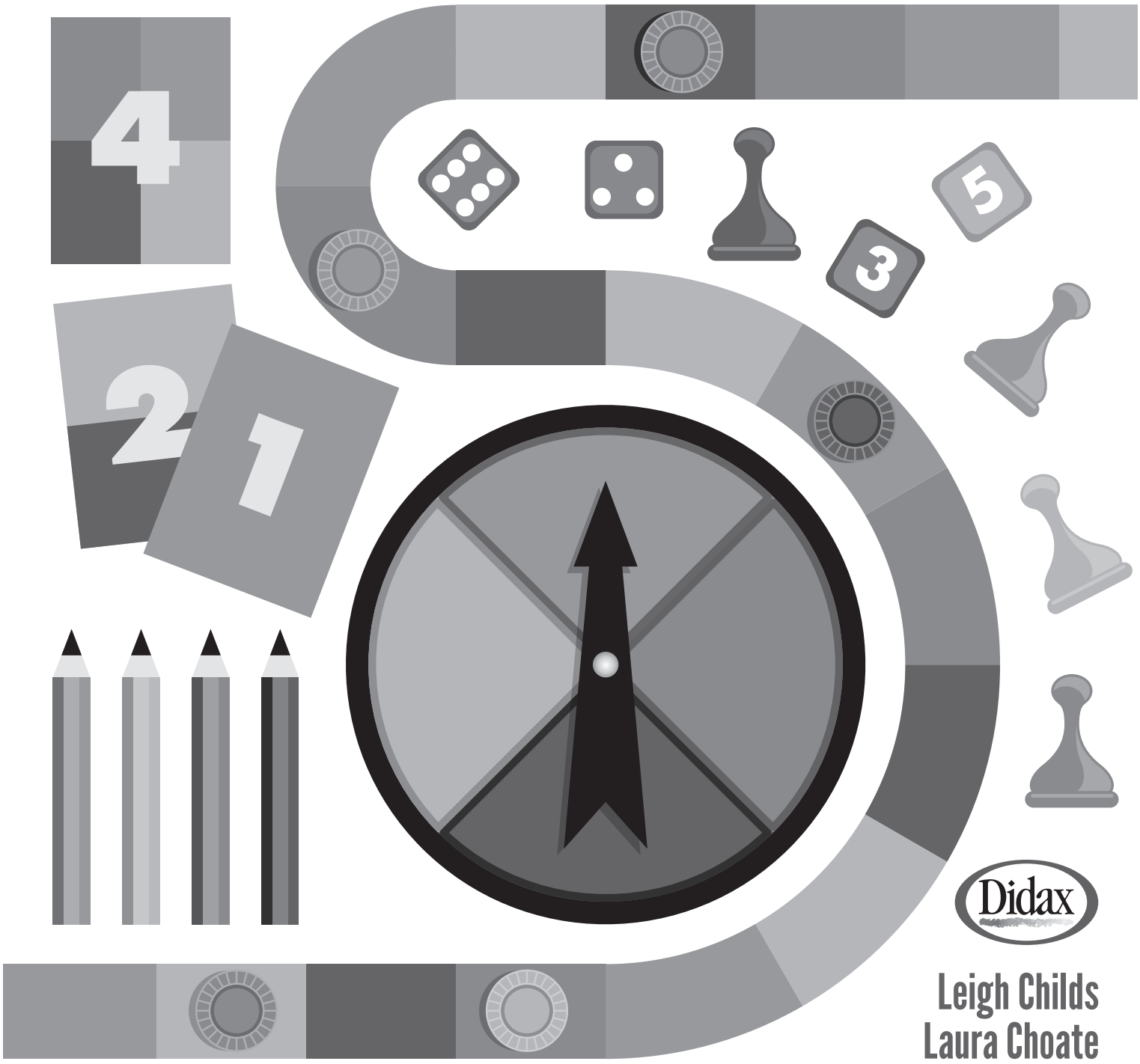
2nd Edition

Grade 1

Nimble *with* Numbers

Fluency Practice *for the* Math Standards



Didax

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Introduction

Welcome to the 2nd Edition!

Over the past ten years, thousands of teachers have enjoyed using *Nimble with Numbers* to provide engaging math experiences to their students. With this new edition we bring you expanded content, explicit connections to current mathematical standards, and more carefully planned practice activities and assessments. This book is not intended to cover every standard, but rather to further the basic number and operations sense central to all the domains of mathematics.

The bulk of the work in this book is appropriate for first-graders, but many activities will be useful to kindergartners and second-graders as well. Efforts have been made to incorporate algebra readiness and to emphasize the addition and subtraction facts six through nine. Money is included in the Counting and Comparing and Place Value sections. Although we have linked the instruction to the content standards, we've elected to organize the book into units that provide a coherent approach to the instruction, rather than follow the sequence of the standards.

Students need a facility with number and operations to achieve success with today's mathematics programs. They are being asked to demonstrate proficiency not just in skills but in problem solving, critical thinking, conceptual understanding, and performance tasks as well. Consequently, the reduced time teachers devote to number must be thoughtful, selective, and efficient.

This book meets the need for high-quality, engaging math experiences that provide meaningful practice and further the development of number sense, operation sense, and mathematical reasoning. These activities are designed to help students practice number concepts previously taught for understanding in a variety of contexts. *Nimble with Numbers:*

- provides a variety of adaptable formats for essential practice;
- supplements and enhances homework assignments;
- encourages parent involvement in improving their children's proficiencies with basic facts and computation; and
- provides motivating and meaningful lessons for a substitute teacher or student teacher.

Introduction

Activities to Create Mathematically Proficient Students

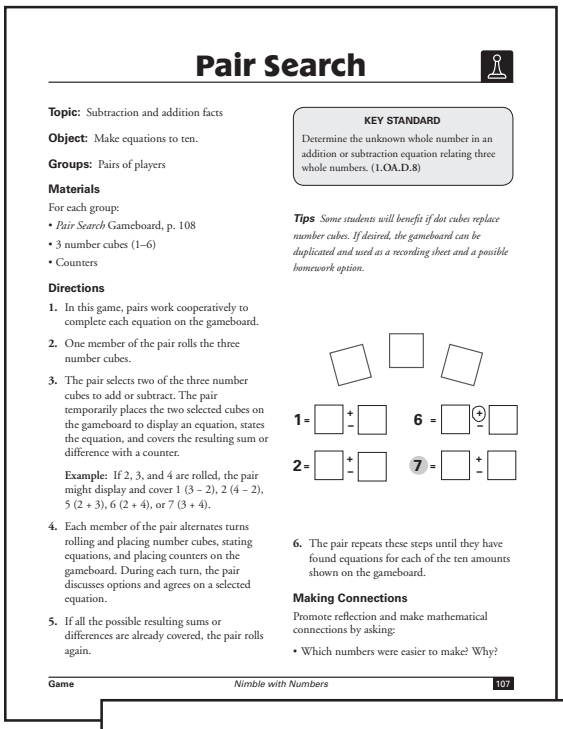
The activities in *Nimble with Numbers* are designed to use the amount of time dedicated to math efficiently. Current mathematical standards require greater focus on fewer topics, coherence from grade to grade, and rigor—that is, deep, authentic command of mathematical concepts, not making math harder or introducing topics at earlier grades. Accordingly, our criteria for selecting activities are that they be:

- Inviting (encourage participation)
- Engaging (maintain interest)
- Simple to learn
- Repeatable (able to be reused often, possibly throughout the school year)
- Open-ended, allowing multiple solutions
- Easy to prepare
- Easy to adapt for various levels
- Easy to vary for extended use

The basic design of the program is very much in keeping with current mathematical practice standards. The activities:

- Require a problem-solving approach
- Improve basic skills
- Enhance number sense and operation sense
- Encourage strategic thinking
- Promote mathematical communication
- Promote positive attitudes toward mathematics as mathematical abilities improve

Here's an interesting Game from the "Addition and Subtraction Facts to 20" unit:



Pair Search

Topic: Subtraction and addition facts

Object: Make equations to ten.

Groups: Pairs of players

Materials

For each group:

- *Pair Search* Gameboard, p. 108
- 3 number cubes (1–6)
- Counters

Directions

1. In this game, pairs work cooperatively to complete each equation on the gameboard.
2. One member of the pair rolls the three number cubes.
3. The pair selects two of the three number cubes to add or subtract. The pair temporarily places the two selected cubes on the gameboard to display an equation, states the equation, and covers the resulting sum or difference with a counter.

   Example: If 2, 3, and 4 are rolled, the pair might display and cover 1 (3 – 2), 2 (4 – 2), 5 (2 + 3), 6 (2 + 4), or 7 (3 + 4).
4. Each member of the pair alternates turns rolling and placing number cubes, stating equations, and placing counters on the gameboard. During each turn, the pair discusses options and agrees on a selected equation.
5. If all the possible resulting sums or differences are already covered, the pair rolls again.

KEY STANDARD

Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. **(1.OA.D.8)**

Tips *Some students will benefit if dot cubes replace number cubes. If desired, the gameboard can be duplicated and used as a recording sheet and a possible homework option.*

1 = ☐ +/– ☐ 6 = ☐ +/– ☐

2 = ☐ +/– ☐ 7 = ☐ +/– ☐

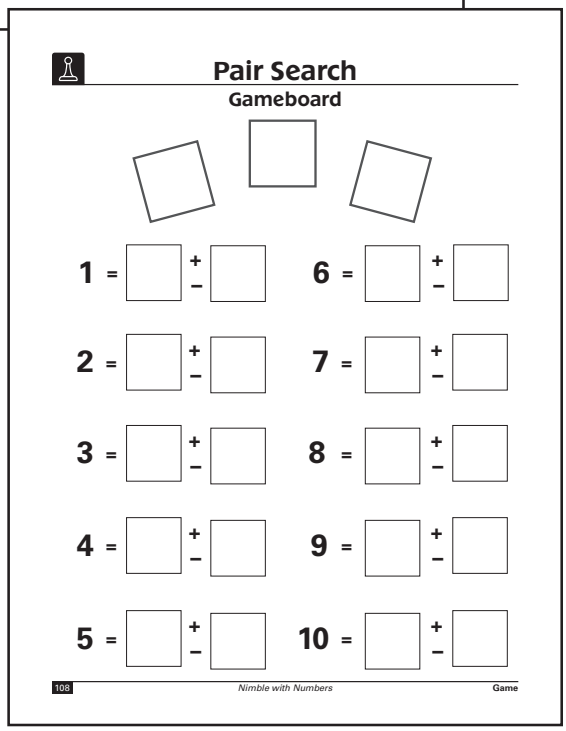
6. The pair repeats these steps until they have found equations for each of the ten amounts shown on the gameboard.

Making Connections

Promote reflection and make mathematical connections by asking:

- Which numbers were easier to make? Why?

Game — *Nimble with Numbers* — 107



Pair Search

Gameboard

1 = ☐ +/– ☐ 6 = ☐ +/– ☐

2 = ☐ +/– ☐ 7 = ☐ +/– ☐

3 = ☐ +/– ☐ 8 = ☐ +/– ☐

4 = ☐ +/– ☐ 9 = ☐ +/– ☐

5 = ☐ +/– ☐ 10 = ☐ +/– ☐

108 — *Nimble with Numbers* — Game

Introduction

Organization of the Book

This book has five units that cover the high-priority number topics for first-graders, as well as some kindergartners and second-graders. The first unit provides practice with counting and comparing numbers through 30 and identifying one more or one less. The next units review the addition and subtraction facts. Because ten plays such an important role in our numeration system, many activities in **Addition Facts, Subtraction Facts,** and **Mixed Facts** emphasize ten as an important anchor and serve as a good lead-in to the **Place Value** unit.

The book contains activities for whole group, small groups, pairs, and individuals. Each unit begins with an overview and suggestions to highlight the activities and provide some time-saving advice. Throughout all units, we make an obvious attempt to promote mental computation. Each unit includes:

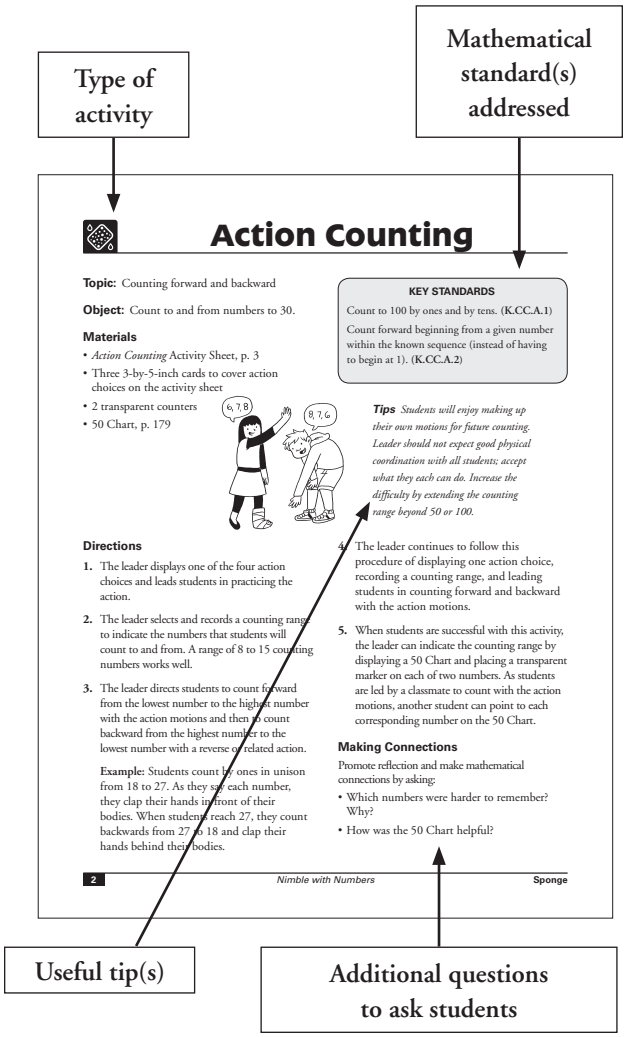
Sponges (S)
Games (G)
Mini-Assessments (A)
Independent Activities (I)

Sponges

Sponges are enriching activities for soaking up spare moments. Use Sponges with the whole class or with small groups as warm-up activities or during spare time to provide additional math practice. Sponges usually require little or no preparation and are short in duration (3–15 minutes). These appealing activities are repeatable, and, once they become familiar, some can be student-led. Students are motivated to finish a task quickly when they know a favorite Sponge will follow.

Key content standards are listed for Sponges, but the instruction provided may cover other standards as well.

Features of the Sponges and Games follow. The Making Connections questions promote reflection and discourse. To capitalize on the Sponge and Game experiences, use these questions to help students make the mathematical connections. The time-saving, useful Tips provide ways to make these activities accessible to more students.



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Mini-Assessments

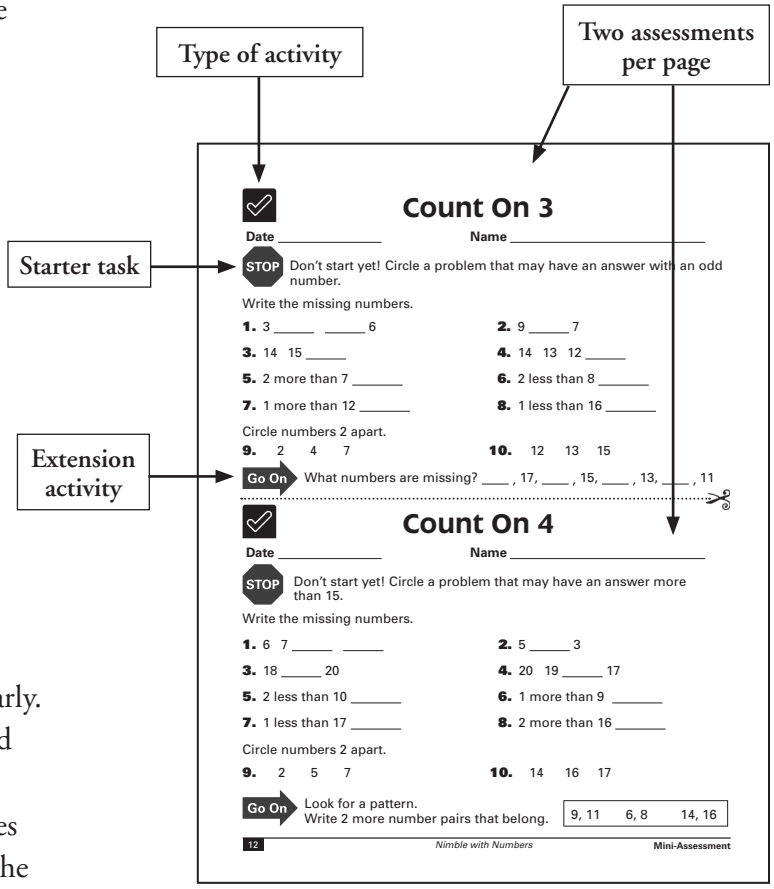
The six Mini-Assessments in each section provide a way to show students' improvement to parents, as well as to students. Each page is designed to be duplicated and cut in half, providing six comparative records for each student.

Before answering the ten problems in each assessment, students should respond to the starter task following the STOP sign. These starter tasks mentally prepare students for sense-making and greater success. Most students will complete an assessment in 10 to 15 minutes. Some teachers believe their students perform better on the assessments if the responses to the STOP task are shared and discussed first.

The concluding extension problem, labeled "Go On," accommodates those students who finish early. We recommend that early finishers be encouraged to create similar problems for others to solve. By having students share and discuss their approaches and responses to the STOP task and to some of the problems, teachers help students begin to develop more efficient mental computation strategies.

These Mini-Assessments can help teachers determine whether further review of a concept is needed by the entire class or by an identified smaller group of students, determine which concepts are confusing to some students (e.g., identifying two less than a number), and identify which students require practicing the topic for a longer period of time.

Here is a sample page from the *Count On* Mini-Assessment in the Counting and Comparing unit:



Games

Initially a new Game might be modeled with the entire class, even though Games are intended to be played by pairs, small groups, or pair players after the rules are understood. ("Pairs" refers to two children who collaborate to play the game and do not compete. "Pair players" refers to a pair of students playing against another pair. This recommended arrangement promotes mathematical thinking and discourse as students collaborate to develop and share successful strategies.) Some Games include easy versions as well as more challenging versions.

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An excellent option is to share the Game with a few students, who then teach the Game to others. The teacher may provide some procedure for selecting the first player and may suggest that players take turns in a clockwise direction. Most Games require approximately 20 minutes of playing time. Games are ideal for home use because they provide students with additional practice and reassure parents that the number strand continues to be valued. When sending gameboards home, be sure to include the directions.

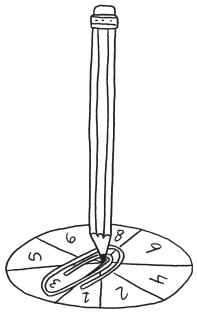
Independent Activities

These sheets are designed to encourage practice of many more facts than would seem apparent at first glance. Some Independent Activity sheets allow multiple solutions. Independent Activity sheets can be completed in class or sent home as homework. For further use of the Independent Activity sheets, encourage students to create similar puzzles for classmates to solve. This provides additional practice and student recognition. When deemed helpful, an open-ended blackline master is included to facilitate this possibility.

Suggestions for Using *Nimble with Numbers*

Materials

An effort has been made to minimize the materials needed. The last section of the book contains blackline masters, including patterns for spinners. A six-sectioned spinner can substitute for a number cube or die. A simple spinner, like the one shown, can be assembled using one of the blackline master spinner bases, a paper clip, and a pencil.



A number of activities require Digit Cards (p. 182). Take time now to duplicate a set for each child on cardstock. Cut the Digit Cards apart and place them in an appropriate container. Initially for first-graders, use cubes with dots, later transitioning to number cubes. Similarly, Dot Cards (p. 184) can be a precursor to Digit Cards. Some teachers find blank cubes easier to manage than Digit Cards and six-sectioned spinners. Number tiles 0–9 can substitute for Digit Cards or Digit Squares. By placing tiles in a sock, the hidden digits are immediately reusable for another round of Sponges. Play money may be used for money activities, although real coins may be more motivating.

Various materials work as markers on gameboards—different types of beans, multicolored cubes, buttons, counters, or transparent color counters (our preference due to the see-through feature). It is assumed that students have access to scratch paper and pencils, especially when a recording sheet is used. It is assumed that a document camera is available, although a whiteboard will also work.

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Recommended Uses

The repeatable nature of these activities makes them ideal for additional use at home. Encouraging children to use these activities at home serves a dual purpose: parents are able to assist their children in gaining competence with the facts and with mental computation, and parents are reassured as they see the familiar basics practiced. Students will become competent and confident as they experience these activities frequently and over time. To support your work in this area, we have included a *Family Letter* (p. *xii*) and a list of helpful open-ended questions for parents to pose.

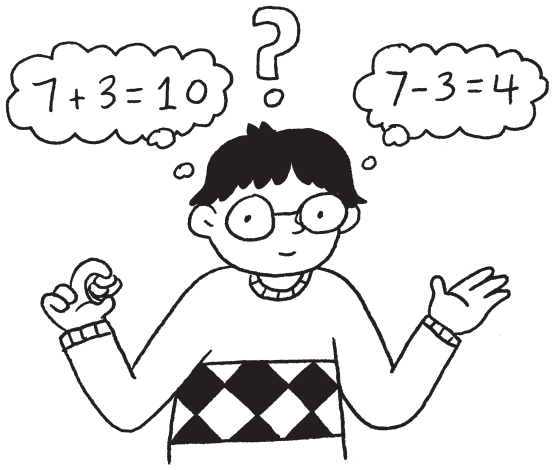
Besides being a source for more familiar homework, these activities offer a wide variety of classroom uses. The activities can be effectively used by substitute teachers, as rainy-day options, for a change of pace, or for "Family Math" events.

Many activities are short-term and require little or no preparation, making them ideal for soaking up spare moments at the end or beginning of a class period. They also work well as choices for center or menu activities. When students are absent from school, these activities can be sent home in independent work packets. You may package these activities in manila envelopes or self-closing transparent bags to facilitate frequent and easy checkout.

Feel free to modify the activities and/or change the rules. To accommodate the needs of your students, you might change the numbers, operations, and/or directions. To facilitate repeated use of Sponges, use transparencies with water-soluble ink.

Getting the Most from These Activities

It is important to focus on increasing students' awareness of the mathematics being learned. To do this, pose open-ended questions that promote reflection, communication, and mathematical connections. For example, after using *Find My Number* (p. 151), one teacher asked her students, "What patterns did you notice on the 50 chart?" A child answered, "Look! When it says 10 more, all you have to do is go down one box, and 10 less means you go up one box." After playing *Cover All* (p. 117), a teacher asked, "Which amounts were easy to make?" A first-grader answered, "Whatever I covered first was easy. When I had a few left, it was hard. Boy, that's a lot of adding and subtracting to find one answer."



Having students work together as pair players is of great value in increasing student confidence. While working this way, students have more opportunities to communicate strategies and to explain their thinking. When asked to identify and to share their successful Game strategies verbally and in writing, students grow mathematically. It is worthwhile to

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ask students to improve these activities or to create new high-interest games.

Good Questions (p. *xiii*) help children make sense of mathematics, build their confidence, and encourage mathematical thinking and communication. These sample questions are designed to help teachers and parents see where students are relative to the Mathematical Practice Standards. Because the teacher's or parent's response impacts learning, we have included suggestions for responding. Share this list with parents for their use as they assist their children with these activities and with other unfamiliar homework tasks.

Concluding Thought

We hope that by using these materials, your students will develop more positive feelings towards mathematics as they become mathematically confident and numerically nimble.

Parent Support

Most parents place high priority on attention to the basic facts. Thus, parents will appreciate the inviting and repeatable activities in this book. Since most parents share the responsibility for short periods of practice, the following items are designed to promote parent involvement:

- **Addition Facts Made Easy** (p. *xiv*) is a simple but effective way to help parents feel they can provide some addition hints to their children.
- **Good Questions** (p. *xiii*) give parents a framework to interact with and guide their children in persevering in problem solving and thinking about math, while demonstrating their involvement and commitment.
- **The Family Letter** (p. *xii*) is a sample to help you easily involve parents. Modify the letter to fit your situation.

Over the course of the year, a number of packets may be sent home to parents. The first might include the *Family Letter, Good Questions,* and the *Less or More Spin* activity (pp. 14–15) with the appropriate materials. A future home packet might include *Addition Facts Made Easy,* the *Finding Addends* activity (pp. 45–46), and a set of Digit Cards (p. 182).

Sponge and Independent Activity sheets can be sent home as packets as well. Their advantage is that, unlike Games, they can be used while a monitoring family member prepares dinner, packs lunches, or attends to other household tasks.

Family Letter

Dear Family,

Today the working world requires an understanding of all areas of mathematics, including statistics, logic, geometry, and probability. To be successful in these areas, students must know their basic facts and be able to compute. It is important that we be more efficient and effective in the time we devote to arithmetic. You can help your child in this area!

Throughout the school year, our mathematics program will focus on enhancing your child's understanding of number concepts. However, students must devote time at school and at home to practice and to improve these skills. Periodically, I will send home activities and related worksheets that will build number sense and provide much-needed practice. These games and activities have been carefully selected to engage your child in practicing more math facts than are usually answered on a typical page of drill or during a flash card session.

By using the enclosed *Good Questions* during homework sessions, you can help your child without revealing the answers. The questions are categorized to help you select the most appropriate questions for your situation. If your child is having difficulty getting started with a homework assignment, try one of the questions in the first section. If your child gets stuck while completing a task, ask one of the questions from the second section. Try asking one of the questions from the third or fourth section to have your child clarify his or her mathematical thinking.

Good Questions will help your child make sense of the mathematics, build confidence, and improve mathematical thinking and communication. I recommend posting the questions in a convenient place so you can refer to it often while helping your child with homework.

Your participation in this crucial area is most welcome!

Sincerely,

Good Questions

Getting Started

How might you begin?

What do you know now?

What do you need to find out?

While Working

How can you organize your information?

How can you make a drawing (model) to explain your thinking?

What approach (strategy) are you developing to solve this?

What other possibilities are there?

What would happen if . . . ?

What do you need to do next?

What assumptions are you making?

What patterns do you see? . . . What relationships?

What prediction can you make?

Why did you . . . ?

Checking Your Solutions

How did you arrive at your answer?

Why do you think your solution is reasonable?

What did you try that didn't work?

How can you convince me your solution makes sense?

Expanding the Response

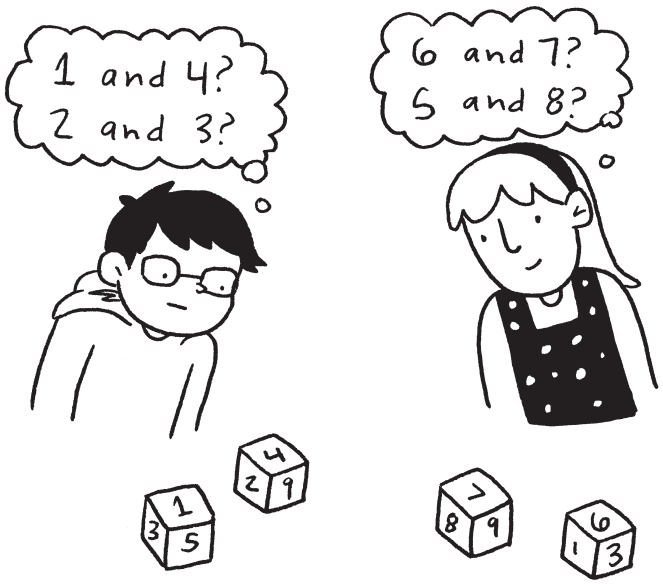
(To help clarify your child's thinking, avoid stopping when you hear the "right" answer and avoid correcting the "wrong" answer. Instead, respond with one of the following.)

Why do you think that?

Tell me more.

In what other way might you do that? What other possibilities are there?

How can you convince me?



Pocket Full of Coins

Topic: Adding like coins

Object: Total coins and predict value for a related representation.

Materials

- *Pocket Full of Coins* Activity Sheet cut apart, p. 10
- Coins

Directions

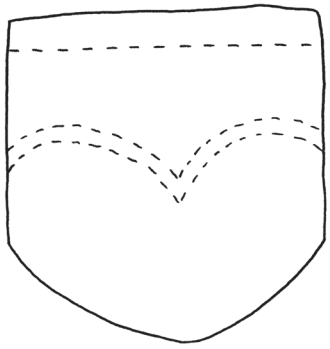
1. The leader displays the smallest pocket and places one penny inside as a reference. The leader asks, "How many pennies will it take to fill the pocket?" Students discuss and estimate.
2. The leader selects a student to help fill the pocket with pennies to check out classmates' estimates. The leader asks, "What is the value of these pennies?" Students discuss. Then the leader points to each penny as students count the value by ones.
3. The leader records the value and removes all pennies from the pocket.
4. Next, the leader places one dime inside the pocket as a reference. The leader asks, "How many dimes will it take to fill the pocket? What will be the value of those dimes?" The leader should remind students to think about the value of the pennies that they just counted. Students discuss and estimate.
5. The leader selects a student to help fill the pocket with dimes to check out classmates' estimates. The leader asks, "What is the value of these dimes?" Students discuss. Then the leader points to each dime as students count the value by tens.

KEY STANDARDS

Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). **1.OA.C.5**

Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count . . . (**1.NBT.C.6**)

Tips *Some students will appreciate having their own copies of the pockets. Duplicate the* Pocket Full of Coins *activity sheet for students to use at tables with coins. Students will enjoy drawing their own shapes to fill with coins and compare values.*



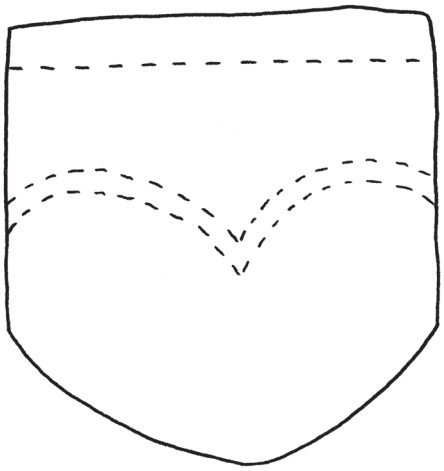
6. The leader records the value and removes all dimes from the pocket.
7. The leader places one nickel inside the pocket and repeats the procedure.
8. For future rounds, repeat the procedure with different-sized pockets.

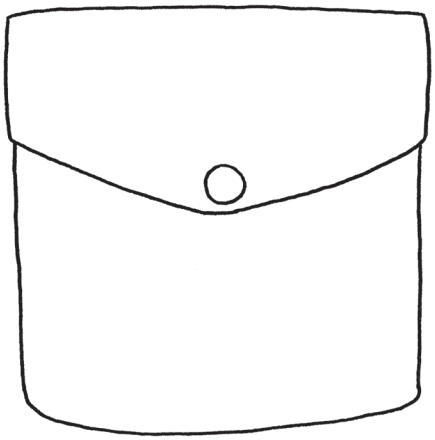
Making Connections

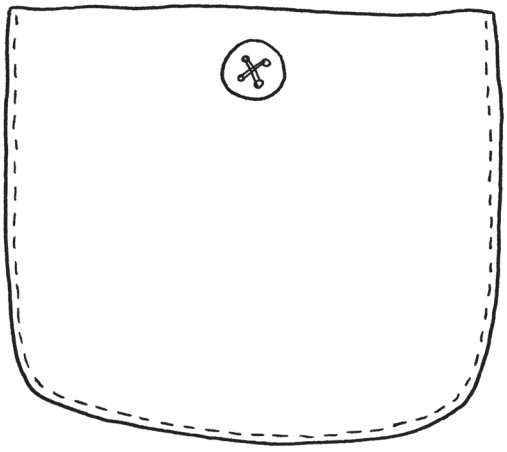
Promote reflection and make mathematical connections by asking:

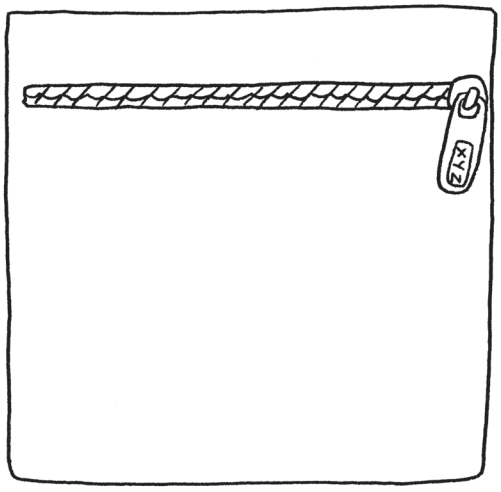
- How did knowing the value of pennies help you figure the value of dimes? Nickels?

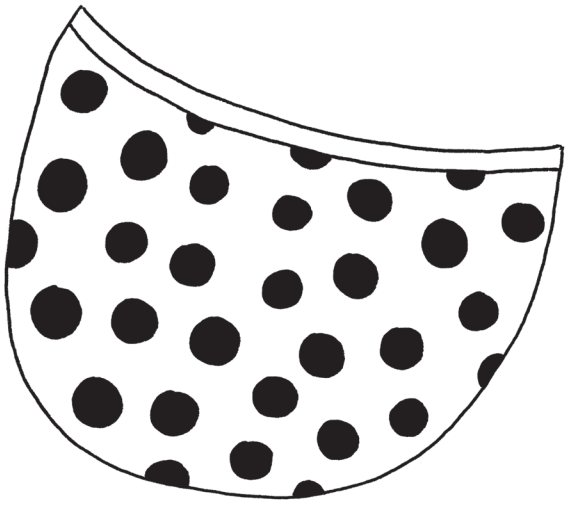
Pocket Full of Coins

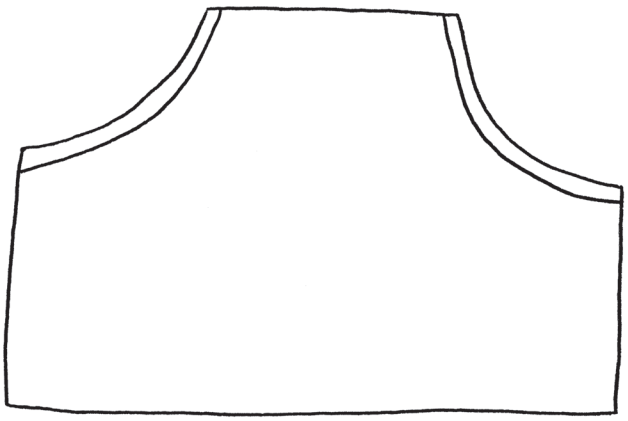












Count On 1

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer more than 10.

Write the missing numbers.

1. 5 _____ _____ 8

2. 6 _____ 4

3. 16 17 _____

4. 18 17 16 _____

5. 1 more than 5 _____

6. 1 less than 9 _____

7. 2 more than 13 _____

8. 2 less than 14 _____

Circle numbers 2 apart.

9. 2 4 7

10. 11 13 16

Go On What numbers are missing? 16, ____ , 14, ____ , 12, ____ , 10, ____

Count On 2

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer less than 10.

Write the missing numbers.

1. 1 _____ 3 _____

2. 7 _____ 5

3. 11 _____ 13

4. 15 14 _____ 12

5. 1 less than 8 _____

6. 2 more than 6 _____

7. 2 less than 13 _____

8. 1 more than 16 _____

Circle numbers 2 apart.

9. 5 6 8

10. 17 18 19

Go On Which numbers are 3 apart?

4	7	8	9

2	5	4	8

Count On 3

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer with an odd number.

Write the missing numbers.

1. 3 _____ _____ 6

2. 9 _____ 7

3. 14 15 _____

4. 14 13 12 _____

5. 2 more than 7 _____

6. 2 less than 8 _____

7. 1 more than 12 _____

8. 1 less than 16 _____

Circle numbers 2 apart.

9. 2 4 7

10. 12 13 15

Go On What numbers are missing? ____ , 17, ____ , 15, ____ , 13, ____ , 11

Count On 4

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer more than 15.

Write the missing numbers.

1. 6 7 _____ _____

2. 5 _____ 3

3. 18 _____ 20

4. 20 19 _____ 17

5. 2 less than 10 _____

6. 1 more than 9 _____

7. 1 less than 17 _____

8. 2 more than 16 _____

Circle numbers 2 apart.

9. 2 5 7

10. 14 16 17

Go On Look for a pattern.
Write 2 more number pairs that belong.

9, 11	6, 8	14, 16

Count On 5

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer less than 10.

Write the missing numbers.

1. 7 _____ _____ 10

2. 10 _____ 8

3. 12 _____ 14

4. 17 16 15 _____

5. 1 more than 6 _____

6. 2 less than 10 _____

7. 2 more than 17 _____

8. 1 less than 11 _____

Circle numbers 2 apart.

9. 3 4 5

10. 12 14 17

Go On What numbers are missing? 19, 18, ____ , ____ , 15, ____ , ____ , 12

Count On 6

Date _____ **Name** _____

STOP Don't start yet! Circle a problem that may have an answer with an even number.

Write the missing numbers.

1. 4 _____ 6 _____

2. 8 _____ 6

3. 16 17 _____

4. 13 12 _____ 10

5. 1 less than 6 _____

6. 2 more than 8 _____

7. 2 less than 18 _____

8. 1 more than 16 _____

Circle numbers 2 apart.

9. 4 7 9

10. 16 18 19

Go On Look for a pattern.
Write 2 more number pairs that belong.

7, 6	18, 17	12, 11

Less or More Spin

Topic: More and less

Object: Cover three numbers in a row with your counters.

Groups: Pair players

Materials for each group

- *Less or More Spin* Gameboard A, p. 15
- Number cube (1–6)
- Counters (different kind for each pair)
- Pencil and paper clip for spinner

Directions

1. The first pair rolls the number cube and spins the spinner. The number cube indicates the starting number, and the spinner indicates the direction. By using the rolled number and the spun direction, the pair identifies possible numbers to cover.

   Example: If "3" is rolled and "1 less" is spun, the pair locates the 2s on the gameboard. However, if "3" is rolled and "less" is spun, the pair locates 0s, 1s, and 2s.

2. The first pair discusses and decides which one number to cover with a counter and then covers that number.

3. The second pair rolls and spins to determine possible numbers they can cover. After discussion, the pair selects and covers one number.

4. Pairs continue to alternate turns, rolling, spinning, and determining where to place the counter.

KEY STANDARD

Understand the relationship between numbers and quantities; connect counting to cardinality:
c. Understand that each successive number name refers to a quantity that is one larger. (K.CC.B.4)

Tip *Cut apart spinner from gameboard to prevent movement of game markers when spinning.*

7	3	6	0
4	5	1	3
3	7	6	5
1	0	2	4

5. If a rolled and spun combination does not result in any available number to cover, the pair rolls again.

6. The first pair to have three counters in a row, horizontally, vertically, or diagonally, wins.

7. The *Less or More Spin* Gameboard B, page 16, is a more challenging version. This gameboard requires two number cubes and a spinner.

Making Connections

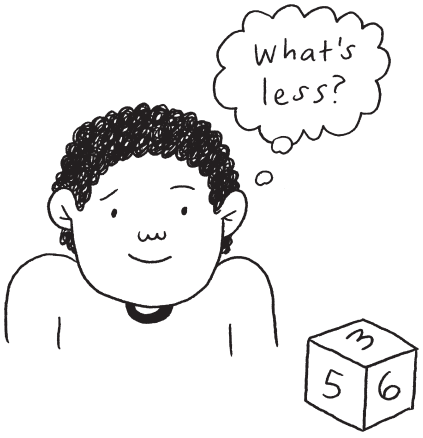
Promote reflection and make mathematical connections by asking:

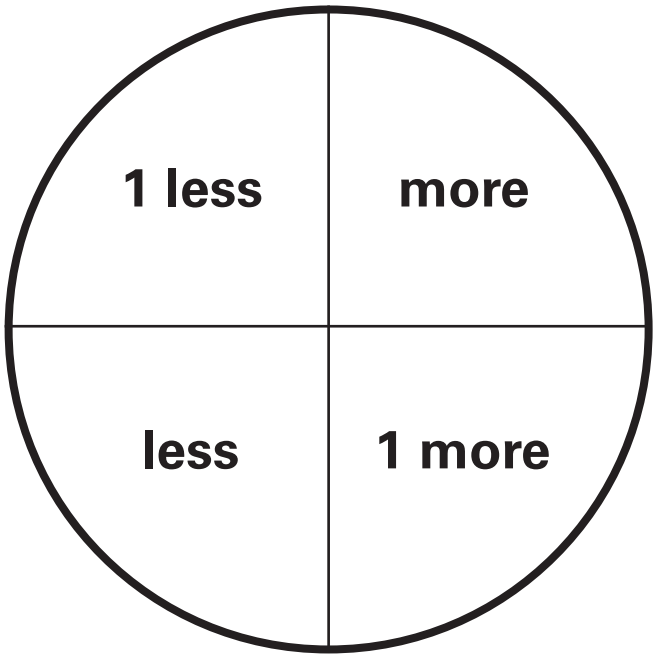
- What strategies helped you line up your counters in a row?
- How did you select which number to cover with your counter?

Less or More Spin

Gameboard A

7	3	6	0
4	5	1	3
2	7	6	5
1	0	2	4





Before, After, Between A

Date _____ **Name** _____

Write the numbers that come before and after.

1. _____ **3**	**2.** **9** _____
3. _____ **8** _____	**4.** _____ **6**
5. **6** _____ _____	**6.** **4** _____
7. _____ **7** _____	**8.** _____ **10**
9. **5** _____	**10.** _____ **10** _____
11. _____ _____ **9**	**12.** **3** _____ _____
13. _____ **8**	**14.** **2** _____
15. _____ **3** _____	**16.** _____ **7**
17. **8** _____ _____	**18.** _____ **5** _____

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Before, After, Between B

Date _____ **Name** _____

Roll a number cube. Write your rolled number in the box.
On the line that follows a box, write the number that comes after.
On the line before a box, write the number that comes before.

1. ☐ _____	**2.** ☐ _____
3. ☐ _____	**4.** ☐ _____
5. ☐ _____	**6.** ☐ _____
7. _____ ☐	**8.** _____ ☐
9. _____ ☐	**10.** _____ ☐
11. _____ ☐	**12.** _____ ☐
13. _____ ☐ _____	**14.** _____ ☐ _____
15. _____ ☐ _____	**16.** _____ ☐ _____

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Before, After, Between C

Date _____ **Name** _____

Roll two number cubes. Write the sum of your rolled numbers in the box.
On the line that follows a box, write the number that comes after.
On the line before a box, write the number that comes before.

1. _____ ☐	**2.** ☐ _____
3. _____ ☐ _____	**4.** _____ ☐
5. ☐ _____ _____	**6.** ☐ _____
7. _____ ☐ _____	**8.** _____ ☐
9. ☐ _____	**10.** _____ ☐ _____
11. _____ _____ ☐	**12.** ☐ _____ _____
13. _____ ☐	**14.** ☐ _____
15. _____ ☐ _____	**16.** _____ ☐

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