

# UNDERSTANDING EVERYDAY MATHS 2

My surfboard weighs 5.3 kg which means that I need to pay a \$10 excess luggage fee.

I create a cool graph to illustrate people's preferences for party music.

You simply work out the surface area of a gift box by calculating the surface area of a cube.



Section 1:  
Numbers and Algebra  
The Holiday

Section 2:  
Statistics and Probability  
The Party

Section 3:  
Geometry and Measurement  
Christmas Elves

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# Teachers' Notes

*Understanding Everyday Maths - Book 2* is intended for Year 6 and 7 maths students. The activities in this book are linked to engaging narratives. The narratives are cleverly illustrated - some with meaningful diagrams, graphs and charts. In the narratives the teenage characters come across mathematical problems during their everyday lives and must solve the challenges presented to them. Students will immediately identify with the characters in the stories and with the everyday mathematical challenges that they face. By doing so, students will understand how maths is a part of life. This validates the purpose of this learning area. By working through the activities, students will demonstrate maths concepts as prescribed by the Australian curriculum.

This BLM will strengthen the students' literacy skills as well as their maths skills and make maths entertaining whilst demonstrating its everyday usefulness. The subject will never appear irrelevant again.

The stories can be read aloud in the classroom followed by individual or small team attempts at the tasks. Your students can complete the activities with only the knowledge taught throughout the story or you may wish to scaffold concepts further depending on the abilities of your students. Sometimes further research to complete a question will be required of the student. This is a valuable skill as throughout the course of their school life, students will not always be given everything they need to answer a question, rather they will need to rely on their own resourcefulness to obtain a solution. Research will occur more confidently when the students have clearly understood the problem and recognised what is required of them. You should structure your lessons in a way that suits your students' needs.

There are three stories in this resource altogether. Each story appears in a different section of the book. The book is sectioned according to the three maths curriculum areas of: Number and Algebra, Measurement and Geometry and Probability and Statistics. Suggested solutions are provided at the conclusion of the resource.

# Curriculum Links

## Year 6 – Number and Algebra

Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

Investigate everyday situations that use integers. Locate and represent these numbers on a number line (ACMNA124)

Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)

Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)

Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)

Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)

Multiply and divide decimals by powers of 10 (ACMNA130)

Make connections between equivalent fractions, decimals and percentages (ACMNA131)

Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)

Explore the use of brackets and order of operations to write number sentences (ACMNA134)

## Year 6 – Measurement and Geometry

Convert between common metric units of length, mass and capacity (ACMMG136)

Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)

Connect volume and capacity and their units of measurement (ACMMG138)

Construct simple prisms and pyramids (ACMMG140)

Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)

Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)

## Year 6 - Statistics and Probability

Describe probabilities using fractions, decimals and percentages (ACMSP144)

Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)

Compare observed frequencies across experiments with expected frequencies (ACMSP146)

Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)

Interpret secondary data presented in digital media and elsewhere (ACMSP148)

# Curriculum Links

## Year 7 – Number and Algebra

Compare, order, add and subtract integers (ACMNA280)

Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)

Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)

Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)

Round decimals to a specified number of decimal places (ACMNA156)

Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)

Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (ACMNA158)

Recognise and solve problems involving simple ratios (ACMNA173)

Investigate and calculate 'best buys' with and without digital technologies (ACMNA174)

Introduce the concept of variables as a way of representing numbers using letters (ACMNA175)

Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)

Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)

Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)

Solve simple linear equations (ACMNA179)

Investigate, interpret and analyse graphs from authentic data (ACMNA180)

## Year 7 – Measurement and Geometry

Establish the formulas for areas of rectangles, triangles and parallelograms, and use these in problem-solving (ACMMG159)

Calculate volumes of rectangular prisms (ACMMG160)

Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)

Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (ACMMG163)

Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)

Demonstrate that the angle sum of a triangle is  $180^\circ$  and use this to find the angle sum of a quadrilateral (ACMMG166)

Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)

## Year 7 – Statistics and Probability

Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)

Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)

Identify and investigate issues involving numerical data collected from primary and secondary sources (ACMSP169)

Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)

Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)

Describe and interpret data displays using median, mean and range (ACMSP172)

# The Holiday - Part 3

Read the story and complete the maths tasks as you go.

Next I decipher the all-important swell of the waves. Waves that are 'surfable' are level 3 and over. I acquire a chart off the Hawaiian Weather Network that exhibits last June's swell conditions.



## Hawaiian Weather Network

Day	Surf Level	Day	Surf Level	Day	Surf Level
1	2	11	1	21	4
2	2	12	3	22	4
3	3	13	2	23	3
4	3	14	4	24	4
5	4	15	4	25	3
6	4	16	5	26	4
7	3	17	2	27	4
8	4	18	4	28	3
9	3	19	3	29	4
10	3	20	3	30	5



Leah is forever bragging that for every bad surf day in Honolulu there will be at least 5 good ones throughout June. Well, let's see then. I convert the chart into a tally graph to make things clearer.



Bad Surf	
Good Surf	

$$\text{Ratio} = 5:25 \text{ OR } 1:5$$

My tally graph tells me there are 5 days that are not surf-friendly in June and the other 25 days are great for surfing. So the ratio looks to be 5:25 or when simplified 1:5. Ratio = 5:25 or 1:5. This does indicate that for every day the surf is bad, there are 5 days when the surf is terrific! I like those numbers!



## The Holiday - Part 3

## Get It?

Use what you have learned from Part 3 of the story to work out these problems.

Express these as ratios.

1. III and IIII = \_\_\_\_\_

2. OOOOO and OO = \_\_\_\_\_

3.  $\triangle$   $\triangle$  and  $\triangle$  = \_\_\_\_\_

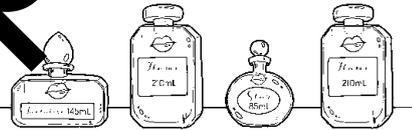
4.  $\square$  and  $\square$   $\square$   $\square$  = \_\_\_\_\_

5.  $\star$  and  $\star$  = \_\_\_\_\_

6. For every one charm bracelet you received for your birthday, you got 4 perfumes. Can you express this as a ratio?

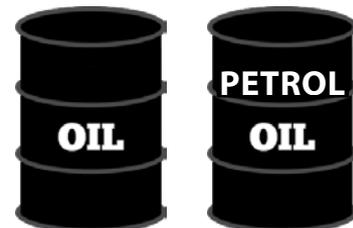


Answer:



7. Your best friend has asked you to help start his lawn mower. He needs to earn extra cash mowing the neighbourhood's lawns. The fuel can says that for every 20mLs of oil you need to add 100mL of petrol and then mix. Can you express this as a ratio?

Answer:



8. You are helping your little brother prepare lolly bags for his birthday. He is very particular and insists that in every bag for every 2 chocolate bars he wants 3 lollipops and 2 balloons. Can you express this as a ratio?

Answer:



## The Party - Part 4

Read the story and complete the maths tasks as you go.

Music! Ok now that I do have covered. Yesterday I shot out a Facebook post asking people to vote for the best 80s and 90s rap albums to grow our song base for the night. The results are looking good. Some fast replies – everyone has an opinion on this:



Rap City: 12 votes

American Beat Box: 5 votes

In Your Head: 6 votes

In The Crib: 7 votes

American Rap Story: 9 votes

Street Noise: 9 votes

I need to reply with a cool graphic to illustrate to everyone the results. I reckon it will get people excited about the party. I use a column graph as my starting point:

BEST 80S AND 90S RAP ALBUMS



That looks smashing. I send out another Facebook post and break for a few minutes surveying the parade of likes and smiley faces as they come filtering in.

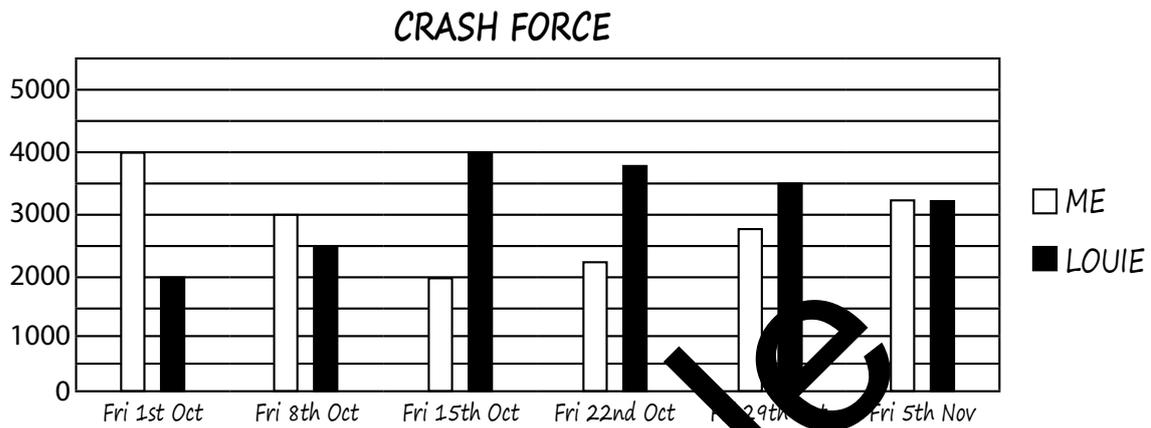


## The Party - Part 4

## Get It?

Use what you have learned from Part 4 of the story to work out these problems.

- Study the following column graph which displays your best score in the Crash Force video game for the past 6 Friday nights, in comparison to your online gaming pal Louie from Singapore.



What can you interpret from the data display?

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- Your teacher points out that your grades are not going to improve unless you put in more effort and time with your homework. To illustrate her point she shows you the below table which she says is the amount of time 13 year old children spend doing homework in different states in Australia.



Convert the following information into a bar graph.

*Approximate hours of homework per night for each Australian State.*

Victoria	2.5
Northern Territory	2.0
Tasmania	1.7
New South Wales	2.2
Queensland	3.2
Western Australia	1.3
South Australia	1.7

## Christmas Elves - Part 2

Read the story and complete the maths tasks as you go.

"Wrapping boxes is harder than it looks," screeches elf number 4 sitting buried in wrapping paper, sticky tape and tinsel. Her job of wrapping empty boxes to fill in Santa's sleigh is proving difficult.

"What's so hard about this?" I pose.

"The company has pre-cut the paper for me!" she says angrily, her face the colour of Santa's suit. "And they don't FIT!" she shrieks.

I wrangle the sizing guide out of her clenched fist. It reads:

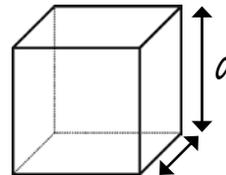


Paper 1	60cm x 20cm = 1200cm surface area
Paper 2	60cm x 30cm = 1800cm surface area
Paper 3	60cm x 40cm = 2400cm surface area
Paper 4	60cm x 50cm = 3000cm surface area
Paper 5	60cm x 60cm = 3600cm surface area

"It's not so hard," I say convincingly. "You simply work out the surface area of a box by calculating the surface area of a cube."

The look of complete confusion on elf 4's annoyed face tells me to attempt again. I quickly jot down the following formula for her:

$$\text{surface area of cube} = 6a^2$$



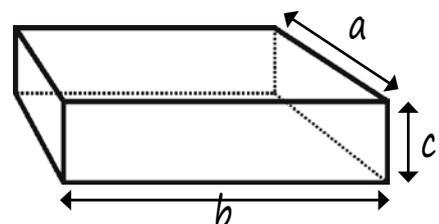
I show her. Still nothing on the face of elf 4.

"The surface area of a cube is the area of the 6 squares that cover it. The area of one of them is  $a^2$ . Since these are all the same, you can multiply one of them by 6, so the surface area of a cube is 6 times one of the sides squared," I impart on my final attempt. "You can use that figure to decide which size paper to use. I can't make it any clearer," I say as I begin to walk away.

"Ok but, but... what the heck do I use for this?" she cries, showing me a rectangular box.

"It's also a prism," I tell her scribbling down a different formula:

$$\begin{aligned} \text{surface area of rectangular prism} \\ = 2ac + 2ba + 2bc \end{aligned}$$



"There are 2 equal sides on a rectangular box 3 times," I say.

## Christmas Elves - Part 2

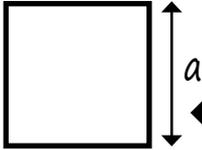
I hang around as she gives the measurements a go. She measures one side of the cubed box to be 15cm and uses the calculator to square the number to equal 225cm. Then she multiplies the 225 by 6 to get 1350cm<sup>2</sup>. I wait for her to look up at me confused. However to her credit she confidently grabs the size 2 sheet of paper and begins wrapping. Before I have a chance to make my escape she apprehends me by the elf shirt.

"Before you run away from me could you please show me how to measure the books?" she pleads in a slightly less angry voice. My eyes set upon a stack of different shaped flat books that need to be wrapped and given away to children. I create some rules for her on the back of a screwed up piece of wrapping paper that she had previously ripped apart in defeat.

She peers at my diagrams with a look of scepticism.

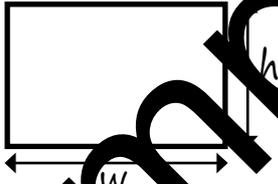
### SURFACE AREA CALCULATION

**SQUARE**  
 $area = a^2$   
 $a = \text{length of side}$





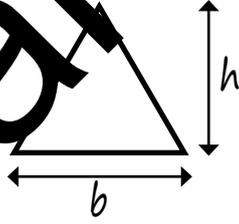
**RECTANGLE**  
 $area = w \times h$   
 $w = \text{width}$   
 $h = \text{height}$



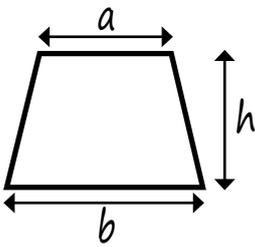


Trust me I am actually pretty good at this stuff.

**TRIANGLE**  
 $area = \frac{1}{2} \times b \times h$   
 $b = \text{base}$   
 $h = \text{vertical height}$



**TRAPEZIUM**  
 $area = \frac{1}{2} (a + b) \times h$   
 $h = \text{vertical height}$



"Trust me I am actually pretty good at this stuff. All the books are paperback so they are fairly flat. Just remember to multiply your answer by 2 as there are 2 sides, the front of the book and the back of the book," I tell her.

"So the first one will be 30cm, but because there are 2 sides you will need to multiply your answer by 2. So,  $30\text{cm}^2 = 900\text{cm}$  and multiplied by 2 = 1800cm. So use paper size 2. This should be all you need to determine paper size and ribbon size and everything else. Ok?" I ask.

She doesn't reply as she busily endeavours measuring one side of a book and plugs that figure into a calculator. I smile as I walk away.