

**TEACHER'S GUIDE**

**MATH SERIES 2**

**PROBLEM SOLVING, Part 1:**

*19 Minutes*

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**FOR USE IN:** Mathematics

**LEVEL:** Grades 7-9

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**EDUCATIONAL OBJECTIVES:**

To help the students understand:

- The five steps to take in solving a problem, one of which is to select a strategy.
- The six common strategies used to solve a problem.
- Why different strategies are better suited to different problems.

**BACKGROUND INFORMATION:**

No one can foresee the kinds of problems they will have to solve in their life or in their job. But this video will introduce you to an orderly process to follow, which will help you solve many problems. Not every problem is solved on the first attempt. If that happens, reexamine the problem for overlooked information, or try another strategy. We will explore the remaining four of six commonly used strategies in Part 2. It may take a combination of strategies to solve one problem. The key to more quickly solving a problem, is to first, clearly understand the problem, and then to relate the nature of the problem to the strategy most likely to solve it. Search your memory for strategies that have solved similar problems. Look at a problem in different ways to increase the chance of finding that analogy with a solved past problem.

### **CONTENT OF THE VIDEO:**

The uncle of our young lady on camera has promised a ride on his boat if she can solve six problems.

There are 5 important steps to follow in solving a problem:

1. Read and re-read the problem
2. Identify important information
3. Choose a strategy from among 6 choices we will learn later, which is best suited for solving the problem.
4. Solve the problem using the selected strategy
5. Check the answer to be sure it's correct.

There are six commonly used strategies to choose from. Two are explained in Problem Solving: Part 1, and the remaining 4 in Part 2.

1. **Guess and Check Strategy.** This strategy is also known as the trial and error strategy. It's useful when the answer to a problem must be a whole number between limits. The problem presented for which this strategy is selected is: There were a number of humans and a number of dogs out for their morning walk one day. Counting both human and dogs, there were 12 heads, 34 legs and 3 trees. How many dogs were there? The information about the 3 trees is disregarded as not relevant information. After several trial and error attempts, the correct answer of 5 dogs is calculated, and then checked for accuracy.

2. **Simpler Related Problem Strategy** If a problem consists of large numbers it is often possible to find the solution by first solving a similar problem with smaller numbers. The problem this strategy was chosen to solve is: " Tina's morning routine is organized to the last second, in 4 time segments:.

segment 1: exercise, which takes twice as long as:

segment 2: shower and dress, which takes twice as long as:

segment 3: eat breakfast, which takes twice as long as:

segment 4: clean teeth, leave house.

The total time Tina's spends in these 4 time segments is 3000 seconds.

How long does Tina spend exercising?

To make the ensuing calculations easier, the 3000 seconds is divided by 100, resulting in 30 seconds. Next a guess and check strategy is used. Guessing at 1 second for segment 4, gives a result of 15 seconds for the total time spent. Multiplied by 2 gives a 30 second result, which is correct. Segment 1 takes 16

seconds. Multiply 30 by 100 converts the numbers back to the original one of 3000 seconds. Segment 1 takes 1600 seconds, or 27 minutes rounded off to the nearest minute, which is how long Tina spends exercising. The answer is checked and is correct. There is a review of the Simpler Related Problem strategy.

**AFTER SHOWING THE VIDEO:**

Discuss why the two strategies explained were appropriate for the problems posed: Guess and Check Strategy for the how many dogs puzzle, and the combined Simpler Related Problem Strategy, and the Guess and Check Strategy for the how long did Tina exercise problem.

These are suggested exercises involving the 2 strategies above:

1. Find two whole numbers whose sum is 60 and whose difference is 12.
2. Cynthia is 5 years older than her cousin Sylvia. The sum of their ages is 13. How old is each girl?
3. An auditorium seats 1,073 people. Each row has the same number of seats, and there are more than 30 rows.
  - a. How many rows are there?
  - b. How many seats are in each row?
4. Two different digits use the same two numbers. The sum of the digits is 7, and the difference between the numbers is 27. Find the numbers.
5. The sophomores made 50 corsages to present to their mothers at Open House. Each corsage consisted of 2 gardenias or 3 roses. If 130 flowers were used, how many of each kind of corsage were made?
6. Dora has a piggy bank that contains 4 times as many quarters as dimes. The bank contains more than \$10 and less than \$12. How many dimes and quarters does the bank contain?
7. A health food store prepares a snack mix by combining 1 pound of nuts,  $\frac{1}{2}$  pound of dried apricots, and 2 pounds of dried apples. How many pounds of apricots are needed to make 15 pounds of this mix?
8. Carlos bought twice as many loaves of bread as he did pounds of meat. Each pound of meat cost 3 times as much as a pound of bread. If Carlos spent \$12 for the meat and bread, how much did he spend for bread?
9. The directions on a bottle of concentrated cleaning fluid recommend that 2 ounces of the concentrate be mixed with 30 ounces of water. How many ounces of concentrate must be used to make 3 gallons (384 ounces) of cleaning solution?

10. A man wishes to divide his herd of horses among his children so that each child gets half as many horses as the next older child. Any extra horses will be sold. The man has 4 children and 48 horses:

- a. How many horses will each child get?
- b. How many horses will be sold?

Math Series 1, consists of 10 videos:

ALGEBRA: A Piece of Cake Part 1

ALGEBRA: A Piece of Cake Part 2

SLOPES: That's a Bit Steep!

PERCENTAGES: That Make Sense

LINEAR EQUATIONS and Their Graphs: Let's Get It Straight Part 1

LINEAR EQUATIONS and Their Graphs: Let's Get It Straight Part 2

INTEGER OPERATIONS: Into the Negative Zone Part 1 Adding and Subtracting

INTEGER OPERATIONS: Into the Negative Zone Part 2 Multiplying and Dividing

FACTORING IS FANTASTIC Part 1: Common Factors

FACTORING IS FANTASTIC Part 2: Quadratic Trinomials

Math Series 2, consists of 12 videos:

PROBABILITY, Parts 1 & 2

RATIOS

TRIGONOMETRY, Parts 1 & 2

STATISTICS Parts 1 & 2

PROBLEM SOLVING Parts 1 & 2

GEOMETRY Parts 1, 2, &3

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