

Problem Solving

Reporting Category	Computation and Estimation
Topic	Solving single-step and multistep practical problems
Primary SOL	4.5 The student will d) solve single-step and multistep practical problems involving addition and subtraction with fractions and with decimals.
Related SOL	4.5a, b, c

Materials

- Problem-Solving Mat (attached)
- Word problems

Vocabulary

fraction, mixed number, improper fraction, like denominators, unlike denominators, estimation, simplify, simplest form, factor, least common denominator, common factors, common multiples, greatest common factor (GCF), least common multiple (LCM), sum difference, decimal, tenths, hundredths, thousandths, decimal point, leading zero, place value

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Begin by asking students to consider how they typically solve a problem in their everyday lives. Do they just do something without thinking, do they get suggestions and opinions from others, do they look at their options? Discuss the importance of connecting the math they are studying to real-life situations. Ask students what kind of questions they need to ask themselves when confronted with a math problem. Ask what they think about when solving such problems. Lead them to realize that they should ask themselves: “What do I know? What do I want to know? What information given is important? What should I do to find the answer? Does the answer make sense?”
2. Distribute copies of the Problem-Solving Mat. Give the class a word problem to solve, and walk through the steps with them. For example: “Sandy ran 3.5 miles each day for 12 days. Mary ran 2.7 miles each day for 10 days. How many more miles did Sandy run than Mary?”
 - What do I know from the statement of the problem? (miles per day and number of days each girl ran) Have students write this information in the appropriate box on their mats.
 - What do I want to know first? (total number of miles each girl ran)
 - What information given is important? What information will help me decide which operation to use? (“__miles each day for __days”) Have students write these words on their mats. Lead a discussion in which students conclude that they must *multiply* (or use repeated addition) to find out the total number of miles each girl ran. Have students show this multiplication in the first SOLVE box on their mats.
 - What do I still want to know? (how many more miles Sandy ran than Mary)
 - What additional information will help me to decide my next step? (“How many more”) Have students write these words on their mats. Lead a discussion in which students

conclude that they could *subtract* to find out how many more miles Sandy ran than Mary.) Have students show this subtraction in the second SOLVE box on their mats and then write the answer to the problem in the last box.

- Have I included everything?
 - Does the answer I've gotten make sense? Do I have the correct units? Is there a way to confirm that my answer is correct?
3. This process works for single-step and multistep problems. It is important to help students learn how to “think through” problems in order to solve them.
 4. Consider sharing some other ideas with your students for problem solving, such as the following:
 - Draw a diagram or picture.
 - Act the problem out, step-by-step.
 - Make a systematic list, chart, or table.
 - Look for a pattern.
 - Simplify the problem—i.e., try it with smaller numbers.
 - Restate the problem in another way, or look for a related problem.
 - Think about “Before” and “After” situations.
 - Work backwards.
 - Guess and check—i.e., try something and see if it works.

Assessment

- **Questions**
 - What is the purpose of the Problem-Solving Mat? How does it help you organize your thoughts?
- **Journal/Writing Prompts**
 - Write a single-step or multistep word problem in your journal, and trade with a friend to solve.

Problem-Solving Mat

READ
What information do you *know* from the problem?

THINK
What is the question?
What information will help me decide which operation to use?

SOLVE & CHECK

