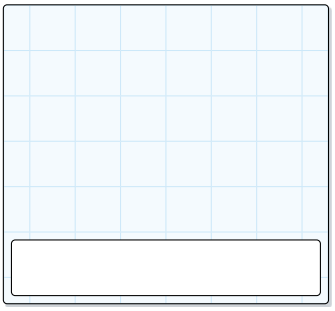
Regular revision

Every 4–5 weeks, your students complete revision activities based on the preceding topics. This regular revision is great for consolidating learning and identifying each student's strengths and weaknesses.

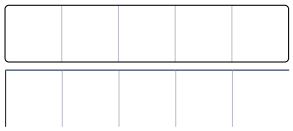
8 Complete the multiplications and division.

a 9612 × 6

b 1946 × 31



c 577 ÷ 4



9 Use a calculator to find the first five answers, then predict the last one.

1 × 9 + 2 = ☐

12 × 9 + 2 = ☐

123 × 9 + 2 = ☐

1234 × 9 + 2 = ☐

12 345 × 9 + 2 = ☐

123 456 × 9 + 2 = ☐

You will need

a calculator

10 Complete the table of values to the 5th term and describe the pattern using a rule based on the previous term. Then complete the table to the 10th term.

Term (T)	1	2	3	4	5	6	7	8	9	10
Number of matchsticks (M)										

Rule based on the previous term → ☐ →

11 Write the inverse of the equations, then work out the unknown. The first one is done for you.

a (Δ + 8) ÷ 2 = 10 ⇨ (10 x 2) − 8 = Δ = 12

b (Δ − 30) × 6 = 18 ⇨ ☐ = ☐

c (Δ + 1) × 10 = 90 ⇨ ☐ = ☐

Investigation Unit 9

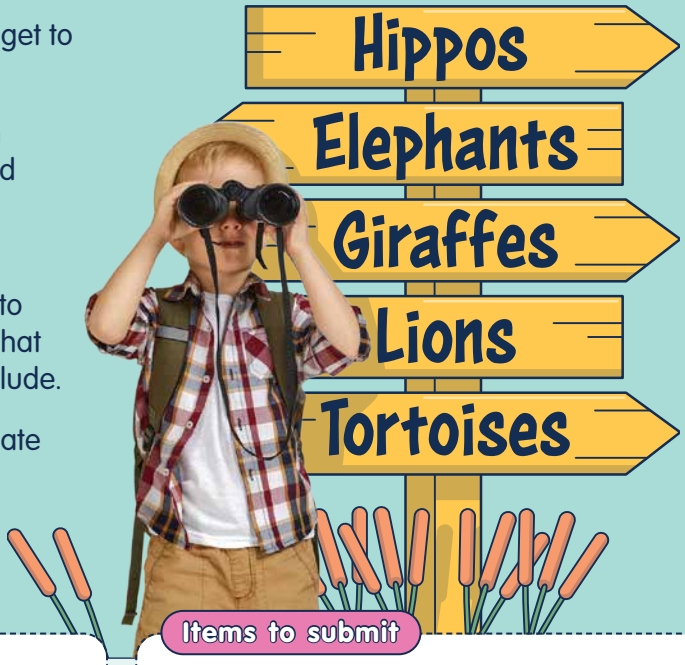
Happy hippos

The Global Wildlife Foundation (GWF) is going to establish an animal-friendly safari park and you get to design it!

A 50 000 square metre wildlife reserve has been set aside for hippos, elephants, giraffes, lions and tortoises. The size of all animal enclosures must comply with GWF guidelines.

Investigate the best way to use these guidelines to plan your animal enclosures. Also, think about what other special features your park design could include.

Prove to the GWF that each enclosure has adequate space for the number of animals.



Topics

Use what you learned in these topics to complete the investigation.

Items to submit

At the end of this investigation you will need to submit:

- Cover sheet
- Safari park calculation tables
- Grid paper with park design

Access @ Maths Trek Online

Investigation steps

1 Discuss features and facilities

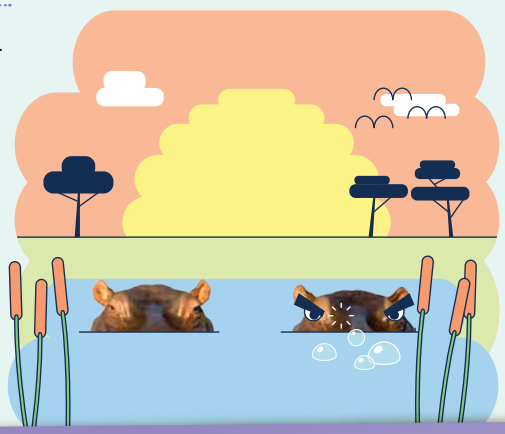
Discuss the features of zoos or safari parks you may have seen or visited. What animals and facilities did they have? List the features and facilities you might like to include in your own safari park.

2 Select animal numbers

Look at the information on your Safari park calculation tables. Decide how many animals to put into each enclosure and choose your features and facilities. All enclosures, features and facilities must fit within the confines of the 50 000 square metres (5 hectares).

Find the total area required for each animal enclosure, feature and facility, and record it in the tables.

Calculate the number of grid squares needed to represent each enclosure, feature or facility. On the Grid paper, one grid square represents 100 square metres.



Bring maths to life

Every Student Book features up to eight investigations. Designed to be conducted over a week, each investigation is packed with opportunities for your students to apply their maths skills to unfamiliar, extended problems.

3 Design the park

Use the Grid paper that represents the 50 000 squa metre site for your park design. Try to maximise the use o available space.

Draw and label all the animal enclosures, features and fo including their areas in square metres. These might be sc rectangles or composite shapes.

4 Compare designs

Swap safari park designs with a classmate. Discuss the area and positions of enclosures. Check the accuracy of the calculations.

Does the number of animals in each enclosure comply with the minimum area required?

Make a class display of the safari park designs.

5 Critical thinking

Justify the area of your giraffe enclosure.

Evaluate your design and offer one improvement.

Develop critical thinking skills

Critical thinking is an essential step in every investigation. At Maths Trek Online you'll find critical thinking lessons, cognitive verb definitions, examples and hints — all designed to help your students craft well-reasoned responses to critical thinking questions.

Inquiry

Use a digital program that shows a 3D representation of the Earth to find your school. Use the measuring tool and estimate the entire area of your school grounds.

Unit 3.4

Problem-solving strategy

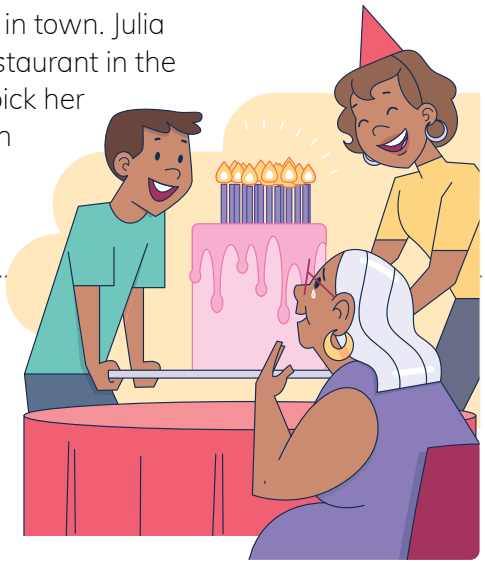
Drawing a picture or diagram

Work together

Problem

Julia is taking her Nan to her surprise birthday party at a restaurant in town. Julia lives 14.5 km from the restaurant, and Nan lives 9.5 km from the restaurant in the opposite direction. Julia will drive from her home to Nan's house to pick her up and take her to the restaurant. After the party, Julia will drive Nan home before driving home herself.

How many kilometres will Julia drive?



Unpacking the problem

a What is the problem asking us to do?

- ◯ calculate the distance from Julia's house to Nan's house
- ◯ calculate the total distance Julia will drive
- ◯ work out how many candles Nan will have on her cake

b Underline the important information in the problem.

c Write, jot, draw or discuss what you know about the problem.
Discuss how this helps us draw a picture or diagram to solve the problem.

Solving the problem

a Complete the diagram by drawing Julia's house and Nan's house, and labelling the known distances.

b Draw arrows on the diagram to indicate Julia's journey.

c Calculate the total distance Julia will drive.

= ☐

d Complete the statement.

Julia will drive a total of ☐.

Your turn

Problem A

Riley lives 8.2 km from the surf club. The pier is 7.5 km fro
To train for an upcoming cycling event, Riley rides from ho
After this, Riley rides back to the pier and then rides hom

How many kilometres does Riley cycle in his training loop

Riley cycles ☐ in his training loop.

Nine problem–solving strategies

Use the online teaching resources and scaffolded *Work together* problem to explicitly teach each strategy. Then give your students independent practice at applying the strategy as they complete the *Your turn* problems.

Problem B

Every day from Monday to Friday, Pop walks from his house to the post office to check his post office box. Pop always stops at the lake, which is 400 m west of his house, along the way. The post office is 300 m south of the lake.

On Friday Pop took a parcel to the post office. When he realised he had left the parcel at the lake, he walked back to the lake to retrieve the parcel before returning to the post office to send it.

If Pop always walks directly from the post office back to his house, which is 500 m away in a straight line, how far did he walk this week?

Pop walked ☐ (or ☐ km).

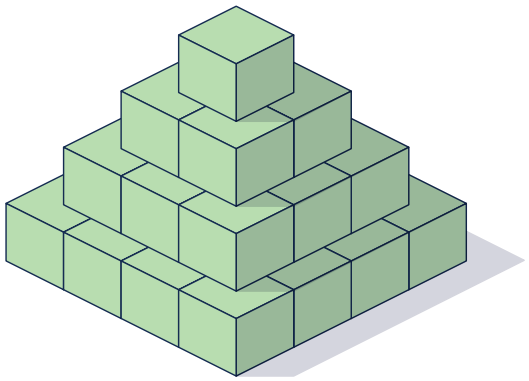
Unit 20.4

Problem-solving practice

Problem A

Marnie built a pyramid with 4 layers using cubes. Then she built a second pyramid with 6 layers using the same pattern.

How many cubes are in Marnie's second pyramid?



There are ☐ cubes in Marnie's second pyramid.

Think critically

a How did you solve the problem? Tick the strategy or strategies you used.

- ☐ Guessing and checking
- ☐ Acting out the problem
- ☐ Solving a simpler problem
- ☐ Drawing a picture or diagram
- ☐ Finding a pattern or using a rule
- ☐ Making an organised list
- ☐ Making a table or chart
- ☐ Finding smaller parts of a larger problem
- ☐ Working backwards

b What if Marnie's second pyramid had 8 layers instead of 6? How would the answer change?

Problem B

Anton has a set of domino tiles. The number of dots on each end of a tile ranges from 0 to 6. Every tile in Anton's set has a different combination of dots.

If all possible dot combinations are included, how many domino tiles are in Anton's set?

There are ☐ domino tiles in Anton's set.

Plenty of problem-solving practice

As the year progresses, your students practise choosing appropriate problem-solving strategies to solve a variety of unfamiliar problems.

Share and discuss

Encourage your students to share their solutions and explain how they used their chosen strategies.

Then discuss the extra related problem with your students to further develop their critical thinking skills.

Think critically

a How did you solve the problem? Tick the strategy or

- ☐ Guessing and checking
- ☐ Acting out the problem
- ☐ Solving a simpler problem
- ☐ Drawing a picture or diagram
- ☐ Finding a pattern or using a rule
- ☐ Making an o
- ☐ Making a tab
- ☐ Finding smaller parts of a larger problem
- ☐ Working backwards

b What if the number of dots on each end of a domino tile ranged from 0 to 9? Is there an efficient way to work out how many tiles Anton's set would contain?

The Maths Trek Program

Maths Trek is a whole-school numeracy program for Foundation to Year 6 that develops mathematical understanding, fluency, reasoning and problem-solving skills.

The Student Book together with the explicit teaching resources at Maths Trek Online build, develop and strengthen each student's ability to work mathematically.

Use the comprehensive online teaching resources to explicitly teach each concept before students apply their learning in the Student Book.

Aligned with the Australian Curriculum v9

In the Student Book you will find ...

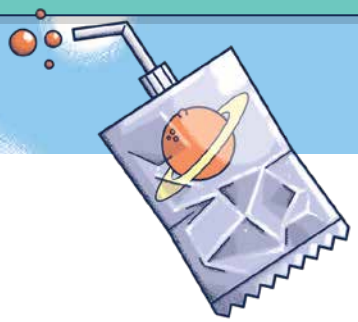
- shared *Work together* activities
- modelled examples
- independent activities to develop and master maths skills
- concepts revisited throughout the year
- scaffolded problems to learn key problem-solving strategies
- practice problems to build confidence in applying the strategies
- real-world investigations where students apply maths skills to unfamiliar, extended mathematical problems to strengthen connections between concepts
- regular revision to consolidate learning

At Maths Trek Online you will find ...

- explicit teaching slides and lesson guides for every topic
- differentiation tasks
- interactive teaching tools
- investigation videos
- digital and printable resources to guide students through every investigation
- critical thinking lessons in every investigation
- mid-term assessments
- access to teaching resources for all year levels

Head to www.fireflyeducation.com.au/mathstrek to:

- view Maths Trek sample pages from other year levels
- download the curriculum match and yearly plan documents
- check out the full Maths Trek product range
- book a meeting with your local education consultant to learn about Maths Trek.



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