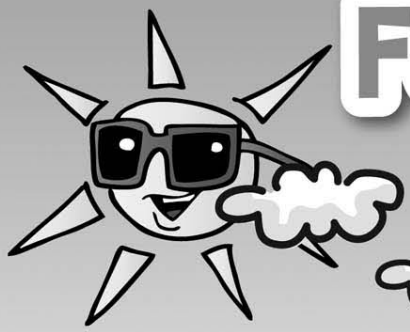
Ready-Ed Publications

PHOTOCOPY MASTERS

Solving Maths Problems For Years 5-6

By Anita Green



CURRICULUM v8.1 LINKED

Contents

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.

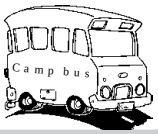
Reflection time is important when implementing these lessons, not just at the end of a lesson, but also during it. It is important to stop at regular intervals and share how students are tackling the problems. This allows students to share successes and to learn about a range of different strategies. 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 or 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.

SCHOOL CAMP



v8.1 CURRICULUM FOCUS

Number and Algebra	Measurement and Geometry
Year 5:	
Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099) Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100) Solve problems involving division by a one digit number, including those that result in a remainder(ACMNA101) Compare, order and represent decimals (ACMNA105) Create simple financial plans (ACMNA106) Find unknown quantities in number sentences involving multiplication and division and identify equivalent number sentences involving multiplication and division (ACMNA121) Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMNA291)	Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108) Compare 12- and 24-hour time systems and convert between them (ACMMG110)
Year 6:	
Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123) Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128) Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA132)	Connect decimal representations to the metric system (ACMMG135) Convert between common metric units of length, mass and capacity (ACMMG136) Interpret and use timetables (ACMMG139)

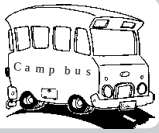
Discussion (before):

- ❑ Have you ever been on a school camp? How long was it for?
- ❑ How many have you been on? Where have you been to?
- ❑ What activities did you do while you were there?
- ❑ What are the best things about school camps?
- ❑ What are the worst things about school camps?

Discussion (after):

- ❑ How many ways could you arrange 145 people into equal groups? (See answers on page 8.)
- ❑ How might the beds be arranged at a school camp? How many rooms would there be and how many beds would there be in each room?
- ❑ How many minutes is 1000 seconds? How many seconds are in one day? (See answers on page 8.)
- ❑ What might the ratio be of girls to boys at a camp? How many does this mean there are of each gender?

SCHOOL CAMP



SUPPORT & EXTENSION QUESTIONS

1. How many buses will be needed and how many students will be on each bus?

Support: If there are 6 buses how many students will be on each bus?

Extension: What is the most and least amount of buses you think will be needed? Would every bus be full? How many students would be needed to fill all of the buses?

2. It is 345 kilometres to camp. How long do you think it might take to get there?

Support: If they are travelling on average 80 kilometres per hour?

Extension: How fast would they need to go to get there in 3 and a half hours? Could they do it quicker?

3. How many different outfit combinations could Sam make with the shorts and t-shirts?

Support: What if he has 8 t-shirts?

Extension: What if he had 1/4 as many t-shirts as shorts? Or 3/4?

4. How many different outfit combinations can he make now?

Support: Can you draw a picture to help you?

Extension: What if there are 4 pairs of shoes? Or 6? Or 8?

5. What might the temperature be for each day?

Support: What if the highest temperature is 28 degrees and the lowest is 21 degrees?

Extension: What if there is a range of 12 degrees?

6. Is it even possible for the students to be placed into 9 equal groups? What equal groups can they make?

Support: How many students will be in each group and how many will be left over?

Extension: If the students get into 6, 7 or 8 groups, how many students will be in each group? Can you see a pattern?

7. Sam didn't go right to the top but he did climb 1.45 metres higher than Jack. How high might Sam and Jack have climbed?

Support: If Jack climbed 3.85 metres, how high did Sam climb?

Extension: How far away might Jack and Sam have been from the top?

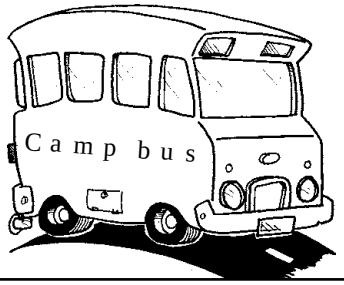
A MATHS STORY - SCHOOL CAMP

Read the story *School Camp* and solve the problems along the way.

"Ok, Mum, you can go now!"

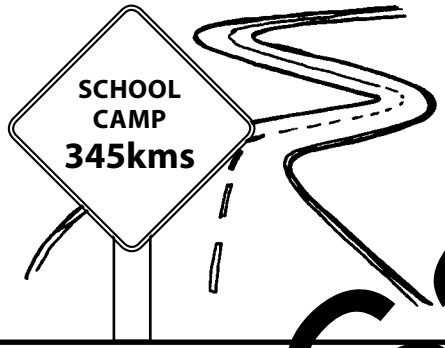
"Sam, I'm not leaving until you get on that bus," Mum said firmly.

We added my bags to the luggage pile and I went and stood with the other 125 excited campers.



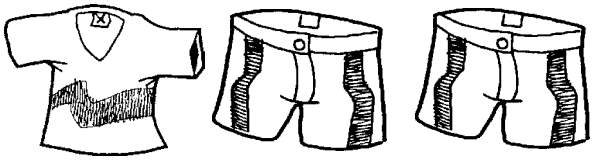
1. How many buses will be needed and how many students will be on each bus?

Finally the luggage was packed onto the buses and it was time to leave. "Bye Mum!" I yelled as I ran to get on the bus with my friends. I sat by the window facing Mum just as she had asked. I swear she was probably still standing there waving when we were half way to camp.



2. It is 345 kilometres to camp. How long do you think it might take to get there?

When we arrived we had to quickly find our cabins and unpack. Mum had done most of my packing. This hadn't been a good idea. She had packed me less than half as many t-shirts as shorts!

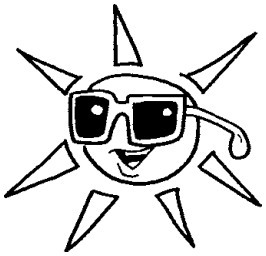


3. How many different outfit combinations can Sam make with the shorts and t-shirts?

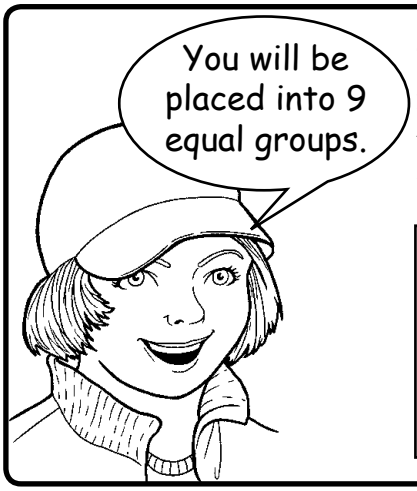
I dug deeper and found just three pairs of shoes.

4. How many different outfit combinations can he now make?

After unpacking we congregated in the courtyard. Outside there was a blue sky! The average temperature for the next five days at camp, according to the forecast, was going to be 25 degrees.



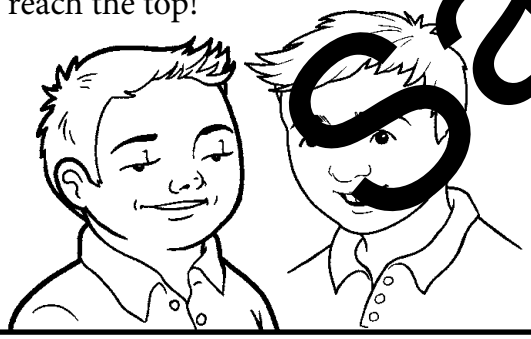
5. What might the temperature be for each day?



The teachers announced that we were going to be doing our first two activities that afternoon. I was really hoping that I would get to do the Giant Swing! The teachers explained to us that we would be placed into 9 equal groups.

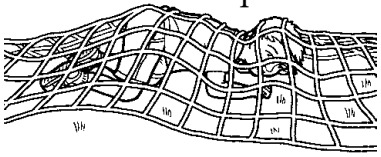
6. Is it even possible for the students to be split into 9 equal groups? What equal groups could be made?

Dan and I were in the same cabin and we were in the same activity group! Our first activity was….. the Giant Swing! I was determined to reach the top!



7. Sam didn't go right to the top, but he did climb 1.45 metres higher than Jack. How high might Sam and Jack have climbed?

Our first activity on the second day was the obstacle course. I was tired from a lack of sleep the night before. I don't know how many times I tripped over things during the obstacle course. It seemed to take forever! Jack ended up finishing the course 132 seconds quicker than me.



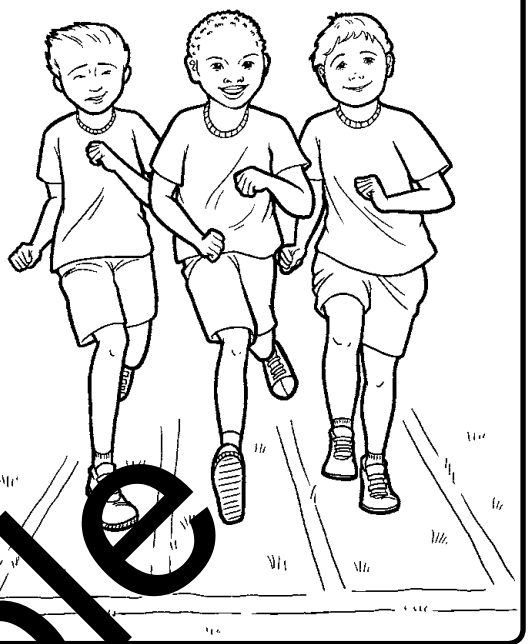
8. How long might it have taken Sam and Jack to complete the obstacle course?

A MATHS STORY - ATHLETICS CARNIVAL

Read the story *Athletics Carnival* and solve the problems along the way.

"On your marks, get set, GO!"

My first race of the day and it was a 100 metre sprint. As we raced down the straight I heard someone shout my name, "Go, Ollie!" The runners were all so close. I could have reached out and touched the people running beside me. Anybody could win this one.



1. How many different combinations could there be for the order in which the students finish?

I came a close second! The winner was a ki[illegible] I recognised from a year above me. The result was so close though. Our finishing times were all between 13 and 14 seconds.

2. What might the students' exact times have been?

My next event was long jump. The teachers record the best of three jumps. My first jump was 1.34 metres but my next two jumps were both better than this. I came second again. The difference between mine and the winner's jump was 12 centimetres.

3. What might Ollie and the winner's jumps have measured?

I wasn't sure when or where my next event was so I pulled out my timetable and map. The map was a bird's eye view of our school oval. It used a co-ordinate system and a key. It had seven areas marked out for the different events as well as the canteen.

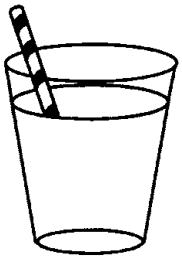
4. Can you draw what you think Ollie's map might look like?

According to my timetable I had a bit of a break until my next event. I grabbed some food out of my bag and headed over to where I could see Charlotte and Sarah already sitting. I needed to keep up my energy. I still had 6 more events to go! Luckily I had a couple more breaks throughout the day.

5. What might Ollie's timetable look like?

My next event was shot put. I had a little time until it started so I walked over to the drinks stand to grab a cup of cordial. As I drank it I thought it tasted and looked more like water! I wondered how much cordial they had put in. At home I make my cordial pretty strong!

6. What do you think the ratio of cordial to water might have been? What should the ratio be?



As I was drinking, an announcement was made through the loud speakers. Someone had broken the school record for the 800 metres! It had been beaten by 1/10 of a second!

7. What might the new record be?