TCM Teacher Created Materials

180 DAYS™

Lessons and Activities

Problem Solving for Second Grade

Table of Contents

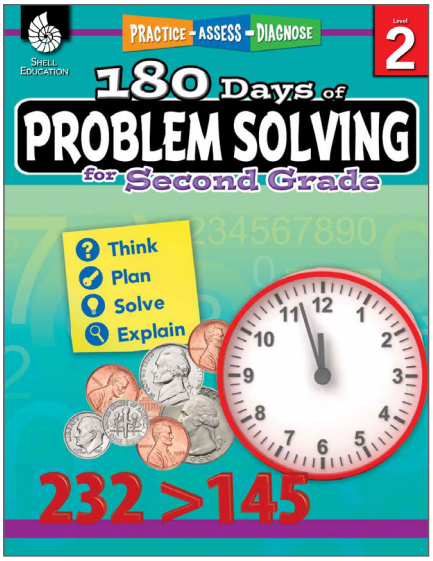
Cover (1 page)

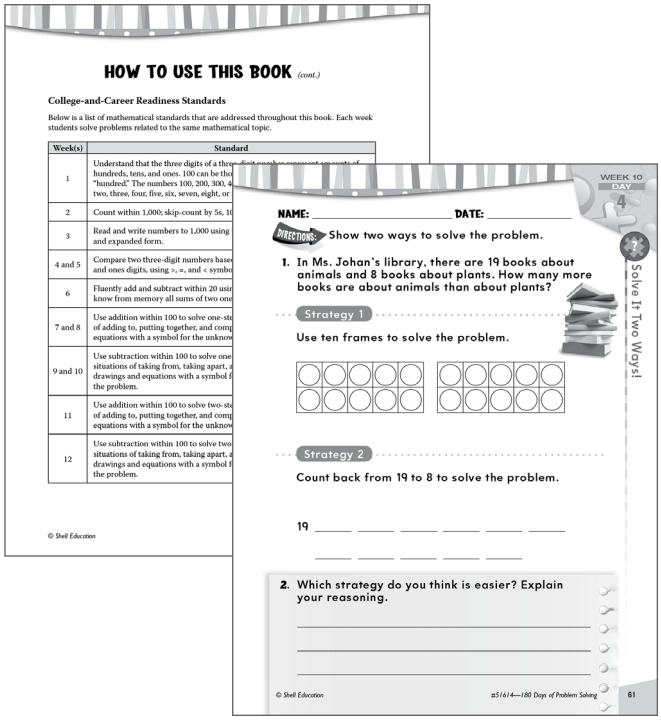
Table of Contents/Introduction (1 page)

How to Use This Book (3 pages)

Lesson Pages (5 pages)

Problem-Solving Framework (1 page)





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PRACTICE - ASSESS - DIAGNOSE

Level 2

180 Days of PROBLEM SOLVING for Second Grade

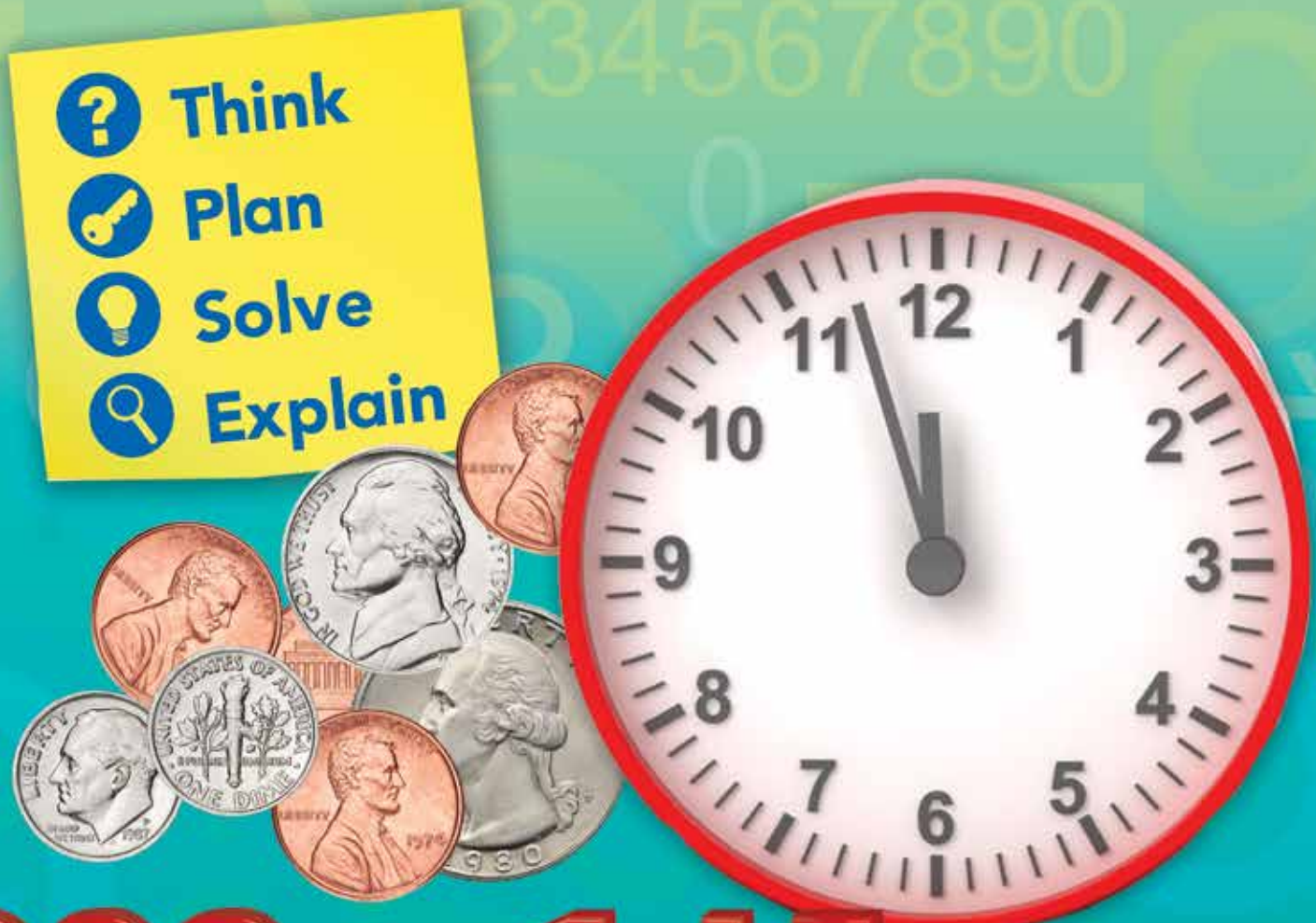

TABLE OF CONTENTS

Introduction 3
How to Use this Book 4
Standards Correlations 12
Daily Practice Pages 13
Answer Key 193
Practice Page Rubric 211
Practice Page Item Analysis 212
Student Item Analysis 216
Problem-Solving Framework 217
Problem-Solving Strategies 218
Digital Resources 219

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(s)	Standard
1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. 100 can be thought of as a bundle of ten tens—called a "hundred." The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
2	Count within 1,000; skip-count by 5s, 10s, and 100s.
3	Read and write numbers to 1,000 using base-ten numerals, number names, and expanded form.
4 and 5	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
6	Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
7 and 8	Use addition within 100 to solve one-step word problems involving situations of adding to, putting together, and comparing, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
9 and 10	Use subtraction within 100 to solve one-step word problems involving situations of taking from, taking apart, and comparing, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
11	Use addition within 100 to solve two-step word problems involving situations of adding to, putting together, and comparing, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
12	Use subtraction within 100 to solve two-step word problems involving situations of taking from, taking apart, and comparing, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

HOW TO USE THIS BOOK *(cont.)*

Week(s)	Standard
13 and 14	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
15	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
16 and 17	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
18	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
19	Add up to four two-digit numbers using strategies based on place value and properties of operations.
20 and 21	Add and subtract within 1,000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
22	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
23	Explain why addition and subtraction strategies work using place value and properties of operation.
24	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
25	Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
26	Estimate lengths using units of inches, feet, centimeters, and meters.

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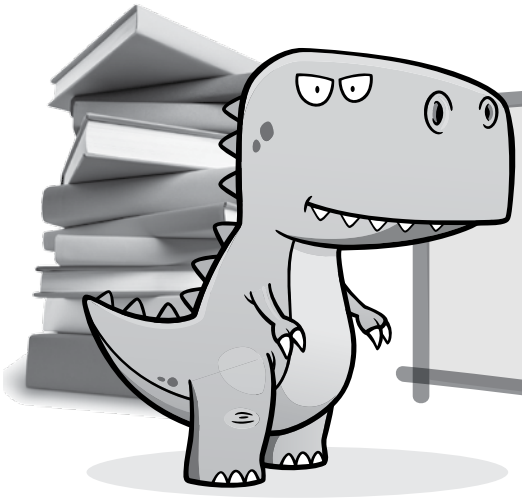
HOW TO USE THIS BOOK *(cont.)*

Week(s)	Standard
27	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
28	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
29	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.
30	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
31	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.
32	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
33	Draw a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.
34	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
35	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
36	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

NAME: _____ DATE: _____

DIRECTIONS: Think about the problem. Answer the questions.



In Mr. Sullivan's library, there are 87 books. He finds 23 books about dinosaurs. Write a subtraction sentence to show how many books are **not** about dinosaurs.

1. What do you know about the problem?

_____

_____

2. What do you need to find?

_____

_____

3. Draw a picture using base-ten blocks to show the problem.

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NAME: _____ DATE: _____

DIRECTIONS: Read and solve the problem.

Problem: In Mr. Sullivan's library, there are 87 books. He finds 23 books about dinosaurs. Write a subtraction sentence to show how many books are **not** about dinosaurs.

What Do You Know?

What Is Your Plan?

Solve the Problem!

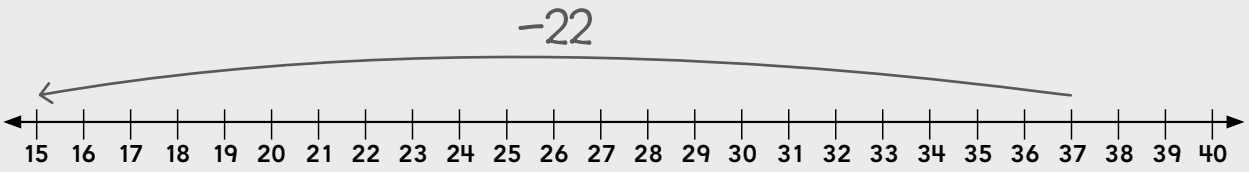
Look Back and Explain!

Picture It!

NAME: _____ DATE: _____

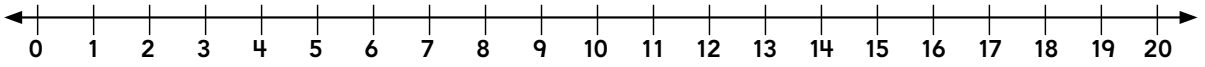
DIRECTIONS: Look at the example. Then, solve the problem using a number line.

Example: In Mr. Lee's library, there are 37 books about space. Paula has read 22 of them. How many more books about space can Paula read?



37 - 22 = 15

In Miss Robinson's library, there are 19 books about animals. Jeff has read 16 of them. How many more books about animals can Jeff read?



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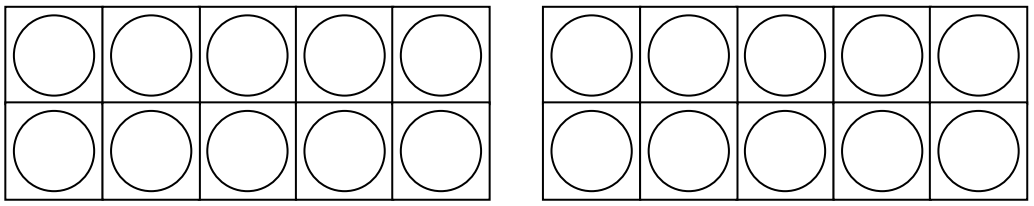
NAME: _____ DATE: _____

DIRECTIONS: Show two ways to solve the problem.

1. In Ms. Johan's library, there are 19 books about animals and 8 books about plants. How many more books are about animals than about plants?

Strategy 1

Use ten frames to solve the problem.



Strategy 2

Count back from 19 to 8 to solve the problem.

19 _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____

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

_____

_____

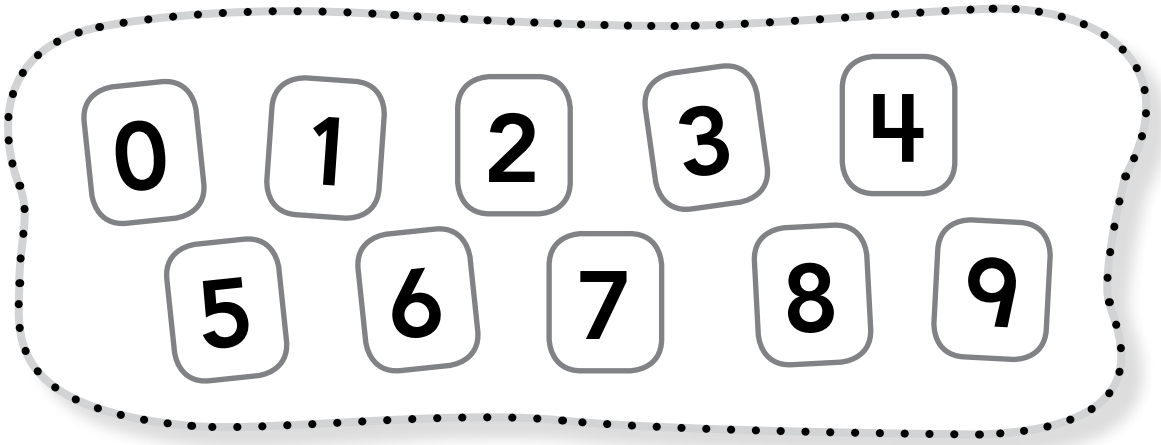
_____

Challenge Yourself!

NAME: _____ DATE: _____

DIRECTIONS: Read and solve the problem.

In Ms. Bing's library, there are fiction books and nonfiction books. Use the numbers in the squares to write a subtraction sentence to show the difference between the number of fiction books and the number of nonfiction books. Use each number only once.



1. What number sentence can you write?

☐☐ – ☐☐ = _____

2. Use your number sentence to write a story problem about the number of fiction books and nonfiction books in Ms. Bing's library.

_____

_____

_____

_____

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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 the problem
- say the problem in your own words
- picture the problem
- find the important information
- understand the question

What Is Your Plan?

- draw a picture or model
- choose a strategy
- choose an operation (+, –)
- decide how many steps there are

Solve the Problem!

- carry out your plan
- check your steps
- decide if your strategy works or choose a new strategy
- find the answer

Look Back and Explain!

- check your answer to see if it makes sense
- decide if there are other possible answers
- use words to explain your answer