

# Introduction

This book is designed around NCTM standards with a focus on problem solving. Students will build new mathematical knowledge, solve problems in context, apply and adapt appropriate strategies, and reflect on the problem-solving process. At the same time, students will utilize skills from the NCTM content standards:

- Number and Operations
- Algebra
- Geometry
- Measurement
- Data Analysis and Probability

The other NCTM process standards are also incorporated throughout the activities. The correlation chart on page 6 identifies the pages on which each NCTM standard appears. Also, look for the following process icons on each page:



Problem Solving



Connections



Reasoning and Proof



Communication



Representation

**Problem-Solving Challenge:** This short cumulative assessment contains a representative sampling of problem-solving activities similar to those used throughout this book. Use this as a pretest or a post test. Give the whole test at once or present one problem at a time over a series of days.

Students may work on these problems individually, in pairs, or in groups. Encourage students to try their best and write down their ideas. These problems can also provide opportunities for class discussion as students share their thought processes with one another.

**Workbook Pages:** These activities can be done independently, in pairs, or in groups. The problems are designed to stimulate higher-level thinking skills and address a variety of learning styles.

Problems may be broken into parts, with class discussion following student work. At times, solution methods or representations are suggested in the activities. Students may gravitate toward using these strategies, but they should also be encouraged to create and share their own strategies.

Many activities will lead into subjects that could be investigated or discussed further as a class. You may want to compare different solution methods or discuss how to select a valid solution method for a particular problem.

# *Introduction (cont.)*

**Communication:** Each activity ends with a communication section. These questions may be used as journal prompts, writing activities, or discussion prompts. Each communication question is labeled **THINK** or **DO MORE**.

**Check Your Skills:** These activities provide a representative sample of the types of problems developed throughout each content section. This can be used as additional practice or as an assessment tool.

**Vocabulary Cards:** Use the vocabulary cards to familiarize students with mathematical language. The pages may be copied, cut, and pasted onto index cards. Paste the front and back on the same index card to make flash cards, or paste each side on separate cards to use in matching games and activities.

**Assessment:** Assessment is an integral part of the learning process and can include observations, conversations, interviews, interactive journals, writing prompts, and independent quizzes or tests. Classroom discussions help students learn the difference between poor, good, and excellent responses. Scoring guides can help analyze students' responses. The following is one possible scoring rubric. Modify this rubric as necessary to fit specific problems.

- 1 – student understands the problem and knows what **he/she** is being asked to find
- 2 – student selects an appropriate strategy or process to **solve** the problem
- 3 – student is able to model the problem with appropriate manipulatives, graphs, tables, pictures, or computations
- 4 – student is able to clearly explain or demonstrate **his/her** thinking and reasoning

## Problem-Solving Challenge

1. Put 7 paperclips into 2 sets. Make one set **more**. Make one set **less**. Draw the paperclips. Write a number sentence.

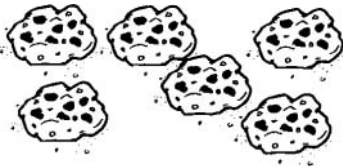


\_\_\_\_\_ + \_\_\_\_\_ = 7

2. 1 dog has a pair of ears.

2 dogs have \_\_\_\_\_ ears. 3 dogs have \_\_\_\_\_ ears.

3. Dana has 6



She gave 2 away.

How many does she have **left**? \_\_\_\_\_

4. Laura picked 3



She picked 4



How many flowers did she pick **in all**? \_\_\_\_\_