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Section 1 — Teaching Strategies for Problem Solving

Introduction to Teaching Strategies

Often the most difficult part of problem solving is simply in knowing where to start. The system presented here gives both student and teacher that starting place. The clearly defined four-step method is easily applied to both simple and complex problems and will allow students consistent practice in the thought processes needed to reach correct solutions. Students are provided with ten different strategies to choose from to use as tools in working through problems.

A 4-Step Method to Problem Solving

Step 1 – Discover what the problem is asking you to solve. To do this you must identify the important information and the information that does not help to solve the problem. You must also determine if any necessary information is missing and what you must do to get that information.

Step 2 – Choose a strategy that will help to solve the problem. There may be more than one strategy that you need to use. Find the strategy or strategies that will aid in finding the answer to the problem.

Step 3 – Solve the problem. Work the problem until you find the answer or answers using the strategy or strategies you chose.

Step 4 – Go back over the problem. Check the solution to see that it answers the question.

Problem Solving Strategies

Use Objects To Solve The Problem

You may find it helpful to use objects to try and solve a problem. This will allow students to develop visual images of both the information given in the problem and the solution process. You can use objects such as coloured counters, or scraps of paper. Objects do not need to be elaborate.

Make And Use a Drawing Or Model

It may be helpful to use a drawing or diagram when trying to solve a problem. This could help the student understand data that is in the problem.

Make A Table

Students may find that making a table helps them keep track of data, see that there is missing data, and discover data that is asked for in the problem.

Make A Systematic List

Recording work in a systematic list makes it easier to review what has been done and to identify further steps that need to be completed.

Guess And Check

Guess and check is helpful when a problem presents large numbers or many pieces of data. When students use this strategy, they guess the answer, test to see if it is correct and guess again if the previous answer is incorrect. They continue the process to come closer to the solution. This is a trial and error strategy.

Look For A Pattern

By identifying a pattern, students can predict what will come next. This is an important strategy and is used to solve many different kinds of problems.

Work Backwards

In order to solve certain problems, the student needs to make a series of computations starting with information presented at the end of a problem and ending with information presented at the beginning of the problem.

Use Logical Reasoning

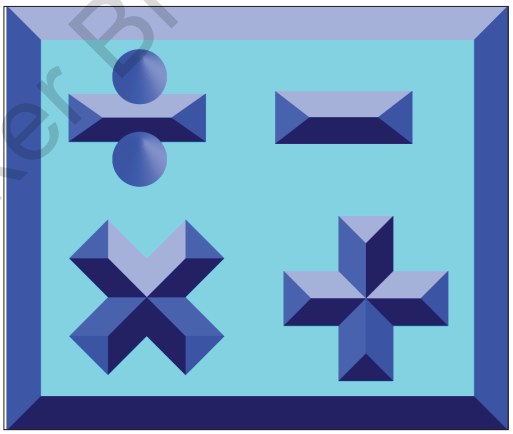
Some problems will include or imply various conditional statements such as: " if-then-else" or "if something is true, then…" or "if something is not true, then…" This kind of problem requires logical reasoning.

Make It Simpler

Making a problem simpler may mean reducing large numbers to smaller ones, or reducing the number of items given in a problem. This in turn may suggest what operation or process to use and could reveal a pattern to use.

Brainstorming

This strategy can be use when all else fails. This strategy means looking at a problem in new and inventive ways. This requires the student to be creative, flexible and to keep trying until the light goes on.



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Problem Solving Practice Exercises

Logical Reasoning

The after school team is playing softball on the playground. Sue, Colleen, Dave and Mike are playing together.

- Sue and Dave have gloves.
- Dave does not have a hat.
- Mike and Colleen have hats.
- Colleen has a bat.

What name belongs on each player?

What Do You Know

- What question do you have to answer?
- How many are playing softball?
- What are their names?
- What do you know about Sue?
- What do you know about Dave?
- What do you know about Mike?
- What do you know about Colleen

Find the Answer

- What does the first clue tell you?
- What does the second clue tell you?
- What does the third clue tell you?
- What does the fourth clue tell you?

How I Know I'm Right

- Look back to see if your answer fits with what the problem tells you and asks you to find. Read the problem again. Does your answer seem to fit?

Answers

Sue = Dave  = Mike  = Col-  leen = 

Organised List

Susan went to the shops and bought some lollies for 50¢. How many different groups of coins could Susan have used to pay for the lollies.

What Do You Know

- What question do you have to answer?
- What did Susan do? How much were the lollies?
- What kinds of coins could she have used?

Find The Answer

- How many columns are there in the list that is started on your paper?
- What is at the top of the first column? The second column? The third column?
- Look at the first 3 groups. Observe how they been organised.
- Finish the list on a separate sheet of paper. How many different groups of coins could Susan use to pay for her lollies?

	50¢	**20¢**	**10¢**	**5¢**
Group 1	1	0	0	0
Group 2	0	2	1	0
Group 3	0	0	0	10

How Do I Know I'm Right

- Look back to see if your answer fits with what the problem asks you to find. Read over the problem again. Look over your work. Does your answer fit?

Answers

Group	50¢	20¢	10¢	5¢
1	1	0	0	0
2	0	0	5	0
3	0	0	4	2
4	0	2	1	0
5	0	1	3	0
6	0	0	1	8
7	0	0	0	10
8	0	1	2	2
9	0	2	0	2
10	0	0	2	6
11	0	0	3	4
12	0	1	0	6
13	0	1	1	4
14	0	0	4	2

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Guess and Check

Dave and Mike wanted to buy a new basketball. The basketball cost 99 dollars. They pooled their money together and purchased the basketball. Dave paid 23 dollars more than Mike did. How much money did each of them pay?

What Do You Know

- What question do you have to answer?
- What are Dave and Mike buying?
- How much did the basketball cost?
- What does the problem say about how much money Dave paid?
- What does the problem say about how much money Mike paid?

Find The Answer

- What is your guess?
- How can you check your guess?
- How was your guess? If your first guess was wrong, how can you make your second guess better?

How I Know I'm Right

- Does your answer fit with what the problem asks you to find out?
- Read over the problem again.
- Does your answer fit?

Answers

Dave paid 61 dollars. Mike paid 38 dollars.