Sample Pages from

SHELL EDUCATION

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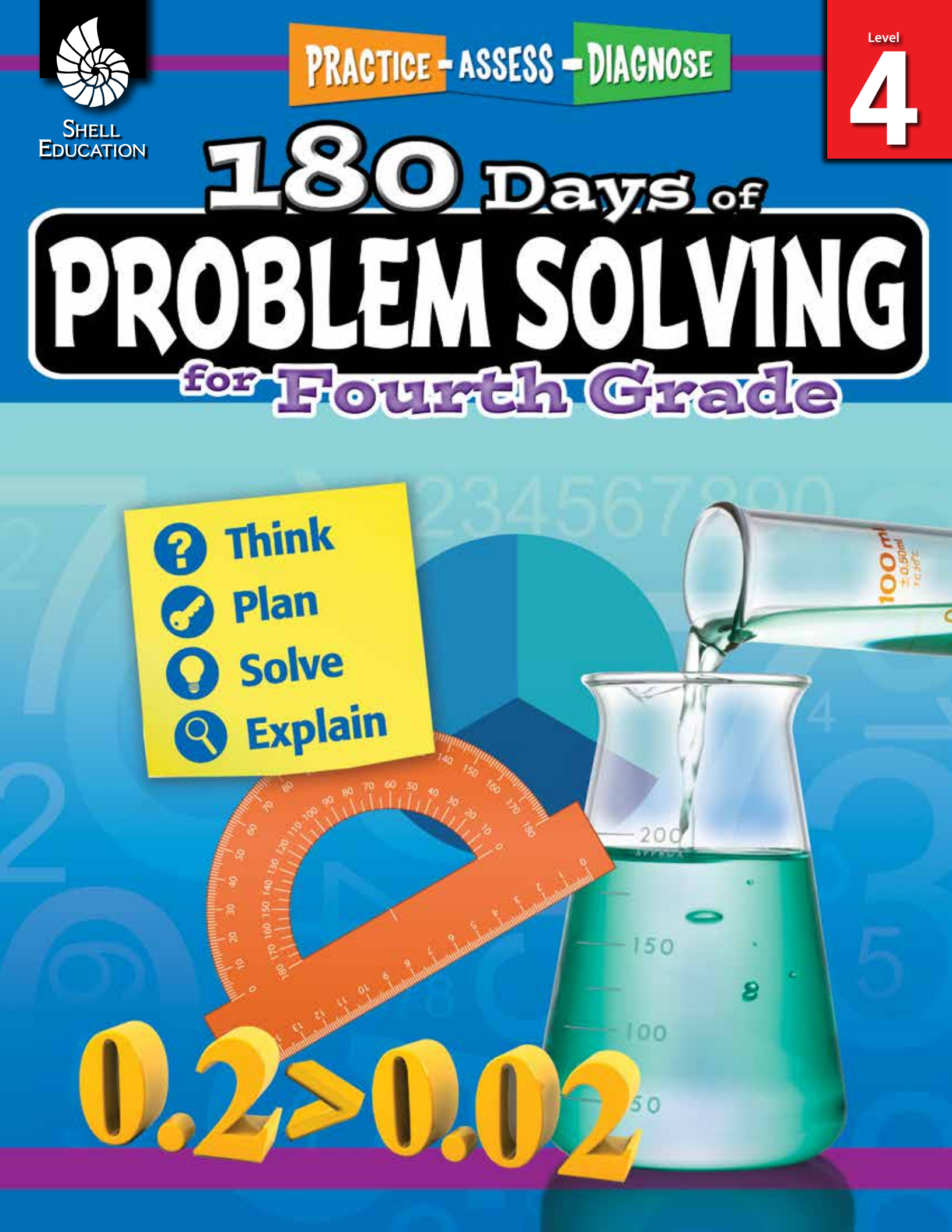
Shell Education
PRACTICE - ASSESS - DIAGNOSE
Level 4
180 Days of
PROBLEM SOLVING
for Fourth Grade
Think
Plan
Solve
Explain
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INTRODUCTION

The Need for Practice

To be successful in today's mathematics classrooms, students must deeply understand both concepts and procedures so that they can discuss and demonstrate their understanding during the problem-solving process. Demonstrating understanding is a process that must be continually practiced for students to be successful. Practice is especially important to help students apply their concrete, conceptual understanding during each step of the problem-solving process.

Understanding Assessment

In addition to providing opportunities for frequent practice, teachers must be able to assess students' problem-solving skills. This is important so that teachers can adequately address students' misconceptions, build on their current understandings, and challenge them appropriately. Assessment is a long-term process that involves careful analysis of student responses from discussions, projects, practice pages, or tests. When analyzing the data, it is important for teachers to reflect on how their teaching practices may have influenced students' responses and to identify those areas where additional instruction may be required. In short, the data gathered from assessments should be used to inform instruction: slow down, speed up, or reteach. This type of assessment is called *formative assessment*.

HOW TO USE THIS BOOK *(cont.)*

College-and-Career Readiness Standards

Below is a list of mathematical standards that are addressed throughout this book. Each week students solve problems related to the same mathematical topic.

Week	Standard
1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.
3	Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
4	Use place value understanding to round multi-digit whole numbers to any place.
5	Fluently add multi-digit whole numbers using the standard algorithm.
6	Fluently subtract multi-digit whole numbers using the standard algorithm.
7	Solve multistep word problems posed with whole numbers and having whole-number answers using addition and subtraction, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
8	Find all factor pairs for a whole number in the range 1–100. Determine whether a given whole number in the range 1–100 is prime or composite.
9	Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number.
10	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
11	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.
12	Multiply a whole number of up to four digits by a one-digit whole number, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
13	Multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

14	Find whole-number quotients and remainders with up to two-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
15	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
16	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
17	Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
18	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
19	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
20	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
21	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
22	Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
23	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.
24	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
25	Use decimal notation for fractions with denominators 10 or 100.
26	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

27	Know relative sizes of measurement units within one system of units including km, m, and cm. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. Use the four operations to solve word problems involving distances, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
28	Know relative sizes of measurement units within one system of units including hr., min., and sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. Use the four operations to solve word problems involving intervals of time, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
29	Know relative sizes of measurement units within one system of units including kg, g; lb., oz.; l, ml. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. Use the four operations to solve word problems involving liquid volumes and masses of objects, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
30	Apply the perimeter formula for rectangles in real world and mathematical problems.
31	Apply the area formula for rectangles in real world and mathematical problems.
32	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
33	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
34	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
35	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
36	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Think About It!

NAME: _____ DATE: _____

DIRECTIONS: Think about the problem. Answer the questions.

Mr. McGwire walks from his house to work. He walks $\frac{3}{10}$ of a mile and stops for coffee. Then, he walks $\frac{45}{100}$ of a mile and arrives at his office. How far does Mr. McGwire travel?

1. Colleen says, "I will add 3 and 45 to get 48, so Mr. McGwire must have traveled $\frac{48}{100}$ of a mile." Do you agree with Colleen's reasoning? Why or why not?

_____

_____

_____

2. How can you use the relationship between tenths and hundredths to solve the problem?

_____

_____

_____

3. Did Mr. McGwire walk less than or more than half a mile? How do you know?

_____

_____

_____

NAME: _____ DATE: _____

DIRECTIONS: Read and solve each problem.

Problem 1: Mr. McGwire walks from his house to work. He walks $\frac{3}{10}$ of a mile and stops for coffee. Then, he walks $\frac{45}{100}$ of a mile and arrives at his office. How far does Mr. McGwire travel?

What Do You Know?

What Is Your Plan?

Solve the Problem!

Look Back and Explain!

Problem 2: A rabbit enters a garden and eats $\frac{3}{100}$ of a carrot before it is scared off. The next day, the rabbit returns and eats $\frac{6}{10}$ of the same carrot. How much of the carrot has the rabbit eaten in all?

What Do You Know?

What Is Your Plan?

Solve the Problem!

Look Back and Explain!

NAME: _____ DATE: _____

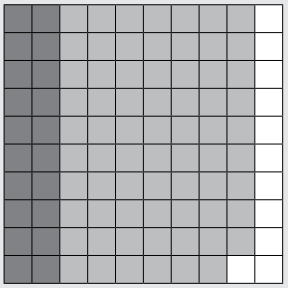
Visualize It!

DIRECTIONS: Look at the example. Then, solve the problem using the hundreds grids.

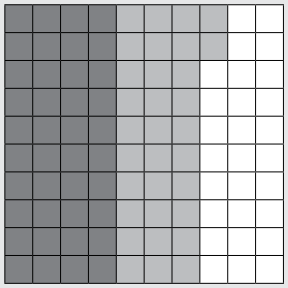
Example: Two teams are participating in a jumping contest. The team with the longest combined jump wins. Which team wins the jumping contest?

Participant	Team name	Jump length (meters)
student 1	Tigers	$\frac{2}{10}$
student 2	Bears	$\frac{32}{100}$
student 3	Bears	$\frac{4}{10}$
student 4	Tigers	$\frac{69}{100}$

Tigers



Bears

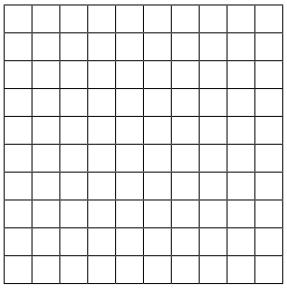


Winning team: Tigers with $\frac{89}{100}$ meter

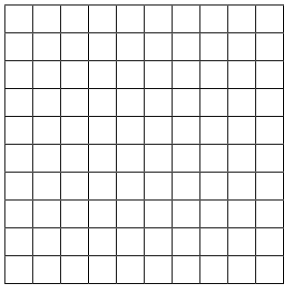
Four teachers from two grade levels are grading history reports. Which grade level has graded more reports?

Teacher	Grade level	Fraction of reports graded
Ms. Lindsey	4th	$\frac{57}{100}$
Mrs. Franklin	5th	$\frac{6}{10}$
Mr. Garcia	4th	$\frac{4}{10}$
Mr. Stone	5th	$\frac{39}{100}$

4th



5th



The grade level that has graded more history reports is _____

NAME: _____ **DATE:** _____

DIRECTIONS: Show two ways to solve the problem.

1. Raquelle ran a total of $\frac{6}{10}$ mile on Saturday and Sunday. Jaiden ran $\frac{3}{10}$ mile on Saturday and $\frac{15}{100}$ mile on Sunday. Jaiden says he ran farther than Raquelle. Is he correct? Use words, numbers, or a picture to show your work.

Strategy 1

Strategy 2

2. Which strategy do you think is better? Explain your reasoning.

_____

_____

_____

Challenge Yourself!

NAME: _____ DATE: _____

DIRECTIONS: Read and solve the problem.

Mr. Ly asks his students to write addition equations with a sum of $\frac{60}{100}$. He tells the class that one addend must have a denominator of 10 and the other addend must have a denominator of 100.

1. Write three equations. Show your work to prove your equations are correct.

$$\frac{\square}{10} + \frac{\square}{100} = \frac{60}{100}$$

$$\frac{\square}{10} + \frac{\square}{100} = \frac{60}{100}$$

$$\frac{\square}{10} + \frac{\square}{100} = \frac{60}{100}$$

2. Choose one of your equations. Write a story problem that represents the equation.

_____

_____

_____

_____

PROBLEM-SOLVING FRAMEWORK

Use the following problem-solving steps to help you:

1. understand the problem
2. make a plan
3. solve the problem
4. check your answer and explain your thinking

What Do You Know?

- read/reread the problem
- restate the problem in your own words
- visualize the problem
- find the important information in the problem
- understand what the question is asking

What Is Your Plan?

- draw a picture or model
- decide which strategy to use
- choose an operation (+, −, ×, ÷)
- determine if there is one step or multiple steps

Solve the Problem!

- carry out your plan
- check your steps as you are solving the problem
- decide if your strategy is working or choose a new strategy
- find the solution to the problem

Look Back and Explain!

- check that your solution makes sense and is reasonable
- determine if there are other possible solutions
- use words to explain your solution