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Activities

Strategies for Problem Solving
(Elementary Level)

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Introduction

Among the most important skills to be taught in the mathematics curriculum is that of problem solving. It may well be said that the importance of this skill is exceeded only by the measure of difficulty associated with teaching it. The root cause of this difficulty is the fact that there is no one empirical method or strategy that can be used to solve all problems of a mathematical or logical nature. Nevertheless, there exist a handful of strategies and techniques that prove useful time and time again. We examine some of these, and give examples illustrating their use.

Guess and Check

- Estimate or try to guess the correct answer.
- Use a series of questions for the guess.
- Check to make sure the answer is correct.

Example: Your school has enough award ribbons for 250 social studies fair participants. If the following numbers of students have entries in the fair, does the school have enough ribbons?

Grade 3	52
Grade 4	67
Grade 5	65
Grade 6	49

- Answer: Think ... round and then estimate the answer.

  52 rounded to 50
  67 rounded to 70
  etc.

Using a Diagram

- Create a visual image to solve the problem.
- Display numerical data in an organized way.
- Demonstrate relationships among the data.

Example: A farmer plants 8 rows of corn and places 12 corn plants in each row. How many plants does the farmer have in the field?

- Answer: Think ... create a visual image or a diagram.

Corn Plants

Rows of Corn												
	X	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*
	X											
	X											
	X											
	X											
	X											
	X											
	X											

Make a Table

- Organize data found in the problem on a chart.
- Label the table/chart to make it useful.
- Find the answer through prediction.

Example: Judy read in a story that two out of five people have blue eyes. She wanted to know (based on this information), how many students in her third-grade class would have blue eyes. How many can she predict?

- Answer: Think ... place data on a table.

Blue Eyes	**2**					
Others	**3**					
TOTAL	**5**	**10**	**15**	**20**	**25**	**30**

Make an Organized List

- Develop a systematic approach to look at the data.
- Discover insufficient data as well as extra data in the problem.
- Use only the needed data to solve the problem.

Example: Ann, Beth, Cindy, Donna, and Edith were playing in tennis matches to determine who would play position 1, 2, 3, 4, and 5 on the girls' tennis team. Each girl played each of the other girls once. How many matches were played?

- Answer: Think ... pair each girl with the others from the list.

A(Ann)B(Beth)	AC	AD	AE
BC	BD	BE	
CD	CE		
DE			

Find a Pattern

- Look at the entire problem or part of the problem.
- Identify the pattern in the data given.
- Calculate/predict the unknown data to solve the problem.

Example: A neighbor asked Alan if he was interested in mowing his yard for the summer. He gave him a choice of mowing all summer (12 weeks) for $200 or earning 1 cent the first week, 2 cents the second week, and so on, doubling the amount each week. Which arrangement should Alan accept?

- Answer: Think ... look for a pattern related to doubling.

Week 1	1 cent	
Week 2	2 cents	
Week 3	4 cents	2×2
Week 4	8 cents	$2 \times 2 \times 2$
etc.		

Solve a Simpler Problem

- Substitute smaller numbers that can be estimated.
- Check the reasonableness of that solution before using the original numbers.

Example: A person bought a car for 25% less than the original price of $20,000. How much was paid for the car?

- Answer: Think ... explore a simpler example first.

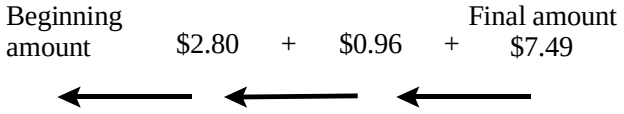
25% of \$100 would be \$75
25% of \$1000 would be \$750
etc.

Work Backward

- Develop a flow chart to solve the problem.
- Use the known information.
- Show the process by using directional arrows.

Example: Pam counted the money she had earned during the week and wrote it on a notepad. She then bought some cards for \$2.80, a pencil for \$0.96, and had \$7.49 left. She lost the notepad. What was the amount written on the notepad?

- Answer: Think ... begin with the current amount and work backward to find the total amount earned.



Develop and/or Write an Equation

- Invent a formula that can be used to solve the problem.
- Apply to real-world situations.

Example: Show "every day for six weeks" in numerical form.

- Answer: Think ... what format is needed to find this answer.

  6 weeks
  7 days per week
  $6 \times 7 =$ _____

References

(1) Alabama Department of Education (2003). Alabama Course of Study: Mathematics, Montgomery, AL.
(2) National Council of Teachers of Mathematics (2000). Principles and Standards for School Mathematics, Reston, VA.