

How to Use the Materials

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Each Lesson and Unit Tells a Story

The story of each grade is told in eight or nine units. Each unit has a narrative that describes the mathematical work that will unfold in that unit. Each lesson in the unit also has a narrative. Lesson narratives explain:

- the mathematical content of the lesson and its place in the learning sequence
- the meaning of any new terms introduced in the lesson
- how the mathematical practices come into play, as appropriate

Activities within lessons also have narratives, which explain:

- the mathematical purpose of the activity and its place in the learning sequence
- what students are doing during the activity
- what the teacher needs to look for while students are working on an activity to orchestrate an effective synthesis
- connections to the mathematical practices, when appropriate

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Launch - Work - Synthesize

Each classroom activity has three phases.

Launch

During the launch, the teacher makes sure that students understand the context (if there is one) and what the problem is asking them to do. This is not the same as making sure the students know how to do the problem—part of the work that students should be doing for themselves is figuring out how to solve the problem. The launch invites students into the lesson and helps them connect to contexts that may be unfamiliar.

Student Work Time

The launch for an activity frequently includes suggestions for grouping students. This gives students the opportunity to work individually, with a partner, or in small groups.

Activity Synthesis

During the activity synthesis, the teacher orchestrates some time for students to synthesize what they have learned. This time is used to ensure that all students have an opportunity to understand the mathematical punch line of the activity and situate the new learning within students' previous understanding.

Practice Problems

Each section in a unit includes an associated set of practice problems. There are 3 types of practice problems: pre-unit, lesson, and exploration. Teachers may decide to assign practice problems for homework or for extra practice in class. They may decide to collect and score them or to provide students with answers ahead of time for self-assessment. It is up to teachers to decide which problems to assign (including assigning none at all).

Pre-unit Problems

The practice problem set associated with the first section of each unit includes several prior grade-level questions. These questions can be used to review prerequisite material from the previous grade or as a pre-unit assessment, if desired.

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Lesson Practice Problems

The practice problem set associated with each section typically includes one question for each lesson in the section.

Exploration Problems

Each practice problem set also includes exploration questions that provide an opportunity for differentiation for students ready for more of a challenge. There are two types of exploration questions. One type is a hands-on activity directly related to the material of the unit that students can do either in class if they have free time, or at home. The second type of exploration is more open-ended and challenging. These problems go deeper into grade-level mathematics. They are not routine or procedural, and they are not just “the same thing again but with harder numbers.”

Exploration questions are intended to be used on an opt-in basis by students if they finish a main class activity early or want to do more mathematics on their own. It is not expected that an entire class engages in exploration problems, and it is not expected that any student works on all of them. Exploration problems may also be good fodder for a Problem of the Week or similar structure.

Instructional Routines

Instructional Routines are designs for interaction that invite all students to engage in the mathematics of each lesson. They provide opportunities for students to bring their personal experiences as well as their mathematical knowledge to problems and discussions. They place value on students’ voices as they communicate their developing ideas, ask questions, justify their responses, and critique the reasoning of others.

As mentioned in the Design Principles, instructional routines have a predictable structure and flow. They provide structure for both the teacher and the students. A finite set of routines support the pacing of lessons as they become familiar and save time in classroom choreography, so students can spend less time learning how to execute lesson directions, and more time on learning mathematics. Some of the instructional routines, known as Mathematical Language Routines (MLRs), were developed by the Stanford University UL/SCALE team.

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There are two types of Instructional Routines used in the materials: Warm-up Routines and Lesson Activity Routines. A list of the routines within each type is outlined in this table.

Warm-up Routines	Lesson Activity Routines
Act It Out	Math Language Routines (MLRs)
Choral Count	MLR1: Stronger and Clearer Each Time
Estimation Exploration	MLR2: Collect and Display
How Many Do You See?	MLR3: Clarify, Critique, Correct
Notice and Wonder	MLR4: Information Gap
Number Talk	MLR5: Co-craft Questions
Questions About Us	MLR6: Three Reads
True or False?	MLR7: Compare and Connect
What Do You Know About _____?	MLR8: Discussion Supports
Which One Doesn't Belong?	Other Lesson Activity Routines
	5 Practices
	Card Sort

Each lesson begins with a Warm-up Routine intentionally designed to elicit student discussions around the mathematical goal of the lesson. The Lesson Activity Routines embed structures within the tasks of the lessons that allow students to engage in the content, and collaborate in ways that support the development of student thinking and precision with language. MLRs are written into each lesson, either as an embedded structure of a lesson activity in which all students engage, or as a suggested optional support specifically for English learners.

Noticing and Assessing Student Progress in Mathematical Practices

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The Standards for Mathematical Practices Chart

The Standards for Mathematical Practice (MP) describe the types of thinking and behaviors students engage in as they are doing mathematics. Throughout the curriculum, the Teacher Guide identifies lessons and activities where different Mathematical Practices are likely to be observed.

Teachers will notice that some instructional routines are generally associated with certain Mathematical Practices. For example:

- The Which One Doesn't Belong routine offers opportunities for attending to precision when describing why something doesn't belong (MP6).
- The How Many Do You See routine offers opportunities to look for and make use of structure (MP7) as students subitize or use grouping strategies to describe the images they see.
- The Number Talk routine offers opportunities to look for and make use of structure (MP7) and look for and express regularity in repeated reasoning (MP8) as students explain the strategies they use and apply strategies as they develop fluency.
- The Estimation Exploration routine offers opportunities to share a mathematical claim and the thinking behind it (MP3) and to make an estimate or a range of reasonable answers with incomplete information, which is a part of modeling with mathematics (MP4).
- The Card Sort routine often asks students to reason abstractly and quantitatively (MP2) and look for and make use of structure (MP7).

The unit-level Mathematical Practice chart is meant to highlight a handful of lessons in each unit that showcase certain Mathematical Practices. Some units, due to their size or the nature of their content, may have fewer predicted chances for students to engage in a particular Mathematical Practice. A dash in the chart indicates that there may not be enough opportunities to reliably look for this Mathematical Practice in the unit. One primary place Mathematical Practice 4 is tagged is the optional modeling lesson at the end of each unit. Aside from these lessons, optional activities and lessons are not included in this chart.

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Kindergarten	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	7, 8, 9, 11	5, 7, 14, 15	3, 5, 12, 13	4, 6, 7, 17	12–16	2, 4–6, 8	–	11
Unit 2 Lessons	4, 19–21	1, 16	17	22	20, 21	4, 6, 10, 20	8, 9, 13, 18, 19	2, 7, 10, 11, 13
Unit 3 Lessons	12	10	1, 6, 3, 12, 13	2, 9, 14, 15	5	4–9	2, 11	3, 8
Unit 4 Lessons	–	7, 9–12	–	13, 18	8, 11	2, 3, 7, 10	15, 17	17
Unit 5 Lessons	5, 9	5, 9	8	7, 15	13, 14	2, 5, 7	3, 4, 8, 10, 13	10, 12, 15
Unit 6 Lessons	–	10, 11	–	–	1, 3, 4	1, 2, 3, 11, 12	5, 6, 9, 11	3, 4, 7, 8, 10
Unit 7 Lessons	1	2, 3, 4, 5, 6	3, 9, 16	3, 13, 16	–	8, 10, 11, 13, 14	1, 2, 6, 7, 9, 10	–
Unit 8 Lessons	–	10, 11, 13, 18	7, 20	6, 8, 9, 10	18, 19	–	13, 15, 18	1, 3, 4, 5

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Grade 1	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	–	1, 2, 12	7, 8, 9	15	12	2, 7, 8, 13	3, 4	3, 4
Unit 2 Lessons	1, 2, 6, 12, 15, 19	2, 3, 9, 20	3, 11	1, 3, 18, 22	1	3, 4	14, 18	–
Unit 3 Lessons	5, 11, 12, 15, 20	6, 10, 13, 20, 25	4, 5, 6, 19, 23, 25	10, 26, 28	10, 15, 20	2, 4, 22, 24	15, 17, 22, 24	9, 11, 17
Unit 4 Lessons	–	4, 8, 17, 19	6, 7, 14	23	1, 6	6, 8, 10, 14, 16, 19	2–4, 12, 20	3, 7, 20
Unit 5 Lessons	8	11, 12	1, 3, 6, 12	8	6, 9	1, 3	3, 5, 7, 9, 10, 12	5, 8
Unit 6 Lessons	–	11, 12, 13, 14, 15	1, 5	2, 17	3	1–3, 6, 7	8, 9, 13	4, 9, 12
Unit 7 Lessons	–	3, 16	3, 11	–	–	3, 4, 5, 6, 9, 10	10, 13, 14, 15	9, 11
Unit 8 Lessons	5	4, 5, 6	8, 9	4, 6	–	7	2, 3, 4, 7, 10	–

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Grade 2	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	15, 16	2, 9, 13, 14, 15	2, 9, 10	8, 18	5, 13	10, 11, 16	2, 4, 15	–
Unit 2 Lessons	11, 12	9, 11, 12, 13, 14	6, 8	2, 3, 12, 13, 16	2, 3, 11	9, 14	8, 9, 12, 13	6
Unit 3 Lessons	6, 11, 12	3, 6, 10, 11, 14	4, 8, 9, 12, 16	9, 18	2, 5, 8, 9	1, 8, 15	9, 10, 16	3, 6, 10
Unit 4 Lessons	5	7, 9, 10, 11, 13	2, 3, 5, 8	15	1	2, 4, 11	2, 4, 8, 10, 12	2, 8
Unit 5 Lessons	–	9	4, 9, 12	14	12	4, 6	1, 2, 3, 5, 8	1, 2, 8, 10
Unit 6 Lessons	3	11, 18, 19	7, 8, 13, 19	21	–	1, 4, 6, 7	8, 15, 16, 17	9, 12, 16
Unit 7 Lessons	–	13, 15	7, 9, 10, 16	18	12	–	1, 2, 4, 7, 14	1, 2
Unit 8 Lessons	8	3, 9, 10	8	–	–	1, 7, 8, 11	1, 2, 3, 8, 12	2, 4, 11
Unit 9 Lessons	–	4, 5, 10, 11, 12	13	10, 12	–	7, 13	2, 3, 5, 6, 9	9, 13

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Grade 3	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	8	1, 10, 11, 13, 14	6, 16, 17, 20	21	–	2, 10, 14, 17, 20	10, 11, 14, 16, 20	11, 14, 15, 19
Unit 2 Lessons	10	5, 13	1, 10, 12, 14	15	–	2, 3, 4, 6	3, 4, 8, 9, 12	–
Unit 3 Lessons	13, 19, 20	2, 18, 19	9, 11, 15, 17, 18	21	3, 7	4, 8, 17, 20	1, 12, 13	12, 14
Unit 4 Lessons	10, 21	4, 6, 10, 14, 17	5, 6, 7, 15	22	13	1, 2, 9, 15	2, 8, 9, 12, 16	9
Unit 5 Lessons	–	4, 12, 15, 17	6, 11	18	1	1, 9, 10, 14	3, 5, 11, 13, 16	2, 8, 13
Unit 6 Lessons	7, 13	5, 10, 11, 12, 15	7, 8, 14, 15	7, 8, 11, 14, 16	4	1, 2, 3, 9, 13	12	10
Unit 7 Lessons	10, 14	9, 13	8, 10	13, 15	–	1, 3, 5, 10, 14	1, 2, 4, 8, 11	6
Unit 8 Lessons	–	4, 7, 10	3, 4	4, 5	–	3, 7, 10	1, 2, 8, 11	–

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Grade 4	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	5, 6,	5	5, 7	5, 6, 8	–	1, 7, 8	1, 2	2–4
Unit 2 Lessons	14	–	3, 9, 12	17	–	2, 7, 9	4, 6, 16	3, 5, 8, 11
Unit 3 Lessons	11, 14, 15, 18	1, 2, 6, 14, 19	3, 6, 9, 11	15, 20	–	12, 13, 15	5, 10, 11, 12, 17	4, 5, 7, 17
Unit 4 Lessons	6	1, 4, 5, 17, 22	2, 10, 13, 19, 20	23	16	3, 8, 13	1, 5, 7, 9, 12, 14, 22	8, 11
Unit 5 Lessons	13	2, 4, 5, 9, 15, 17	3, 7, 10	18	–	5, 6, 13	6–8, 10, 12, 16	6
Unit 6 Lessons	12, 22	12, 20, 21, 23	7, 9, 11, 18, 19	25	–	3, 4	1, 4, 5, 8, 16	4
Unit 7 Lessons	15	–	3, 6	4	–	1, 2, 4, 5, 11	3, 6, 13, 14	–
Unit 8 Lessons	–	–	5, 7	–	2, 4, 5, 8–10	1, 3, 4	1, 3, 8	2, 7
Unit 9 Lessons	7	1–3, 7–9	2	9	–	–	1, 4, 5, 6	4

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Grade 5	MP1	MP2	MP3	MP4	MP5	MP6	MP7	MP8
Unit 1 Lessons	5, 7, 11	3, 4, 5, 9, 10	1, 4, 7, 10	12	1	1, 2, 5, 7	3, 6, 8, 10	8
Unit 2 Lessons	1, 3, 14, 15	2, 4, 7	3, 5, 7, 12	17	9	2, 5, 9, 10, 14	2, 3, 6, 9–11	8, 13
Unit 3 Lessons	17	1, 4, 11, 14, 18	4, 12, 16, 18	8	–	2, 17	3, 5, 6, 19	3, 7, 12, 14
Unit 4 Lessons	10	9, 10, 15, 16	1, 4, 9, 12–14	16, 18–21	–	6, 12	2, 5, 10, 11	13
Unit 5 Lessons	9	3, 8, 10, 18	2, 8, 12, 16	26	5, 11, 14	6, 7, 13, 16, 25	4, 6, 17–19, 21	14, 17, 21, 23
Unit 6 Lessons	–	4, 6, 12, 14, 17	7, 10, 13, 14	21	8	5, 12, 15	1–4, 11, 17, 19	4, 10, 19
Unit 7 Lessons	–	6, 10, 12	8	–	–	1, 2, 4, 5	3–5, 9, 12, 13	9, 11, 13
Unit 8 Lessons	6, 8	6, 8	1, 2, 5	7	–	–	1–4, 10, 13	2, 10, 13

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A list of opportunities to use particular Mathematical Practices is never exhaustive. Some activities lend themselves to use of a particular Mathematical Practice more than others, but rather than requiring its use, leave room to be surprised by how students use the Mathematical Practices to make sense of the mathematics, especially as students become more flexible in making their thinking visible.

How you can use the Mathematical Practices Chart

No single task is sufficient for assessing student engagement with the Standards for Mathematical Practice. For teachers looking to assess their students, consider

- providing students the list of learning targets to self-assess their use of the practices
- assigning students to create and maintain a portfolio of work that highlights their progress in using the Mathematical Practices throughout the course
- monitoring collaborative work and noting student engagement with the Mathematical Practices

Because using the mathematical practices is part of a process for engaging with mathematical content, we suggest assessing the Mathematical Practices formatively. For example, if you notice that most students do not use appropriate tools strategically (MP5), plan in future lessons to select and highlight work from students who have chosen different tools.

Since the Mathematical Practices in action can take many forms, a list of learning targets for each Mathematical Practice is provided to support teachers and students in recognizing when engagement with a particular Mathematical Practice is happening. The intent of the list is not that students check off every item on the list. Rather, the “I can” statements are examples of the types of actions students could do if they are engaging with a particular Mathematical Practice.

Standards for Mathematical Practice Student Facing Learning Targets

MP1 I Can Make Sense of Problems and Persevere in Solving Them

- I can ask questions to make sure I understand the problem.
- I can say the problem in my own words.
- I can keep working when things aren't going well and try again.
- I can show at least one try to figure out or solve the problem.

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- I can check that my solution makes sense.

MP2 I Can Reason Abstractly and Quantitatively

- I can think about and show numbers in many ways.
- I can identify the things that can be counted in a problem.
- I can think about what the numbers in a problem mean and how to use them to solve the problem.
- I can make connections between real-world situations and objects, diagrams, numbers, expressions, or equations.

MP3 I Can Construct Viable Arguments and Critique the Reasoning of Others

- I can explain or show my reasoning in a way that makes sense to others.
- I can listen to and read the work of others and offer feedback to help clarify or improve the work.
- I can come up with an idea and explain whether that idea is true.

MP4 I Can Model with Mathematics

- I can wonder about what mathematics is involved in a situation.
- I can come up with mathematical questions that can be asked about a situation.
- I can identify what questions can be answered based on data I have.
- I can identify information I need to know and don't need to know to answer a question.
- I can collect data or explain how it could be collected.
- I can model a situation using a representation such as a drawing, equation, line plot, picture graph, bar graph, or a building made of blocks.
- I can think about the real-world implications of my model.

MP5 I Can Use Appropriate Tools Strategically

- I can choose a tool that will help me make sense of a problem. These tools might include counters, base-ten blocks, tiles, a protractor, ruler, patty paper, graph, table, or external resources.
- I can use tools to help explain my thinking.
- I know how to use a variety of math tools to solve a problem.

MP6 I Can Attend to Precision

- I can use units or labels appropriately.
- I can communicate my reasoning using mathematical vocabulary and symbols.
- I can explain carefully so that others understand my thinking.
- I can decide if an answer makes sense for a problem.

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MP7 I Can Look for and Make Use of Structure

- I can identify connections between problems I have already solved and new problems.
- I can compose and decompose numbers, expressions, and figures to make sense of the parts and of the whole.
- I can make connections between multiple mathematical representations.
- I can make use of patterns to help me solve a problem.

MP8 I Can Look for and Express Regularity in Repeated Reasoning

- I can identify and describe patterns and things that repeat.
- I can notice what changes and what stays the same when working with shapes, diagrams, or finding the value of expressions.
- I can use patterns to come up with a general rule.

Center Overview

Centers are intended to give students time to practice skills and concepts that are developed across the year. There are 2 types of centers. Addressing centers address the work of a lesson or section of a unit. Supporting centers review prior unit or prior grade-level understandings and fluencies.

Each center builds across multiple stages that may span several grades. For example, Get Your Numbers in Order, a center in which students use their understanding of relative magnitude to order numbers, has 5 stages that span grades 1–5. Center stages are aligned to Common Core standards and in grades 2–5, suggested centers are included in each lesson. These centers build towards the content in a lesson or section, develop fluency across that grade level, or preview content for an upcoming unit. In kindergarten and grade 1, centers are an integral part of the lessons, so additional suggested centers are not included in each lesson. Note: Early center stages in kindergarten may be building toward the aligned kindergarten grade-level standards.

Structure of Center Time

In kindergarten and grade 1, center time is built into lessons so that students have a chance to spend more time on topics that require more time to develop understanding. New centers are introduced during this time and students are given a choice to work on previously introduced centers.

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In grades 1 and 2, there is a center day at the end of each section of each unit. In grade 2, these lessons are optional. In these lessons, new centers are introduced and students also have time to choose between previously introduced centers that reinforce content from the unit or build grade-level fluencies.

In grades 3–5, center time is in addition to regular class time, as desired by the teacher. Optional center day lessons are included occasionally in a unit to introduce a center to students, but in general centers are provided as an extra resource for teachers.

Centers can be used in a variety of additional ways. Students can work on centers if a lesson is completed and there is class time remaining. Entire class sessions can also be dedicated to centers for students to practice or solidify the mathematical ideas of a unit. Students can work on center activities during morning work time, or any other free periods throughout the day. Centers can also be used as support for students when practice with prior grade-level standards is needed.