

# Maths Trek

Exploring maths in the real world

5



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.

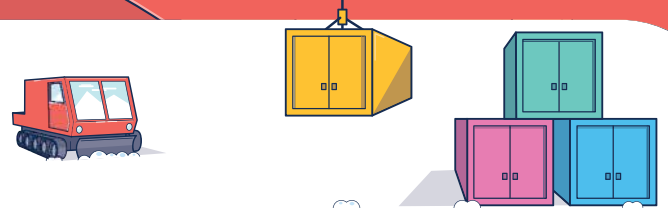
To maximise the benefits of the program, use the Student Book with the explicit teaching resources at Maths Trek Online to build, develop and strengthen each student's ability to work mathematically.

- 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.

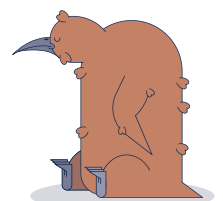
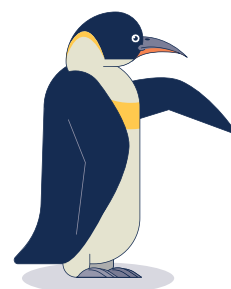
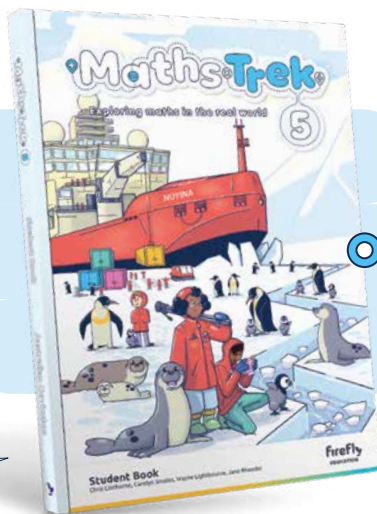
You will also find investigation notes, Student Book answers, and preparation and planning documents at Maths Trek Online.



## ○ 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.



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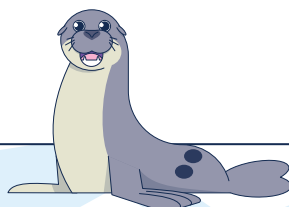


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You'll find extra investigations at Maths Trek Online — a great way to round off a year of maths!

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## 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.



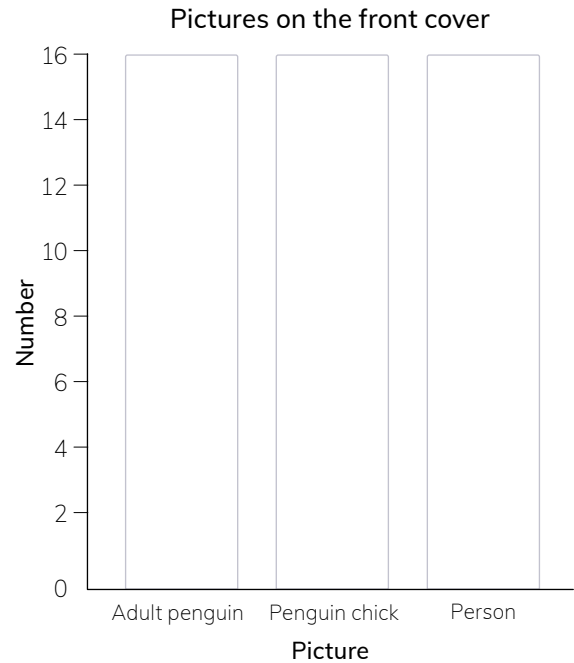
# Maths is everywhere

## Cover hunt

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

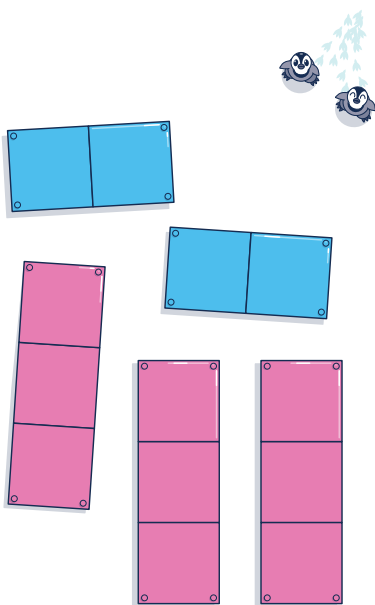
Picture	Tally	Total
 Adult penguin		
 Penguin chick		
 Person		

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

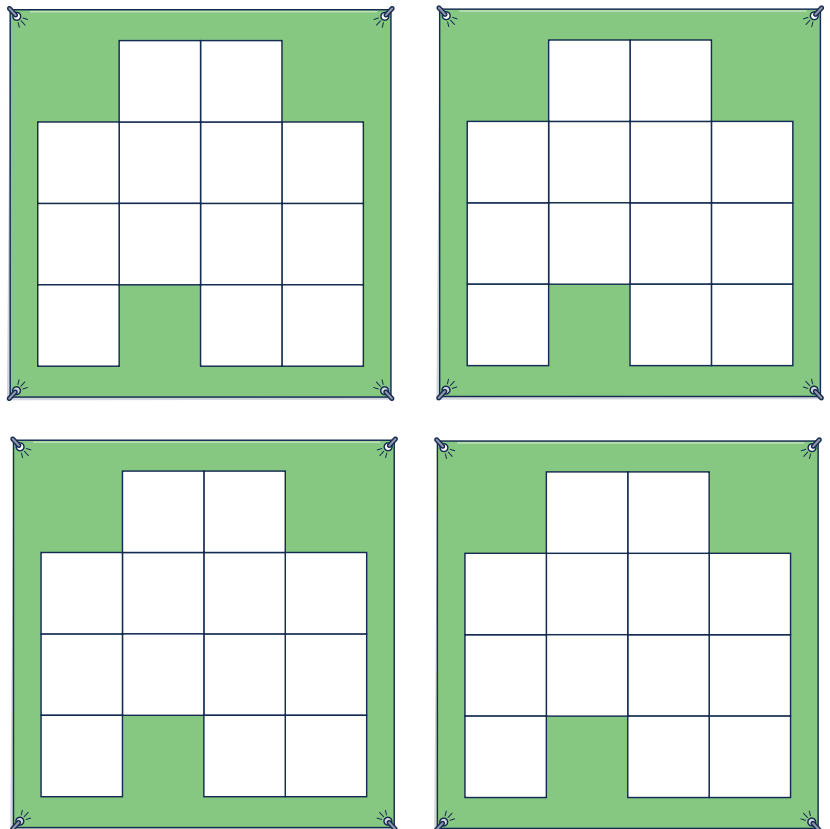


## Container puzzle

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



Storage bay



## Engaging activities from day one

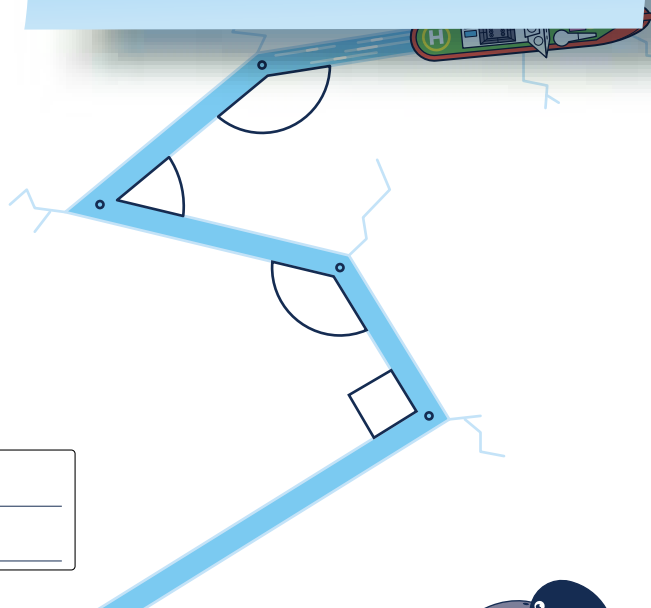
Get your students excited about maths as they apply skills learned in the previous year to these fun activities — all cleverly inspired by the art on the cover.

### Icy angles

Look at the path left by the icebreaker.

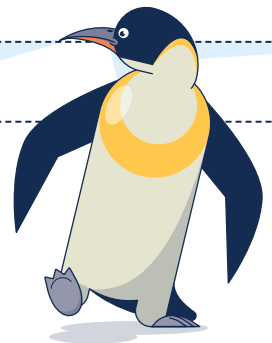
- Colour any acute angles **blue**.
- Colour any right angles **green**.
- Colour any obtuse angles **red**.

What other angles can you find?

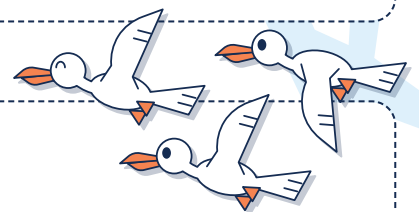
### Waddle waddle!

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 (     ,     )

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.

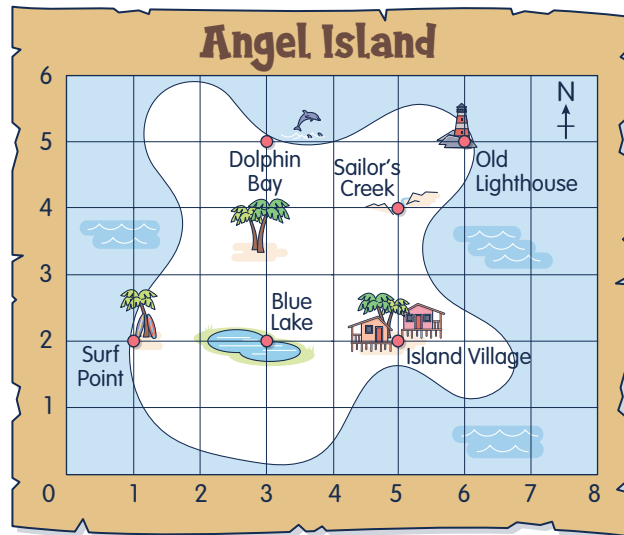
a The direction from Blue Lake to Surf Point.

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

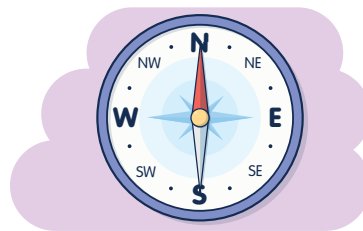
c The direction from Dolphin Bay to Old Lighthouse.

### 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.



Scale  
1 km



## Your turn

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

a Main Drive and Third Avenue (     ,     )


b Lake Street and Fourth Avenue (     ,     )

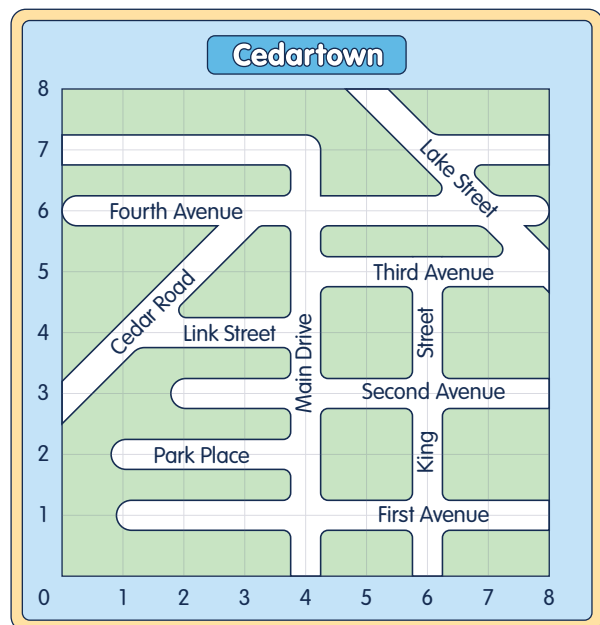
c First Avenue and King Street (     ,     )

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)





- 6 Use the clues to find buried treasure. Mark your travels on the *Treasure Map* and write the coordinates after each clue.

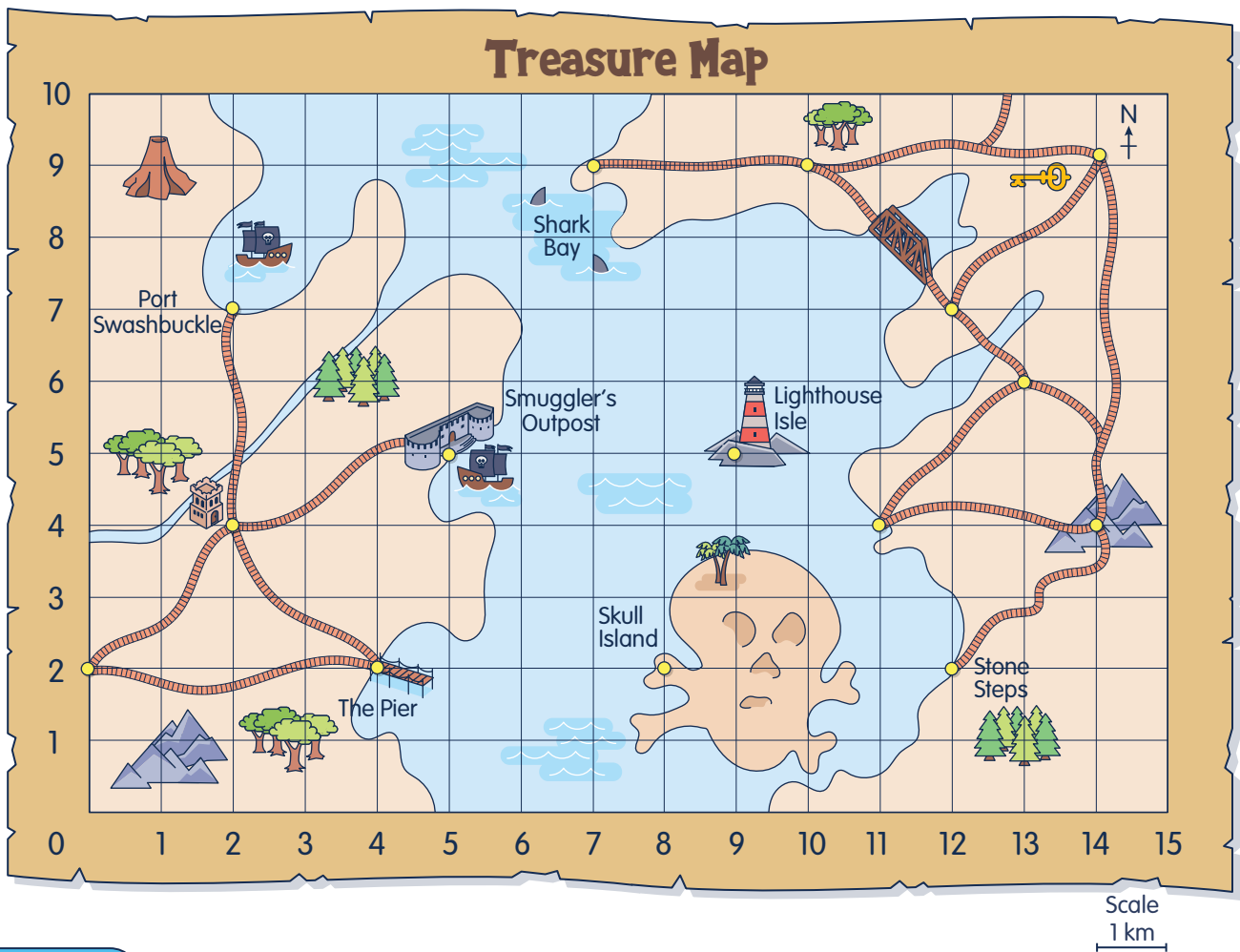


**Clues**

- a Start at Port Swashbuckle. (   ,   )
- b Journey south, crossing the river to the castle. (   ,   )
- c Head north-east to the coast for supplies. (   ,   )
- d Sail south-east to collect a treasure map from Skull Island. (   ,   )
- e Voyage north 2 km, then north-east to a small isle. (   ,   )
- f Head south-east to Stone Steps. (   ,   )

- g Climb mountain. (   ,   )
- h Travel north. (   ,   )
- i Go south. (   ,   )
- j Cross river next to castle. (   ,   )
- k Quick! Find treasure in water. The treasure is here! (   ,   )

**70+ topics in every year**  
 From number and measurement to space and statistics, your students complete a wide variety of activities to apply what they've learned in the lesson.  
 Key topics are revisited throughout the year to consolidate learning.



**Challenge**

Write a clear set of directions for the journey home to Port Swashbuckle by sea and land based on question 6. Start at the location of the treasure, and try to find the shortest way to Port Swashbuckle. Remember you left your ship at Stone Steps!

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## Work together

### Modelled example

	T	h	t	o
$532 \times 5$				
$500 \times 5 =$				
$30 \times 5 =$				
$2 \times 5 =$				

Split into hundreds, tens and ones.

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

	T	h	t	o
$500 \times 5 =$	2	5	0	0
$30 \times 5 =$		1	5	0
$2 \times 5 =$			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
$500 \times 5 =$	2	5	0	0
$30 \times 5 =$		1	5	0
$2 \times 5 =$			1	0
	2	6	6	0

Add the three numbers.  
 $2500 + 150 + 10 = 2660$



1 Use the split and multiply strategy for multiplication.

a  $643 \times 6$

	T	h	t	o

b  $327 \times 3$

	T	h	t	o

c  $442 \times 4$

	T	h	t	o

## Your turn

2 Use the split and multiply strategy.

a  $846 \times 3$

	T	h	t	o

b  $659 \times 2$

	T	h	t	o

c  $734 \times 5$

	T	h	t	o

d  $252 \times 7$

	T	h	t	o

e  $845 \times 4$

	T	h	t	o

f  $322 \times 9$

	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 
$$\begin{array}{r} 70 \\ \times 3 \\ \hline \end{array}$$
  
(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.

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	

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?

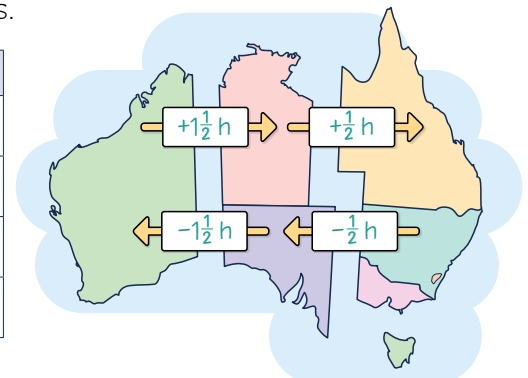
c Once a week Archie stays after school for footy practice until 4:00 pm. On which day?

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



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

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

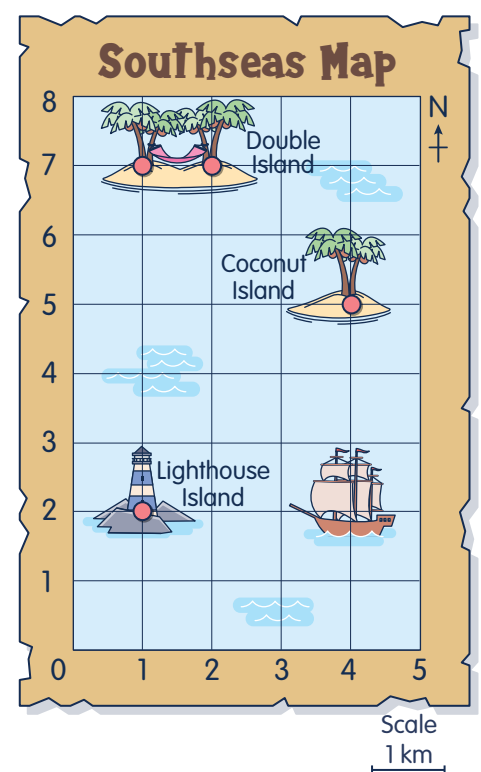
d Which island is 3 km west of the ship?

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 on 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 capital city and each flight direction.

Did anyone take off from a city before their predicted time? Who finished flying in the fastest time? Discuss how you identified your race route and your total race time.

### 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.



## 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.

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

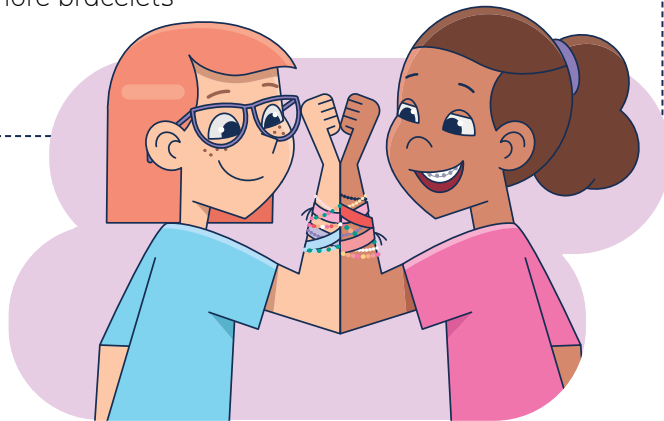
# Guessing and checking

## 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 Write the important information as equations. Use 'Cleo' and 'Mae' in the equations to represent the number of bracelets each girl has.

Cleo has five more bracelets than Mae:  +  = Cleo

They have 27 bracelets altogether:  +  =

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

#### Guess

#### Check

	Mae	Mae + 5 = Cleo	Mae + Cleo = <input type="text"/>	Correct? X or ✓	Next guess? higher or lower
guess 1	10	<input type="text" value="10"/> + 5 = <input type="text"/>	10 + <input type="text"/> = <input type="text"/>	<input type="checkbox"/>	<input type="text"/>
guess 2	12	<input type="text"/> + 5 = <input type="text"/>	12 + <input type="text"/> = <input type="text"/>	<input type="checkbox"/>	<input type="text"/>
guess 3	11	<input type="text"/> + 5 = <input type="text"/>	11 + <input type="text"/> = <input type="text"/>	<input type="checkbox"/>	

- c Complete the statement.

Mae has  bracelets and Cleo has  bracelets.



## 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 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.

## 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.

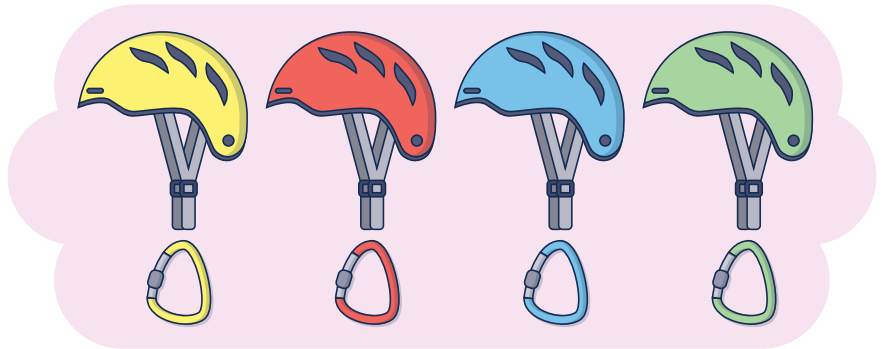
How many fish does each of them have?

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.

The three friends did  laps of the bike track altogether.

### 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 strategies you used.

- |  |  |
|--|--|
| <input type="checkbox"/> Guessing and checking             | <input type="checkbox"/> Making an educated guess                  |
| <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 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](http://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.

