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PHOTOCOPY MASTERS

Timed Maths Problems

5, 10 and 15 minute problems for 8 to 10 year olds

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Timed Maths Problems

Introduction

The '*Timed Maths Problems*' book presents a range of problem solving techniques in a gradually more complex way as each section of the book is encountered. This enables problems to be grouped according to the time intended for an activity to be completed; 5 minutes, 10 minutes or 15 minutes. Naturally, these times are arbitrary and will range widely depending upon the abilities of the students, but the opportunities exist to extend students by presenting problems as a challenge to be completed within the specified time. The Teachers' Notes section gives an outline of the various strategies that the students will use as they attempt the problems.

The problems in this book are ideally suited to a maths learning centre set up in the class room. The problems can be copied, cut up and placed in boxes with students selecting a problem from the appropriate box, depending on how much time they have.

Contents

Teachers' Notes

The problems in this book require the use of the range of strategies detailed in these notes. Teachers may choose to introduce the activities by explaining the strategies before assigning the problems. With this in mind, the initial use of each section in this book incorporates explanation and examples for students to consider before attempting the problems themselves.

Making a List: This strategy involves examining all the possibilities for a solution by listing the various elements in the problem. The technique can be used when information has to be gathered and checked in order to cover a variety of possibilities.

Example: Sam has an orange, a banana and yoghurt in his lunch box. List all of the different combinations he could eat them in.

orange, banana, yoghurt
banana, orange, yoghurt
yoghurt, orange, banana
yoghurt, banana, orange
banana, yoghurt, orange
orange, yoghurt, banana

There are six combinations.

Guess and Check: This is a good strategy to use when introducing children to problem solving. As its name suggests the children guess an answer to the problem, use the guess to reach an approximate answer and then attempt the problem. When an answer is obtained the guess is modified so that an answer which is closer to the correct one can be gained.

Example: A farmer has 55 cows and sheep in total. If he has nine more cows than sheep, how many of each does he have?

The first guess might be 25 cows. If this is true then there would be 16 sheep, making a total of 41 animals altogether. This guess is too low so a higher guess can be made until the student works out that there must be 32 cows and 23 sheep.

A table can be used to check guesses.

Number of cows			
Number of sheep			
Total			

Find a Pattern: This requires the problem solver to find a pattern in the information given. This must then be continued on to find the answer.

Example: □, △, ○, □, ..., ...

The answer is □, △, ○, □, △, ○.

Solve an Easier Version of the Problem: This strategy is similar to Finding a Pattern. The student finds the solution to a complex problem by working out an easier version and then applying the same rules to the harder version.

Example: There are 30 people at a meeting. Everyone shakes hands with each person once. How many handshakes take place?

Students could first work out how many handshakes would occur with a group of five and then look for a pattern to apply to the more difficult problem.

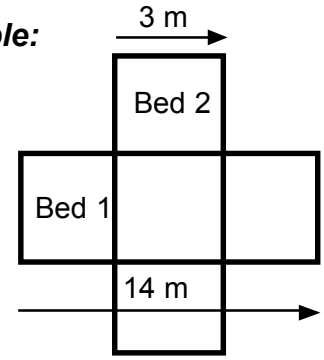
Logical Reasoning: This strategy helps students to develop skills in deductive reasoning by allowing them to use what they already know to solve the problem. Students develop a hypothesis and then check their answer as opposed to guessing the answer. Clues should be written down in the grid as shown.

Example: Jennifer and Neil went to a fancy dress party. The boy wore a cowboy suit. The girl wore a pirate suit. What did Neil go as?

	Cowboy	**Pirate**
Neil	yes	no
Jennifer	no	yes

Create a Diagram: This strategy requires the students to draw a diagram of the problem which can then be used to provide a solution. It is particularly useful with problems relating to area.

Example:



Julie has two identical garden beds that form a cross. Bed 1 is 14 metres long and Bed 2 is 3 metres wide. What is the distance around the edge of the garden.

Working Backwards: This strategy works best when a problem is stated so that the final outcome is clear. It is necessary to determine the range of events that occurred that produced the result.

Example: Sebastian has saved $30 in his account this week. Each week he saves $5 more than the week before. How much did Sebastian save three weeks ago?

If Sebastian saved $30 this week he must have saved $25 last week and $20 the week before. This can be written into a table.

Money saved:	$30	$25	$20	$15	$10
Weeks ago:	This week	one	two	three	four

From the table we can see that Sebastian must have saved $15 three weeks ago.

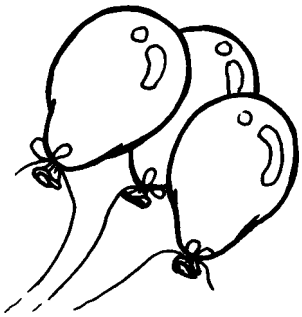
Student Information Card

5 Minute Problems

Making a List

This strategy can be used to list all possible answers. You can use this technique when you need to gather and check all the information contained in the problem.

Example: There are three balloons in a bag (one yellow, one red, and one green). In how many different combinations can they be drawn out of the bag?



Answer:

Red, yellow, green
Red, green, yellow
Yellow, green, red
Yellow, red, green
Green, red, yellow
Green, yellow, red

= 6 combinations

Strategy: Making a List 5

1. Carl works in a bike shop. He is getting the front window display ready and has a mountain bike, a racer, and a tandem bike which he must place from left to right. How many ways could he arrange the bikes?

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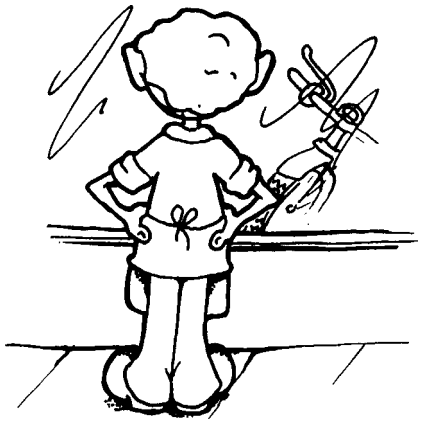
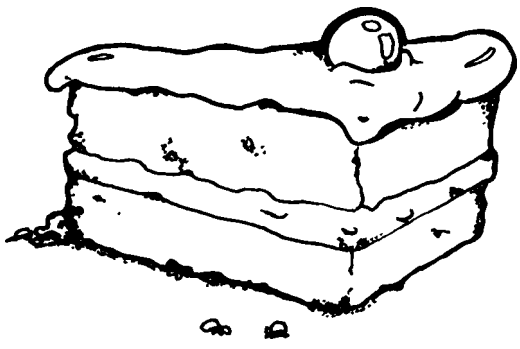


Strategy: Making a List 5



2. Shelly had a choice of banana cake, mud cake, carrot cake and apple slice at afternoon tea. She decided to try a piece of each. How many different orders could she eat the cakes in?

.....

.....

.....

Student Information Card

5 Minute Problems

Find a Pattern

This strategy is very useful in saving the amount of time it takes to work out a problem. Often the way to solve a problem can be by identifying a pattern that occurs, making it easy to predict what will happen next. Tables can be used in this strategy to help you find possible patterns.

Example: Madison has started collecting football cards. On Tuesday she collected two cards and on Wednesday she received four cards, while on Thursday she collected eight cards. If she continues at this rate, how long will it be before she has over 100 cards?

A table can be used to identify a pattern:

Day	1	2	3	4	5	6	7
Cards	2	4	8	16	32	64	128

After 7 days she will have 128 cards.

Strategy: Find a Pattern 5

1. Fred delivers papers to all the houses in his street. He starts at his house which is number 46 and then does his neighbour's house which is 44. The last house on that side is nineteen houses away. What number is it?

   .....

   .....

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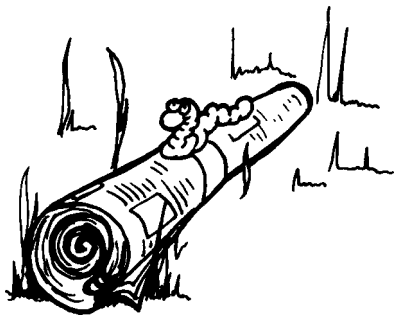
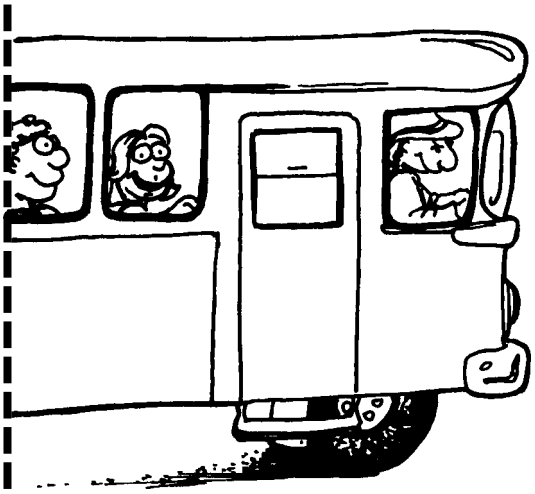


Strategy: Find a Pattern 5



2. The 419 bus that goes from the school to the shops has nine stops in between. The first stop is numbered seven and the next is fourteen. What is the number of the stop at the shops?

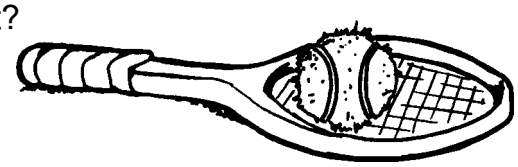
   .....

   .....

   .....

Strategy: Logical Reasoning 5

3. Marcus, Sam and Katherine love sport. One likes football, one likes tennis and the other likes water polo. Who likes which sport?

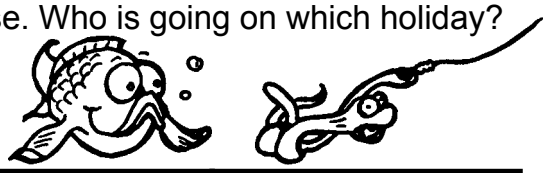


- ☆ Katherine likes all water sports.
- ☆ Marcus enjoys football.

	football	tennis	water polo
Marcus			
Sam			
Katherine			

Strategy: Logical Reasoning 5

4. Liam, Nicole and Natalie are going on holidays. One is going snow skiing, one is going fishing and the other is going on a cruise. Who is going on which holiday?



- ☆ The boy is going fishing
- ☆ Natalie hates skiing.

	skiing	fishing	cruise
Liam			
Nicole			
Natalie			

Strategy: Logical Reasoning 5

5. Amanda, Rachel and Chloe each have their favourite subject. The subjects are French, maths and art. Who likes which subject?

- ☆ Rachel likes all languages other than English.
- ☆ Chloe hates mathematics.

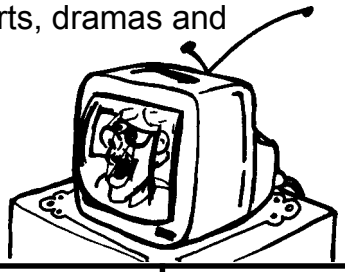
	French	Maths	Art
Amanda			
Rachel			
Chloe			

Logical Reasoning

10 Minute Problems

Strategy: Logical Reasoning 10

1. Bill, Wayne, Megan, Julie and Cynthia enjoy watching different channels on pay TV. The channels they watch are the news, films, sports, dramas and comedies. Who likes which channel?

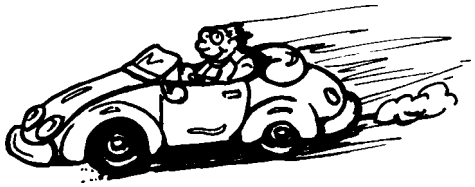


- ☆ All of the females hate sports.
- ☆ Megan only enjoys films.
- ☆ Cynthia laughs a lot during her shows.
- ☆ The news is watched by Wayne.

	news	films	sport	drama	comedy
Bill					
Wayne					
Megan					
Julie					
Cynthia					

Strategy: Logical Reasoning 10

2. Jill, Amanda, Nathan and Betty are going to a concert. One will go by car, one by bus, one by train and the other by tram. How does each person get to the concert?



- ☆ The male hates public transport.
- ☆ Jill lives next to a bus stop.
- ☆ Amanda enjoys trains.

	car	bus	train	tram
Jill				
Amanda				
Nathan				
Betty				