Ready-Ed Publications

Years 6-7

PHOTOCOPY MASTERS

UNDERSTANDING EVERYDAY MATHS 1

Section 1:
Numbers and Algebra
My First Day In Retail

Section 2:
Geometry and Measurement
Youth Sports Day

Section 3:
Statistics and Probability
Student Council Elections

CURRICULUM LINKED

By Carmel Iaria

Contents

Teachers' Notes

Understanding Everyday Maths - Book 1 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 activities. 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 recognise what is required of them. You may 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° 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)

My First Day In Retail - Part 1

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

Ok, so it's my very first day. Everyone else is slogging away in cold supermarkets, stacking shelves with incredibly glamorous products like margarine and sponges. Or worse, they're sporting hideous visors while waiting for customers to resolve whether they want a diet soda with their greasy meal at fast food joints. But not me, uh-uh. I succeeded in scoring a job at PASH after sending 9 application letters to its head office. Persistence does pay off! Anyway, my friends are green with envy. No repulsive hats or shirts to wear, no smelling like hamburgers. I will be besieged by designer clothes and fragrances and I even get to pump my favourite tunes.

"I will be back before closing," Jane, my stylish boss, hollers. "Remember everything you need to know is in the manual, if you took the time to study it you will have no problems. I will be meeting with design houses and stockists all day but if you need anything please call me, and good luck," she imparts with a smile and a wave in a cloud of perfume, leaving me to mind this entire place on my own.

I flick through the pages of the colossal manual. It tells me that my first task before opening the shop is to sort out some stock. The brown dirty stock boxes are sprawled around the dusty storeroom in no particular order. Where do I begin?

The instructions state that I need to 'balance the racks' and 'make them look happy'. Huh? How do I make racks look happy? The left side of the shop is reserved for the dressier, formal clothes. The instructions state that the 6 metre rack on that left side of the shop needs to be arranged as follows:

20% of the rack needs to contain formal tops
20% of the rack needs to contain skirts
35% of the rack needs to contain dresses
25% of the rack needs to contain pants

Ok, that doesn't sound too hard. I know that to make a percentage look like a decimal I need to divide it by 100. So:

20 / 100 = 0.20
35 / 100 = 0.35
25 / 100 = 0.25

It seems I just move the decimal point forward two spaces…my maths teacher would be so proud.

My First Day In Retail - Part 1

Ok, enough praising myself. To calculate the space I have on the rack I need to multiply these decimals by 6 metres. So:

0.20 x 6 = 1.2 metres of formal tops
0.20 x 6 = 1.2 metres of skirts
0.35 x 6 = 2.1 metres of dresses
0.25 x 6 = 1.5 metres of pants

Easy! However just before I begin grabbing the stock to hang, I read on:

Of the tops, no more than 10% are to be black.

Of the dresses, 50% need to be short and the other 50% long.

Of the pants, there needs to be 80% between sizes 8 to 14 as these are the most popular sizes.

Ok, so I guess that's where the 'happy rack' part comes into it. Now, I need to think about this:

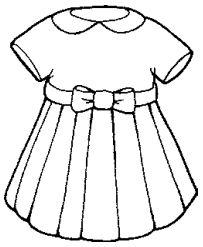
Tops

10% of 1.2 metres. I guess I just need to move the decimal forward again but this time only one place.

So there will be 0.12 metres of black tops and 1.08 metres of non-black tops.

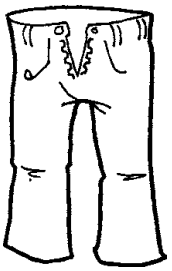
Dresses

I know 50% is half so 0.50 x 2.1 metres = 1.05 metres of long dresses and 1.05 metres of short dresses.



Pants

80% of 1.5 metres = 1.2 metres of size 8-14 pants and 0.3 metres of other sizes.



I quickly get to work with my calculation sheet in one hand and tape measure in the other.

Get It?

Use what you have learned from Part 1 of the story to work out these problems.

1. 0.1 of 10 = _____

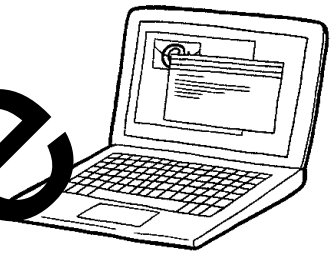
2. 10% of 50 = _____

3. 50% of 110 = _____

4. _____ % of 40 = 4

5. _____ % of 30 = 10

6. If you have 50% of your sister's share of computer time and your sister is allowed 40% of the total family computer time, how much total family computer time do you have?



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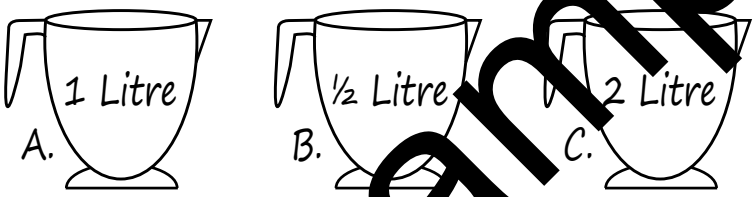
7. Which container holds 100% more soda than a 1 litre jug?



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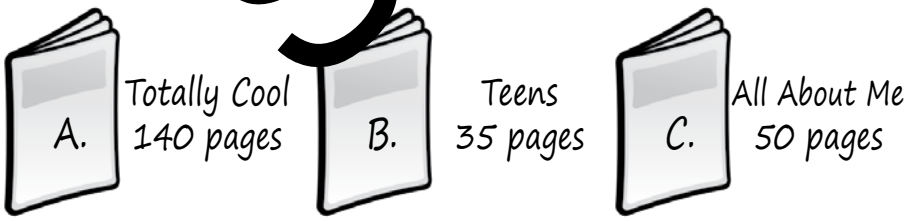
8. Which magazine has 50% less pages than your favourite mag which contains 70 pages?



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9. On Wednesday night you realise that you are already so tired and it is only midweek! What percentage of the school week is still left?

_____

Curriculum Links: Multiply and divide decimals by powers of 10 (Year 6: ACMNA130) Make connections between equivalent fractions, decimals and percentages (Year 6: ACMNA131) Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies (Year 7: ACMNA158)

Youth Sports Day - Part 1

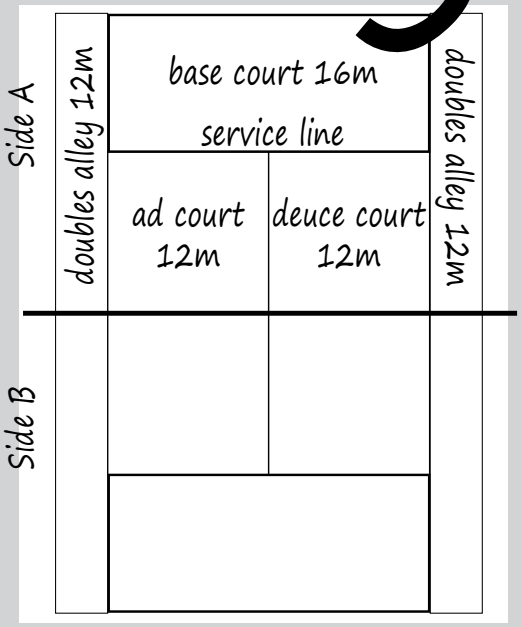
Read the story and complete the maths tasks as you go.

It's the eve of sports day at the local youth centre, Youth United. Alex and I stand at the edge of the park and grounds that we have to transform into playing fields in a matter of just a few hours. We volunteered for this as it will offer the kids from disadvantaged areas a fantastic and memorable experience. Plus its part of our Social Studies assignment. Best assignment ever – helping kids and playing sport. How hard can it be? I *am* the Sports Captain at school, so it's a matter of pride that I coordinate this day perfectly. The sports part will be a blast, it's the setup beforehand that may be a little complicated.

The folder in my hand marked 'Mark and Alex' contains instructions to create a tennis court, soccer pitch and prep an abandoned swimming pool at the local reserve. The Youth United leaders have asked us to create the court and pitch, adhering to strict measurements as the areas have to meet sport standards in order for all kids to have a 'fair go'.

We must fill bottles with energy drink instead of water and stack wooden cubes to create seats for a team photo opportunity. I nominate myself as team leader and my friend Alex as my reluctant assistant.

"Ok…" I say slapping sidekick Alex on the back, "…let's start with building the tennis court." To create the tennis court we are using a sketch.



TENNIS COURT

Perimeter of ad court to be 12m as a square.

Perimeter of deuce court to be 12m as a square.

Perimeter of base court to be 16m as a rectangle.

Perimeter of doubles alley to be 12m as a rectangle.

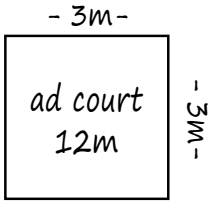
Youth Sports Day - Part 1

"Looks easy enough," I say to Alex, who gives me a sceptical look with a measuring tape in one hand and a can of spray paint in the other. He is not confident mapping out the lines.

"Ok, so according to this we need to ensure that the doubles alley lines are parallel, and that the service line is parallel to the base line," I say. "The perimeter of each section is listed for us," I say, showing him. Alex looks stressed. "Ok, don't start stressing Alex, we got this. It's just a little maths, that's all," I reassure him.

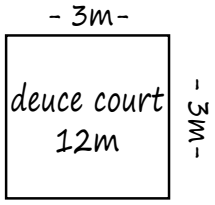
We study the instructions one at a time.

*Perimeter of **ad court** is 12m as a square.*



This means that the ad court perimeter needs to be 3 x 4;
this equals 12 metres.

*Perimeter of **deuce court** is 12m as a square.*



I instruct Alex to begin spraying a white line for three metres in a square.

"Just do it, trust me it's right!" I insist.

When he is done I move on to the next piece.

*Perimeter of **base court** is 16m as a rectangle.*

"Alright, perimeter of the base court is 16 square metres in a rectangle," I voice. "Which means that the formula for this rectangle is 2a + 2b = 16."

We know that the lengths of the two service courts are 3 metres + 3 metres which equals 6 metres.

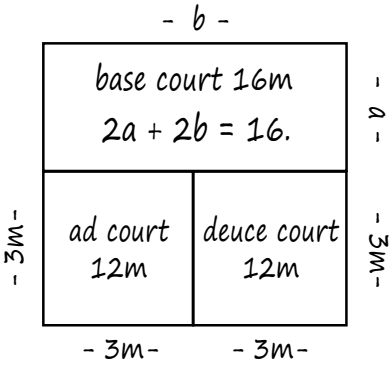
So our formula becomes 2a + (2x6) = 16

And when transposed 2a + 12 = 16

So 2a = 16-12

2a = 4

a = 2



Therefore the base court should be 6 metres across and 2 metres down." I determine without any help at all. "Alrighty, get to work Alex."

He begins spraying lines while I suss out the next problem. His confidence in my abilities is now growing.

Get It?

Use what you have learned from Part 1 of the story to work out these problems.

1. How many millimetres (mm) are there in 1 centimetre? _____

2. How many centimetres (cm) are there is 1 metre? _____

3. How many meters (m) are there in 1 kilometre? _____

4. Draw a diagram to show what 1 square metre would look like. Label the diagram.

5. Work out the surface areas of the following shapes using the information below.

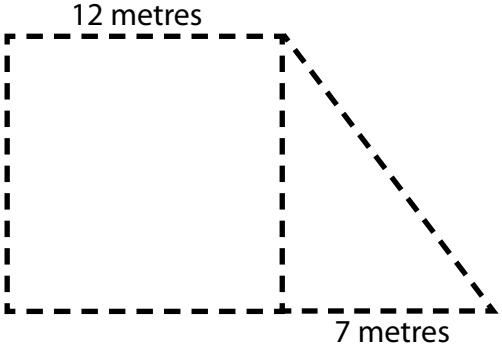
The square measures 2.5 centimetres by 2.5 centimetres.

The rectangle measures 5.0 metres by 2.5 metres.

The parallelogram measures 4.5 metres by 6.5 metres.

Answer:

6. You have been asked by your grandmother to mow her lawn at her country home. She promises you $1 for every square metre you mow. If the diagram below is her property map, how much money can you earn? Show your working out.



Answer:

Curriculum Links: Solve problems involving the comparison of lengths and areas using appropriate units (Year 6: ACMMG137)
Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (Year 7: ACMMG159)

Student Council Elections - Part 1

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

Student representative council elections are finally here! I have waited a long time to be the next Julia Gillard - it is a very big deal at our school.

I will listen to the students' requests. I will push for a coffee vending machine instead of the soft drink machine. I will campaign for the students' choice of musical school production, the students' chosen theme for the school formal, and for the best ski location at the next retreat. Yes, I have loads to accomplish!

Our school sets up the student council elections each year just like a real political ballot vote. The election process is held over 4 weeks of campaigning.

I saunter into the rec room during lunch to congregate with my team; Team Eva. My team or 'party' as it's known in politics, mainly includes a few close friends. They are huddled around a table deep in planning.

"Hey, I'm here," I announce. "What did I miss?" No one offers any news. "Anyone?" Serena looks up from her magazine. I target her.

"Serena, I asked you yesterday to find out the average amount of flyers needed. Did you get the dirt on the other campaigns? I need to know how many I should print to keep in line with the other candidates."

"Ahh, yes," she says slowly. "This is what I found." She hands me a sheet.

Number of flyers printed by each candidate

Candidate 1	Candidate 2	Candidate 3	Candidate 4	Candidate 5	Candidate 6
135	120	95	125	110	450

"Amy translate this please. Advise me on the best amount to go to print." Amy is my statistics guru! A maths wiz and the brainies on our team, she is like a human calculator.

The range is 355. Which is achieved when you minus the smallest number from the largest (450-95),'' she says.

"What? 355 that's the range? But that doesn't sound right."

"Well one of the candidates, obviously Candidate 6, has a dad who runs a FastPrint store and can print as many flyers as she likes even if she doesn't need them," explains Serena. "I guess she is going to stuff as many as she can in lockers and hand out loads of them to flood the school with just *her* flyers".

"The range does not really work if there is an outlier value - it skews the result," adds Amy. "We can use the mean for the average then. That is, you add all the values and divide by the number of values to get 1025 / 6 = 170.833. This is the average amount of flyers that the Candidates are printing and giving out. It's a little higher than normal, but at least you won't get swamped by Candidate 6."

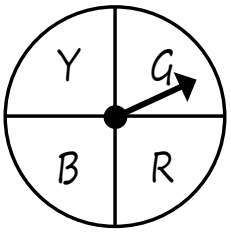
"Great, done!" I determine.

Student Council Elections - Part 1

Get It?

Use what you have learned from Part 1 of the story to work out these problems.

1. Friday night is family board games night. Your little sister is accusing you of cheating. You explain that it is impossible to cheat. How do you prove to her that you have equal probability of landing on every colour? That is, what are the chances of landing on green, red, blue and yellow? Express the probability in fraction form and also as a percentage.



Fraction: _____ Percentage: _____

2. What is the probability of rolling a six on a dice? Fraction: _____

3. You work the following hours at the local supermarket this week:

4 hours 3.5 hours 4.5 hours 3 hours 2.5 hours

How many hours do you work on average each day? _____

4. You are enjoying watching the Summer Olympics on TV. The commentator remarks that the average speed of the 100 metre sprint is 10.359 seconds. This doesn't seem right to you as you are sure that the Jamaicans have pushed this average under the 10 second mark. You decide to do your own calculations with the following race statistics:

9.345 9.568 10.432 9.999 10.271 9.432 9.001 10.852 10.040 9.331

Is the commentator correct? _____

5. Your weekend tennis match starts in the usual way with a coin toss to decide who serves first. You win the coin toss – what are the chances of this happening? Can you express this as a fraction and a decimal?

_____

6. **a.** Use the median to gain the average of the following maths test results:

88.50% 90% 56.5% 70.5% 62% 73.5% 76% 79.5% 85% 59.5% 68%

_____

b. You have scored 73.5 on a maths test. How did you fare compared to the average using the range? Can you explain?

_____

_____

Curriculum Links: Describe probabilities using fractions, decimals and percentages (Year 6: ACMSP144) Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (Year 7: ACMSP171) Describe and interpret data displays using median, mean and range (Year 7: ACMSP172)