



## Introduction

### 1st grade

Claire, a first grader, enters her classroom and hangs her backpack in her assigned cubby. After placing her take-home folder on her desk, she moves to the front of the classroom. There she chooses a magnet in the shape of a banana and places it under the Brought Lunch heading to indicate she would not be eating school lunch since she brought a lunch from home.

### 3rd grade

Third graders Laurel and Cody are each working on a story about a favorite memory. When they hear their teacher say, “One, two,” they stop working, look at her, and reply, “Eyes on you.” She tells the class to move to their conferencing areas, so Laurel and Cody move to the couch—their assigned area for the week. After the conferencing time ends, Cody collects papers from the class.

### 7th grade

As seventh grader Andre enters the classroom, he picks up his math journal. The question of the day is posted on the board, and Andre begins composing a response to the question. After a few minutes, the teacher signals the students to put their journals away. Andre passes his journal to the right. When the pile of journals reaches the end of the row, the student sitting at the end places the pile back in the class tub.

**Our** classrooms are full of routines. Our students quickly learn the procedure for taking attendance and lunch count, the procedure for assigning classroom jobs, the procedure for lining up, and the procedure for collecting and distributing papers. The creation and implementation of routines brings a sense of predictability and comfort to our classrooms. Routines help with organization and classroom management, and they help make transitions smooth. Although we often think of routines as being used for organization, routines can also be used to enhance instruction.

Many textbooks make suggestions and give directions for a variety of mathematical routines. These mathematical routines are structured activities that, when used consistently, can help students gain proficiency with a range of concepts and practices. Some of these routines are well known and commonly implemented. One example is Calendar Time, a familiar and often-implemented routine described in textbooks as well as supplementary resources. Calendar Time allows students to learn about the months of the year, days of the week, and school-day activities through using the calendar (Shumway 2011). Teachers may also design questions, based on the calendar, that allow students to practice grade-specific skills. Whereas teachers use Calendar Time often, they use other routines less frequently, and as a result, many opportunities to enhance our students' understanding of and proficiency with mathematics are lost.

Consistent use of routines can yield many benefits for students. Such routines offer access to the big ideas of mathematics and allow deep understanding of concepts. In fact, routines can be designed to focus on the desired mathematical content. Mathematical routines also give students opportunities to develop expertise with the eight mathematical practices described in the Common Core State Standards for Mathematics (National Governors Association Center for Best Practices [NGA Center] and Council of Chief State School Officers [CCSSO] 2010; see fig. I.1 and the appendix). The mathematical practices are based on the National Council of Teachers of Mathematics (NCTM; 2000) Process Standards of Problem Solving, Reasoning and Proof, Communication, Representation, and Connections as well as the strands of mathematical proficiency described in the National Research Council's book *Adding It Up* (Kilpatrick, Swafford, and Findell 2001). Mathematical routines offer opportunities for students to demonstrate their thinking and for teachers to gain insight into the thinking of their students.

### **Standards for Mathematical Practice**

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

**Fig. I.1.**

The Standards for Mathematical Practice described in the Common Core State Standards for Mathematics (NGA Center and CCSSO 2010, p. 6)

Implementing mathematical routines can prove beneficial to students across all grade levels. In *Principles and Standards for School Mathematics*, NCTM (2000) calls for curriculum that is coherent and well articulated. A coherent curriculum is organized around important mathematical ideas so that students can see how the ideas build on and connect with other ideas. A well-articulated curriculum provides guidance regarding the important mathematical ideas that should be emphasized and the depth of study appropriate for each grade level. As teachers from multiple grade levels plan and consistently implement common routines, students will experience a more coherent and better-articulated mathematical experience. In addition, the use of common models such as number lines and Venn diagrams within the routines will improve students' ability to accurately and strategically use these models.

Mathematical routines are easily and quickly implemented. Once developed, most routines will take five to ten minutes per day. The routines are commonly used at the beginning of a lesson, but they could also be implemented at the end of the lesson or even within a lesson. Choosing a few routines to implement and implementing them consistently and often will yield the greatest benefits for students.

In this book, we present seven easily implemented mathematical routines that may be used effectively at a variety of grade levels and with a variety of mathematical content. We also provide some ideas for infusing mathematics into the nonmathematical routines that take time away from instruction. Here are the titles of the remaining chapters:

Chapter 1: Today's Number

Chapter 2: Mystery Number

Chapter 3: Alike and Different

Chapter 4: Number Lines

Chapter 5: Quick Images

Chapter 6: Guess My Rule

Chapter 7: How Do You Know?

Chapter 8: Infusing Mathematics into Nonmathematical Routines

Chapter 9: High Yield from Routines

Each chapter begins with classroom vignettes that provide a glimpse of how the routine might look as it is implemented in a variety of grade levels. A description of the routine and implementation strategies follow. We give examples of student work from various grade levels for each of the routines, examples of ways to assess student thinking by using the routines, and suggestions for adapting the routines.

## High-Yield Routines

We hope the routines we describe and the student work we share will encourage you to try the routines with your own students and to think of creative ways to implement these and other mathematical routines.

## References

- Kilpatrick, Jeremy, Jane Swafford, and Bradford Findell, eds. *Adding It Up: Helping Children Learn Mathematics*. Washington, D.C.: National Academies Press, 2001.
- National Council of Teachers of Mathematics (NCTM). *Principles and Standards for School Mathematics*. Reston, Va.: NCTM, 2000.
- National Governors Association Center for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO). *Common Core State Standards for Mathematics. Common Core State Standards (College- and Career-Readiness Standards and K–12 Standards in English Language Arts and Math)*. Washington, D.C.: NGA Center and CCSSO, 2010. <http://www.corestandards.org/>.
- Shumway, Jessica F. *Number Sense Routines: Building Numerical Literacy Every Day in Grades K–3*. Portland, Maine: Stenhouse Publishers, 2011.