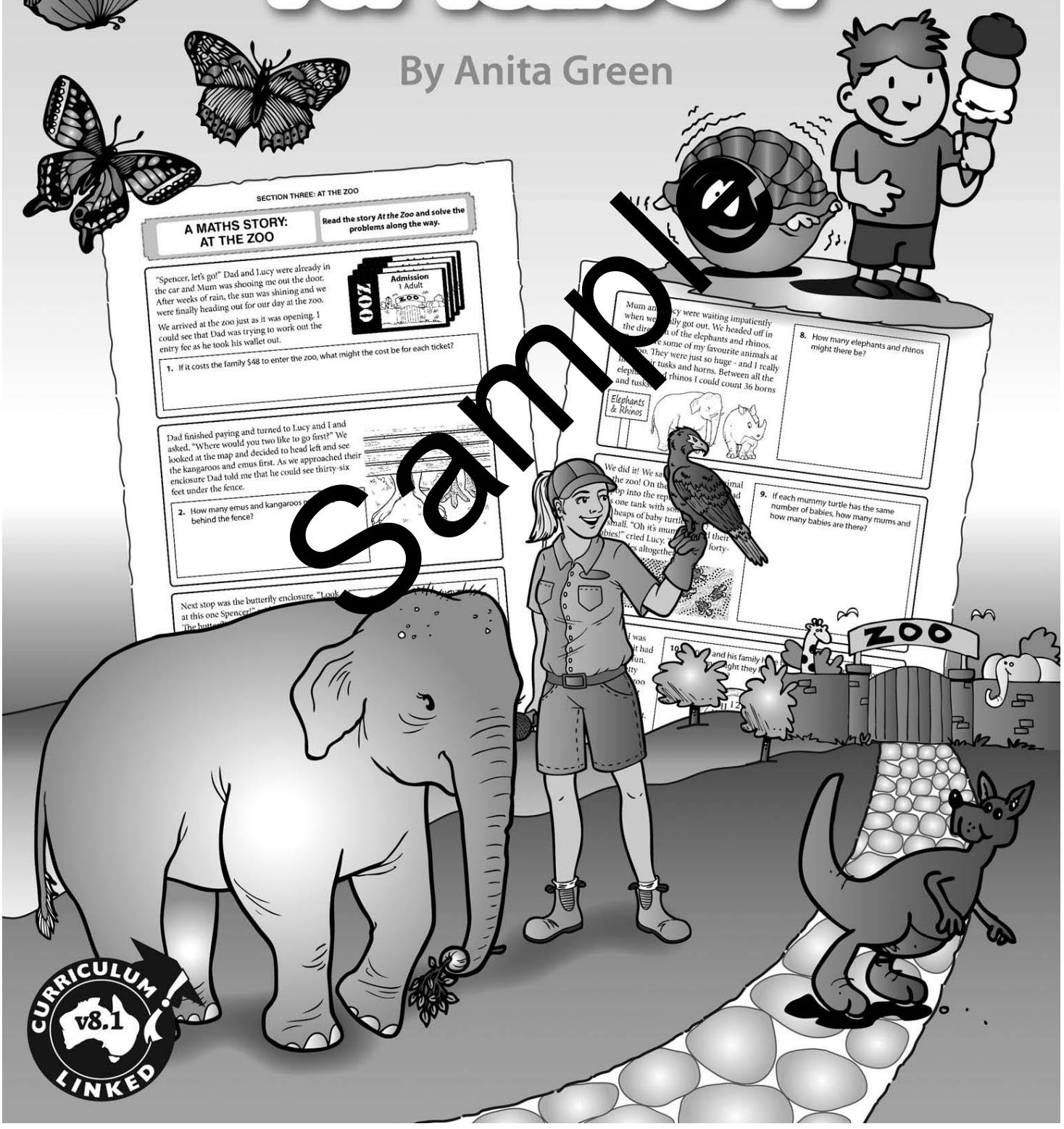
Ready-Ed Publications

PHOTOCOPY MASTERS

Solving Maths Problems For Years 3-4

By Anita Green



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Sample

Teachers' Notes

This book contains a series of open-ended maths problems based on fun and engaging stories. The problems are placed into real life everyday contexts in which the students are likely to find themselves. It's important for students to know that open-ended maths problems have more than one answer and that students often need to add to the information to be able to solve them. For example, if the problem is: 'If I have 30 tablets, how many days will it take me to finish them all?', students need to decide how many tablets the patient is required to take each day to work out how many days it would take to finish the course. They could work out answers for 1 a day, 2 a day, 3 a day, etc.

A benefit of using open-ended problems is that all students in one class, each with their range of experiences and mathematical knowledge and skills, can be working on the same problem. This is because these problems can be solved using a variety of strategies which means students can tackle them at their own level.

You will notice that the problems based on the stories have accompanying support and extension questions. This allows for further differentiation. If there are students who seem to be struggling with the main problem (this will often happen when you are first introducing these kinds of problems) it is a good idea to have a support question on hand for them to attempt first. In my experience usually once students have worked through the support question they are then ready to move on to the main question. The extension questions are there for the students who solve the main problems quickly to challenge them further.

Reflection time is important when implementing these lessons, not just at the end of a lesson, but also during it. It is important to stop at regular intervals and share how students are tackling the problems. This allows students to share successes and to learn about a range of different strategies. It also helps those students who may be struggling or are using a strategy that isn't working for them.

The questions that you pose during these lessons are also important. These questions can help students delve deeper and think more critically. For example:

- What would happen if…?
- Can you do it a different way?
- How do you know….?
- Have you found all the answers?
- How could you make this problem more challenging/easier? (This question encourages them to take responsibility for their own learning.)
- Prove it! Convince me!
- Can you show me/explain to me how you got your answer?
- Can you find a pattern?

All questions and activities are linked to the v8.1 Australian Curriculum. As Problem Solving is one of the proficiency strands, it is important that students are able to use all mathematical concepts that they have learnt in a problem solving situation. This book will also help to address Reasoning as students are required to show and explain their thinking and working out. Understanding may also be shown as students need to have some understanding of mathematical concepts taught to be able to apply the knowledge to solve a problem.

Sample

MOVIE MAYHEM

v8.1 CURRICULUM FOCUS

Number and Algebra	Measurement and Geometry	Statistics and Probability
Year 3:		
Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems (ACMNA053) Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies (ACMNA057) Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole (ACMNA058) Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059) Describe, continue, and create number patterns resulting from performing addition or subtraction (ACMNA060	Tell time to the minute and investigate the relationship between units of time (ACMMG062)	Conduct chance experiments, identify and describe possible outcomes and recognise variation in results (ACMSP067)
Year 4:		
Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (ACMNA073) Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 (ACMNA074) Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder (ACMNA076) Investigate equivalent fractions used in contexts (ACMNA077) Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line (ACMNA078) Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080) Explore and describe number patterns resulting from performing multiplication (ACMNA081) Solve word problems by using number sentences involving multiplication or division where there is no remainder (ACMNA082)	Convert between units of time (ACMMG085) Use 'am' and 'pm' notation and solve simple time problems (ACMMG086)	

Sample

Discussion (before):

- ❑ When was the last time you went to the movies?
- ❑ What did you see?
- ❑ How often do you go to the movies?
- ❑ Can you remember the first movie that you ever saw at the cinema?
- ❑ How long do movies usually go for?
- ❑ How much does it cost to go to the movies?
- ❑ Can you get discounts? How much does it cost for a whole family to go to the movies?
- ❑ What do you like to eat at the movies?

Discussion (after):

- ❑ Design a ticket that you would get when you go to the movies. What information needs to be on it? What maths is involved?
- ❑ How much money would a cinema take in a day? Think about how much a movie ticket is; how many people might see each movie and how many movies might cinemas play in a day?
- ❑ How many different ways can you make $7.85? How much change would you get from a $10 note? How many different ways can you make that change? (See answers on page 8.)
- ❑ My friend gave the last movie he saw 7/10 – what does this mean?
- ❑ Think of the last movie that you saw - what would you rate it? What does this rating mean to you?

MOVIE MAYHEM

SUPPORT & EXTENSION QUESTIONS

1. What time might the movie start and finish?

Support: If the movie starts on the hour, draw what the start and finish times might be on an analogue clock.

Extension: The movie doesn't start on the hour. Can you draw the start and finish times on an analogue and digital clock?

2. What might Jane's money be made up of and what might Zain's money be made up of?

Support: If Jane and Zain both have $2.85 in coins, what might their money look like?

Extension: What is the maximum and minimum amount of notes and coin they could have?

3. How much money might Zain have?

Support: All three notes are the same. Half of the coins are gold. Draw what this might look like.

Extension: What is the most Zain can have? What's the least? If all his notes are different and he has doubles of coins, how much might Zain have?

4. What might the original ticket price be and how much will Zain save?

Support: If Zain saves $1, what might the original ticket price have been? What if he saves $2? Or $3?

Extension: What if Zain had got 3/5 off the price of his ticket?

5. How much might Zain's ticket cost and how much change might Zain receive?

Support: If Zain paid with a $5 note and all the coins were the same, what might his change have been? What would have been the cost of the ticket?

Extension: How many different answers can you find? What is the most that the ticket could have cost and what is the least that it could have cost?

6. How much might the deal be and what might be the cost of the items separately?

Support: If the three items cost $4, how much might each of the three items cost?

Extension: Zain just wants popcorn and a drink. Jane said she would have the ice-cream from the deal. How much should Jane pay to Zain?

7. How many seats might be in each cinema?

Support: There are 8 rows of seats. Can you draw what this might look like and work out how many seats there are altogether?

Extension: If the other cinema has two more rows of seats, how many seats altogether? How many more seats are there than in the first cinema?

Sample

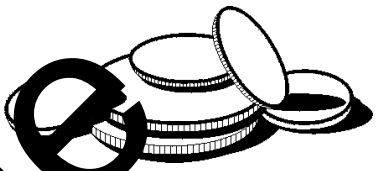
A MATHS STORY - MOVIE MAYHEM

Read the story *Movie Mayhem* and solve the problems along the way.

We had finally convinced our parents that we were old enough to go to the movies on our own. So Liam, Jane and I are going to see *Space Hero*. Jane's parents are going to pick us up as soon as the movie finishes. The movie goes for 1 hour and 48 minutes.

1. What time might the movie start and finish?

In the car on the way to the movies, Jane got out her money and counted it. It looked like she had way more money than me but as she counted it, I realised that we had exactly the same amount.

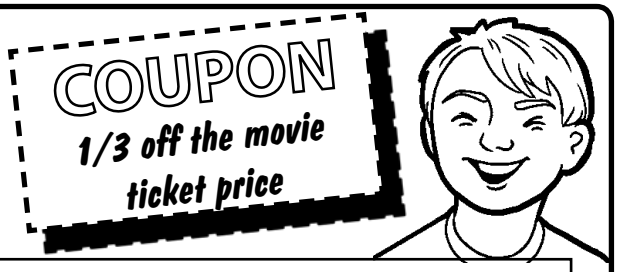


2. What might Jane's money be made up of and what might Zain's money be made up of?

Mum had given me some money but not as much as I wanted, so I had taken a little bit extra out of my moneybox. I had three notes and eight coins.

3. How much money might Zain have?

Finally we were parent-free! We headed straight to the queue to buy our tickets. I was lucky. Mum had given me a coupon which meant that I could get 1/3 off the price of my ticket.



4. What might the original ticket price be and how much will Zain save?

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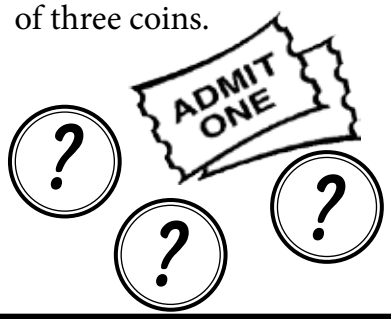
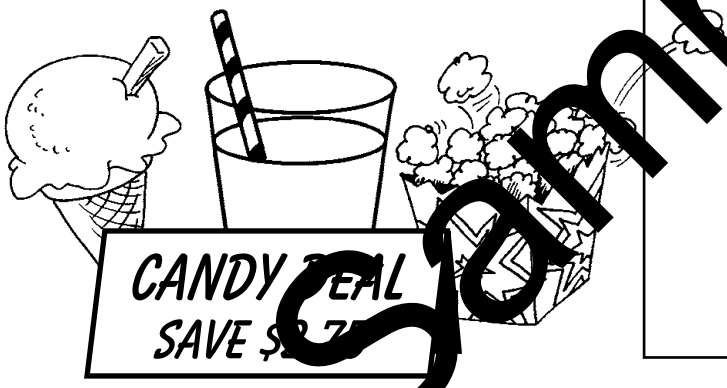
The lady gave me my ticket and I handed her the money. I paid with a ten dollar note and the lady handed me my change which was made up of three coins.



5. How much might Zain's ticket cost and how much change might Zain receive?

Once we had our tickets, we headed straight for the candy bar. While lining up we were trying to work out how much we would save if we bought the deal which included a popcorn, ice-cream and a drink rather than buying each item separately. We worked out that we would be saving $2.75.



6. How much might the deal be and what might be the cost of the items separately?

Sample

Loaded with food from the candy bar, we headed into the cinema. We were in the smaller of the two cinemas. Each cinema had the same amount of seats in each row but next door had 3 more rows of seats.

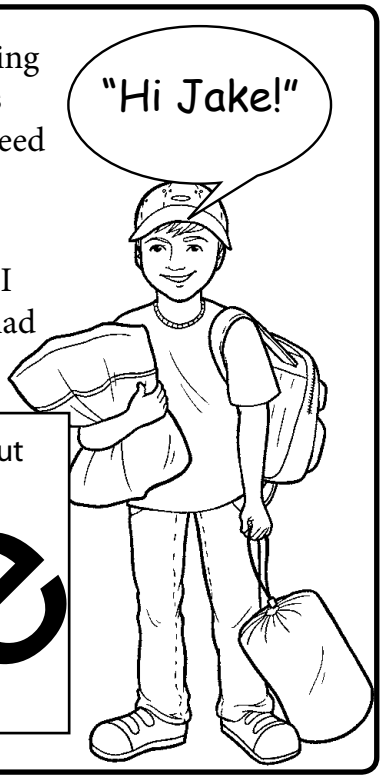
7. How many seats might be in each cinema?

A MATHS STORY: THE SLEEPOVER

Read the story *The Sleepover* and solve the problems along the way.

"Hi Jake!" Noah was the first to arrive. Liam's Mum was dropping the others off in about an hour. I had asked Mum and Dad ages ago if I could have my friends over for a sleepover and they agreed as long as we had it on the school holidays. The five of us were going to have so much fun!

As soon as the others arrived we went through the movies that I had hired earlier and started planning a movie marathon. We had about 7 hours of movies to watch!



1. How many movies might this be? You will need to think about how long each movie might run for.

Dad ordered pizzas for himself, my Mum, my sister, and my friends and I. I hoped that he'd ordered enough because we were all starving!

2. How many pizzas do you think are needed to feed everyone? How many slices will each person receive?

There was going to be about a 45 minute wait for the pizzas, so we headed into the spare room to play video games while we waited. Liam and Tim started playing first. Half way through their game, Tim had already tripled Liam's score.

3. What might Tim and Liam's scores be?

Sample

While Tim and Liam continued to battle it out, Kane was playing around in a pile of Lego. He had created a series of towers. Not only was there a coloured pattern in the towers but the heights of the towers were in a pattern too.

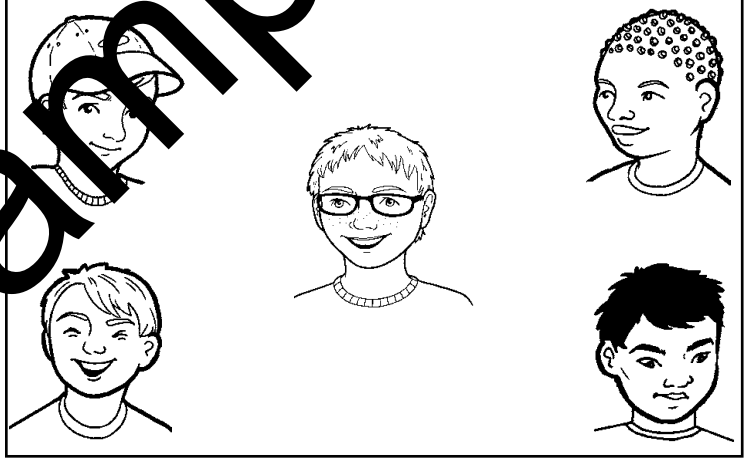
4. What might these towers look like?

While waiting for our turn, Noah and I found my sister's diary down the side of the couch. It had one of those locks on it where you had to work out the four digit passcode. I had tried watching when she put it in, and I knew that it started with a four.

5. How many combinations will Jake and Noah have to try to crack the code?

Before we cracked the code, it was our turn at the game. And before we finished our turn on the pizzas arrived! While scoffing the pizza we started talking about Liam's birthday which was only two weeks away. We were going bowling for his birthday. Noah was trying to work out how long it was until his birthday. I knew that there is exactly 40 days between Liam and Noah's birthdays.

6. When might Liam and Noah's birthdays be?



We set up our sleeping bags in the spare room to get ready for our movie marathon. Mum had been reluctant to let me have four friends stay over at one time because she didn't think that 5 sleeping bags would fit in the spare room. The room was about 3 x 3 metres. I thought that was plenty of room!

7. How many sleeping bags could fit in the spare room?

Sample