

M A T H E M A T I C S

Unit Planning

in a PLC at Work[®]



GRADES 3–5

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Introduction

By Timothy D. Kanold

At the heart of your work as teachers of mathematics for grades 3–5 is developing student self-efficacy. *Student self-efficacy* references a student’s *belief* in his or her capability to learn the mathematics you *need students to know* by the end of each grade.

But what exactly *does* a grade 3–5 mathematics student need to know by the end of each unit of study throughout the school year? And, more important, how does a teacher develop his or her personal self-efficacy to adequately plan for and then deliver those mathematics units of study to students?

I have been trying to answer this question my entire professional life.

In 1987 I coauthored my first mathematics textbook (a geometry book for students who found mathematics a difficult subject); it was my first real experience in taking a wide body of content for the complete school year and breaking the standards into reasonable chunks for every teacher and student to learn.

As I eventually expanded my textbook writing to include K–12 mathematics students and teachers, I realized the time spent teaching these manageable chunks of content could vary from twenty to thirty-five days, and often had names like *units* or *chapters* or *modules*. As you know, mathematics is a vertically connected curriculum, and units of study at each grade level cannot be taught in random order; the units must exist in the right sequence of the story for each grade level. There is an order to the flow of the third-, fourth-,

and fifth-grade mathematics content story. And, as third-, fourth-, and fifth-grade teachers, you need to fully understand the *how* and *why* of the content trajectories across these grades.

I have spent over half of my life trying to get these story arcs correct—trying to create textbooks that make contextual sense to both the students and the teacher. In a way, I wanted to help students and teachers develop their self-efficacy to learn mathematics.

Sarah Schuhl, lead author of these by grade-band books, and I realize every grades 3–5 mathematics teacher and teacher team needs to work collaboratively with his or her textbook and other resources to in order to collectively *own* the planning process for each unit of study.

Developing *collective teacher efficacy* is at the heart of the Professional Learning Communities (PLC) at Work process: “Social interactions firmly anchored in instructional practice can move teachers beyond contrived collegiality to a culture that can in turn influence a teachers’ sense of efficacy” (Neugebauer, Hopkins, & Spillane, 2019, p. 13). However, educators and coauthors Sabina Neugebauer, Megan Hopkins, and James Spillane (2019) point out that social team interactions must be “anchored in actual teaching and assessing episodes.” Teachers then place those episodes into manageable chunks of content for the team’s discussion and work.

In 2019, when Solution Tree asked Sarah and I to develop the *Mathematics at Work Plan Book* (Kanold

& Schuhl, 2020), we jumped at the chance to provide a book that would help you organize your mathematics work and story arc for the entire school year. The weekly planners we created for the plan book provide helpful organizational tools and these may be completely sufficient for your team. However, we also realize you might need more specific direction with the elements of planning we ask you to prepare for each unit of mathematics study.

The coauthors of this Mathematics at Work unit planning guide for grades 3–5 (Sarah Schuhl, Jennifer Deinhart, Matthew R. Larson, Mona Toncheff, and I) serve or have served in many mathematics teaching and leading roles. One such role is to serve on our Mathematics at Work team of national thought leaders. As we travel around the United States helping elementary school teachers improve student learning in mathematics, we often hear the question, How do we collectively plan for a unit of study in mathematics at our grade level?

And that is the purpose of this book.

The Purpose of This Book

We want to help your grade-level team learn *how* to work together to perform the following seven collaborative tasks for each unit of mathematics study throughout the year.

Generate Essential Learning Standards for Each Unit

Unwrap standards into daily learning targets and write those standards in student-friendly language for essential learning standards. And then use those essential learning standards to drive feedback on common mathematics assessments, classwork, independent practice, and intervention as a collaborative team.

Create a Team Unit Calendar

Decide the number of days needed to teach each essential learning standard, and the start and end dates for the unit. Decide the dates to administer any common mid-unit or end-of-unit assessments. Establish each date the team will analyze data from any common mid-unit and end-of-unit assessments to plan a team response to student learning.

Identify Prior Knowledge

Determine and identify the recent prerequisite content knowledge students need to access the grade-level learning in each unit of study. Decide which mathematical activities (tasks or prompts) to use for students to connect their prior knowledge at the start of each lesson throughout the unit. Use these activities to discern student readiness and entry points for each lesson.

Determine Vocabulary and Notations

Identify the academic vocabulary students will be reading and using during discourse throughout the unit. Identify any mathematical notations students will need to read, write, and speak during the unit.

Identify Resources and Activities

Determine which lessons in the team's current basal curriculum materials align to the essential learning standards in the unit. Determine examples of higher- and lower-level tasks students must engage in to fully learn each essential learning standard.

Agree on Tools and Technology

Determine any manipulatives or technology needed to help students master the essential learning standards of the unit. Identify whether the tools and technology needed for the unit will support student learning of the essential learning standards with a focus on conceptual understanding, application, or procedural fluency. Identify which tools and technology, if any, will be part of instruction or available as a resource for common assessments.

Record Reflection and Notes

When planning the unit, record notes of *things to remember when teaching* (by answering, for example, these questions: When should students use manipulatives? How will students write fractions? What are the expectations for student work? Which mathematical strategies should teachers use throughout the unit?). After the unit, reflect on instruction and assessments to keep or change for next year, and record ideas to use when planning the unit for next year.

The Parts of This Book

Part 1 provides detailed insight into how your mathematics team can effectively respond to these seven planning tasks for the essential standards you expect students to learn in grades 3, 4, and 5.

Part 2 provides three detailed model units for fractions (one for each grade level) and describes the fractions story arc for grades 3, 4, and 5 related to equivalence and addition and subtraction of fractions. We hope part 2 provides an inspiring model for your grade-level team.

A Final Thought

You might wonder, “Why is this book titled *Mathematics Unit Planning in a PLC, Grades 3–5*?” In 1980, my second mathematics teaching job landed me on the doorstep of an educational leader who would later start an education movement in the United States that would spread throughout North America and even worldwide. He was the architect of the Professional Learning Communities at Work movement (along with Robert Eaker) and my principal for many years. Dr. Richard DuFour expected every grade-level or

course-based team in our school district to answer four critical questions for each unit of study in mathematics (DuFour, DuFour, Eaker, Many, & Mattos, 2016).

1. What do we want all students to know and be able to do? (essential learning standards)
2. How will we know if they know it? (lesson design elements, assessments, and tasks used)
3. How will we respond if they don't know it? (formative assessment processes)
4. How will we respond if they do know it? (formative assessment processes)

As your collaborative team pursues this deep work, remember it all begins with a robust and well-planned response to PLC critical question one (What do we want all students to know and be able to do?). That is the focus of this guide book for grades 3–5.

We want to help you plan for and answer the first question for each mathematics unit, grade level, and student. We wish you the best in your mathematics teaching and learning journey, *together*.