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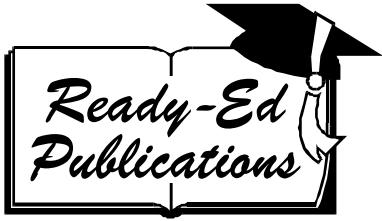
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Everyday Math

2

Problem Solving Math for Intermediate Level Students

Stimulating 'word' problem solving
activities for Grade 3 - 5 students.

Written by Jane Bourke. Illustrated by Rod Jefferson.

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SAMPLE

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Teachers' Notes

The idea of Problem Solving activities often conjures up images of numbers and objects that have no direct meaning for students other than teaching the basic problem solving strategies. The activities in this book are designed to present real life problems in a realistic context so as to provide children with situations in which every day problem solving and comprehension skills are required.

The activities are based around recurring characters who find themselves exposed to a range of problems that need to be solved; the sorts of problems that students may one day encounter.

Most pages include a challenge activity, usually an extension of the main problem, which will further consolidate comprehension skills. Included throughout the book are brainteaser pages which focus on a particular problem solving strategy, highlighted at the foot of the page. These brainteasers can be photocopied and individually glued on to card so as to create a set. Students might like to think up their own brainteasers to add to the set.

Problem Solving Strategies

There are many strategies for solving every day math problems. Some of the main problem solving strategies have been explained below. In some cases examples of problems are given where the particular strategy can be applied.

Guess and check:

Probably the first strategy children might try and definitely the easiest. By making a guess and checking their answer children have a point of reference on which to base all other guesses.

An example:

I am thinking of two consecutive numbers that when multiplied give 182. A guess might be to try 14×15 which would give 210. Obviously the next guess would try lower numbers.

	14					
	15					
Total	210					

Act it out:

Students quite often need to visualize the problem, especially where people or objects are concerned. Counters, coins and students can be used to help solve the problem.

Some examples:

There are 48 players in the darts championships. Each player stays in the competition until they lose a game. How many games must be played to find the club champion?

A caterpillar crawls up the tree 2 m every day. Every night it slips back 50 cm. The tree trunk is 10.5 m tall. How long will it take for the caterpillar to reach the top of the trunk?

Make a model:

When problems cannot be acted out, the next best thing is to make a model using cubes, matches and so on.

Make a drawing, diagram or graph:

Graphs and diagrams are particularly useful for trying different combinations or clarifying information.

An example:

Jack has a rectangular field that has an area of 360 m. What are the possible dimensions of the rectangle?

Look for a pattern:

This strategy can be used in many number and space activities to help simplify the problem.

Number patterns: It takes three matches to make a triangle, 5 matches to make 2 triangles. How many matches are needed to make 3 triangles?

Spatial Patterns: How many squares are there on a checker board?

Construct a table:

By organizing data in a more meaningful way children can better see relationships, patterns and possibly missing information. This strategy is best used where different information is given about each person or object in the problem. A table can include all the information and eliminate irrelevant information.

An example:

Tim, Jess, Max, Jane, Tarnie and Kelly each play sport over the weekend. They all play a different sport. Match the person to their sport based on the following:

Tim doesn't like swimming but enjoys baseball.

Jess likes tennis more than swimming.

Kelly enjoys netball.

Max won't play hockey.

Jane doesn't like baseball or diving.

Tarnie plays the sport that Max doesn't like.

	Swimming	Tennis	Netball	Hockey	Baseball	Diving
Tim	X				✓	
Peter	X	✓				
Kelly			✓			
Max				X		
Tarnie				✓		
Jane					X	X

The solution can then be found through the process of elimination.

Make a list:

All possibilities can be listed when using this strategy and again the process of elimination can be used.

An example:

You have three T-shirts: red, blue, and yellow; and four pairs of jeans: green, black, navy, and light blue. How many different combinations can you wear?

Restate the problem:

This is best used to make sure students fully comprehend the problem and know what they need to do to find the solution.

An example:

At the supermarket Sarah bought some groceries. All the things she bought were the same price and she bought as many things as the total number of cents she was charged for each item. If her bill was \$6.25 how many things did she buy?

This could then be rephrased as: How many things can be bought with \$6.25 where they all cost the same amount?

Solve a simpler problem:

By exploring a simpler problem, an apparently difficult task can be made easier. Students can look for a pattern and then transfer this pattern to the larger problem.

An example:

There are 20 people at a meeting. Everyone shakes hands with each person once. How many handshakes take place?

This could be tried with a group of five and then children can look for a pattern.

Account for all possibilities:

This strategy can be used in addition to some of the strategies already mentioned such as making a list.

An example:

Emily is playing monopoly and wants to buy Boardwalk at a cost of \$400. She has four \$100 notes, ten \$50 dollar notes, seventeen \$20 dollar notes, eight \$10 dollar notes, fifteen \$5 dollar notes, and six \$1 dollar notes. How many different combinations of \$400 can she hand over to the banker?

Use logical reasoning:

This strategy involves students using what they already know to solve a problem. A solution can be reached when logical reasoning is used to draw conclusions about mathematics. Strategies involve using models, known facts, properties and relationships to explain thinking.

An example:

Ann, Brendan, Cathy and Daryl all play an instrument in the school band. They play the tuba, violin, flute, and harp. Ann plays the harp and Brendan does not play the violin. If Cathy plays the tuba, what does Daryl play?

Work backwards:

This strategy works best when a problem is stated so that the final outcome is clear. In such a case the condition that existed earlier needs to be determined.

An example:

Michael arrived at the airport and noticed that he had to wait two hours for his flight. A delay of one hour and fifteen minutes was announced. Michael's flight eventually departed at 10.30 pm. At what time did Michael actually arrive at the airport?

Flight departure	10.30
Delay of one hour and fifteen minutes	10.30 less 1.15 = 9.15
Arrived two hours early	9.15 - 2.00 = 7.15 pm

Tips for Students (Make a wall chart of these points.)

- ☆ Make sure you understand the problem.
- ☆ Have a go even if you just play around with the problem.
- ☆ Try a variety of strategies.
- ☆ Learn from your mistakes.
- ☆ Keep a record of your working out for the bigger problems so that you can refer back if needed.
- ☆ Check your answers.