

# Planning for Student Learning of Mathematics in Grades 3–5

Mathematics is a conceptual domain. It is not, as many people think, a list of facts and methods to be remembered.

—Jo Boaler

The first critical question of a PLC is, What do we expect all students to know and be able to do? (DuFour et. al, 2016). As your collaborative team successfully answers this question for each unit of study, members build a common understanding of the mathematics students learn at your grade level. What is the mathematics story that unfolds as student learning progresses from one mathematics unit to the next? How do the units fit together and build on one another within and across third, fourth, and fifth grades?

## Guaranteed and Viable Curriculum

Your third-, fourth-, or fifth-grade team effectively backward plans the year by grouping essential mathematics standards into units to create the guaranteed and viable mathematics curriculum students must learn. The order you teach the units provides the framework for your grade-level mathematics story. Within each unit, your daily lessons create the beginning, middle, and end for that part of the story.

Thus, evidence of your team’s guaranteed and viable curriculum includes (1) a yearlong standards pacing plan (proficiency map or pacing guide), (2) unit plans, and (3) daily lessons. The graphic in figure 1.1 (page 10) illustrates these areas of team planning for a mathematics guaranteed and viable curriculum.

Together, the mathematics units of study tell the story of the grade-level standards teachers expect students to learn throughout the year and from one year to the next.

As figure 1.1 (page 10) shows, a district yearlong pacing guide or proficiency map (showing a time line for student proficiency with each mathematics

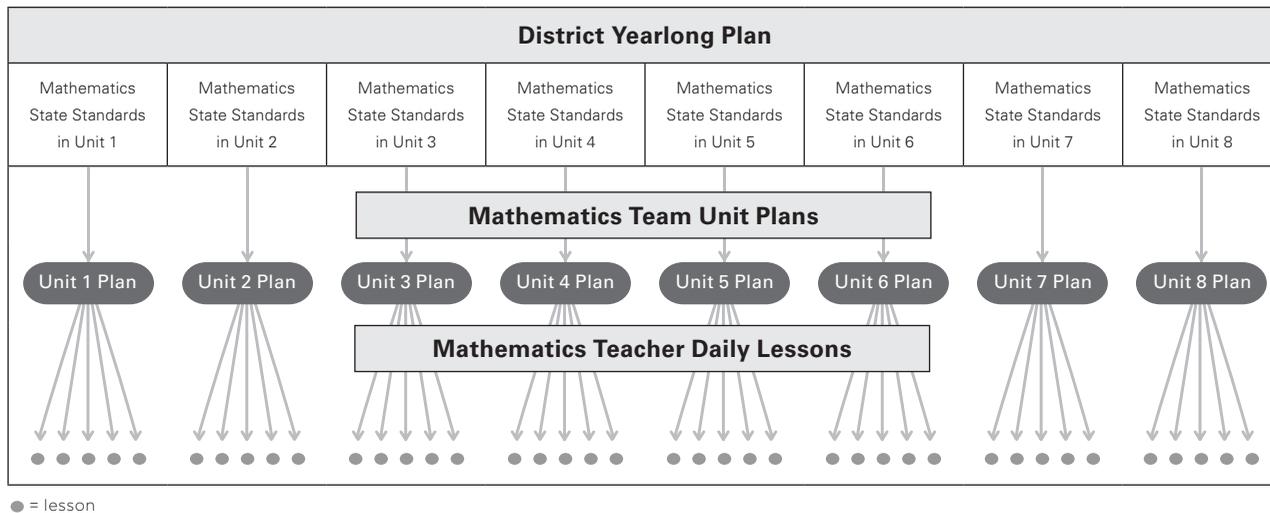
standard) first defines your grade-level team’s guaranteed and viable curriculum. Your team then determines a time frame appropriate for each mathematics unit, typically two to four weeks for grades 3–5. This process eliminates the potential risk of running out of time and skipping units or essential standards that fall at the end of the year.

If your collaborative team does not have a year-long plan with standards in clearly defined units, see appendix A (page 99), “Create a Proficiency Map” for additional support. Helping each teacher on your team become comfortable with the progression of mathematics units throughout the school year will support your students’ understanding of the mathematics story arc for various standards.

## Mathematics Unit Planner

Once your team determines the mathematics units for your grade level (detailing the standards and time line for each unit) for the year, the team next plans for student learning on a *unit-by-unit* basis (see figure 1.2, page 11; Kanold & Schuhl, 2020, p. 30).

The Mathematics Unit Planner in figure 1.2 (page 11) provides a template your team can use as it develops a shared understanding of what students are expected to learn in each unit of study. The numbered sections in the Mathematics Unit Planner correspond with the seven elements of unit planning. Throughout this book, you will see numbered headings that correspond with these seven areas. (Find completed examples of unit planners for third grade in figure 3.11 [page 55], fourth grade in figure 4.11 [page 75], and fifth grade in figure 5.10 [page 93].)



**Figure 1.1: Mathematics guaranteed and viable curriculum plan.**

In *Principles to Action*, researchers for the National Council of Teachers of Mathematics (NCTM; 2014) note, “Effective mathematics teaching begins with a shared understanding among teachers of the mathematics that students are learning and how this mathematics develops along learning progressions” (p. 12). Therefore, before diving into each individual unit plan for the year, as a team, first consider the mathematical content students are learning in your grade. Additionally, make sense of the mathematical content trajectories (progressions) students are learning across the grades 3–5 band.

### Mathematics Concepts and Skills for Grades 3–5

Students in grades 3–5 deepen their understanding of number, place value, addition and subtraction of whole numbers, and geometry and measurement learned in grades preK–2. Throughout grades 3–5, teachers expect students to grow their mathematical understanding of number to include larger whole number values as well as fractions and decimals, learn multiplication and division computations, and to more critically reason with geometry, measurement, and data.

Table 1.1 (page 12) shows some of the key mathematics concepts teachers expect students to learn in grades 3–5, both by grade and as a vertical trajectory the National Council of Teachers of Mathematics’s (2006) *Curriculum Focal Points for Prekindergarten Through Grade 8 Mathematics* first defines.

Grades 3–5 students are still developing *flexibility with number* to develop number sense and mathematical

reasoning. Third and fourth graders work to develop procedural fluency with addition and subtraction of whole numbers. Throughout grades 3–5, students first develop a conceptual understanding of multiplication and division, and in fifth grade, demonstrate procedural fluency for multiplication of whole numbers. In sixth grade, students develop procedural fluency for whole-number division.

Students develop *fraction understanding, application, and procedural fluency* throughout grades 3–5 as they make sense of fractions; generate equivalent fractions; compare fractions; and add, subtract, multiply, and divide fractions. Grade-level teams expect students to simultaneously develop an understanding of decimals and connect their work with fractions and whole numbers to work with decimals.

In *geometry and measurement*, students learn to find areas of rectangles, perimeters of polygons, and volumes of rectangular prisms. They deepen their ability to classify two-dimensional figures and then teachers introduce plotting points on a coordinate plane. Students also solve measurement problems involving conversions.

Your team may want to explore mathematics learning progressions as defined in your state standards or reference online mathematics learning progression documents, such as those of the Common Core Standards Writing Team (2013), or Student Achievement Partners’s (n.d.) coherence map. Your team may also want to engage in a book study, perhaps referencing NCTM resources related to understanding the essential content and skills needed for mathematics in grades 3–5.

Unit: _____					
Start Date: _____		End Date: _____		Total Number of Days: _____	
Unit Planning					
<b>1</b>	<b>Essential Learning Standards</b>	List the essential learning standards for this unit.			
<b>3</b>	<b>Prior Knowledge</b>	List standards from a previous unit or grade students will access in this unit.			
<b>4</b>	<b>Vocabulary and Notations</b>	List the mathematical academic vocabulary and notations for this unit.			
<b>5</b>	<b>Possible Resources or Activities</b>	List the possible resources or activities to use when teaching the essential learning standards.			
<b>6</b>	<b>Tools and Technology</b>	List the essential tools, manipulatives, and technology needed for this unit.			
<b>7</b>	<b>Reflection and Notes</b>	After the unit, reflect and list what to do again, revise, or change.			
<b>2 Unit Calendar</b>					
	Monday	Tuesday	Wednesday	Thursday	Friday
<b>Week 1</b>					
<b>Week 2</b>					
<b>Week 3</b>					
<b>Week 4</b>					
<b>Week 5</b>					

Source: Adapted from Kanold & Schuhl, 2020, p. 30.

Figure 1.2: Mathematics Unit Planner.

Visit [go.SolutionTree.com/MathematicsatWork](http://go.SolutionTree.com/MathematicsatWork) for a free reproducible version of this figure.

**Table 1.1: Key Mathematics Concepts and Skills for Grades 3–5**

	<b>Grade 3</b>	<b>Grade 4</b>	<b>Grade 5</b>
<b>Number and Operations</b>	<ul style="list-style-type: none"> <li>• Understand multiplication and division strategies for multiplication and division within 100.</li> <li>• Understand and develop fluency with multidigit addition and subtraction based on place value.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand and develop fluency with multidigit multiplication and understand finding quotients of whole numbers involving multidigit dividends.</li> <li>• Fluently add and subtract using the standard algorithm.</li> </ul>	<ul style="list-style-type: none"> <li>• Fluently multiply multidigit whole numbers using the standard algorithm.</li> <li>• Understand division strategies with two-digit divisors.</li> <li>• Understand and develop fluency with operations involving decimals to the hundredths place.</li> </ul>
<b>Fractions</b>	<ul style="list-style-type: none"> <li>• Understand fractions, especially unit fractions with specified denominators.</li> <li>• Understand fraction equivalence and comparison.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand fraction equivalence and comparison.</li> <li>• Understand fraction addition and subtraction with like denominators.</li> <li>• Understand fraction multiplication by whole numbers.</li> <li>• Understand decimal fractions.</li> </ul>	<ul style="list-style-type: none"> <li>• Develop fluency with addition and subtraction of fractions.</li> <li>• Understand fraction multiplication.</li> <li>• Understand fraction division involving a whole number and unit fraction.</li> </ul>
<b>Geometry and Measurement</b>	<ul style="list-style-type: none"> <li>• Solve measurement problems involving mass and time.</li> <li>• Understand arrays and the area of a rectangle.</li> <li>• Describe and analyze two-dimensional shapes.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve measurement problems involving conversions.</li> <li>• Analyze and classify two-dimensional figures using properties.</li> <li>• Measure and classify angles.</li> </ul>	<ul style="list-style-type: none"> <li>• Solve measurement problems involving conversions.</li> <li>• Understand volume of rectangular prisms.</li> <li>• Classify two-dimensional shapes.</li> </ul>

Source: Adapted from NCTM, 2006.

With so much mathematics content to learn, your team’s collaborative unit planning helps ensure a guaranteed and viable mathematics curriculum at your grade level and across grades 3–5. Planning the units together to more deeply learn your own grade-level content and its importance in the grade 3–5 trajectory builds teacher team self-efficacy.

### Connections Between Mathematics Content and Unit Planning

For each unit at your grade level, you support your teams’ progress toward better understanding the standards that support the guaranteed and viable mathematics curriculum. Together, you and your team use the Mathematics Unit Planner template in figure 1.2 (page 11) to record answers to the following questions.

- What exactly do students need to know and be able to do in this unit?
- Which mathematics standards should we commonly assess? When?
- How does the mathematics learning in this unit connect to the standards students must learn in previous or future units?
- Which academic mathematics vocabulary and notations must students learn to read, write, and speak to be proficient on the unit standards? What are examples of higher- and lower-level-cognitive-demand mathematical tasks students should demonstrate proficiency with if they have learned the standards?
- Which mathematical tools or technology should students learn or utilize to demonstrate an understanding the unit standards?

Answering these questions as a team creates more equitable student learning experiences from one teacher to the next. Additionally, developing teacher efficacy strengthens your instructional practices. Consequently, student learning improves because your entire team is working to ensure each student *learns* the organized mathematics content from one unit to the next.

Chapter 2 (page 15) provides tools and protocols that help your third-, fourth-, or fifth-grade mathematics team unpack unit standards and learn how to intentionally address each unit-planning element as your mathematics story arc develops for the school year.