

Maths Trek

Exploring maths in the real world

5



Take a look inside!

As you explore these sample pages, look out for these handy notes which point out the important information and exciting features of Maths Trek.

Sample Student Book Pages
(Australian Curriculum Edition)

firefly
EDUCATION

Your Maths Trek Teacher Guide

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

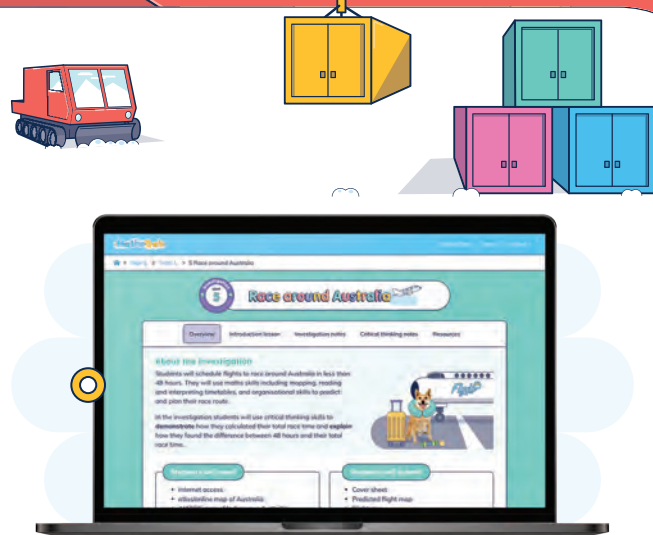
To maximise the benefits of the program, use the Student Book with the explicit teaching resources at Maths Trek Online to build, develop and strengthen each student's ability to work mathematically.

- 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.

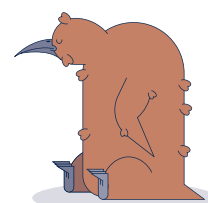
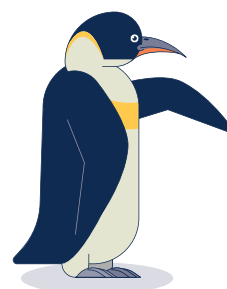
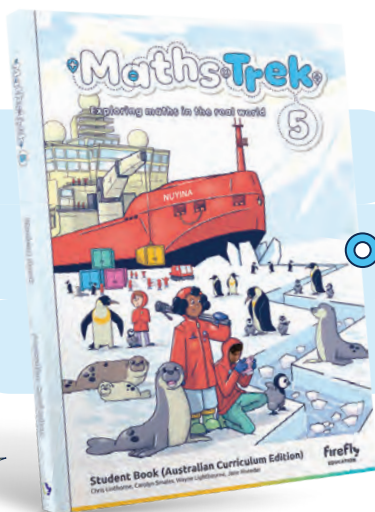
You will also find investigation notes, Student Book answers, and preparation and planning documents at Maths Trek Online.



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.

Download the *Problem-Solving Progress Checklist* to record each student's progress throughout the year.

Investigations

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

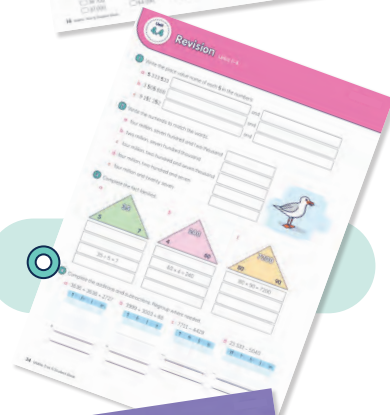
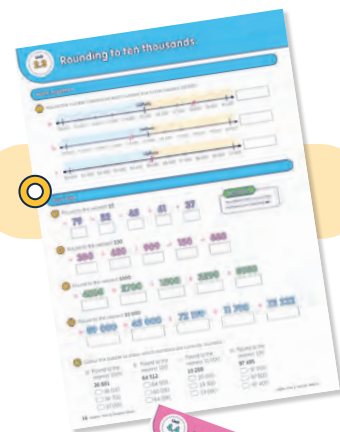
Use the online teaching notes, exemplars, videos and printable resources to introduce and guide students through each step of the investigation.

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.



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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.

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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: Twinkle twinkle



Investigation: If I were a Martian



Investigation: Never a cross word






Investigation: Finals fever

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

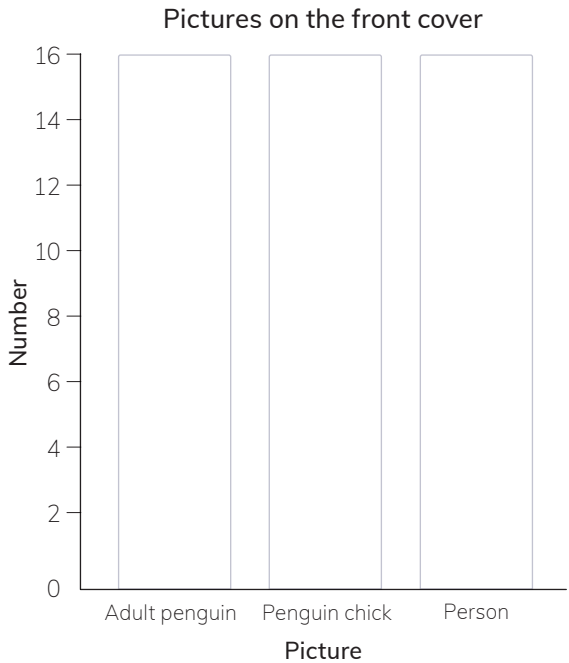


Cover hunt

Look at the front cover of your book.
Tally the pictures, then write the totals.

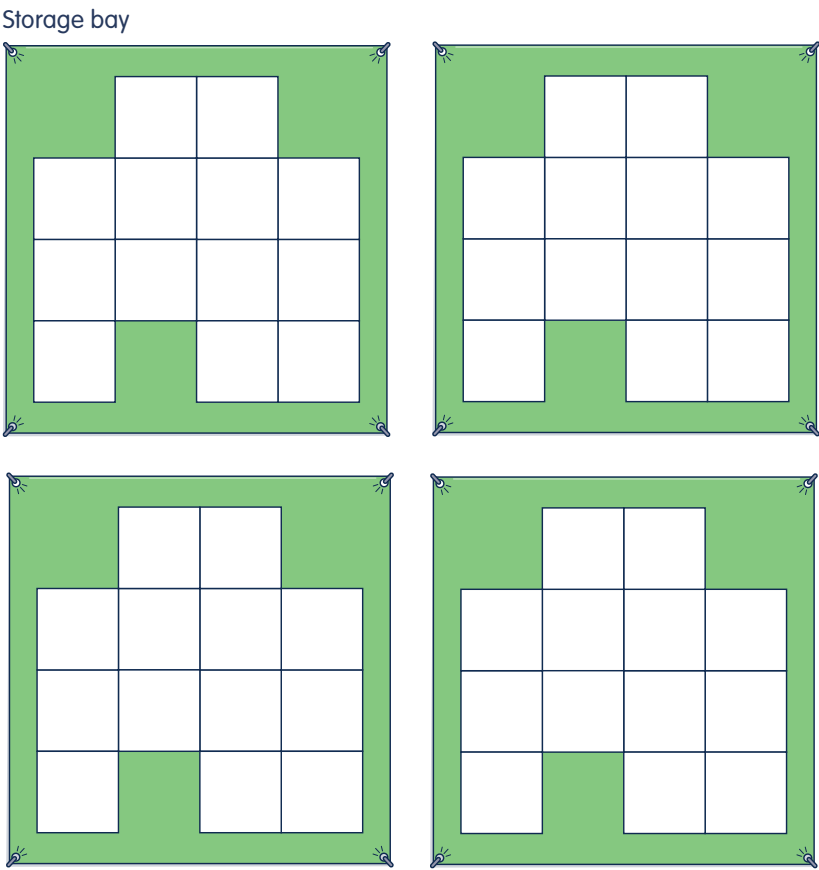
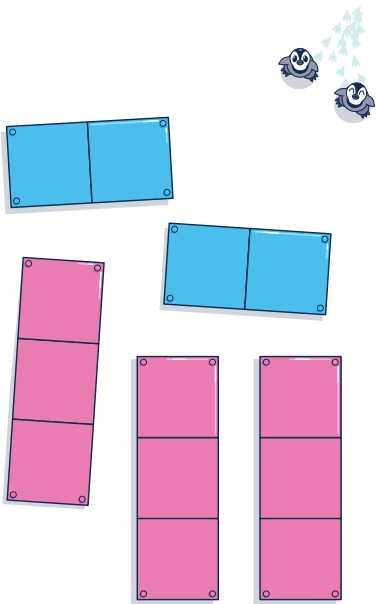
Picture	Tally	Total
 Adult penguin		
 Penguin chick		
 Person		

Use the data from the table to complete the column graph.



Container puzzle

Show four different ways the containers can fit in the storage bay.



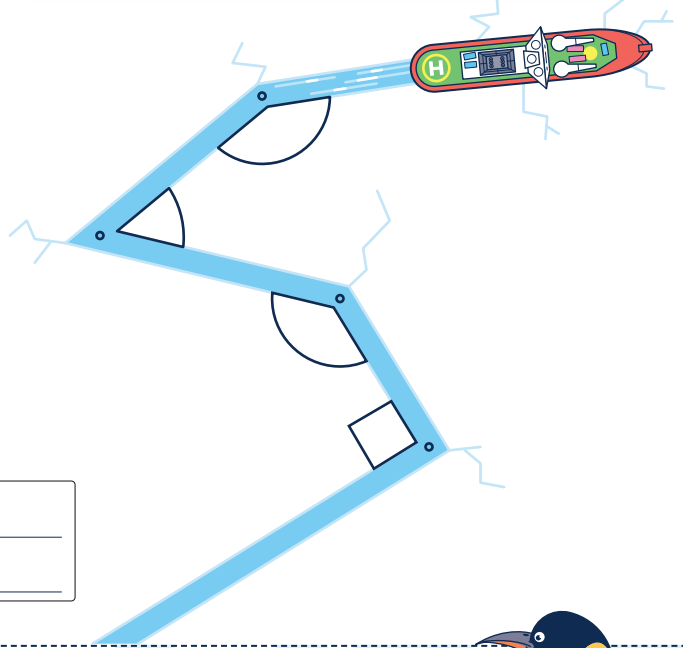
Engaging activities from day one

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.

Icy angles

Look at the path left by the icebreaker.

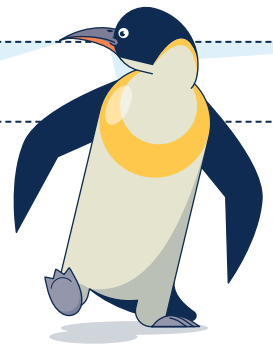
- Colour any acute angles **blue**.
- Colour any right angles **green**.
- Colour any obtuse angles **red**.



What other angles can you find?

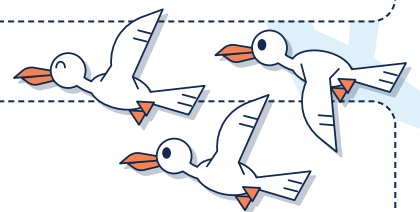
Waddle waddle!

An emperor penguin can waddle 40 metres in a minute.
How far can it waddle in an hour?



Seals and snowcats

A king penguin has a mass of 15 kg.
10 king penguins weigh as much as a male fur seal.
100 male fur seals weigh as much as a snowcat vehicle.
Work out the mass of a fur seal, then a snowcat.



Work together

- 1 Write the coordinates of each location on *Angel Island*.

a Old Lighthouse (,)

b Surf Point (,)

c Island Village (,)

Reminder

On the grid the Old Lighthouse is at (6, 5). The first number is the horizontal position and the second number is the vertical position.

- 2 Write the name of the *Angel Island* location at the coordinates.

a (3, 2)

b (5, 4)

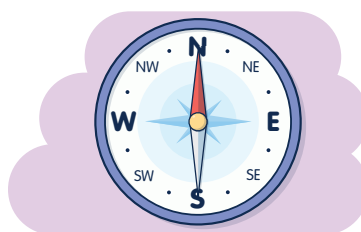
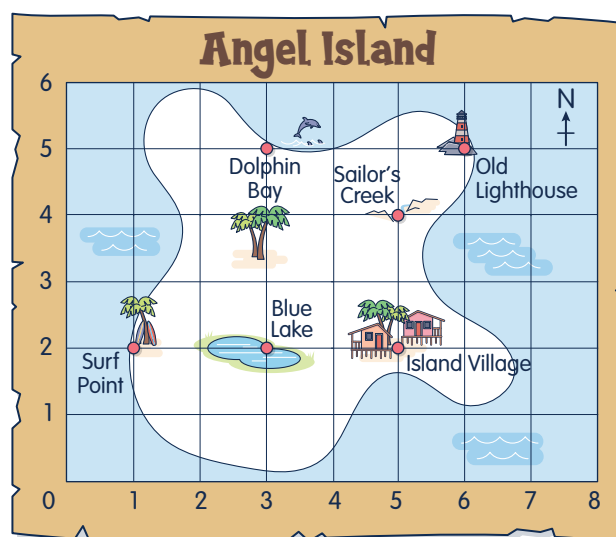
c (3, 5)

- 3 Use the *Angel Island* map to complete the directions.

a The direction from Blue Lake to Surf Point.

b The direction from Sailor's Creek to Blue Lake.

c The direction from Dolphin Bay to Old Lighthouse.



Your turn

- 4 Write the coordinates for the *Cedartown* street intersections.

a Main Drive and Third Avenue (,)

b Lake Street and Fourth Avenue (,)

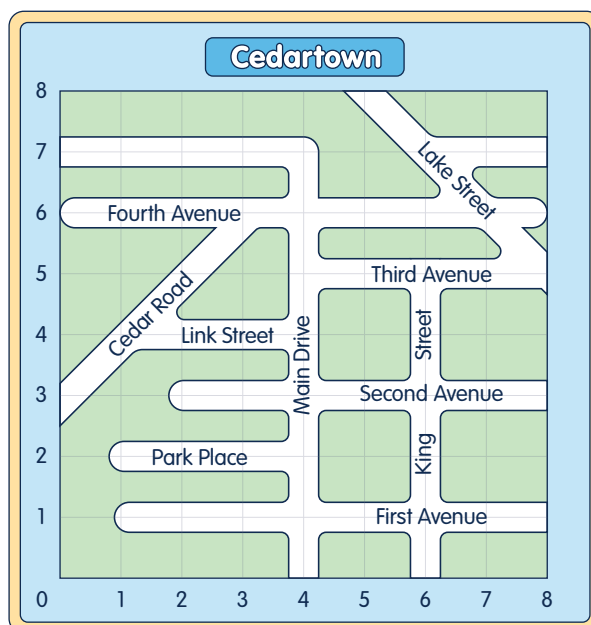
c First Avenue and King Street (,)

- 5 Draw the icons on the map.

a  A school at (5, 4)

b  A hospital at (1, 3)

c  Traffic lights at (4, 5)



- From number and algebra to statistics and probability, your students complete a wide variety of activities to apply what they've learned in each lesson.
- Some concepts are revisited throughout the year to consolidate learning.

f Head south-east to Stone Steps.

k Quickly head west and dig near water. The treasure is here!

Work together

Modelled example

532 × 5

	T	h	t	o
500 × 5 =				
30 × 5 =				
2 × 5 =				

Split into hundreds, tens and ones.

$$532 \times 5 = (500 \times 5) + (30 \times 5) + (2 \times 5)$$

	T	h	t	o
500 × 5 =	2	5	0	0
30 × 5 =		1	5	0
2 × 5 =			1	0

Multiply the hundreds, tens and ones.

$$\begin{aligned} 500 \times 5 &= 2500 \\ 30 \times 5 &= 150 \\ 2 \times 5 &= 10 \end{aligned}$$

	T	h	t	o
500 × 5 =	2	5	0	0
30 × 5 =		1	5	0
2 × 5 =			1	0
	2	6	6	0

Add the three numbers.

$$2500 + 150 + 10 = 2660$$



1 Use the split and multiply strategy for multiplication.

a 643 × 6

	T	h	t	o

b 327 × 3

	T	h	t	o

c 442 × 4

	T	h	t	o

Your turn

2 Use the split and multiply strategy.

a 846 × 3

	T	h	t	o

b 659 × 2

	T	h	t	o

c 734 × 5

	T	h	t	o

d 252 × 7

	T	h	t	o

e 845 × 4

	T	h	t	o

f 322 × 9

	T	h	t	o

- a three birds

	T	h	t	o
three birds				
<div></div>				
<div></div>				
<div></div>				
\$				



- b two kittens

	T	h	t	o
two kittens				
<div></div>				
<div></div>				
<div></div>				
\$				

- c five fish

	T	h	t	o
five fish				
<input type="text"/>				
<input type="text"/>				
<input type="text"/>				
\$				

- d six
puppies

	T	h	t	o
<div> <div></div> <div>six</div> <div>puppies</div> </div>				
<div> <div></div> <div>=</div> </div>				
<div> <div></div> <div>=</div> </div>				
<div> <div></div> <div>=</div> </div>				
\$				

- q six soccer balls

- [illegible]

- c five cricket bats

[illegible]

- ☐ six soccer balls
- ☐ four tennis rackets
- ☐ five cricket bats



1 Write the place value name of each **5** in the numbers.

a 5 333 533

and

b 3 505 888

and

c 9 151 252

and

2 Write the numerals to match the words.

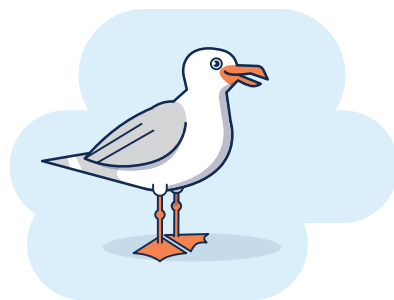
a four million, seven hundred and two thousand

b two million, seven hundred thousand

c four million, two hundred and seven thousand

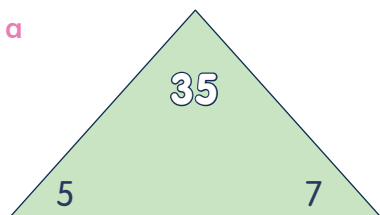
d four million, two hundred and seven

e four million and twenty-seven

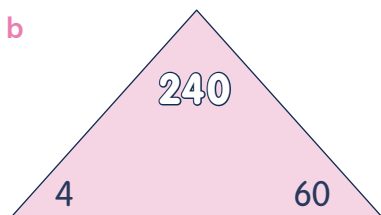


3 Complete the fact families.

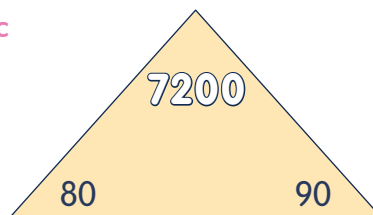
a



b



c



4 Complete the additions and subtractions. Regroup where needed.

a 3636 + 3636 + 2727

	T	h	t	o
+				

b 3999 + 3003 + 88

	T	h	t	o
+				

c 7711 – 4429

	T	h	t	o
–				

d 23 333 – 5040

	tT	T	h	t	o
–					

5 Use rounding to give reasonable estimates.

a
$$\begin{array}{r} 3885 \\ + 4019 \\ \hline \end{array}$$

(estimate)

b
$$\begin{array}{r} 5872 \\ - 2943 \\ \hline \end{array}$$

(estimate)

c
$$\begin{array}{r} 703 \\ \times 31 \\ \hline \end{array}$$

(estimate)

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.

6 Archie rides his bike home each school day. The table shows the times he leaves school and arrives home.

a Work out the travel time for each day and complete the table.

b On which day does Archie take the longest time to ride home?

c Once a week Archie stays after school for footy practice until 4:00 pm. On which day?

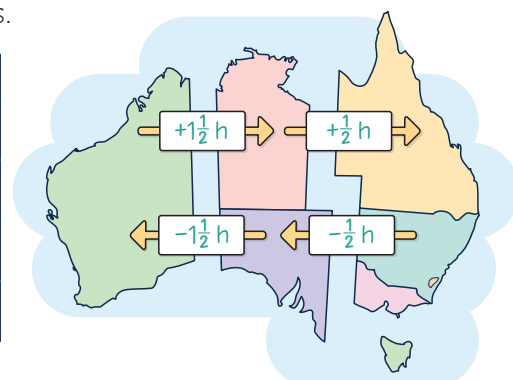
d Archie has to be home 5 minutes before guitar practice at 3:30 pm. On which day?

Day	Leaves school	Arrives home	Travel time (min)
Monday	15:10	15:35	
Tuesday	15:05	15:35	
Wednesday	15:20	15:40	
Thursday	16:05	16:27	
Friday	15:05	15:25	



7 Show the corresponding times across the three Australian time zones.

	Western (AWST)	Central (ACST)	Eastern (AEST)
a	10:00 am	11:30 am	12:00 pm
b	3:15 pm	9:30 am	
c		7:30 pm	



8 a What is the direction from Lighthouse Island to Double Island?

b What is the direction from Coconut Island to Lighthouse Island?

c Which island is south-east of Double Island?

d Which island is 3 km west of the ship?

e How far is Coconut Island from the ship?

f Which island is located at (4, 5) on the map?

g Write the coordinates of the ship.

h Write both coordinates on Double Island.





How fast can you fly?

Investigate if it is possible to fly around Australia and back to your starting point in less than 48 hours.

Your challenge is to be the fastest in your class to fly to each state and territory capital city using commercial flights. It's time to get racing!



Topics

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

- Unit 3.2 24-hour time..... p 22
- Unit 3.3 Reading timetables..... p 24
- Unit 4.1 Australian time zones p 28
- Unit 4.2 Directional language..... p 30
- Unit 4.3 Coordinates and directions..... p 32

Items to submit

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

- Cover sheet
- Predicted flight map
- Flight map
- Flights table



Investigation steps


1 Prepare your map

Mark each Australian capital city on the **Predicted flight map** using the map references in the table. Use an atlas or online map to help you.

Find the location of your school and mark it on your **Predicted flight map** .

Map references		
City	Airport code	Coordinates
Adelaide	ADL	(25, 10)
Brisbane	BNE	(37, 18)
Canberra	CBR	(33, 9)
Darwin	DRW	(18, 31)
Hobart	HBA	(32, 1)
Melbourne	MEL	(30, 7)
Perth	PER	(5, 14)
Sydney	SYD	(35, 12)


2 Predict the best route

Predict the best route around Australia, starting at the nearest capital city to your school and returning to your starting point. Include every capital city and mark a possible route on your [Predicted flight map](#) .

Use arrowed straight lines connecting the cities to show the flight directions.




3 Find flights and make a table

Plan your route using flight schedules from different airlines and travel websites. Record the date, stage, departure time, arrival time and duration for each flight in 24-hour time in your [Flights table](#) .


You may need to adjust your route if you cannot find suitable flight times.


4 Calculate your total race time

Investigate a way to calculate how much time your entire journey took. Include waiting time between flights. Did you finish the race in more or less than 48 hours?



Calculate how close you were. Record the results on your [Flight map](#) .

5 Mark the flights on your map

Copy the capital cities onto your [Flight map](#) . Use arrowed straight lines connecting the cities to show your actual route.

Label the major and intermediate compass points on the compass on your [Flight map](#) . Then label the directions of the arrowed lines, for example north, south-east, north-west. How does this route compare to your predicted route?

6 Compare maps and tables

Compare your [Flight map](#)  and [Flights table](#)  with your classmates. Check the accuracy of the location of each capital city and each flight direction.

Did anyone take off from a city before their previous flight arrived? Who finished flying in the fastest time? How did they achieve this? Discuss how you identified your race route and calculated your total race time.

7 Critical thinking

Demonstrate how you calculated your total race time.

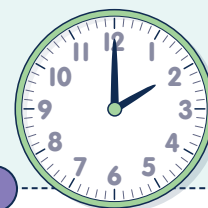
Explain how you found the difference between 48 hours and your total race time.

Bring maths to life

Designed to be conducted over a week, every investigation is packed with opportunities for your students to apply their maths skills to unfamiliar, extended problems.

Develop critical thinking skills

Critical thinking is an integral part of 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 when sharing and discussing results.



Inquiry

How much longer is three hours, two minutes and one second than one hour, two minutes and three seconds?

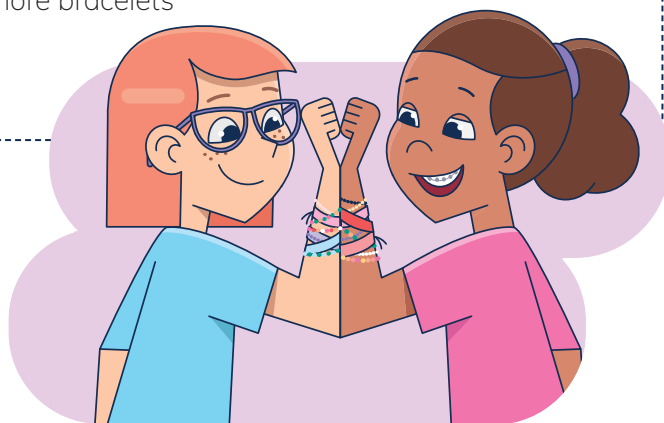
Guessing and checking

Work together

Problem

Mae and Cleo collect beaded bracelets. Cleo has five more bracelets than Mae. They have 27 bracelets altogether.

How many bracelets does each of them have?



Unpacking the problem

- a What is the problem asking us to do?

Work out how many bracelets ...

- ☐ Cleo has
☐ Mae has
☐ each of them has

- 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 use guessing and checking to solve the problem.

Solving the problem

- a Use guessing and checking to identify the number of bracelets Cleo and Mae have.

Tip

We need to find a pair of numbers that add to 27 **and** have a difference of 5.

Guess

guess 1 17 for Cleo
10 for Mae

27	
Cleo	Mae

guess 2 15 for Cleo
12 for Mae

27	
Cleo	Mae

guess 3 16 for Cleo
11 for Mae

27	
Cleo	Mae

Check

Correct?
X or ✓

Next guess?
higher or lower

$$17 - 10 = \boxed{} \quad \boxed{} \quad \boxed{}$$

$$15 - 12 = \boxed{} \quad \boxed{} \quad \boxed{}$$

$$16 - 11 = \boxed{} \quad \boxed{}$$

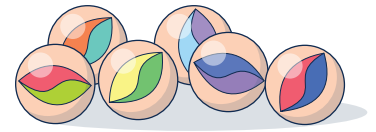
- b Complete the statement.

Cleo has bracelets and Mae has bracelets.

**Problem A**

Toby and Rhett collect marbles. Rhett has nine more marbles than Toby. They have 41 marbles altogether.

How many marbles does each of them have?



Toby has marbles and Rhett has marbles.

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

Emily surveyed her classmates about their pets. She learned that students in her class own cats or dogs. There is an even number of cats, and five more dogs than cats.

If Emily's classmates have 29 pets in total, how many cats and dogs?

Emily's classmates have cats and dogs.

Problem C

Eve, Lucas and Kelly all have pet fish. Eve has the least number of fish and Kelly has the most. Lucas has three more fish than Eve and Kelly has five more fish than Eve. The three of them have 26 fish between them.

How many fish does each of them have?

Eve has fish, Lucas has fish and Kelly has fish.

Problem A

Jimmy is about to begin a high ropes course with his friends. The helmets and carabiners come in red, yellow, blue and green.

If Jimmy wants to wear a helmet in a different colour from his carabiner, how many combinations can he choose from?



Jimmy can choose from different combinations.

Think critically

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

- | | |
|--|--|
| <input type="checkbox"/> Guessing and checking | <input type="checkbox"/> Making an organised list |
| <input type="checkbox"/> Acting out the problem | <input type="checkbox"/> Making a table or chart |
| <input type="checkbox"/> Solving a simpler problem | <input type="checkbox"/> Finding smaller parts of a larger problem |
| <input type="checkbox"/> Drawing a picture or diagram | <input type="checkbox"/> Working backwards |
| <input type="checkbox"/> Finding a pattern or using a rule | |

b What if there were purple helmets and orange carabiners as well?
Is there a simple way to find the number of possible combinations?

Problem B

Three friends were riding laps around a bike track. While Eva took 4 minutes to complete one lap, Taylor took 6 minutes and Diego took 9 minutes. All three began at the starting line at 11:00 am. They stopped riding when Taylor completed her sixth lap.

How many laps did the three friends do altogether?



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.

The three friends did laps of the bike track altogether.

Think critically

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

- | | |
|--|--|
| <input type="checkbox"/> Guessing and checking | <input type="checkbox"/> Making an organised list |
| <input type="checkbox"/> Acting out the problem | <input type="checkbox"/> Making a table or chart |
| <input type="checkbox"/> Solving a simpler problem | <input type="checkbox"/> Finding smaller parts of a larger problem |
| <input type="checkbox"/> Drawing a picture or diagram | <input type="checkbox"/> Working backwards |
| <input type="checkbox"/> Finding a pattern or using a rule | |

b What if Eva took 4 minutes and 30 seconds to complete one lap?

Look for a simple way to work out how many laps Eva would complete. Explain your answer.

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.



In this book students 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 teachers will find ...

- explicit teaching slides and lesson guides for every topic and problem-solving lesson
- engaging visuals and hands-on activities in lessons
- differentiation tasks
- interactive teaching tools
- investigation videos
- digital and printable resources to guide students through every investigation
- critical thinking lessons
- formative and summative assessments

Maths Trek Online includes the teaching resources for all year levels and complimentary access to the student site.

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
- sign up for a free trial of the online teaching resources
- book a free professional learning workshop for your school.

