Reviewing *Everyday Mathematics*

For over 35 years, *Everyday Mathematics* has helped teachers transform how they deliver math instruction. Since the first edition, the program has incorporated research-based practices such as problem-based instruction, flexible grouping strategies, math discourse, and productive struggle. These features are woven into core instruction rather than appearing as labels or stand-alone parts of the lesson.

The authors have created a unique tool called “Planning for Rich Mathematical Instruction” to help teachers and reviewers see where these practices appear in lessons and specific activities. See page xx for more information.

*Everyday Mathematics* remains the only program that dedicates the time and resources required to develop research-based learning trajectories that are carefully designed to spiral both practice and instruction over time, which has been proven to be the most effective way of achieving true, life-long mastery of mathematics skills and concepts.

To help teachers and reviewers see the coherence of the spiral, the authors have created tools such as the spiral tracker which shows how each standard progresses across lessons and units. See page xxx for more information.

### Features
- Assessment .......................................................... xvi
- Differentiation ..................................................... xvii
- Educational Equity .............................................. v
- Focus, Coherence, and Rigor ............................... vi
- Lesson Structure .................................................. xili
- Mastery ............................................................ xxx
- Online Resources .................................................... xiv
- Practice ............................................................... viii
- Rich Mathematics Instruction ............................... xx

### Content
- Lesson Types ......................................................... xxiii
- Lesson Parts and Features ................................... xxiv
- Standards Correlations ........................................ xxxi
- Grade 3 Lessons (Table of Contents) ............ xlvi
- Sample Unit Organizer ........................................... 112
- Sample Lesson ..................................................... 160
- Sample Open Response and Reengagement Lesson .................. 166
- Sample Exploration Lesson ..................................... 194
- Sample Progress Check Lesson ............................. 200
The Everyday Mathematics Classroom

A pervasive element of an Everyday Mathematics classroom is collaborative learning. Working collaboratively in classrooms creates an atmosphere for sharing ideas and problem-solving strategies. As students encounter different ways of solving problems from peers, they learn to interpret and evaluate each other’s point of view and engage in discussions that address the strengths and weaknesses of a variety of approaches.

Each lesson activity includes recommendations for one or more grouping options, helping you create a flexible, dynamic learning environment every day.
An Investment in How Your Children Learn

Behind each student success story is a team of teachers and administrators who set high expectations for themselves and their students. *Everyday Mathematics* is designed to help you achieve those expectations with a research-based approach to teaching mathematics.

**The Everyday Mathematics Difference**

Decades of research show that students who use *Everyday Mathematics* develop deeper conceptual understanding and greater depth of knowledge than students using other programs. They develop powerful, life-long habits of mind such as perseverance, creative thinking, and the ability to express and defend their reasoning.
A Commitment to Educational Equity

*Everyday Mathematics* was founded on the principle that every student can and should learn challenging, interesting, and useful mathematics. The program is designed to ensure that each of your students develops positive attitudes about math and powerful habits of mind that will carry them through college, career, and beyond.

### Provide Multiple Pathways to Learning

Through *Everyday Mathematics*’ spiraling structure, your students develop mastery by repeatedly experiencing math concepts in varied contexts, with increasing sophistication, over time. By providing multiple opportunities to access math concepts, you can easily adapt your instruction to better meet the unique learning needs of your children.

### Create a System for Differentiation in Your Classroom

Turn your classroom into a rich learning environment that provides multiple avenues for each of your students to master content, make sense of ideas, develop skills, and demonstrate what they know. *Everyday Mathematics* helps you do this by providing the tools you need to effectively address the key components of effective differentiation in your classroom: Content, Process, Product, Classroom Organization, and Learning Environment.*

### Access High Quality Materials

All students deserve strong learning materials especially in early childhood. You can be confident teaching with *Everyday Mathematics* because your instruction is grounded in a century of research in the learning sciences and has been rigorously field tested and proven effective in classrooms for over thirty years.

### Build and Maintain Strong Home-School Connections

Research shows that strengthening the link between home and school is integral to your students’ success. That’s why *Everyday Mathematics* provides a wealth of resources to help you extend what your students learn in your classroom to what they can do at home.

### Use Data to Drive Your Instruction

Using the Quick-Entry Evaluation tool in the ConnectED Teacher Center, you can go beyond tracking progress solely through periodic assessments and easily record evaluations of almost every activity your students engage in every day. The data you collect drives a suite of reports that help you tailor your instruction to meet the needs of every student in your classroom.


About *Everyday Mathematics*
Build Mathematical Literacy

Designed for College and Career Readiness, Everyday Mathematics builds a solid foundation for success in your mathematics classroom through meaningful practice opportunities, discussion of reasoning and strategies, and engagement in the mathematical practices every day.

Focused Instruction

The instructional design of Everyday Mathematics allows you to focus on the critical areas of instruction for each grade.

Focus Clusters

Everyday Mathematics identifies the clusters addressed in the Focus part of each lesson to help you understand the content that is being taught in the lesson.

Major Clusters

Each unit focuses on Major Clusters that are clearly identified in the Unit Organizer.

Focus

In this unit, students explore patterns in the base-10 place-value system and ways of representing large numbers. Students are also introduced to U.S. traditional multiplication and review partial-quotients division.

Major Clusters

S.NBT.A Understanding the place value system.
S.NBT.B Perform operations with multi-digit whole numbers with decimals.
S.MD.A Convert like measurement units within a given measurement system.

Process and Practice Standards

SMP1 Make sense of problems and persevere in solving them.
SMP6 Attend to precision.
Coherence Within and Across Grades

Spiral Towards Mastery
Carefully crafted, research-based learning progressions provide opportunities for your students to connect skills, concepts, and applications, while developing deep understanding, long-term learning, and transfer of knowledge and skills to new contexts.

Coherence

The table below describes how standards addressed in the Focus parts of the lessons link to the mathematics that students have done in the past and will do in the future.

<table>
<thead>
<tr>
<th>Focus in the Past</th>
<th>Links to the Past</th>
<th>Focus in the Future</th>
<th>Links to the Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.OA.1</td>
<td>In Unit 1, students reviewed how to use grouping symbols in expressions and how to evaluate expressions with grouping symbols.</td>
<td>In Unit 7, students will use grouping symbols in an expression to model situations which no more than two operations are involved.</td>
<td></td>
</tr>
<tr>
<td>5.OA.2</td>
<td>In Unit 1, students represented the volumes of rectangular prisms using expressions. They also wrote expressions to record calculations in the game Name That Number. In Grade 4, students represented problems using equations with a letter standing for an unknown quantity.</td>
<td>Throughout Grade 5, students will write expressions to record calculations in a variety of contexts. In Unit 6, they will order and interpret expressions without evaluating them. In Grade 6, students will write expressions in which letters stand for numbers.</td>
<td></td>
</tr>
</tbody>
</table>

Rigorous Content

*Everyday Mathematics* gives you the tools and resources you need to emphasize conceptual understanding, procedural fluency, and applications with equal intensity.

Planning for Rich Math Instruction

<table>
<thead>
<tr>
<th>Conceptual Understanding</th>
<th>Procedural Skill and Fluency</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Place Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exponential notation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiplicating</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Linking Prior and Future Knowledge

Each unit contains information about how the focus standards covered in the unit developed in prior units and grades and how your instruction lays the foundation for future lessons.
Problem-based Instruction

*Everyday Mathematics* builds problem solving into every lesson. Problem solving is in everything they do.

<table>
<thead>
<tr>
<th>Warm-up Activity</th>
<th>Daily Routines</th>
<th>Math Message</th>
<th>Focus Activities</th>
<th>Summarize</th>
<th>Practice Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lessons begin with a quick, scaffolded Mental Math and Fluency exercise.</td>
<td>Reinforce and apply concepts and skills with daily activities.</td>
<td>Engage in high cognitive demand problem solving activities that encourage productive struggle</td>
<td>Introduce new content with group problem solving activities and classroom discussion.</td>
<td>Discuss and make connections to the themes of the focus activity.</td>
<td>Lessons end with spiraled review of content from past lessons.</td>
</tr>
</tbody>
</table>

Practice Embedded in Every Lesson

Because *Everyday Mathematics* is a problem-based curriculum, practice opportunities appear naturally in daily instruction, but specific activities in the practice part of lessons help you be confident your students are progressing toward mastery and maintaining and applying knowledge and skills over time.

Games

Provide opportunities for fluency practice, along with collaborative learning experiences.

**Math Boxes**

Provide students with an opportunity to recall previously taught skills and concepts. These are distributed practice activities that include a balance of skills, concepts, and applications.

**Home Links**

Allow students to practice school mathematics and help family members connect to school.
Mathematical Literacy
Sets The Stage for Algebra

*Everyday Mathematics* encourages students to recognize, analyze, and generalize patterns; represent quantities and relationships symbolically; model problem situations using objects, pictures, words, and symbols; and understand real-world relationships such as direct proportion—which, along with a fluent mastery of basic arithmetic, are the building blocks of algebraic thinking.

<table>
<thead>
<tr>
<th>GRADE</th>
<th>K</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Instruction builds on student curiosity about patterns to explore numbers, shapes, and relationships between them.</td>
<td>Students work with symbolic representations for quantities and relationships, model simple situations, and build arithmetic skills.</td>
<td>Students use symbolic representations to model problem situations, build their understanding of fundamental relations such as direct proportion, and master elementary arithmetic concepts and skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*About Everyday Mathematics*
Be the Teacher They Will Always Remember

An Everyday Mathematics classroom has a unique energy that’s a result of student engagement and excitement about learning math. This environment builds growth mindset and other positive attitudes about learning that will help your students succeed long after they’ve left your classroom.

Math Talk
Talking about mathematics is an essential part of learning mathematics. Opportunities for students to share their problem-solving strategies and their reasoning as well as critique others’ reasoning are embedded throughout Everyday Mathematics, making it easy for you to facilitate math discussions every day.

“I can share my solution!”

Collaboration
Everyday Mathematics was designed to allow your students to share ideas and strategies. They work in small groups and with partners formed according to their needs, helping you create a rich learning environment that supports powerful instruction.
Perseverance and Productive Struggle

*Everyday Mathematics* helps you create a classroom culture that values and supports productive struggle, that fosters productive dispositions in your students—a belief that mathematics is worthwhile, an inclination to use the mathematics they know to solve problems and confidence in their own mathematical abilities.

Hands-on Exploration

*Everyday Mathematics* includes hands-on activities in every lesson that often involve the use of manipulatives and games to help students make connections to their everyday life. These activities allow students to model mathematics physically, concretely, and visually—deepening their understanding of concepts and skills.

“I can do this!”

*Everyday Mathematics* in Your Classroom
The Everyday Mathematics Lesson

Lessons are designed to help teachers facilitate instruction and engineered to accommodate flexible grouping models. The three-part, activity-driven lesson structure helps you easily incorporate research-based instructional methods into your daily instruction.

Embedded Rigor and Spiraled Instruction

Each lesson weaves new content with practice of content introduced in earlier lessons. The structure of the lessons ensures that your instruction includes all elements of rigor in equal measure with problem solving at the heart of everything you do.

Review

Warm Up

FLUENCY

Lessons begin with quick, scaffolded warm up exercises that provide important fluency practice.

Introduction of New Content

Focus

CONCEPTUAL UNDERSTANDING AND APPLICATION

Math Message: Students solve a challenging and engaging problem and discuss how they solved it.

Focus Activities: Introduce new content, skills, and concepts.

Review

Practice

APPLICATION AND FLUENCY

Spiraled practice that revisits content from earlier lessons.
Key Components

The *Everyday Mathematics* authors have developed a suite of resources that support your instruction, helping you create a mathematically rich environment every day.

Open Response and Reengagement Lessons

Every unit includes a 2-day lesson that provides your students the opportunity to work with rich tasks and solve complex problems while explicitly engaging in the mathematical practices.

Activity Cards

Activity Cards provide for structured exploration of content tied to the focus of the lesson independently, in partnerships, and in small groups, especially in centers, where students are expected to complete the activity with minimal teacher guidance.

Games

Research shows that games provide a more effective learning experience than tedious drills and worksheets. Games allow for playful, repetitive practice that develops fluency and confidence and helps students learn to strategize.

Quick Looks

Quick Look activities are routines that help your students develop the ability to recognize a quantity without counting and to decompose numbers in various ways. As they encounter various combinations of numbers, they also develop strategies for basic facts.
Online Resources

Digital tools to help you confidently deliver effective mathematics instruction in your classroom are included with every implementation. Everything you need is included in one easy-to-navigate place and you can customize your lessons by adding resources and notes—and everything is saved and available to you year after year.

The Teacher Center

You’ll never waste time looking for resources because everything you need for every lesson is right where you need it, when you need it. When you open the Everyday Mathematics Teacher Center, you’re automatically taken to the overview of the current lesson.

Plan Your Lesson
Review all of the activities for the lesson.

Resources
Access lesson resources, additional projects and home-school connections.

Games
Open online games for fluency practice.

Quick Entry
Easily record evaluations of your students’ progress.

Today’s Data
Easy access to Data Dashboard reports to drive your daily instruction.

Differentiation
Resources to help you adjust the lesson to support all learners.

Launch Presentation
Editable versions of digital lessons that help you lead instruction.
The Student Learning Center

Engineered to help each of your students experience confidence and develop positive feelings about math in a digital environment that keeps them engaged and excited about learning.

Lesson Content

Your students' lessons are synched with your planner so they always have easy access to each day's activities.

My Reference Book

One-click access to the interactive reference book that includes descriptions and examples as well grade-level-appropriate explanations of mathematical content and practices.

eToolkit

eTools and writing tools that enable your students to show their work and explore dynamic extensions.

Tutorial Videos

Demonstrations of concepts and skills.

Geometer’s Sketchpad Activities and EM Games Online

Easy to access Fact Practice games and full integration of The Geometer’s Sketchpad® activities.

EM at Home

Parents have easy access to resources to help them support their child's learning.
Data Driven Instruction

Everyday Mathematics includes a complete set of tools and resources to help teachers evaluate the development of each student’s mathematical understanding and skills, while providing actionable data to inform instruction.

Evaluate

Ongoing Assessments
Assessment Check-In  Daily lesson based assessment opportunities.

Writing and Reasoning Prompts  Allow students to communicate understanding of concepts and skills and strategies for solving problems.

Periodic Assessments
Progress Check  lessons at the end of each unit provide formal opportunities to assess students’ progress toward mastery of content and process/practice standards.

- Unit Assessments  Assess students’ progress toward mastery of concepts, skills, and applications in the current unit.

- Self Assessments  Allow students to reflect on their understanding of content and process/practice standards that are the focus of the unit.

- Challenge Problems  Extend important ideas from the unit, allowing students to demonstrate progress beyond expectations.

- Cumulative Assessments  Assess students’ progress toward mastery of content and process/practice standards from prior units.

- Open Response Assessments  Provide information about students’ performance on longer, more complex problems and emphasize the process and practice standards for mathematics.

Benchmark Assessments  Beginning of Year, Mid-Year, and End of Year benchmarks follow the same format as Unit Assessments.
Record
A full suite of tools including rubrics and class checklists are available to help you track your students’ progress.

Quick Entry Evaluation Tool
You can quickly and efficiently record evaluations of your students’ performance as well as add notes.

Report
The Data Dashboard is a responsive reporting tool that delivers actionable information to help you adapt and personalize your instruction and provide feedback to families and administrators.

Everyday Mathematics in Your Classroom xvii

iv_xxi_EM4_nonCCSS_TLG_FM_G3_V1_703841.indd 17
30/04/19 11:47 AM
Differentiation System

*Everyday Mathematics* fosters rich learning environments that provide multiple avenues for mastering content, making sense of ideas, developing skills, and demonstrating knowledge. This allows rigorous mathematics content to be accessible and engaging for all students.

*Everyday Mathematics* Differentiation Model

**Content**
Clear goals and features that can be readily adapted or scaffolded to adjust the content for individual students.

**Process**
Engaging activities and point-of-use prompts that help foster rich pedagogical interaction in the classroom.

**Product**
Multiple opportunities to assess and monitor progress over time and to analyze mathematical strengths and misconceptions.

**Classroom Organization**
Opportunities for whole-class and small-group instruction built into every lesson, as well as time for students to work in partners, and individually.

**Learning Environment**
*Everyday Mathematics* provides multiple opportunities for students to reflect on their own strengths and weaknesses while engaging in productive collaboration.
**Differentiation Options**

### Readiness
- **5–15 min**
  - **Whole Class**
  - **Small Group**
  - **Partner**
  - **Independent**

- **Counting to Convert Inches to Feet**
  - 5 MD.1 S.M.T.7.7
  - per group the 12-inch ruler
  - 36 square pattern blocks
  - To explore unit conversions using a concrete model, students count how many 1-inch square pattern blocks are equal to the length of a 1-foot ruler. Distribute 36 square pattern blocks to each group explaining that each pattern block is 1 inch long. Have students line up the blocks from one end of the table to the other without overlap.

### Enrichment
- **15–30 min**
  - **Whole Class**
  - **Small Group**
  - **Partner**
  - **Independent**

- **Writing Unit Conversion Number Stories**
  - S.M.D.1
  - Activity Card 20: Math Journal 1, p. 52; Student Reference Book, p. 328
  - To extend their work with unit conversions, students write unit conversion number stories using the problems on page 52 as examples. Partners solve each other’s number stories.

### Extra Practice
- **5–15 min**
  - **Whole Class**
  - **Small Group**
  - **Partner**
  - **Independent**

- **Converting Units**
  - S.M.D.1
  - Activity Card 21: Student Reference Book, p. 328; number cards (1 of each); two 6-sided dice
  - For more practice, students roll dice to generate unit conversion problems and record and show their work.

---

**Supplementary Activities**

**Everyday Mathematics** offers specific differentiation options in every lesson for:

- Students who need more scaffolding
- Students who need extra practice
- Advanced Learners
- Beginning English Language Learners
- Intermediate and Advanced English Language Learners

---

**Lesson Supplements**

Almost every lesson has Differentiation Support Pages found in the ConnectED Teacher Center that offer extended suggestions for working with diverse learners, including English Language Learners and students who need more scaffolding.

---

**Differentiate | Adjusting the Activity**

- **To help students focus on the digits being used in each step, suggest covering the 2 with a slip of paper while working on Step 1 and the 5 while working on Step 2. It may be helpful to keep in mind that they are multiplying from the left to the right column.**

**Common Misconception**

- **In Step 1 after multiplying 3 by 2 tens, some students may write 0 below the tens column. Remind them that in each step they should multiply and add in any extra tens of hundreds they have recorded. Encourage them to cross out each digit as they add it.**

**Point-of-Use Differentiation**

- **Assessment Adjustments** Suggestions for scaffolding and extending Progress Check assessments.
- **Game and Activity Adjustments** Recommendations for tools, visual aids, and other instructional strategies that provide immediate support.
- **Adjusting the Activity** Suggestions for adapting activities to fit students’ needs.
- **Common Misconceptions** Notes that suggest how to use observations of students’ work to adapt instruction.
Supporting Rich Mathematical Instruction

Everyday Mathematics includes a wealth of resources to help you deliver effective instruction every day.

Planning
Every Unit Organizer includes a chart that shows where the building-blocks for rich mathematical instruction appear throughout each unit.

Preparing
Every Unit Organizer also includes important background information on both content and practice standards to help you confidently deliver instruction.
Support

The Everyday Mathematics Virtual Learning Community (VLC) at The University of Chicago, provides a free space where you can connect with a network of skilled, passionate educators who are also using the program, and interact with the authors. Resources on the VLC include classroom videos of lessons in action and instructional tools and resources.

Resources

Everything you need to successfully implement Everyday Mathematics is at your fingertips through the ConnectED Resource page of your Teacher Center including videos from the authors, quick start guides for key features, and the Implementation Guide, a comprehensive guide to using the program.
Getting Ready to Teach

Third Grade Everyday Mathematics

Welcome to Third Grade Everyday Mathematics. This guide introduces the organization and pedagogy of Everyday Mathematics and provides tips to help you start planning and teaching right away.

Grade 3 has 108 lessons in 9 units. Plan to spend 60–75 minutes every day on math so that you complete 3–4 lessons each week and one unit every 3–5 weeks.

This pacing is designed for flexibility and depth. You will have flexibility so you can extend a lesson if discussion has been rich or if students’ understandings are incomplete. You can add a day for "journal fix-up" or for differentiation—to provide an Enrichment activity to every student, for example—or for games. There will also be time to accommodate outside mandates, district initiatives, and special projects.

This pacing also gives you time to go deep, to create a classroom culture that values and supports productive struggle. You can expect your students to do their own thinking, to solve problems they have not been shown how to solve, to make connections between concepts and procedures, to explain their thinking, and to understand others' thinking. Creating such a classroom culture takes time, but the pacing of Everyday Mathematics 4 is designed to give you the time you’ll need.

The Teacher’s Lesson Guide is your primary source for information on planning units and teaching lessons. In most lessons, children will complete pages in their Math Journals or digitally in the Student Learning Center. Additional pages that require copies are available as Math Masters. See the Materials section on pages xxvi-xxviii for information on the teacher and student components.

Preparing for the Beginning of School

- Use the list on pages xxvi-xxvii to check that your Classroom Resource Package is complete.
- See page xxix for manipulatives and supplies you will need.
- Read the Unit 1 Organizer (pages 2–13) and the first several lessons in Unit 1 to help you plan for the first week of school.
- Read the Everyday Mathematics in Grades 1–6 section of the Implementation Guide for more information on getting started.
- Prepare the Unit 1 Family Letter on Math Masters, pages 2–6 to distribute early in the school year.
- Review the Beginning-of-Year Assessment on pages 105–110 in the Assessment Handbook and consider when you will administer it.

Go Online to join the Virtual Learning Community (VLC) to learn about Everyday Mathematics classrooms from other teachers and to find tips for setting up your classroom.
Lesson Types

*Third Grade Everyday Mathematics* includes four types of lessons, which share many of the same features.

**Regular Lessons** are the most common lesson type. See the tables on the following pages for details about regular lessons.

**Explorations Lessons** occur once per unit and give children three unique opportunities to explore new concepts and tools in an informal small-group setting. Exploration A is often a teacher-led activity and focuses on the main content of the lesson. Activity Cards provide directions for children to complete most Explorations.

**Open Response and Reengagement Lessons** extend over two days and occur in every unit. On Day 1 children solve a challenging problem that involves more than one possible strategy or solution. On Day 2 children reengage in the problem and are asked to defend their reasoning and make sense of the reasoning of others.

**Progress Check Lessons** are two-day lessons at the end of every unit. All items on the Progress Check match expectations for progress at that point in the grade and, with the exception of the optional challenge assessment, are fair to grade. On Day 1 children complete a self-assessment, a unit assessment, and an optional challenge assessment covering the content and process/practice standards that were the focus of the unit. Day 2 includes one of the following types of assessments:

- **Open Response Assessments** are included in odd-numbered units and allow children to think creatively about a problem. They address both content and process and practice standards and are accompanied by task-specific rubrics.

- **Cumulative Assessments** are included in even-numbered units and cover standards from prior units.
Lesson Parts and Features

Every lesson begins with two planning pages. The remaining pages provide a detailed guide for teaching the three parts of a lesson: Warm Up, Focus, and Practice.

<table>
<thead>
<tr>
<th>Lesson Parts and Features</th>
<th>Description</th>
<th>Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lesson Opener</strong></td>
<td>An outline of the lesson to assist in your planning that includes information on content and standards, timing suggestions, assessment, and materials.</td>
<td>• See Before You Begin for preparation tips. • Follow the time allotments for each part of the lesson.</td>
</tr>
</tbody>
</table>
| **Differentiation Options** | Optional Readiness, Enrichment, Extra Practice, and English Language Learners (ELL) Support activities that allow you to differentiate instruction. Additional Differentiation Support pages are available online for each regular lesson. | • Choose to complete Differentiation Options as a whole class, as a small group, with partners, or individually depending on the needs of your children. • Note that some children may benefit from completing the Readiness activity prior to the lesson.  
[Go Online](#) to the Implementation Guide for information on differentiation. |

**Part 1: Warm Up**

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Description</th>
<th>Tips</th>
</tr>
</thead>
</table>
| Mental Math and Fluency | Quick, leveled warm-up exercises children answer orally, with gestures, or on slates or tablets that provide practice towards fluency. | • Select the levels that make sense for your children and customize for your class. • For most lessons, spend 5 or fewer minutes on this feature. For Quick Looks, allow up to 10 minutes.  
[Go Online](#) to the Implementation Guide for information on Quick Looks. |

**Part 2: Focus**

<table>
<thead>
<tr>
<th>Instruction</th>
<th>Description</th>
<th>Tips</th>
</tr>
</thead>
</table>
| Math Message and Math Message Follow-Up | An introductory activity to the day’s lesson that usually requires children to solve a problem they have not been shown how to solve. The follow-up discussion connects to the focus activities of the lesson and gives children opportunities to discuss their strategies. | • Consider where and how you will display the Math Message and how children will record their answers.  

- **Math Message**
  - On a half sheet of paper, draw an array that has 2 rows of 3Xs with 3 Xs in each row. Record a number sentence that matches your array.  

- **Exploring Multiplication Squares**
  - Math Masters 1, page TA19 (Centimeter Grid Paper) and read the directions on journal page 86. Have partnerships work together to build and record arrays. Circulate and ask questions such as the following: What do you notice about the two factors? What do you notice about the two numbers being multiplied, in the number sentence 3 X 9? They are both 3. Tell children that today they will create and explore more arrays with equal factors.  

- **Math Message Follow-Up**
  - Have children share their arrays and number sentence. Ask about the two factors, and the number. The factors are the same as the number of rows and columns. The product is the same as the total number of dots in the array. They have the same number of dots. They are all squares. I skip counted by 3.  

- **Math Message Follow-Up**
  - For Quick Looks, allow up to 10 minutes.  

- **Math Message Follow-Up**
  - Maintain high cognitive demand by expecting children to work through the problem without your help before the follow-up discussion begins. |
### Part 2: Focus, con’t.

<table>
<thead>
<tr>
<th>Description</th>
<th>Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focus Activities</strong></td>
<td>Two to four main instructional activities, including games, in which children explore and engage in new content (skills, concepts, games).</td>
</tr>
<tr>
<td>• Encourage children to discuss and work together to solve problems during focus activities.</td>
<td></td>
</tr>
<tr>
<td>• Remember that many focus skills, concepts, applications, and games will be revisited in later practice. Go Online to the Spiral Tracker to see the complete spiral.</td>
<td></td>
</tr>
<tr>
<td>• Look for Goals for Mathematical Process and Practice icons. Go Online Use these to facilitate discussions about the processes. Go Online to the Implementation Guide for information on Mathematical Process and Practice Standards.</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Check-In</strong></td>
<td>A daily assessment opportunity to assess the focus content standards in the lesson. Assessment Check-Ins provide information on expectations for particular standards at that point in the curriculum.</td>
</tr>
<tr>
<td>• Use results to inform instruction. Expectation statements in the Assessment Check-Ins help you decide which children would benefit from differentiation activities.</td>
<td></td>
</tr>
<tr>
<td>• Consider Assessment Check-Ins as “fair to grade” in most cases. Go Online to record children’s progress and to see trajectories toward mastery for these and other standards. Go Online to the Implementation Guide for assessment information.</td>
<td></td>
</tr>
</tbody>
</table>

### Part 3: Practice

<table>
<thead>
<tr>
<th>Description</th>
<th>Tips</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Practice Activity</strong></td>
<td>An opportunity to practice previously taught skills and content through a practice page or a game in many lessons.</td>
</tr>
<tr>
<td>• Allow time for practice pages and games because they are critical for children to meet expectations for standards. This is an essential part of the distributed practice in <em>Everyday Mathematics</em>.</td>
<td></td>
</tr>
<tr>
<td>• Plan for all children to play <em>Everyday Mathematics</em> games at least 60 minutes per week. Go Online to the Implementation Guide for tips to ensure that all children have ample game time. See also the Virtual Learning Community (VLC) to observe many <em>Everyday Mathematics</em> games in action.</td>
<td></td>
</tr>
<tr>
<td><strong>Math Boxes</strong></td>
<td>A daily <em>Math Journal</em> page, beginning in Lesson 1-5, that reviews skills and concepts which children have seen prior to that point in the program. Preview Math Boxes anticipate content in the upcoming unit.</td>
</tr>
<tr>
<td>• Aim to have children complete Math Boxes with as little teacher support as possible.</td>
<td></td>
</tr>
<tr>
<td>• Complete Math Boxes at any point during the day.</td>
<td></td>
</tr>
<tr>
<td><strong>Home Link</strong></td>
<td>A daily homework page that provides practice and informs families about the math from that day’s lesson.</td>
</tr>
<tr>
<td>Encourage children to do these activities with someone at home, such as a parent, caregiver, or sibling.</td>
<td></td>
</tr>
</tbody>
</table>

### Differentiation and Language Features

<table>
<thead>
<tr>
<th>Description and Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adjusting the Activity</strong></td>
</tr>
<tr>
<td><strong>Common Misconception</strong></td>
</tr>
<tr>
<td><strong>Game Modifications</strong></td>
</tr>
<tr>
<td><strong>Differentiation Support</strong></td>
</tr>
<tr>
<td><strong>Academic Language Development</strong></td>
</tr>
<tr>
<td><strong>English Language Learners (ELL)</strong></td>
</tr>
</tbody>
</table>
Getting to Know Your Classroom Resource Package

Complete access to all digital resources is included in your Classroom Resource Package. To access these resources, log into my.mheducation.com.

**Planning, Instruction, and Assessment**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher's Lesson Guide (Volumes 1 and 2)</td>
<td>• Comprehensive guide to the <em>Everyday Mathematics</em> lessons and assessments</td>
</tr>
<tr>
<td></td>
<td>• Standards alignment information: digital version includes online tracking of each content standard</td>
</tr>
<tr>
<td></td>
<td>• Point-of-use differentiation strategies: Readiness, Enrichment, Extra Practice,</td>
</tr>
<tr>
<td></td>
<td>English Language Learners Support, Academic Language Development, Adjusting the Activity, Game</td>
</tr>
<tr>
<td></td>
<td>Modifications, Common Misconception</td>
</tr>
<tr>
<td></td>
<td>• Additional Differentiation Support pages available digitally for virtually every lesson</td>
</tr>
<tr>
<td></td>
<td>• Unit overviews</td>
</tr>
<tr>
<td></td>
<td>• Planning and calendar tools</td>
</tr>
<tr>
<td>eToolkit</td>
<td>• Online tools and virtual manipulatives for dynamic instruction</td>
</tr>
<tr>
<td></td>
<td>• A complete list of Grade 3 eTools on page xxix</td>
</tr>
<tr>
<td>ePresentations</td>
<td>• Ready-made interactive white board lesson content to support daily instruction</td>
</tr>
<tr>
<td>Math Masters</td>
<td>• Reproducible masters for lessons, Home Links, Family Letters, and games</td>
</tr>
<tr>
<td>Minute Math+</td>
<td>• Brief activities that require little or no materials; useful for transition times and for spare</td>
</tr>
<tr>
<td></td>
<td>moments throughout the day</td>
</tr>
<tr>
<td>Classroom Posters</td>
<td>• Posters that display grade-specific mathematical content</td>
</tr>
</tbody>
</table>
### Planning, Instruction, and Assessment (con't)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Assessment Handbook**        | • Assessment masters for unit-based assessments and interim assessments  
                                 | • Record sheets for tracking individual and class progress                                                                                   |
| **Assessment and Reporting Tools** | • Student, class, school, and district reports  
                                 | • Data available at point-of-use in the planning and teaching materials  
                                 | • Real-time data to inform instruction and differentiation                                                                                  |
| **Spiral Tracker**             | • Online tool that helps you understand how standards develop across the spiral curriculum                                                |

### Professional Development

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementation Guide</strong></td>
<td>• Online resource with information on implementing the curriculum</td>
</tr>
</tbody>
</table>
| **Virtual Learning Community** | • An online community, sponsored and facilitated by the Center for Elementary Mathematics and Science Education (CEMSE) at the University of Chicago, to network with other educators and share best practices  
                                 | • A collection of resources including videos of teachers implementing lessons in real classrooms, photos, work samples, and planning tools |

### Family Communications

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Home Connection Handbook**   | • A collections of tips and tools to help you communicate to families about *Everyday Mathematics*  
                                 | • Reproducible masters for home communication for use by both teachers and administrators                                                        |
### Student Materials

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Math Journal, (Volumes 1 and 2)</strong></td>
<td>• Student work pages that provide daily support for classroom instruction</td>
</tr>
<tr>
<td></td>
<td>• Provide a long-term record of each student’s mathematical development</td>
</tr>
<tr>
<td>digital</td>
<td></td>
</tr>
<tr>
<td>print</td>
<td></td>
</tr>
<tr>
<td><strong>Pattern Block Template</strong></td>
<td>• eTools to support mathematical concepts, including geometry and measurement</td>
</tr>
<tr>
<td>digital</td>
<td>• Also available as plastic templates</td>
</tr>
<tr>
<td>print</td>
<td></td>
</tr>
<tr>
<td><strong>Student Reference Book</strong></td>
<td>• Resource to support student learning in the classroom and at home</td>
</tr>
<tr>
<td>digital</td>
<td>• Includes explanations of mathematical content and directions for many</td>
</tr>
<tr>
<td>print</td>
<td><em>Everyday Mathematics</em> games</td>
</tr>
<tr>
<td><strong>Activity Cards</strong></td>
<td>• Directions for students for Explorations, Differentiation Options, and other small-group activities</td>
</tr>
<tr>
<td>digital</td>
<td></td>
</tr>
<tr>
<td>print</td>
<td></td>
</tr>
<tr>
<td><strong>Student Learning Center</strong></td>
<td>• Combines Student Math Journal, Student Reference Book, eToolkit, and Activity Cards, and other resources for students in one location</td>
</tr>
<tr>
<td>digital</td>
<td>• Interactive functionality provides access in English and Spanish</td>
</tr>
<tr>
<td>print</td>
<td>• Interactive functionality provides immediate feedback on select problems</td>
</tr>
<tr>
<td></td>
<td>• Animations that can help with skills and concepts and reinforce classroom teaching</td>
</tr>
<tr>
<td></td>
<td>• Provides access to EM Games Online and Facts Workshop Game</td>
</tr>
<tr>
<td><strong>EM Games Online</strong></td>
<td>• Digital versions of many of the <em>Everyday Mathematics</em> games that provide important practice in a fun and engaging setting</td>
</tr>
<tr>
<td>digital</td>
<td></td>
</tr>
<tr>
<td>print</td>
<td></td>
</tr>
<tr>
<td><strong>Facts Workshop Game</strong></td>
<td>• Games that build computation skill and fact fluency with <em>Everyday Mathematics</em> routines such as fact families and fact triangles</td>
</tr>
<tr>
<td>digital</td>
<td></td>
</tr>
<tr>
<td>print</td>
<td></td>
</tr>
</tbody>
</table>
Manipulative Kits and eToolkit

The table below lists the materials that are used on a regular basis throughout *Third Grade Everyday Mathematics*. All of the items below are available from McGraw-Hill Education. They may be purchased as a comprehensive classroom manipulatives kit or by individual items. The manipulative kit comes packaged in durable plastic tubs. Note that some lessons call for additional materials, which you or your children can bring in at the appropriate times. The additional materials are listed in the Unit Organizers and in the lessons in which they are used.

<table>
<thead>
<tr>
<th>Manipulative Kit Contents</th>
<th>Quantity</th>
<th>eTools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attribute Blocks</td>
<td>Not in kit</td>
<td></td>
</tr>
<tr>
<td>Base-10 Big Cube</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
<tr>
<td>Base-10 Flats</td>
<td>6 packs of 10 flats</td>
<td>✔️</td>
</tr>
<tr>
<td>Base-10 Longs</td>
<td>5 packs of 50 longs</td>
<td>✔️</td>
</tr>
<tr>
<td>Base-10 Cubes</td>
<td>10 packs of 100 cubes</td>
<td>✔️</td>
</tr>
<tr>
<td>Beakers, Nested Graduated Set</td>
<td>4 sets; 5 beakers in each set</td>
<td></td>
</tr>
<tr>
<td>Clock Faces</td>
<td>1 pack of 25 faces</td>
<td>✔️</td>
</tr>
<tr>
<td>Clock Face Stamp</td>
<td>2 stamps</td>
<td>✔️</td>
</tr>
<tr>
<td>Connectors</td>
<td>1 pack of 2,000</td>
<td>✔️</td>
</tr>
<tr>
<td>Counters, Double-Sided</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
<tr>
<td>Counters, Translucent (red, yellow, blue, green)</td>
<td>1 pack of 200</td>
<td>✔️</td>
</tr>
<tr>
<td>Counting Sticks</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
<tr>
<td>Dice, Blank</td>
<td>1 pack of 16</td>
<td>✔️</td>
</tr>
<tr>
<td>Dice, Dot</td>
<td>2 packs of 12</td>
<td>✔️</td>
</tr>
<tr>
<td>Dice, Polyhedral</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
<tr>
<td>Dice, 10-Sided, numbered 1-10</td>
<td>25 dice</td>
<td>✔️</td>
</tr>
<tr>
<td>Dominos, Double-9</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
<tr>
<td>Everything Math Deck</td>
<td>15 decks</td>
<td>✔️</td>
</tr>
<tr>
<td>Fraction Circle Pieces</td>
<td>25 sets</td>
<td>✔️</td>
</tr>
<tr>
<td>Geoboard, Two-Sided, 7&quot; by 7&quot;</td>
<td>8 geoboards</td>
<td>✔️</td>
</tr>
<tr>
<td>Marker Boards</td>
<td>25 boards</td>
<td>✔️</td>
</tr>
<tr>
<td>Medicine Dropper, 1 mL</td>
<td>12 droppers</td>
<td>✔️</td>
</tr>
<tr>
<td>Metersticks, Dual Scale</td>
<td>2 packs of 10</td>
<td>✔️</td>
</tr>
<tr>
<td>Number Line, -35 to 180</td>
<td>1 number line (in 3 parts)</td>
<td>✔️</td>
</tr>
<tr>
<td>Pattern Blocks</td>
<td>2 sets of 250</td>
<td>✔️</td>
</tr>
<tr>
<td>Play Money Bill Set</td>
<td>$1 Bills: 1 pack of 350 bills; $10 Bills: 1 pack of 150 bills</td>
<td>✔️</td>
</tr>
<tr>
<td>Quick Look Cards</td>
<td>1 set Equal Groups; 1 set Fractions</td>
<td>✔️</td>
</tr>
<tr>
<td>Rocker (Pan) Balance</td>
<td>1 balance</td>
<td>✔️</td>
</tr>
<tr>
<td>Rubber Bands</td>
<td>1 pack of 400</td>
<td>✔️</td>
</tr>
<tr>
<td>Ruler, 12 in.</td>
<td>5 packs of 5 rulers</td>
<td>✔️</td>
</tr>
<tr>
<td>Standard Metric Masses</td>
<td>1 set</td>
<td>✔️</td>
</tr>
<tr>
<td>Straws</td>
<td>1 pack of 500</td>
<td>✔️</td>
</tr>
<tr>
<td>Tape Measure, Retractable</td>
<td>15 tape measures</td>
<td>✔️</td>
</tr>
<tr>
<td>Thermometer, Classroom</td>
<td>Not in kit</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Clear Pathway to Mastery

You can be confident your students are progressing toward mastery of every standard because Everyday Mathematics provides detailed information about the learning trajectories for each standard as well as expectations for mastery at every step of the way.

Unpack

<table>
<thead>
<tr>
<th>Standards for Mathematical Content</th>
<th>Everyday Mathematics Goals for Mathematical Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cluster</strong> Write and interpret numerical expressions.</td>
<td><strong>GMC</strong> Write numerical expressions that contain grouping symbols.</td>
</tr>
<tr>
<td><strong>5.OA.1</strong> Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.</td>
<td><strong>GMC</strong> Write numerical expressions that contain grouping symbols.</td>
</tr>
<tr>
<td><strong>5.OA.2</strong> Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as 2 × (8 + 7). Recognize that 3 × (1893 + 921) is three times as large as 1893 + 921, without having to calculate the indicated sum or product.</td>
<td><strong>GMC</strong> Model real-world and mathematical situations using simple expressions. Evaluate numerical expressions without evaluating them.</td>
</tr>
<tr>
<td><strong>Cluster</strong> Analyze patterns and relationships.</td>
<td><strong>GMC</strong> Generate numerical patterns using given rules. Identify relationships between corresponding terms of two patterns.</td>
</tr>
<tr>
<td><strong>5.OA.3</strong> Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.</td>
<td><strong>GMC</strong> Generate numerical patterns using given rules. Identify relationships between corresponding terms of two patterns. Form ordered pairs from corresponding terms of patterns and graph them.</td>
</tr>
</tbody>
</table>

Goals for Mathematical Practice

The authors created Goals for Mathematical Practice (GMP) that unpack the practice standards, operationalizing them in ways that are appropriate for elementary students. See pages EM6–EM9 for a full view of the practice standards and the related GMPs.

Goals for Mathematical Content

The Everyday Mathematics authors developed Goals for Mathematical Content (GMC) that break down each content standard to provide detailed information about the learning trajectories required to meet the full standard. See pages EM3–EM5 for a full view of the content standards and the related GMCs.
**Track**

*Everyday Mathematics* provides the tools you need to easily monitor your students’ progress toward mastery.

**Visible Learning Trajectories**

Get a full picture of how each standard develops across a unit—and the entire grade.

---

**Spiral Towards Mastery**

The *Everyday Mathematics* curriculum is built on the spiral, where standards are introduced, developed, and mastered in multiple exposures across the grade. Go to the Teacher Center at my.mheducation.com to use the Spiral Tracker.

---

**Operations and Algebraic Thinking**

Each unit organizer contains a view of the progression of the standards in the unit across recent and upcoming lessons.

Using the online Spiral Tracker you can see how each standard progresses across the grade.

---

**Master**

Unit organizers include mastery expectation statements that provide guidance about what you should expect your students to know by the end of the unit and to help you make decisions about differentiation and groupings.

**Progress Towards Mastery**

By the end of Unit 2, expect students to write expressions to model situations which no more than two operations are involved; reason about the relative value of simple expressions without evaluating them.

**Full Mastery of 5.OA.2** expected by the end of Unit 8.

---

The Mastery Expectations charts starting on page xi provide a full picture of how every standard develops across the entire grade.
## Correlation to the Standards for Mathematics

*Everyday Mathematics* is a standards-based curriculum engineered to focus on specific mathematical content in every lesson and activity. The chart below shows complete coverage of each mathematics standard in the core program throughout the grade level.

*Bold lesson numbers indicate that content from the standard is taught in the Focus part of the lesson. Lesson numbers not in bold indicate that content from the standard is addressed in the Warm Up or Practice part of the lesson. The second set of lesson numbers, which are in parentheses, indicate that content from the standard is being addressed in Home Links or Math Boxes.

### Content Standards for Mathematics for Grade 3

<table>
<thead>
<tr>
<th>Operations and Algebraic Thinking</th>
<th>3.OA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.OA.1</strong> Interpret products of whole numbers, e.g., interpret $5 \times 7$ as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as $5 \times 7$.</td>
<td>1-8, 1-10, 1-12, 1-13, 2-6, 2-7, 3-9, 3-10, 3-11, 3-12, 3-13, 4-2, 4-5, 5-4, 5-6, 5-9, 5-11, 6-3, 6-4, 7-2, 9-1</td>
</tr>
<tr>
<td><em>(1-11, 2-1, 2-2, 2-3, 2-4, 2-10, 2-12, 3-2, 3-4, 3-5, 3-7, 4-1, 4-3, 4-4, 4-7, 4-9, 5-5, 5-7, 8-3)</em></td>
<td></td>
</tr>
<tr>
<td><strong>3.OA.2</strong> Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.</td>
<td>1-9, 2-7, 2-8, 2-9, 2-10, 2-12, 3-10, 4-1, 4-10, 5-10, 6-2, 6-6, 7-3, 7-12, 8-2, 8-4, 8-6, 9-6</td>
</tr>
<tr>
<td><em>(1-11, 2-5, 3-1, 3-2, 3-3, 3-6, 3-8, 3-13, 4-6, 4-8, 4-11, 5-1, 5-3, 5-8, 6-9, 6-11, 7-1, 7-9, 8-2, 9-1, 9-3)</em></td>
<td></td>
</tr>
<tr>
<td><strong>3.OA.3</strong> Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</td>
<td>1-2, 1-8, 1-9, 1-10, 2-5, 2-6, 2-7, 2-8, 2-9, 2-10, 2-11, 3-8, 3-9, 3-10, 3-11, 3-12, 4-1, 4-5, 4-8, 4-10, 5-4, 5-5, 5-10, 5-11, 6-2, 6-4, 6-6, 6-7, 7-2, 7-3, 8-2, 8-3, 8-4, 8-6, 9-2, 9-3, 9-5</td>
</tr>
<tr>
<td><em>(1-11, 1-13, 2-1, 2-2, 2-3, 2-4, 2-12, 3-1, 3-3, 3-4, 3-5, 3-6, 3-7, 3-13, 4-2, 4-4, 4-11, 6-5, 6-7, 6-9, 6-11, 7-1, 7-4, 7-5, 7-7, 7-9, 9-1)</em></td>
<td></td>
</tr>
<tr>
<td><strong>3.OA.4</strong> Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = ? + 3$, $6 \times 6 = ?$.</td>
<td>2-7, 2-8, 3-1, 3-12, 5-4, 5-6, 5-8, 6-1, 6-4, 6-6, 6-7, 6-9, 7-3, 8-2, 8-3, 8-4, 8-5, 8-7, 9-1, 9-2, 9-3, 9-4</td>
</tr>
<tr>
<td><em>(2-9, 3-5, 3-7, 3-9, 4-1, 4-3, 4-7, 6-2, 6-3, 6-9, 6-10, 6-11, 7-1, 7-2, 7-4, 7-9, 7-10, 7-12, 8-1, 8-6, 9-5, 9-6, 9-7)</em></td>
<td></td>
</tr>
</tbody>
</table>

### Understand properties of multiplication and the relationship between multiplication and division.

<table>
<thead>
<tr>
<th>3.OA.5</th>
<th>Apply properties of operations as strategies to multiply and divide.2 Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find $8 \times 7$ as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8, 1-10, 3-11, 3-12, 5-4, 5-5, 5-6, 5-9, 5-11, 6-3, 6-7, 8-3, 9-3, 9-5</td>
<td></td>
</tr>
<tr>
<td><em>(3-5, 3-7, 4-1, 4-2, 4-3, 4-4, 4-5, 4-7, 4-9, 5-7, 6-2, 6-4, 6-9, 6-11, 7-1, 7-2, 7-3, 7-4, 7-12, 8-1, 8-4, 8-7)</em></td>
<td></td>
</tr>
<tr>
<td><strong>3.OA.6</strong> Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes $32$ when multiplied by $8$.</td>
<td></td>
</tr>
<tr>
<td>1-9, 1-10, 4-5, 5-6, 5-8, 6-1, 6-2, 6-6, 6-9, 7-3, 8-2, 8-3, 8-5, 8-7, 9-1, 9-2, 9-4</td>
<td></td>
</tr>
<tr>
<td><em>(2-1, 2-3, 3-6, 3-8, 4-1, 4-3, 6-4, 6-10, 6-11, 7-5, 7-7, 8-8, 9-5, 9-7)</em></td>
<td></td>
</tr>
</tbody>
</table>

---

1See Glossary, Table 2.
2Students need not use formal terms for these properties.
Content Standards for Mathematics for Grade 3

### Multiply and divide within 100.

**3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

| 1-1, 1-5, 1-8, 1-9, 1-10, 1-11, 1-12, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 2-9, 2-10, 2-11, 2-12, 3-1, 3-2, 3-3, 3-4, 3-5, 3-8, 3-9, 3-10, 3-11, 3-12, 3-13, 4-1, 4-2, 4-3, 4-4, 4-5, 4-7, 4-9, 4-10, 4-11, 4-12, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, 6-10, 6-11, 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7, 7-8, 7-9, 7-10, 7-11, 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, 9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7 |

### Solve problems involving the four operations, and identify and explain patterns in arithmetic.

**3.OA.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

| 2-2, 2-3, 2-4, 2-5, 2-10, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 3-9, 4-12, 5-4, 5-10, 6-1, 6-7, 6-8, 6-9, 6-10, 6-11, 7-1, 7-2, 9-1, 9-7 |

**3.OA.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

| 2-6, 3-10, 5-4, 5-5, 5-6, 5-7, 5-9, 6-7, 9-3, 9-5 |

### Number and Operations in Base Ten

**3.NBT** Use place value understanding and properties of operations to perform multi-digit arithmetic.

**3.NBT.1** Use place value understanding to round whole numbers to the nearest 10 or 100.

| 1-4, 1-7, 1-13, 2-4, 2-3, 2-3, 3-4, 3-5, 3-6, 4-2, 4-5, 4-6, 4-8, 4-11, 7-4 |

**3.NBT.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

| 1-1, 1-2, 1-3, 1-4, 1-7, 1-8, 1-10, 1-13, 2-1, 2-2, 2-3, 2-4, 2-5, 2-10, 2-11, 2-12, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-13, 4-1, 4-3, 4-6, 4-7, 4-9, 5-1, 5-4, 5-5, 5-6, 5-7, 5-9, 6-1, 6-8, 6-10, 6-11, 7-1, 7-2, 7-3, 7-4, 7-6, 7-12, 8-2, 9-1, 9-5, 9-6, 9-7 |

**3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

| 1-9, 4-7, 7-2, 7-3, 8-2, 8-3, 8-5, 9-2, 9-3, 9-4, 9-5, 9-7 |

Pathway to Mastery xxxiii
### Content Standards for Mathematics for Grade 3

<table>
<thead>
<tr>
<th><strong>Everyday Mathematics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 3 Lessons</strong></td>
</tr>
<tr>
<td><strong>3.NF.2</strong> Understand a fraction as a number on the number line; represent fractions on a number line diagram.</td>
</tr>
<tr>
<td><strong>3.NF.2a</strong> Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.</td>
</tr>
<tr>
<td><strong>3.NF.2b</strong> Represent a fraction a/b on a number line diagram by marking off a lengths b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.</td>
</tr>
<tr>
<td><strong>3.NF.3</strong> Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</td>
</tr>
<tr>
<td><strong>3.NF.3a</strong> Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</td>
</tr>
<tr>
<td><strong>3.NF.3b</strong> Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.</td>
</tr>
<tr>
<td><strong>3.NF.3c</strong> Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.</td>
</tr>
<tr>
<td><strong>3.NF.3d</strong> Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols &gt;, =, or &lt;, and justify the conclusions, e.g., by using a visual fraction model.</td>
</tr>
</tbody>
</table>

### Measurement and Data  3.MD

**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**

<table>
<thead>
<tr>
<th><strong>Everyday Mathematics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 3 Lessons</strong></td>
</tr>
<tr>
<td><strong>3.MD.1</strong> Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.</td>
</tr>
<tr>
<td><strong>3.MD.2</strong> Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.</td>
</tr>
</tbody>
</table>

### Represent and interpret data.

<table>
<thead>
<tr>
<th><strong>Everyday Mathematics</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 3 Lessons</strong></td>
</tr>
<tr>
<td><strong>3.MD.3</strong> Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</td>
</tr>
<tr>
<td><strong>3.MD.4</strong> Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.</td>
</tr>
</tbody>
</table>

---

4Excludes compound units such as cm3 and finding the geometric volume of a container.
5Excludes multiplicative comparison problems (problems involving notions of “times as much”; see Glossary, Table 2).

Pathway to Mastery
## Content Standards for Mathematics for Grade 3

**Everyday Mathematics**

**Grade 3 Lessons**

### Geometric measurement: Understand concepts of area and relate area to multiplication and to addition.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.MD.5</td>
<td>Recognize area as an attribute of plane figures and understand concepts of area measurement.</td>
<td>2-12, 3-7, 4-7, 4-8, 4-9, 4-10, 4-12, 5-3, 5-11, 7-10 (3-11, 5-1, 5-2, 5-6, 5-10)</td>
</tr>
<tr>
<td>3.MD.5a</td>
<td>A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.</td>
<td>2-12, 3-7, 4-7, 4-8, 4-10, 4-12, 5-3 (3-11, 4-9, 5-1, 5-2, 5-6, 5-10)</td>
</tr>
<tr>
<td>3.MD.5b</td>
<td>A plane figure which can be covered without gaps or overlaps by ( n ) unit squares is said to have an area of ( n ) square units.</td>
<td>2-12, 3-7, 4-7, 4-8, 4-9, 4-10, 5-3, 7-10 (3-11, 4-12, 5-1, 5-2, 5-6, 5-10)</td>
</tr>
<tr>
<td>3.MD.6</td>
<td>Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).</td>
<td>2-12, 3-7, 4-7, 4-8, 4-9, 4-10, 5-1 (3-11, 5-3)</td>
</tr>
<tr>
<td>3.MD.7</td>
<td>Relate area to the operations of multiplication and addition.</td>
<td>3-7, 4-7, 4-8, 4-9, 4-10, 4-11, 4-12, 5-1, 5-3, 5-4, 5-5, 5-6, 5-11, 7-10, 8-7, 9-1, 9-5 (5-2, 5-9, 5-10, 6-1, 6-2, 6-3, 6-4, 6-6, 6-10, 7-1, 7-2, 7-3, 7-4)</td>
</tr>
<tr>
<td>3.MD.7a</td>
<td>Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.</td>
<td>3-7, 4-7, 4-8, 4-9, 4-10, 4-11, 4-12, 5-1, 5-3, 5-4, 5-5, 5-6, 5-11, 7-10, 8-3, 8-7, 9-1, 9-5 (5-2, 5-9, 5-10, 6-1, 6-2, 6-3, 6-4, 6-6, 6-10, 7-1, 7-2, 7-3, 7-4)</td>
</tr>
<tr>
<td>3.MD.7b</td>
<td>Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.</td>
<td>4-9, 4-10, 4-11, 4-12, 5-1, 5-4, 5-5, 5-6, 5-11, 7-10, 8-7, 9-1, 9-5 (5-3, 5-9, 5-10, 6-1, 6-2, 6-3, 6-4, 6-6, 6-10, 7-1, 7-2, 7-3, 7-4)</td>
</tr>
<tr>
<td>3.MD.7c</td>
<td>Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths ( a ) and ( b + c ) is the sum of ( a \times b ) and ( a \times c ). Use area models to represent the distributive property in mathematical reasoning.</td>
<td>5-5, 5-6, 5-11, 8-3, 9-5 (7-1, 7-3)</td>
</tr>
<tr>
<td>3.MD.7d</td>
<td>Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.</td>
<td>4-12, 5-5, 5-6, 5-11, 9-1, 9-5 (4-9, 5-2, 5-4, 5-9, 6-6, 6-10, 7-2, 7-4)</td>
</tr>
</tbody>
</table>

### Geometric measurement: Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.MD.8</td>
<td>Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.</td>
<td>4-3, 4-6, 4-7, 4-8, 4-10, 4-11, 5-1, 5-11, 6-5, 7-10, 9-1 (4-12, 5-3, 5-5, 5-6, 5-7, 5-10, 6-1, 6-3, 6-6, 6-10, 8-2, 8-6)</td>
</tr>
</tbody>
</table>

### Geometry 3.G

**Reason with shapes and their attributes.**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.G.1</td>
<td>Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.</td>
<td>1-3, 4-4, 4-5, 4-6, 6-5, 6-8, 8-8, 9-4 (1-6, 1-8, 2-10, 2-12, 3-11, 4-8, 4-10, 4-11, 4-12, 5-1, 5-2, 5-3, 5-4, 5-5, 5-7, 5-9, 5-11, 6-1, 6-6, 6-7, 6-10, 7-9, 8-5, 9-2, 9-6)</td>
</tr>
<tr>
<td>3.G.2</td>
<td>Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.</td>
<td>1-12, 2-9, 3-7, 5-1, 7-4, 7-10, 7-11, 8-5, 8-7, 9-4 (2-5, 2-7, 2-10, 2-12, 3-2, 3-4, 3-11, 4-9, 5-3, 5-5, 5-7, 6-5, 6-7, 6-8, 7-6, 8-3)</td>
</tr>
</tbody>
</table>
Correlation to the Mathematical Processes and Practices

*Everyday Mathematics* is a standards-based curriculum engineered to focus on specific mathematical content, processes, and practices in every lesson and activity. The chart below shows complete coverage of each mathematical process and practice in the core program throughout the grade level.

|--------------------------------------|---------------------------------------------------------------------|

**2. Reason abstractly and quantitatively.**

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
**Mathematical Processes and Practices**

**3. Construct viable arguments and critique the reasoning of others.**

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

**Everyday Mathematics Goals for Mathematical Processes and Practices**


**4. Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.
### Mathematical Processes and Practices

<table>
<thead>
<tr>
<th>7. Look for and make use of structure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see $7 \times 8$ equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the $14$ as $2 \times 7$ and the $9$ as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as $5$ minus a positive number times a square and use that to realize that its value cannot be more than $5$ for any real numbers $x$ and $y$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. Look for and express regularity in repeated reasoning.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing $25$ by $11$ that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through $(1, 2)$ with slope $3$, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process and practice, while attending to the details. They continually evaluate the reasonableness of their intermediate results.</td>
</tr>
</tbody>
</table>

### Everyday Mathematics Goals for Mathematical Processes and Practices


| Pages 81, 82, 83, 155, 157, 159, 184, 186, 221, 222, 223, 224, 279, 281, 282, 283, 345, 471, 480, 482, 485, 551, 554, 566, 577, 585, 586, 657, 663, 674, 675, 679, 680, 681, 682, 683, 685, 686, 746, 747, 748, 762, 776, 777, 808, 810 |

Pathway to Mastery xxxix
Mastery Expectations

In Third Grade, *Everyday Mathematics* focuses on procedures, concepts, and applications in four critical areas:

- Understanding of multiplication and division and strategies within 100.
- Understanding of fractions, especially unit fractions.
- Understanding of the structure of rectangular arrays and of area.
- Describing and analyzing two-dimensional shapes.

<table>
<thead>
<tr>
<th>Standards</th>
<th>First Quarter Benchmark Expectations for Units 1 and 2</th>
<th>Second Quarter Benchmark Expectations for Units 3 and 4</th>
<th>Third Quarter Benchmark Expectations for Units 5 and 6</th>
<th>Fourth Quarter Benchmark Expectations for Units 7 through 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.OA.1</td>
<td>Represent multiplication as equal groups with concrete objects and drawings.</td>
<td>Represent multiplication as equal groups with arrays.</td>
<td>Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.</td>
<td>Ongoing practice and application.</td>
</tr>
<tr>
<td>3.OA.2</td>
<td>Equally share groups of concrete objects. Represent equal shares with drawings.</td>
<td>Represent equal shares with drawings and number models.</td>
<td>Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.</td>
<td>Ongoing practice and application.</td>
</tr>
<tr>
<td>3.OA.3</td>
<td>Use skip counting, repeated addition, or multiplication to solve number stories involving equal groups.</td>
<td>Use multiplication or division to solve number stories involving equal groups or equal shares.</td>
<td>Use multiplication and division to solve number stories. Model number stories involving multiplication.</td>
<td>Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</td>
</tr>
</tbody>
</table>
### Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>First Quarter Benchmark Expectations for Units 1 and 2</th>
<th>Second Quarter Benchmark Expectations for Units 3 and 4</th>
<th>Third Quarter Benchmark Expectations for Units 5 and 6</th>
<th>Fourth Quarter Benchmark Expectations for Units 7 through 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.OA.4</td>
<td>Use fact triangles to generate fact families.</td>
<td>Determine the unknown product or factor in multiplication and division equations involving 1s, 2s, 5s, and 10s facts.</td>
<td>Determine the unknown product or factor in multiplication and division equations involving square products, and 0s, 1s, 2s, 3s, 5s, 9s, and 10s facts.</td>
<td>★ Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 \times _\ = 3$, $6 \times 6 = ?$.</td>
</tr>
<tr>
<td>3.OA.5</td>
<td>No expectations for mastery at this point.</td>
<td>Illustrate the “turn-around rule” (Commutative Property of Multiplication) with arrays and facts.</td>
<td>Use strategies such as adding/subtracting a group, near squares, and doubling to multiply and divide.</td>
<td>★ Apply properties of operations as strategies to multiply and divide. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find $8 \times 7$ as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)</td>
</tr>
<tr>
<td>3.OA.6</td>
<td>No expectations for mastery at this point.</td>
<td>Use multiplication to determine the unknown factor in division equations involving 1s, 2s, 5s, and 10s facts.</td>
<td>Use multiplication to determine the unknown factor in division equations involving 1s, 2s, 5s, 10s, square products, and 0s, 3s, and 9s facts.</td>
<td>★ Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.</td>
</tr>
<tr>
<td>3.OA.7</td>
<td>No expectations for mastery at this point.</td>
<td>Know all products of one-digit numbers $\times 1$, $\times 2$, $\times 5$, and $\times 10$.</td>
<td>Know all square products of one-digit numbers. Know all products of one-digit numbers $\times 0$, $\times 1$, $\times 2$, $\times 3$, $\times 5$, $\times 9$, and $\times 10$.</td>
<td>★ Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.</td>
</tr>
</tbody>
</table>

---

Instruction concludes for this standard during this quarter (but the standard may be revisited for review, practice, or application to promote long-term retention, applications, generalization, and transfer).

★ Mastery expected during this quarter.
<table>
<thead>
<tr>
<th>Standards</th>
<th>First Quarter Benchmark Expectations for Units 1 and 2</th>
<th>Second Quarter Benchmark Expectations for Units 3 and 4</th>
<th>Third Quarter Benchmark Expectations for Units 5 and 6</th>
<th>Fourth Quarter Benchmark Expectations for Units 7 through 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.OA.8</td>
<td>Use drawings, diagrams, and estimates to explain why answers to number stories involving addition and subtraction are reasonable. Use pictures, words, or numbers to solve 2-step number stories involving addition and subtraction.</td>
<td>Use mental computation and estimation strategies, including rounding, to determine whether answers to addition and subtraction problems are reasonable. Represent problems using equations with a ? standing for the unknown quantity.</td>
<td>Solve 2-step number stories using two of the four operations.</td>
<td>★ Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</td>
</tr>
<tr>
<td>3.OA.9</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Use the multiplication table to help identify whether products of 2 even factors, 2 odd factors, and 1 even and 1 odd factor are even or odd. Use doubling as a strategy to solve multiplication facts.</td>
<td>★ Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.</td>
</tr>
<tr>
<td>3.NBT.1</td>
<td>Use open number lines to round 2-digit numbers to the nearest 10 and 3-digit numbers to the nearest 100.</td>
<td>★ Use place value understanding to round whole numbers to the nearest 10 or 100.</td>
<td>Ongoing practice and application.</td>
<td></td>
</tr>
<tr>
<td>3.NBT.2</td>
<td>Add and subtract within 1000 using tools along with strategies based on place value and/or the relationship between addition and subtraction.</td>
<td>Add and subtract within 1000 using partial-sums addition, and counting-up and expand-and-trade subtraction, or other strategies.</td>
<td>Fluently add within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction; fluently subtract within 1000 using counting up, expand and trade, trade first, or other strategies.</td>
<td>★ Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.</td>
</tr>
<tr>
<td>3.NBT.3</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>★ Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.</td>
</tr>
<tr>
<td>Standards</td>
<td>First Quarter Benchmark Expectations for Units 1 and 2</td>
<td>Second Quarter Benchmark Expectations for Units 3 and 4</td>
<td>Third Quarter Benchmark Expectations for Units 5 and 6</td>
<td>Fourth Quarter Benchmark Expectations for Units 7 through 9</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>3.NF.1</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Identify and represent given unit ( \frac{1}{b} ) and non-unit ( \frac{a}{b} ) fractions using pictures, words, and fraction circles.</td>
<td>★ Understand a fraction ( \frac{1}{b} ) as the quantity formed by 1 part when a whole is partitioned into ( b ) equal parts; understand a fraction ( \frac{a}{b} ) as the quantity formed by ( a ) parts of size ( \frac{1}{b} ).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.NF.2; 3NF.2a</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>★ Understand a fraction as a number on the number line; represent fractions on a number line diagram. Represent a fraction ( \frac{1}{b} ) on a number line diagram by defining the interval from ( 0 ) to ( 1 ) as the whole and partitioning it into ( b ) equal parts. Recognize that each part has size ( \frac{1}{b} ) and that the endpoint of the part based at ( 0 ) locates the number ( \frac{1}{b} ) on the number line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.NF.2; 3NF.2b</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>★ Understand a fraction as a number on the number line; represent fractions on a number line diagram. Represent a fraction ( \frac{a}{b} ) on a number line diagram by marking off ( a ) lengths ( \frac{1}{b} ) from ( 0 ). Recognize that the resulting interval has size ( \frac{a}{b} ) and that its endpoint locates the number ( \frac{a}{b} ) on the number line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.NF.3; 3NF.3a</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Use fraction circle pieces to determine that equivalent fractions are the same size.</td>
<td>★ Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</td>
</tr>
</tbody>
</table>

* Instruction concludes for this standard during this quarter (but the standard may be revisited for review, practice, or application to promote long-term retention, applications, generalization, and transfer).

* Mastery expected during this quarter.
<table>
<thead>
<tr>
<th>Standards</th>
<th>First Quarter</th>
<th>Second Quarter</th>
<th>Third Quarter</th>
<th>Fourth Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.NF.3; 3.NF.3b</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Use fraction circle pieces to generate simple equivalent fractions</td>
<td>★ Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Recognize and generate simple equivalent fractions, e.g., ( \frac{1}{2} = \frac{2}{4}, \frac{4}{6} = \frac{2}{3} ). Explain why the fractions are equivalent, e.g., by using a visual fraction model.</td>
</tr>
<tr>
<td>3.NF.3; 3.NF.3c</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>★ Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. <em>Examples:</em> Express 3 in the form ( \frac{3}{1} ); recognize that ( \frac{6}{1} = 6 ); locate ( \frac{4}{4} ) and 1 at the same point of a number line diagram.</td>
</tr>
<tr>
<td>3.NF.3; 3.NF.3d</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Use tools, such as fraction circle pieces, to justify the conclusions of fraction comparisons.</td>
<td>★ Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols &gt;, =, or &lt;, and justify the conclusions, e.g., by using a visual fraction model.</td>
</tr>
<tr>
<td>3.MD.1</td>
<td>Tell and write time to the nearest 5 minutes. Use open number lines, toolkit clocks, or other tools to add time intervals in minutes.</td>
<td>Use open number lines, toolkit clocks, or other strategies to solve problems and number stories involving time intervals in minutes.</td>
<td>Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.</td>
<td>★ Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.</td>
</tr>
<tr>
<td>Standards</td>
<td>First Quarter</td>
<td>Second Quarter</td>
<td>Third Quarter</td>
<td>Fourth Quarter</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------</td>
<td>----------------</td>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>3.MD.2</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Estimate the mass of objects by comparing benchmark masses to the masses of various items. Use addition and subtraction to solve one-step number stories about mass.</td>
<td>Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.</td>
</tr>
<tr>
<td>3.MD.3</td>
<td>Use information in a given scaled bar graph to solve one-step “how many more” and “how many less” problems.</td>
<td>Represent a data set with several categories on a given scaled bar graph and use the information presented in the graph to solve one-step “how many more” and “how many less” problems.</td>
<td>Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</td>
<td>Ongoing practice and application.</td>
</tr>
<tr>
<td>3.MD.4</td>
<td>Measure lengths to the nearest inch using rulers marked with whole and half inches.</td>
<td>Measure lengths to the nearest half-inch using rulers marked with wholes, halves, and fourths of an inch. Represent length data on a line plot where the horizontal scale is marked off in whole numbers and halves.</td>
<td>Measure lengths to the nearest half-inch using rulers marked with wholes, halves, and fourths of an inch. Represent length data on a line plot where the horizontal scale is marked off in whole numbers and halves.</td>
<td>Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.</td>
</tr>
<tr>
<td>3.MD.5; 3.MD.5a</td>
<td>No expectations for mastery at this point.</td>
<td>Recognize area as an attribute of plane figures.</td>
<td>Recognize area as an attribute of plane figures and understand concepts of area measurement. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.</td>
<td>Ongoing practice and application.</td>
</tr>
</tbody>
</table>

Instruction concludes for this standard during this quarter (but the standard may be revisited for review, practice, or application to promote long-term retention, applications, generalization, and transfer).

Mastery expected during this quarter.
<table>
<thead>
<tr>
<th>Standards</th>
<th>First Quarter Benchmark Expectations for Units 1 and 2</th>
<th>Second Quarter Benchmark Expectations for Units 3 and 4</th>
<th>Third Quarter Benchmark Expectations for Units 5 and 6</th>
<th>Fourth Quarter Benchmark Expectations for Units 7 through 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.MD.5; 3.MD.5b</strong></td>
<td>No expectations for mastery at this point.</td>
<td>Recognize area as an attribute of plane figures.</td>
<td></td>
<td>Ongoing practice and application.</td>
</tr>
<tr>
<td><strong>3.MD.6</strong></td>
<td>No expectations for mastery at this point.</td>
<td>Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).</td>
<td></td>
<td>Ongoing practice and application.</td>
</tr>
<tr>
<td><strong>3.MD.7; 3.MD.7a</strong></td>
<td>No expectations for mastery at this point.</td>
<td>Find the area of a rectangle with whole-number side lengths by tiling it.</td>
<td>Relate area to the operations of multiplication and addition.</td>
<td>No expectations for mastery at this point.</td>
</tr>
<tr>
<td><strong>3.MD.7; 3.MD.7b</strong></td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Multiply side lengths to find areas of rectangles.</td>
<td>Relate area to the operations of multiplication and addition.</td>
</tr>
<tr>
<td><strong>3.MD.7; 3.MD.7c</strong></td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Explain how a given area model, fully labeled, with a side length decomposed into 2 addends can be used to solve a multiplication problem.</td>
<td>Relate area to the operations of multiplication and addition. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.</td>
</tr>
<tr>
<td>Standards</td>
<td>First Quarter Benchmark Expectations for Units 1 and 2</td>
<td>Second Quarter Benchmark Expectations for Units 3 and 4</td>
<td>Third Quarter Benchmark Expectations for Units 5 and 6</td>
<td>Fourth Quarter Benchmark Expectations for Units 7 through 9</td>
</tr>
<tr>
<td>-----------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>3.MD.7; 3.MD.7d</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>★ Relate area to the operations of multiplication and addition. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.</td>
</tr>
<tr>
<td>3.MD.8</td>
<td>No expectations for mastery at this point.</td>
<td>Solve problems involving perimeters of polygons.</td>
<td>Distinguish between area and perimeter.</td>
<td>★ Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.</td>
</tr>
<tr>
<td>3.G.1</td>
<td>No expectations for mastery at this point.</td>
<td>No expectations for mastery at this point.</td>
<td>Understand that shapes in different categories may share attributes that can define a larger category. Recognize specified subcategories of quadrilaterals.</td>
<td>★ Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.</td>
</tr>
<tr>
<td>3.G.2</td>
<td>No expectations of mastery at this point.</td>
<td>Partition rectangles into parts with equal areas.</td>
<td>★ Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.</td>
<td>Ongoing practice and application.</td>
</tr>
</tbody>
</table>

Instruction concludes for this standard during this quarter (but the standard may be revisited for review, practice, or application to promote long-term retention, applications, generalization, and transfer).

★ Mastery expected during this quarter.
Contents

Getting Ready to Teach
Third Grade Everyday Mathematics

Focus

In Unit 1, children recall how to use a variety of math tools to solve problems, tell time to the nearest minute, and calculate elapsed time. Children also obtain a foundation for developing multiplication and division strategies.

Major Clusters
3.OA.A Represent and solve problems involving multiplication and division.
3.MD.A Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

Supporting Cluster
3.NBT.A Use place value understanding and properties of operations to perform multi-digit arithmetic.

Unit 1 Math Tools, Time, and Multiplication 2

| 1-1 | Number Grids | 14 |
| 1-2 | Introducing the Student Reference Book | 20 |
| 1-3 | Tools for Mathematics | 26 |
| 1-4 | Number Lines and Rounding | 32 |
| 1-5 | Time | 40 |
| 1-6 | Open Response | How Long is a Morning? | 48 |
| 1-7 | Scaled Bar Graphs | 58 |
| 1-8 | Multiplication Strategies | 64 |
| 1-9 | Introducing Division | 72 |
| 1-10 | Foundational Multiplication Facts | 78 |
| 1-11 | The Length-of-Day Project | 86 |
| 1-12 | Explorations | Exploring Mass, Equal Shares, and Equal Groups | 92 |
| 1-13 | Measuring Mass | 98 |
| 1-14 | Assessment | Unit 1 Progress Check | 104 |
In Unit 2, children make sense of one- and two-step number stories involving all four arithmetic operations. They also represent situations with diagrams, arrays, pictures, words, and number models.

**Major Clusters**

- **3.OA.A** Represent and solve problems involving multiplication and division.
- **3.OA.D** Solve problems involving the four operations, and identify and explain patterns in arithmetic.

**Supporting Cluster**

- **3.NBT.A** Use place value understanding and properties of operations to perform multi-digit arithmetic.

---

**Unit 2 Number Stories and Arrays**

- **2-1** Extended Facts: Addition and Subtraction ........................................ 124
- **2-2** Number Stories .............................................................................. 130
- **2-3** More Number Stories ................................................................. 136
- **2-4** Multistep Number Stories, Part 1 .................................................. 142
- **2-5** Multistep Number Stories, Part 2 .................................................. 148
- **2-6** Equal Groups .............................................................................. 154
- **2-7** Multiplication Arrays .................................................................. 160
- **2-8** Open Response Picturing Division ............................................... 166
- **2-9** Modeling Division ..................................................................... 176
- **2-10** Playing Division Arrays ........................................................... 182
- **2-11** Frames and Arrows .................................................................. 188
- **2-12** Explorations Exploring Fraction Circles, Liquid Volume, and Area . 194
- **2-13** Assessment Unit 2 Progress Check ........................................... 200

---

**Unit 3 Operations**

- **3-1** “What’s My Rule?” .................................................................. 220
- **3-2** Open Response Connecting Fractions and Division, Part 2 .......... 226
- **3-3** Partial-Sums Addition ................................................................ 236
- **3-4** Column Addition ...................................................................... 242
- **3-5** Counting-Up Subtraction .......................................................... 248
- **3-6** Expand-and-Trade Subtraction ................................................... 254
- **3-7** Explorations Exploring Bar Graphs, Area, and Partitioning Rectangles . 260
- **3-8** Scaled Picture Graphs ................................................................. 266
- **3-9** Exploring Multiplication Squares ............................................... 272
- **3-10** The Commutative Property of Multiplication .............................. 278
- **3-11** Adding a Group ..................................................................... 284
- **3-12** Subtracting a Group ............................................................... 292
- **3-13** Equivalent Names .................................................................. 298
- **3-14** Assessment Unit 3 Progress Check ......................................... 304
Focus

In Unit 4, children measure to an inch and represent measurement data on a scaled line plot. They also explore geometric attributes of polygons and classify quadrilaterals. They identify and measure the perimeters of polygons and distinguish between perimeter and area.

Major Clusters

3.MD.A Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

3.MD.C Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Supporting Clusters

3.MD.B Represent and interpret data.

3.MD.D Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.


Focus

In Unit 5, children relate their part-whole understanding of fractions to visual and symbolic representations and begin to explore fraction equivalence. They also develop multiplication fact strategies.

Major Clusters

3.OA.C Multiply and divide within 100.

3.NF.A Develop understanding of fractions as numbers.

3.MD.C Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Unit 4 Measurement and Geometry

4-1 Measuring with a Ruler .................................................. 324
4-2 Application: Line Plots .................................................. 330
4-3 Explorations Exploring Measures of Distance and Comparisons of Mass .................................................. 336
4-4 Polygon Review .................................................. 342
4-5 Special Quadrilaterals .................................................. 348
4-6 Perimeter .................................................. 354
4-7 Area and Perimeter .................................................. 360
4-8 Area and Composite Units .................................................. 368
4-9 Number Sentences for Area of Rectangles .................................................. 374
4-10 Playing The Area and Perimeter Game .................................................. 380
4-11 Open Response Building a Rabbit Pen .................................................. 386
4-12 Rectilinear Figures .................................................. 396
4-13 Assessment Unit 4 Progress Check .................................................. 402

Unit 5 Fractions and Multiplication Strategies

5-1 Explorations Exploring Equal Parts, Fractions of Different Wholes, and Area .................................................. 444
5-2 Representing Fractions .................................................. 450
5-3 Equivalent Fractions .................................................. 458
5-4 Recognizing Helper Facts .................................................. 464
5-5 Multiplication Facts Strategies: Doubling, Part 1 .................................................. 470
5-6 Multiplication Facts Strategies: Doubling, Part 2 .................................................. 478
5-7 Patterns in Products .................................................. 484
5-8 Finding Missing Factors .................................................. 490
5-9 Multiplication Facts Strategies: Near Squares .................................................. 496
5-10 Open Response Button Dolls: Solving a Number Story .................................................. 502
5-11 Multiplication Facts Strategies: Break-Apart Strategy .................................................. 512
5-12 Assessment Unit 5 Progress Check .................................................. 518
### Unit 6  More Operations  526

<table>
<thead>
<tr>
<th>6-1</th>
<th>Trade-First Subtraction</th>
<th>538</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-2</td>
<td>Playing <em>Baseball Multiplication</em></td>
<td>544</td>
</tr>
<tr>
<td>6-3</td>
<td>Taking Inventory of Known Facts Strategies</td>
<td>550</td>
</tr>
<tr>
<td>6-4</td>
<td>Fact Power and <em>Beat the Calculator</em></td>
<td>556</td>
</tr>
<tr>
<td>6-5</td>
<td>Explorations  Exploring Geometry Problems, Measurement Data, and Polygons</td>
<td>562</td>
</tr>
<tr>
<td>6-6</td>
<td>Multiplication and Division Diagrams</td>
<td>568</td>
</tr>
<tr>
<td>6-7</td>
<td>Multiplication with Larger Factors</td>
<td>576</td>
</tr>
<tr>
<td>6-8</td>
<td>Number Sentences with Parentheses</td>
<td>582</td>
</tr>
<tr>
<td>6-9</td>
<td>Open Response  Writing Number Stories</td>
<td>588</td>
</tr>
<tr>
<td>6-10</td>
<td>Order of Operations</td>
<td>598</td>
</tr>
<tr>
<td>6-11</td>
<td>Number Models for Two-Step Number Stories</td>
<td>604</td>
</tr>
<tr>
<td>6-12</td>
<td>Assessment  Unit 6 Progress Check</td>
<td>612</td>
</tr>
</tbody>
</table>

### Unit 7  Fractions  622

<table>
<thead>
<tr>
<th>7-1</th>
<th>Liquid Volume</th>
<th>634</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-2</td>
<td>Explorations  Exploring Arrays, Volume, and Equal Shares</td>
<td>640</td>
</tr>
<tr>
<td>7-3</td>
<td>Number Stories with Measures</td>
<td>646</td>
</tr>
<tr>
<td>7-4</td>
<td>Fraction Strips</td>
<td>652</td>
</tr>
<tr>
<td>7-5</td>
<td>Fractions on a Number Line, Part 1</td>
<td>658</td>
</tr>
<tr>
<td>7-6</td>
<td>Fractions on a Number Line, Part 2</td>
<td>664</td>
</tr>
<tr>
<td>7-7</td>
<td>Comparing Fractions</td>
<td>672</td>
</tr>
<tr>
<td>7-8</td>
<td>Open Response  Finding Rules for Comparing Fractions</td>
<td>678</td>
</tr>
<tr>
<td>7-9</td>
<td>Locating Fractions on Number Lines</td>
<td>688</td>
</tr>
<tr>
<td>7-10</td>
<td>Justifying Fraction Comparisons</td>
<td>694</td>
</tr>
<tr>
<td>7-11</td>
<td>Fractions in Number Stories</td>
<td>700</td>
</tr>
<tr>
<td>7-12</td>
<td>Fractions of Collections</td>
<td>706</td>
</tr>
<tr>
<td>7-13</td>
<td>Assessment  Unit 7 Progress Check</td>
<td>712</td>
</tr>
</tbody>
</table>

**Focus**

In **Unit 6**, children compare different approaches to solving the same problem and reflect on the strategies. They are also introduced to the order of operations.

**Major Clusters**

- **3.OA.B** Understand properties of multiplication and the relationship between multiplication and division.
- **3.OA.C** Multiply and divide within 100.
- **3.OA.D** Solve problems involving the four operations, and identify and explain patterns in arithmetic.

**Supporting Cluster**

- **3.NBT.A** Use place value understanding and properties of operations to perform multi-digit arithmetic.

**Focus**

In **Unit 7**, children revisit volume measurement and focus on comparing, estimating, and then measuring liquid volumes. They continued to develop an understanding of fractions as numbers by exploring a new area fraction model and fractions as representations of distances on number lines.

**Major Clusters**

- **3.NF.A** Develop understanding of fractions as numbers.
- **3.MD.A** Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects.

**Supporting Cluster**

Focus

In Unit 8, children deepen and apply their understanding of multiplication, division, measurement, and attributes of shapes.

Major Clusters
3.OA.A Represent and solve problems involving multiplication and division.
3.OA.C Multiply and divide within 100.

Supporting Clusters
3.MD.B Represent and interpret data.

Unit 8 Multiplication and Division
8-1 Measuring to the Nearest \(\frac{1}{4}\) Inch ................................................. 732
8-2 Extended Facts: Multiplication and Division .................................................. 738
8-3 Factors of Counting Numbers ................................................................. 744
8-4 Open Response Setting Up Chairs ........................................................... 750
8-5 Playing Factor Bingo .......................................................... 760
8-6 Sharing Money .......................................................... 766
8-7 Explorations Exploring Number Lines, Fractions, and Area .......................... 772
8-8 Solid Shapes .......................................................... 778
8-9 Assessment Unit 8 Progress Check .......................................................... 784

Focus

In Unit 9, children apply basic fact knowledge to mentally solve number stories and multiply larger factors. They also interpret length-of-day data and work to calculate elapsed time more efficiently.

Major Clusters
3.OA.B Understand properties of multiplication and the relationship between multiplication and division.
3.OA.C Multiply and divide within 100.
3.MD.A Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects.

Supporting Cluster
3.NBT.A Use place value understanding and properties of operations to perform multi-digit arithmetic.

Unit 9 Multidigit Operations
9-1 Playing Product Pile-Up .......................................................... 806
9-2 Multiply and Divide with Multiples of 10 .................................................. 812
9-3 Using Mental Math to Multiply ............................................................. 818
9-4 Explorations Exploring Elapsed Time, Squares, and Bridges .......................... 824
9-5 Multidigit Multiplication .......................................................... 832
9-6 Open Response Packing Apples ........................................................... 838
9-7 The Length-of-Day Project, Revisited .................................................... 848
9-8 Assessment Unit 9 Progress Check .......................................................... 854

Contents
# Unit 2 Organizer

## Number Stories and Arrays

### Contents

<table>
<thead>
<tr>
<th>Lesson and Overview</th>
<th>Page</th>
<th>Content Standards</th>
<th>Processes and Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2-1</strong> Extended Facts: Addition and Subtraction</td>
<td>124</td>
<td>3.NBT.2</td>
<td>SMP6, SMP7</td>
</tr>
<tr>
<td>Children use basic addition and subtraction facts to solve problems with larger numbers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-2</strong> Number Stories</td>
<td>130</td>
<td>3.OA.8, 3.NBT.2</td>
<td>SMP1</td>
</tr>
<tr>
<td>Children use diagrams or pictures to help solve number stories.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-3</strong> More Number Stories</td>
<td>136</td>
<td>3.OA.8, 3.NBT.2</td>
<td>SMP1</td>
</tr>
<tr>
<td>Children use situation diagrams and other representations to help solve number stories.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-4</strong> Multistep Number Stories, Part 1</td>
<td>142</td>
<td>3.OA.7, 3.OA.8, 3.NBT.2</td>
<td>SMP1, SMP4, SMP6</td>
</tr>
<tr>
<td>Children make sense of and solve two-step number stories.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-5</strong> Multistep Number Stories, Part 2</td>
<td>148</td>
<td>3.OA.3, 3.OA.7, 3.OA.8, 3.NBT.2</td>
<td>SMP1, SMP4</td>
</tr>
<tr>
<td>Children solve number stories using two operations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-6</strong> Equal Groups</td>
<td>154</td>
<td>3.OA.1, 3.OA.3, 3.OA.5, 3.OA.7</td>
<td>SMP1, SMP6, SMP8</td>
</tr>
<tr>
<td>Children solve problems involving multiples of equal groups and make sense of multiplying by 0 and 1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-7</strong> Multiplication Arrays</td>
<td>160</td>
<td>3.OA.1, 3.OA.2, 3.OA.3, 3.OA.4, 3.OA.7</td>
<td>SMP2, SMP3, SMP4</td>
</tr>
<tr>
<td>Children solve array problems and play Array Bingo.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-8</strong> Open Response Picturing Division</td>
<td>166</td>
<td>3.OA.2, 3.OA.3, 3.OA.4</td>
<td>SMP1, SMP2</td>
</tr>
<tr>
<td><strong>2-Day Lesson</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 1: Children create mathematical representations for solving division problems.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2: Children discuss representations and solutions, and then refine their work.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-9</strong> Modeling Division</td>
<td>176</td>
<td>3.OA.2, 3.OA.3, 3.OA.7, 3.NF.1, 3.G.2</td>
<td>SMP1, SMP2, SMP3</td>
</tr>
<tr>
<td>Children solve division number stories and learn about remainders.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-10</strong> Playing Division Arrays</td>
<td>182</td>
<td>3.OA.2, 3.OA.3, 3.OA.7</td>
<td>SMP2, SMP7, SMP6</td>
</tr>
<tr>
<td>Children explore even and odd number patterns and play Division Arrays.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-11</strong> Frames and Arrows</td>
<td>188</td>
<td>3.OA.7, 3.NBT.2</td>
<td>SMP3, SMP7</td>
</tr>
<tr>
<td>Children review Frames-and-Arrows diagrams and solve problems using the four operations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-12</strong> Explorations Exploring Fraction Circles, Liquid Volume, and Area</td>
<td>194</td>
<td>3.NF.1, 3.MD.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6</td>
<td>SMP3, SMP5, SMP6</td>
</tr>
<tr>
<td>Children explore fraction circles, area measures, and liquid volume in liters.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2-13</strong> Assessment Unit 2 Progress Check</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 1: Administer the Unit Assessments.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2: Administer the Cumulative Assessment.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The standards listed here are addressed in the **Focus** of each lesson. For all the standards in a lesson, see the Lesson Opener.*
## Focus

In this unit, children make sense of one- and two-step number stories involving all four arithmetic operations. They also represent situations with diagrams, arrays, pictures, words, and number models.

### Major Clusters

- **3.OA.A** Represent and solve problems involving multiplication and division.
- **3.OA.D** Solve problems involving the four operations, and identify and explain patterns in arithmetic.

### Supporting Cluster

- **3.NBT.A** Use place value understanding and properties of operations to perform multi-digit arithmetic.

### Process and Practice Standards

- **SMP1** Make sense of problems and persevere in solving them.
- **SMP2** Reason abstractly and quantitatively.

## Coherence

The table below describes how standards addressed in the Focus parts of the lessons link to the mathematics that children have done in the past and will do in the future.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Links to the Past</th>
<th>Links to the Future</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.OA.2</strong></td>
<td>In Grade 2, children partitioned shapes into equal shares and described the whole as two-halves, three-thirds, or four-fourths.</td>
<td>In Units 5, 6, and 7, children will make sense of and solve real-world and mathematical problems. Also, in Unit 7, children will equally share fractions of a collection. In Grade 4, children will extend the use of equal-sharing strategies to help develop an understanding of fraction equivalence. In Grade 5, children will interpret fraction and mixed-number quotients of whole numbers and will solve number stories that lead to quotients in the form of fractions or mixed numbers.</td>
</tr>
<tr>
<td><strong>3.OA.3</strong></td>
<td>In Unit 1, children used multiplication and division to solve number stories. In Grade 2, children used addition and subtraction to solve one- and two-step number stories, including those involving length. They solved number stories involving equal shares among two, three, and four people.</td>
<td>In Unit 6, children will be introduced to multiplication/division diagrams to make sense of and solve multiplication and division number stories. In Grade 4, children will solve word problems involving multiplicative comparisons by using drawings and equations.</td>
</tr>
<tr>
<td><strong>3.OA.7</strong></td>
<td>In Grade 2, children began early multiplication fact work by using addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns. They wrote an equation to express the total as a sum of equal addends. They connected equal groups to addition doubles facts and even numbers.</td>
<td>Throughout Grade 3, children will use strategies to fluently multiply and divide within 100. In Units 3 and 5, children will use array representations to develop strategies for solving multiplication facts. In Grade 4, children will extend their multiplication and division skills to solving multidigit problems. They will be introduced to algorithms for multiplication and division.</td>
</tr>
<tr>
<td><strong>3.NBT.2</strong></td>
<td>In Grade 2, children added and subtracted within 1,000 using concrete models or drawings, partial-sums addition, and expand-and-trade subtraction.</td>
<td>In Unit 3, children will be introduced to algorithms to solve addition and subtraction problems within 1,000. In Unit 6, children will use trade-first subtraction, parentheses, and order of operations to solve addition and subtraction problems within 1,000. In Grade 4, children will add and subtract multidigit whole numbers using the standard algorithm.</td>
</tr>
</tbody>
</table>
### Planning for Rich Math Instruction

**Unit 2 Organizer**

#### Extended Facts: Addition and Subtraction
- **Conceptual Understanding**
  - Extended facts
    - Extending Facts to Multiples of 10, pp. 126–127
    - Extending to Higher Decades, pp. 127
    - Extending Combinations of 10, pp. 128–129

- **Procedural Skill and Fluency**
  - Mental Math and Fluency, p. 126
  - Math Message, p. 126
  - Home Link 2-1, p. 129
  - Differentiation Options, p. 125

- **Applications**
  - Finding Elapsed Time, p. 129
  - Journal p. 34, #1, #3

- **Rich Tasks and Mathematical Reasoning**
  - Extending Facts to Multiples of 10, pp. 126–127
  - Extending to Higher Decades, p. 127
  - Extending Combinations of 10, pp. 128–129

- **Mathematical Discourse**
  - Summarize, p. 129
  - Enrichment, p. 125

- **Distributed Practices**
  - Mental Math and Fluency, p. 126
  - Math Message, p. 129
  - Finding Elapsed Time, p. 129
  - Math Boxes 2-1, p. 129

- **Differentiation Support**
  - Differentiation Options, p. 125
  - ELL Support, p. 125
  - Online Differentiation Support 2-1
  - Adjusting the Activity, p. 127
  - Common Misconception, p. 128

---

**Number Stories**

- **Conceptual Understanding**
  - Number stories
    - Using the Guide to Solving Number Stories, pp. 132–134

- **Procedural Skill and Fluency**
  - Mental Math and Fluency, p. 132
  - Math Message, p. 132
  - Home Link 2-3, p. 135
  - Differentiation Options, p. 131

- **Applications**
  - Journal p. 37, #5
  - Readiness, p. 131
  - Enrichment, p. 131

- **Rich Tasks and Mathematical Reasoning**
  - Organizing Number Story Information, pp. 138–139
  - Differentiation Options, p. 131

- **Mathematical Discourse**
  - Summarize, p. 132
  - Enrichment, p. 131

- **Distributed Practices**
  - Mental Math and Fluency, p. 132
  - Minute Math+, p. 135
  - Math Boxes 2-2, p. 135

- **Differentiation Support**
  - Differentiation Options, p. 131
  - ELL Support, p. 131
  - Online Differentiation Support 2-2

---

**More Number Stories**

- **Conceptual Understanding**
  - Number stories
    - Organizing Number Story Information, pp. 138–139

- **Procedural Skill and Fluency**
  - Mental Math and Fluency, p. 138
  - Math Message, p. 138
  - Home Link 2-3, p. 141
  - Readiness, p. 137

- **Applications**
  - Solving Number Stories, pp. 134–135
  - Enrichment, p. 137

- **Rich Tasks and Mathematical Reasoning**
  - Exploring Multistep Stories, pp. 145–146

- **Mathematical Discourse**
  - Summarize, p. 134
  - Extra Practice, p. 134

- **Distributed Practices**
  - Mental Math and Fluency, p. 144
  - Minute Math+, p. 147
  - Math Boxes 2-4, p. 147

- **Differentiation Support**
  - Differentiation Options, p. 143
  - ELL Support, p. 143
  - Online Differentiation Support 2-4

---

**Multistep Number Stories, Part 1**

- **Conceptual Understanding**
  - Number stories
    - Organizing Number Story Information, pp. 138–139

- **Procedural Skill and Fluency**
  - Mental Math and Fluency, p. 145
  - Math Message, p. 145
  - Solving Multistep Stories, pp. 146–147
  - Differentiation Options, p. 143

- **Applications**
  - Estimating Costs, pp. 144–145
  - Exploring Multistep Stories, pp. 145–146
  - Home Link 2-3, p. 141

- **Rich Tasks and Mathematical Reasoning**
  - Exploring Multistep Stories, pp. 145–146
  - Solving Multistep Stories, pp. 146–147

- **Mathematical Discourse**
  - Summarize, p. 144
  - Extra Practice, p. 143

- **Distributed Practices**
  - Mental Math and Fluency, p. 144
  - Minute Math+, p. 147
  - Rounding Numbers, p. 147
  - Math Boxes 2-4, p. 147

- **Differentiation Support**
  - Differentiation Options, p. 143
  - ELL Support, p. 143
  - Online Differentiation Support 2-4
  - Academic Language Development, p. 145
  - Common Misconception, p. 145
## Unit 2 Organizer

### 2-5 Multistep Number Stories, Part 2

- **Multistep number stories with two operations**
  - Using Number Models as Records, p. 151

### 2-6 Equal Groups

- **Equal groups**
  - Making Sense of Equal Groups, pp. 156-157
  - Multiplying by 0 and 1, pp. 157-158

### 2-7 Multiplication Arrays

- **Understanding multiplication**
  - Exploring Many Arrays, Same Total, pp. 162-163
  - Representing Number Stories with Arrays, pp. 163-164

### 2-8 Open Response

- **Picturing Division**

#### Conceptual Understanding

- **Mental Math and Fluency**
  - p. 150

- **Writing Number Models**
  - p. 153

- **Differentiation Options**
  - p. 149

#### RIGOR

- **Math Message**
  - p. 150

- **Using Number Models as Records**
  - p. 151

- **Math Message**
  - p. 156

- **Making Sense of Equal Groups**
  - pp. 156-157

- **FindingElapsed Time**
  - p. 159

- **Extra Practice**
  - p. 155

- **Introducing Array Bingo**
  - pp. 164-165

- **Extra Practice**
  - p. 161

- **Home Link 2-7**
  - p. 165

#### Procedural Skill and Fluency

- **Math Message**
  - p. 156

- **Making Sense of Equal Groups**
  - pp. 156-157

- **Finding Elapsed Time**
  - p. 159

- **Math Boxes 2-5**
  - p. 153

#### Applications

- **Math Message**
  - p. 156

- **Making Sense of Equal Groups**
  - pp. 156-157

- **Finding Elapsed Time**
  - p. 159

- **Math Boxes 2-5**
  - p. 153

- **Math Boxes 2-6**
  - p. 159

#### Rich Tasks and Mathematical Reasoning

- **Comparing Mathematical Representations**
  - pp. 167-169

- **Setting Expectations**
  - p. 173

- **Reengaging in the Problem**
  - p. 173

#### Mathematical Discourse

- **Mental Math and Fluency**
  - p. 150

- **Minute Math+**
  - p. 153

- **Playing Roll to 1.000**
  - p. 153

- **Math Boxes 2-5**
  - p. 153

- **Mental Math and Fluency**
  - p. 156

- **Minute Math+**
  - p. 159

- **Finding Elapsed Time**
  - p. 159

- **Math Boxes 2-6**
  - p. 159

#### Distributed Practice

- **Differentiation Options**
  - p. 149

- **Online Differentiation Support 2-5**
  - Academic Language Development, p. 151

- **Adjusting the Activity**
  - p. 151

- **Differentiation Options**
  - p. 155

- **ELL Support**
  - p. 155

- **Online Differentiation Support 2-6**
  - Academic Language Development, p. 156

- **Common Misconception**
  - p. 158

- **Differentiation Options**
  - p. 161

- **ELL Support**
  - p. 168

- **Common Misconception**
  - p. 169

### 2-Day Lesson Un it Organizer

- **Unit Organizer**

- **= Fact Work**

- **Red text = Game**

- **Unit Organizer**

- **= Fact Work**

- **Red text = Game**

- **Unit Organizer**

- **= Fact Work**

- **Red text = Game**

- **Unit Organizer**

- **= Fact Work**

- **Red text = Game**

- **Unit Organizer**

- **= Fact Work**

- **Red text = Game**
## Planning for Rich Math Instruction

### RIGOR

<table>
<thead>
<tr>
<th>Conceptual Understanding</th>
<th>Procedural Skill and Fluency</th>
<th>Applications</th>
<th>Rich Tasks and Mathematical Reasoning</th>
<th>Mathematical Discourse</th>
<th>Distributed Practice</th>
<th>Differentiation Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
<tr>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>Solving More Multistep Number Stories, pp. 187</td>
<td>Exploring Even and Odd with Arrays, pp. 184–185</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Introducing Division Arrays, pp. 185-186</td>
<td>■ Mental Math and Fluency, p. 190</td>
<td>Adjusting the Activity, p. 185</td>
</tr>
</tbody>
</table>

### 2-9 Modeling Division

- Understanding division
  - Modeling with Division, pp. 179–180

### 2-10 Playing Division Arrays

- Mental Math and Fluency, p. 178
- Math Message, p. 178
- Dividing to Solve Number Stories, pp. 180–181
- Home Link 2-9, p. 181

### 2-11 Frames and Arrows

- Math Message, p. 184
- Exploring Even and Odd with Arrays, pp. 184–185
- Solving More Multistep Number Stories, p. 187

### 2-12 Explorations

- Exploring Fraction Circles, Liquid Volume, and Area
  - Exploration A: Exploring Fraction Circles, p. 197
  - Exploration B: Measuring Area, p. 197

* ■ = Fact Work  Red text = Game
Lesson 2-13 is an assessment lesson. It includes:

- Self Assessment
- Unit Assessment
- Optional Challenge Assessment
- Cumulative Assessment
- Suggestions for adjusting the assessments.

Go Online:

**Evaluation Quick Entry**
Use this tool to record children’s performance on assessment tasks.

**Data**
Use the Data Dashboard to view children’s progress reports.
# Unit 2 Materials

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Math Masters</th>
<th>Activity Cards</th>
<th>Manipulative Kit</th>
<th>Other Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>pp. 45–47; TA14</td>
<td>base-10 blocks (optional); toolkit clock</td>
<td>slate; calculator; number grid; Class Data Pad (optional); demonstration clock</td>
<td></td>
</tr>
<tr>
<td>2-2</td>
<td>pp. 48–49; TA8; TA15–TA16; G6</td>
<td>19 number cards 1–10 (4 of each); blank die</td>
<td>slate</td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td>pp. 50–51; TA2; TA8; TA15–TA16; G6 (optional)</td>
<td>20–21 number cards 1–10 (4 of each) (optional); die labeled 2, 2, 5, 5, 10, 10 (optional)</td>
<td>slate; Fact Triangles; calculator</td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>pp. 52–54; TA2; TA15</td>
<td>22 number cards 0, 1, 2, 5, and 10 (4 of each)</td>
<td>slate</td>
<td></td>
</tr>
<tr>
<td>2-5</td>
<td>pp. 52; 55–56; G7</td>
<td>22 6-sided dice (2 per group); number cards 0, 1, 2, 5, and 10 (4 of each); counters; coins (optional)</td>
<td>slate</td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>pp. 57–58; TA8; TA11; TA12 (optional); TA15</td>
<td>23 Quick Look Cards 123, 124, 129; toolkit clock; counters</td>
<td>slate; scissors; envelope; paper clip; container of objects (optional)</td>
<td></td>
</tr>
<tr>
<td>2-7</td>
<td>pp. 59–60; TA17–TA19; TA20 (optional); G8</td>
<td>24–26 Quick Look Cards 131, 132, 133; counters (optional); number cards 1–20; centimeter cubes; 6-sided die; 10-sided die</td>
<td>5&quot; by 7&quot; index cards labeled with 1, 2, and 5; Fact Triangles</td>
<td></td>
</tr>
<tr>
<td>2-8</td>
<td>pp. 61–62; TA6</td>
<td>counters</td>
<td>slate; marker; stick-on notes (optional); colored pencils (optional); Guidelines for Discussion Poster; selected samples of children’s work; children’s work from Day 1</td>
<td></td>
</tr>
<tr>
<td>2-9</td>
<td>pp. 39; 63–65; TA20 (optional)</td>
<td>27–28 counters; pan balance; standard masses; 6-sided die</td>
<td>slate; Mass Museum items; pennies; stick-on notes; paper</td>
<td></td>
</tr>
<tr>
<td>2-10</td>
<td>pp. 64; 66–67; G9</td>
<td>28–29 Quick Look Cards 151, 154, 156; counters; number cards 6–18; 6-sided die; base-10 blocks</td>
<td>slate (optional); full sheets of paper; quarter-sheets of paper</td>
<td></td>
</tr>
<tr>
<td>2-11</td>
<td>pp. 68–71; TA21</td>
<td>30–31 number cards 1–9 (4 of each)</td>
<td>slate</td>
<td></td>
</tr>
<tr>
<td>2-12</td>
<td>pp. 72–74; TA19; TA22; G9</td>
<td>32–33 Everything Math Decks including number cards 6–18; counters; 6-sided die; centimeter cubes; fraction circles; 1-liter beaker</td>
<td>slate; rectangular items of various sizes; tape (optional); assorted containers; paper towels; dishpan; pitcher; empty, transparent 1-liter bottle; water; food coloring (optional)</td>
<td></td>
</tr>
<tr>
<td>2-13</td>
<td>pp. 75–78; Assessment Handbook, pp. 15–24</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Literature Link** Optional Book: *Each Orange Had 8 Slices: A Counting Book*  
*Go Online* for a complete literature list for Grade 3 and to download all Quick Look Cards.
Assessment Check-In

These ongoing assessments offer an opportunity to gauge children’s performance on one or more of the standards addressed in that lesson.

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Task Description</th>
<th>Content Standards</th>
<th>Processes and Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>Use basic facts to solve fact extensions.</td>
<td>3.NBT.2</td>
<td>SMP7</td>
</tr>
<tr>
<td>2-2</td>
<td>Solve number stories using question marks for the unknown.</td>
<td>3.NBT.2</td>
<td>SMP1</td>
</tr>
<tr>
<td>2-3</td>
<td>Solve number stories using question marks for the unknown.</td>
<td>3.OA.8, 3.NBT.2</td>
<td>SMP1</td>
</tr>
<tr>
<td>2-4</td>
<td>Solve multistep number stories.</td>
<td>3.OA.8</td>
<td>SMP4</td>
</tr>
<tr>
<td>2-5</td>
<td>Solve number stories using representations.</td>
<td>3.OA.8</td>
<td>SMP4</td>
</tr>
<tr>
<td>2-6</td>
<td>Solve equal-groups number stories.</td>
<td>3.OA.1, 3.OA.3</td>
<td>SMP6</td>
</tr>
<tr>
<td>2-7</td>
<td>Solve number stories using number models and arrays.</td>
<td>3.OA.1, 3.OA.3</td>
<td>SMP2</td>
</tr>
<tr>
<td>2-8</td>
<td>Create mathematical representations to solve problems.</td>
<td>3.OA.2, 3.OA.3</td>
<td>SMP2</td>
</tr>
<tr>
<td>2-9</td>
<td>Solve division number stories.</td>
<td>3.OA.2, 3.OA.3</td>
<td>SMP2</td>
</tr>
<tr>
<td>2-10</td>
<td>Create arrays to practice division with and without remainders.</td>
<td>3.OA.2</td>
<td>SMP2, SMP7</td>
</tr>
<tr>
<td>2-11</td>
<td>Use Frames-and-Arrows diagrams to solve problems.</td>
<td>3.OA.7, 3.NBT.2</td>
<td>SMP7</td>
</tr>
</tbody>
</table>

Virtual Learning Community
vlc.uchicago.edu

While planning your instruction for this unit, visit the Everyday Mathematics Virtual Learning Community. You can view videos of lessons in this unit, search for instructional resources shared by teachers, and ask questions of Everyday Mathematics authors and other educators. Some of the resources on the VLC related to this unit include:

**EM4: Grade 3 Unit 2 Planning Webinar**
This webinar provides a preview of the lessons and content in this unit. Watch this video with your grade-level colleagues and plan together under the guidance of an Everyday Mathematics author.

**Picturing Division: An Open Response and Reengagement Lesson**
Watch one classroom work through an Open Response and Reengagement lesson. Explore the introduction and reengagement in practice.

**Exploring Fraction Circle Pieces**
In this 4-clip series, watch third graders explore fraction circles in a small group, and then move on to use those manipulatives to answer questions in their journals.

For more resources, go to the VLC Resource page and search for Grade 3.
Spiral Towards Mastery

The *Everyday Mathematics* curriculum is built on the spiral, where standards are introduced, developed, and mastered in multiple exposures across the grade. Go to the Teacher Center at my.mheducation.com to use the Spiral Tracker.

**Spiral Towards Mastery Progress**  This Spiral Trace outlines instructional trajectories for key standards in Unit 2. For each standard, it highlights opportunities for Focus instruction, Warm Up and Practice activities, as well as formative and summative assessment. It describes the *degree of mastery*—as measured against the entire standard—expected at this point in the year.

### Operations and Algebraic Thinking

**3.OA.1**

- **Progress Towards Mastery**  By the end of Unit 2, expect children to interpret multiplication in terms of equal groups by drawing arrays or equal groups to match number stories.
  
  **Full Mastery of 3.OA.1**  expected by the end of Unit 5.

**3.OA.2**

- **Progress Towards Mastery**  By the end of Unit 2, expect children to use drawings to interpret whole-number quotients of whole numbers.
  
  **Full Mastery of 3.OA.2**  expected by the end of Unit 6.

**3.OA.3**

- **Progress Towards Mastery**  By the end of Unit 2, expect children to solve word problems in situations involving equal groups and arrays by using drawings, repeated addition, or skip counting to represent the problem.
  
  **Full Mastery of 3.OA.3**  expected by the end of Unit 9.
Progress Towards Mastery  By the end of Unit 2, expect children to fluently multiply using strategies for all products of 1-digit numbers and 1, 2, 5, and 10.

**Full Mastery of** 3.OA.7  expected by the end of Unit 9.

Progress Towards Mastery  By the end of Unit 2, expect children to make sense of and represent two-step number stories involving addition and subtraction.

**Full Mastery of** 3.OA.8  expected by the end of Unit 9.

**Number and Operations in Base Ten**

Progress Towards Mastery  By the end of Unit 2, expect children to add and subtract within 1,000 using tools along with strategies based on place value and/or the relationship between addition and subtraction.

**Full Mastery of** 3.NBT.2  expected by the end of Unit 8.
Mathematical Background:
Content

> Number Stories and Situation Diagrams
(Lessons 2-2 through 2-10)

*Everyday Mathematics* approaches the four basic operations of arithmetic by examining how they are used in various situations. Most of these situations can be sorted into a handful of categories called *use classes*. For each use class, *Everyday Mathematics* suggests a situation diagram to organize the information in simple one-step problems and help children write number models that represent the problems.

Children should be allowed to use problem-solving methods that best fit their needs. Not all will need situation diagrams to organize their problem solving. Keep in mind that more than one diagram may fit a given situation, and that most problems can be solved in more than one way. Some problems, however, may not easily fit into any diagram.

**Addition and Subtraction Use Classes** In *Everyday Mathematics*, there are three basic use classes for addition and subtraction: *parts and total*, *change*, and *comparison* (See margin). Each can be solved using either addition or subtraction, depending on the unknowns. 3.NBT.2 Children were introduced to corresponding situation diagrams in first and second grades and review them in Lessons 2-2 and 2-3.

**Multiplication and Division Use Classes** There are several multiplication and division use classes. In this unit, children solve *equal-groups* and *arrays* number story problems. Each type of situation can involve either multiplication or division, depending on the unknowns. As children first made sense of equal-groups and equal-sharing stories in Unit 1, they used a variety of representations and invented their own strategies to solve problems. 3.OA.1, 3.OA.2, 3.OA.3 In Unit 2, children examine those strategies and adopt more efficient strategies such as skip counting or repeated addition.

In an *equal-groups* situation, there are several groups of objects with the same number of objects in each group. When the numbers of groups and objects in each group are known, you can solve the problem by multiplying. 3.OA.1 Equal groups situations in which the total number of objects are known are called *equal-grouping* (unknown number of groups) and *equal-sharing* (unknown number of objects in each group) problems. You can solve an equal-grouping or equal-sharing problem by dividing or thinking of it as multiplication with an unknown factor. 3.OA.2, 3.OA.4

---

### Standards and Goals for Mathematical Content

Because the standards within each strand can be broad, *Everyday Mathematics* has unpacked each standard into Goals for Mathematical Content (GMC). For a complete list of Standards and Goals, see page EM1.

---

### Partial and Total Diagrams

<table>
<thead>
<tr>
<th>Start</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>-5</td>
<td>9</td>
</tr>
</tbody>
</table>

A change diagram for 14 \(-\) 5 = 9

### Quantity

<table>
<thead>
<tr>
<th>Quantity</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

A comparison diagram for 12 = 9 + ?
**Unit 2 Organizer**

**Unit 2 Vocabulary**
- area
- array
- arrow rule
- change diagram
- combinations of ten
- comparison diagram
- dividend
- division
- efficient
- equal groups
- equation
- fact extensions
- factors
- fraction
- fraction circles
- frames
- Frames and Arrows
- liter
- multiples
- number model
- number sentence
- parts-and-total diagram
- product
- quotient
- remainder
- representation
- square centimeter (sq cm)
- square inch (sq in.)
- unknown
- volume
- whole

**Number Stories and Situation Diagrams** Continued

You share 12 blocks so that each friend gets 3 blocks. How many people get 3 blocks?

**Equal-grouping Problem**

12 blocks are shared among 3 friends so that each friend gets an equal number of blocks. How many blocks does each friend get?

**Equal-sharing Problem**

**Array** situations are equal-groups situations in which either factor can be thought of as the “number of groups” or the “number of objects in each group.” If equal groups are arranged in rows and columns, they form a rectangular array. As with equal-groups situations, array problems can be solved using either multiplication or division.

Note that because of the Commutative Property of Multiplication, the factors in multiplication can be interchanged without affecting the product. For example, an array with 4 rows of 6 chairs has exactly the same number as an array of 6 rows with 4 chairs in each row. However, the difference may be important within the context of the number story. The convention is for the dimensions of an array to be named as “rows” by “columns,” in that order. Reminding children of this convention will help the class communicate more effectively about how they solve array problems.

Exposing children to a wide variety of number-story situations, and changing which quantity within the stories is unknown, helps them learn to be flexible problem solvers. Children are not expected to distinguish between equal-grouping and equal-sharing situations; the classifications are a tool you can use to help ensure variety and present children with options.

**Two-step or Multistep Number Stories** The standards and *Everyday Mathematics* use the term **two-step number stories** as shorthand for number stories that can be solved by using two arithmetic operations. In Lessons 2-4 and 2-5, children solve number stories and model them with number sentences. The stories may be solved through direct modeling, counting, or by one or several calculations, and do not have to be solved in two steps. Some children will represent their strategies with one number model with several operations, while others write a others write a separate number model for each step. The Guide to Solving Number Stories provides support as they solve complex number stories without limiting children to a rigid set of problem-solving steps. Children will revisit two-step number stories throughout third grade. Through continued practice, children will make better sense of the problems they face and become more efficient at solving them.
Unit 2 Organizer

Professional Development

- **Number Stories and Situation Diagrams Continued**
  Note that *Everyday Mathematics* uses the term *number model* specifically to mean number sentences, expressions, or equations that model number stories or other real-world situations. When number sentences are presented outside the contexts of number stories, they are not called *number models*. *Number sentence* (introduced in Lesson 2-7) and *equation* (introduced in Lesson 2-3) are also used, but children are not expected to distinguish the difference between these terms. Similarly, children do not need to understand the term *expression*.

- **Remainders (Lessons 2-9 and 2-10)**
  In the equal-sharing number stories in Lesson 2-9, children are introduced to problems with remainders. *3.OA.2, 3.OA.3* They reason about the different ways to handle the "leftovers." Number stories that provide a real-world context for equal sharing of collections or objects help children develop a fundamental understanding of division. Most early exposures will be in contexts for which whole-number remainders make sense. Number stories with contexts where it makes sense to further divide the remainders will be gradually introduced. This will support children as they learn fractions and apply their understanding of fractions and fraction notation later in the year. In Lesson 2-10 children learn to model division with and without remainders during the *Division Arrays* game. They identify even and odd number patterns in arithmetic and build their understanding of factors, remainders, and divisibility. *3.OA.9*

- **Number Patterns (Lesson 2-11)**
  *Everyday Mathematics* uses Frames-and-Arrows diagrams across grades to represent number sequences. Each frame contains a number forming the sequence, and each arrow represents a rule (called an *arrow rule*) that may involve one or more arithmetic operations. *3.OA.7, 3.NBT.2* The rule determines which number goes in the next frame. (See margin.) Children apply rules to determine missing frames and interpret number patterns to figure out missing rules. *SMP7, SMP8* Frames-and-Arrows diagrams help develop children's abilities to determine patterns and rules and reinforce connections between operations.

- **Introducing Fractions (Lesson 2-12)**
  Children use fraction circles to develop an understanding of the "whole" and of unit fractions as equal parts of that whole. *3.NF.1* Many children see the red circle as the only fraction circle that can be the "whole." To avoid this common misconception, Exploration A in Lesson 2-12 specifically has children using different shapes to represent the whole. While exploring relative sizes of shapes, children learn that the name of a fractional part is linked with the size of the whole, that is, the same physical object can be both one-quarter of a circle and also one-half of a semicircle. *3.NF.1*
Mathematical Background: Process and Practice

See below for some of the ways that children engage in SMP1 Make sense of problems and persevere in solving them and SMP2 Reason abstractly and quantitatively through Operations and Algebraic Thinking and the other mathematical content of Unit 2.

- **Standard for Mathematical Process and Practice 1**

  In *Everyday Mathematics*, problem solving is broadly conceived and permeates the entire curriculum. Children consider problems both in purely mathematical contexts and in real-world situations from the classroom and everyday life.

  A key step in solving problems is to make sense of the problem. **GMP1.1** To do this, children must have *number sense*, or a feeling for where numbers come from and what they mean. They must also have *operations sense*, or a feeling for what addition, subtraction, multiplication, and division do. Children use the Guide to Solving Number Stories, introduced in Lesson 2-2, as they work through complex problems. **GMP1.2**

  Allow children time to make sense of problems and persevere to find strategies that work best. They will develop a deeper understanding of various mathematical processes and practices when asked to reflect and strategize rather than merely repeat the steps of a rigidly prescribed procedure. **GMP1.2**

  Children develop a wider variety of problem-solving strategies when they are given the opportunity to share their ideas with their peers. Children should feel comfortable sharing their strategies, regardless whether their solutions are correct or incorrect, and their reasoning for why their solutions make sense. **GMP1.4** Emphasize that everyone makes mistakes, and that we can learn from those mistakes. Encourage children to compare and contrast strategies and to find advantages and disadvantages of each. **GMP1.6**

- **Standard for Mathematical Process and Practice 2**

  When children “make sense of quantities and their relationships in problem situations,” they are better able to create mathematical representations. **GMP2.1** *Everyday Mathematics* focuses on four types of representations: concrete, verbal, pictorial, and symbolic. (See margin) Double-headed arrows connect each kind of representation with each of the other kinds. Children and adults are likely to use all of these representations at one time or another, depending on the situation.

  Representations are closely related to solution strategies; translating a problem into another representation is often a key to solving it. In the Open Response Problem in Lesson 2-8, children find ways to represent an equal-grouping problem. Some children will draw a picture or an array, some might use counters, and some may write a number model to represent the situation. As you discuss problems and solutions with children, compare their representations. Ask: How are these representations similar? How are they different? Do both representations fit the story? Can we use another representation to solve this problem? **GMP2.2** Encouraging multiple representations and connecting them helps children develop into more powerful problem solvers.
Multiplication Arrays

Overview: Children solve array problems and play Array Bingo.

Before You Begin
For Part 1, select and sequence Quick Look Cards 131, 132, and 133. For Part 2 Math Message, display and label a 2-by-5 array to remind children what an array looks like. You will need one set each per partnership of Array Bingo Cards cut from Math Masters, page G8 (see Planning Ahead in Lesson 2-4) and number cards 1–20.

Vocabulary
array • number sentence • factors • product

1 Warm Up 5–10 min

Mental Math and Fluency
Children practice Quick Looks with equal groups and arrays.

Materials
Quick Look Cards 131, 132, and 133

Standards
3.OA.1, 3.OA.7
SMP2, SMP6

2 Focus 45-50 min

Math Message
Children find multiple arrays for 24.

Materials
Math Masters, p. TA17; counters (optional)

Standards
3.OA.2, 3.OA.3

Exploring Many Arrays, Same Total
Children discuss how to find all possible arrays for a product.

Materials
Math Masters, p. TA17; counters (optional)

Standards
3.OA.1, 3.OA.3
SMP3, SMP4

Representing Number Stories with Arrays
Children draw arrays to represent number stories.

Materials
Math Journal 1, p. 48; Math Masters, p. TA18 and p. TA20 (optional); counters (optional)

Standards
3.OA.1, 3.OA.3, 3.OA.4
SMP2, SMP4

Assessment Check-In
See page 164.

Expect most children to create arrays and number models that fit the number stories.

Introducing Array Bingo Game
Children practice multiplication with arrays and equal groups.

Materials
Student Reference Book, pp. 232 and 233; Math Masters, p.G8; number cards 1–20

Standards
3.OA.1, 3.OA.7
SMP2

3 Practice 10-15 min

Minute Math+
Children practice mental math strategies.

Materials
Minute Math®+

Standards

Math Boxes 2-7
Children practice and maintain skills.

Materials
Math Journal 1, p. 49

Standards
See page 165.

Home Link 2-7
Homework
Children practice representing array situations.

Materials
Math Masters, p. 60

Standards
3.OA.1, 3.OA.3
SMP4

Go Online to see how mastery develops for all standards within the grade.
Differentiation Options

<table>
<thead>
<tr>
<th>Readiness</th>
<th>10–15 min</th>
<th>Enrichment</th>
<th>10–15 min</th>
<th>Extra Practice</th>
<th>5–15 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOLE CLASS</td>
<td>SMALL GROUP</td>
<td>PARTNER</td>
<td>INDEPENDENT</td>
<td>WHOLE CLASS</td>
<td>SMALL GROUP</td>
</tr>
</tbody>
</table>

### Building Arrays

**3.OA.1, SMP 5**

Activity Card 24; Math Masters, pp. 59 and TA19; 6-sided die; centimeter cubes

To provide experience with multiplication, have children build arrays with centimeter cubes. Have partners record the arrays on Math Masters, page TA19 and fill in the Building Arrays Record Sheet on Math Masters, page 59. Then have children discuss how building arrays can help them learn multiplication facts. **GMP 5.2**

### Building and Predicting with Arrays

**3.OA.1, SMP 7**

Activity Card 25; centimeter cubes; 5” by 7” index cards labeled with 1, 2, and 5; 10-sided die

To further explore arrays, have children build arrays for 1s, 2s, or 5s facts with centimeter cubes. Have them write number models, look for patterns, and predict the next array. Then have children build additional arrays to check their predictions and discuss the patterns they notice. **GMP 7.1**

---

**English Language Learner**

**Beginning ELL** Help children describe nonverbally how they saw the dots on the Quick Look Cards. Show them how to use up-and-down gestures for *column*, side-to-side gestures for *row*, and their fingers to show how many dots they saw in each row or column. Verbalize children’s nonverbal accounts with short statements, and then have them revoice your statements using *as* they point to themselves. For example: *You saw three rows going across.* “I saw three rows going across.” *You saw three dots in each row.* “I saw three dots in each row.”

---

**Differentiation Support** pages are found in the online Teacher’s Center.

---

Lesson 2-7 161
Standards and Goals for Mathematical Process and Practice

SMP2 Reason abstractly and quantitatively.
   GMP2.2 Make sense of the representations you and others use.

SMP3 Construct viable arguments and critique the reasoning of others.
   GMP3.1 Make mathematical conjectures and arguments.

SMP4 Model with mathematics.
   GMP4.1 Model real-world situations using graphs, drawings, tables, symbols, numbers, diagrams, and other representations.

1 Warm Up 5–10 min

Mental Math and Fluency

Show Quick Look Cards 131, 132, and 133 one at a time for 2–3 seconds. Ask children to share both what they saw and how they saw it.

Quick Look Card 131  Sample answer: I saw 2 rows of 2, and that makes 4.
Quick Look Card 132  Sample answer: I saw 2 rows of 5, and 5 + 5 = 10.
Quick Look Card 133  Sample answer: I saw 3 rows of 3, and I know 3 + 3 = 6 and 6 + 3 = 9.

2 Focus 45–50 min

Math Message

Math Masters, p. TA17

Suppose there are 24 trombone players in a big parade. Find at least 3 different ways the players could arrange themselves into an array to march. Shade or draw Xs in the squares on your grid paper to record each array.

Exploring Many Arrays, Same Total

Math Masters, p. TA17

Adjusting the Activity

Differentiate  Children may benefit from using 24 counters to create their arrays before recording them for the Math Message. Some children may also require scaffolding to help them systematically explore the possibilities, such as trying an array with 1 row, 2 rows, and so on.

Math Message Follow-Up  Remind children that a rectangular array is an arrangement of objects in rows and columns. Have children display their arrays until the class is sure all the possibilities have been shown. As each array is discussed, have children suggest number models to match. Record the number models with the arrays.

The arrays are 4-by-6, 6-by-4, 3-by-8, 8-by-3, 2-by-12, 12-by-2, 1-by-24, and 24-by-1. The number models are 4 × 6 = 24, 6 × 4 = 24, 3 × 8 = 24, 8 × 3 = 24, 2 × 12 = 24, 12 × 2 = 24, 1 × 24 = 24, and 24 × 1 = 24.
Help children differentiate between the two possible arrays formed by a set of factors. For example, a 4-by-6 array would represent 4 rows of 6 players, while a 6-by-4 array would represent 6 rows of 4 players. (See margin.) Although both have the same number of players, these arrays would look different in a parade.

Remind children that the two numbers being multiplied together in each number sentence are called factors, and the resulting total is called the product. Support children in applying these ideas by asking the following:

• What factors did we find for 24? 1, 2, 3, 4, 6, 8, 12, 24 Point to them in the number models as you list them.
• What are some numbers that we have not used as factors of 24? Sample answers: 5, 7, 9
• Could those numbers work as factors of 24? Explain. Sample answer: No. I tried to use 5, but 5 rows of 4 gives me 20 with 4 left over. 5 rows of 5 is 25, so I would be one short.

Point out that if it is not possible to form a complete rectangle using a particular number of rows, then that number is not a factor of 24. Gesture to an array of 24 to emphasize the filled rows and columns, and trace around the rectangular border. Explain that today children will work with arrays to help them think about and solve multiplication problems.

► Representing Number Stories with Arrays

*Math Journal 1, p. 48; Math Masters, p. TA18*

Ask: What have we used so far to show our arrays? Sample answers: Dots, Xs, shading in squares on grid paper, counters Display the dot grids on Math Masters, page TA18 and model how to mark dots with an X to show the 3-by-8 array from the Math Message.

\[
\begin{array}{cccccccccccccccc}
\times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times & \times \\
\end{array}
\]

Pose the following number story: 3 boxes of crayons. 5 crayons in each box: how many crayons? 15 crayons

As children follow along, use Math Masters, page TA18 to model representing the number story in Problem 1 on journal page 48.

• Write the topic for the story. For example: crayons.
• Record a number model using a question mark to represent the unknown quantity. For example: \(3 \times 5 = ?\) or \(? = 3 \times 5\).
• Draw an array on a dot grid to model the story with 3 rows and 5 Xs in each row. Ask: What does our array show? It shows 3 rows with 5 in each row. How does it represent the story? GMP2.2, GMP4.1

The 3 rows represent 3 boxes of crayons. The 5 Xs in each row show 5 crayons in each box.

• Solve the problem and share solution strategies, for example, counting the rows by 5s. Be sure to include the unit in the answer.

• Discuss the reasonableness of the answer and whether it makes the number model true.

In a similar manner, have children use arrays to model and solve the following stories using journal page 48. GMP2.2, GMP4.1

• 6 fishbowls, 1 fish per bowl: how many fish? 6 fish
• 5 shelves of books, 8 books per shelf: how many books? 40 books
• 2 cartons of eggs, 12 eggs per carton: how many eggs? 24 eggs

Assessment Check-In 3.OA.1, 3.OA.3

Math Journal 1, page 48

Expect most children to create arrays and number models that fit the stories. If children have difficulty translating between equal groups and arrays, label the first row of the array as “group 1,” the second row as “group 2,” and so on. GMP2.2 If children have difficulty writing number models, remind them that the number of rows and the number of objects in each row in their arrays make up the factors. The total number of objects in their array is the product.

Evaluation Quick Entry Go online to record student progress and to see trajectories toward mastery for these standards.

Have children share their arrays, and help them recognize that arrays can represent equal-groups situations even when the real-life groups do not look like arrays. GMP2.2

Introducing Array Bingo

Student Reference Book, pp. 232 and 233; Math Masters, p. G8

To practice recognizing arrays as representations for multiplication facts, have children play Array Bingo. GMP2.2 (See Before You Begin.)

Read and discuss the rules on Student Reference Book, page 232 with the class. Play a few rounds together and have children share strategies for matching arrays and products. Refer them to the Fact Strategy Wall and discuss efficient strategies for figuring out the total number of dots in an array, such as skip counting, repeated addition, and recalling known multiplication facts.
Observe

• Do children correctly match products and arrays?
• Which arrays do children instantly recognize? Which are more difficult for them to match? **GMP2.2**

Discuss

• Which arrays do you recognize easily, or “just know”? 
• What strategies did you use to find the total dots in the arrays? Can you think of more efficient strategies you could use?

Summarize  Have children share their strategies for finding the total number of dots in the arrays in Array Bingo. Add new strategies to the Fact Strategy Wall.

3 Practice  10 - 15 min

▶ **Minute Math+**

To practice mental math strategies, select a **Minute Math+** activity.

▶ **Math Boxes 2-7**

* Math Journal 1, p. 49

<table>
<thead>
<tr>
<th>WHOLE CLASS</th>
<th>SMALL GROUP</th>
<th>PARTNER</th>
<th>INDEPENDENT</th>
</tr>
</thead>
</table>

**Mixed Practice**  Math Boxes 2-7 are paired with Math Boxes 2-5.

▶ **Home Link 2-7**

* Math Masters, p. 60

**Homework**  Children practice representing array situations, including finding several arrays for a given product. **GMP4.1**
Picturing Division

Overview

Day 1: Children create mathematical representations for solving division problems.
Day 2: Children discuss representations and solutions and then revise their work.

Day 1: Open Response

Before You Begin

Solve the open response problem and think about different ways children might represent their solutions. If possible, schedule time to review children’s work and plan for Day 2 of this lesson with your grade-level team.

Vocabulary

- division
- representation
- remainder

Warm Up

5 min

Mental Math and Fluency

Children do start-and-stop skip counting.

Materials

slate

Focus

55–65 min

Math Message

Children represent and solve an equal-sharing problem.

Comparing Mathematical Representations

Children compare their representations.

Solving the Open Response Problem

Children use representations to solve division problems.

Getting Ready for Day 2

Review children’s work and plan discussion for reengagement.

Focus Cluster

- Represent and solve problems involving multiplication and division.

Standards

- 3.OA.2
- 3.OA.3
- 3.OA.4
- SMP1
- SMP2

Go Online

to see how mastery develops for all standards within the grade.
Standards and Goals for Mathematical Process and Practice

SMP1  Make sense of problems and persevere in solving them.
GMP1.6  Compare the strategies you and others use.

SMP2  Reason abstractly and quantitatively.
GMP2.1  Create mathematical representations using numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects.
GMP2.2  Make sense of the representations you and others use.

Warm Up  5 min

Mental Math and Fluency
To support multiplication, have children do start-and-stop skip counting and record the next number on their slates. *Leveled exercises:*

- ○ ○  Skip count forward by 5s from 25 to 55. 60 Skip count back by 10s from 70 to 20. 10
- ○ ○  Skip count forward by 2s from 20 to 48. 50 Skip count back by 5s from 60 to 20. 15
- ○ ○ ○  Skip count forward by 2s from 46 to 66. 68 Skip count back by 2s from 46 to 28. 26

Focus  55–65 min

Math Message
*Math Journal 1, p. 50*

Complete journal page 50. Share your drawing with a partner.  GMP2.1

Comparing Mathematical Representations
*Math Journal 1, p. 50*

**Math Message Follow-Up**  Children’s strategies for solving the problem may include counting by 1s or 2s to equally share the pennies (for example, one for you and one for me). They may recognize that 14 has 2 equal parts of 7, or they may think of the multiplication or division fact and determine the missing factor (for example, 2 times what number is 14). Children’s representations of their strategies may vary as well. Have a few children with different representations draw and display them.  GMP2.1  Then have children make sense of and compare the different strategies and their representations. Representations may include:

- two groups of 7 tally marks
- an addition number model \(7 + 7 = ?\) or \(7 + 7 = 14\), multiplication number model \(2 \times ? = 14\) or \(2 \times 7 = 14\), or \text{division} number model \(14 \div 2 = ?\) or \(14 \div 2 = 7\)
• drawings such as two circles with 7 pennies in each or 14 pennies in a row with lines drawn to Leah and Matthew to show 7 pennies each, as shown in the margin
• an array with two equal rows of 7 dots or Xs, as shown in the margin
If an array is not among the representations shown, model an array as described above.

As a class, compare the different representations and make connections among them. GMP1.6 Ask:

• How is this picture or representation of the problem similar to another child’s? How is it different? Answers vary.

• How did you use the drawing (array, number model) to help you solve the problem? Sample answer: For my array, I made a row of dots for Matthew and a row for Leah. I took turns putting a dot in Matthew’s row and then Leah’s row until I counted 14 in all. There were 7 dots in each row.

• Does this representation match the problem? GMP2.2 How do you know? Sample answer: It shows two children and 14 pennies shared fairly between them, so it matches.

• How does this picture show that the pennies are shared equally? Sample answers: Leah and Matthew each have 7 pennies. The pennies are divided into two groups of 7.

Have children explain their equal-sharing strategies and encourage them to ask questions when they are unsure about others’ strategies.

**English Language Learners Support** Prior to the lesson, use counters to preview the vocabulary for situations involving sharing. Give Total Physical Response commands and ask short questions, such as: Pick up 8 counters. Divide the counters to share them equally between 2 people. How many did each person get? 4 counters Share the counters equally between 4 people. How many did each person get? 2 counters Pick up 7 counters. Divide the counters to share equally between 3 people. How many did each person get? 2 counters How many are left over? 1 counter
Explain that a **representation** includes the pictures, numbers, and words they use to solve the problem and communicate their thinking. Point to the representations displayed. Tell children they will continue to work on representing number story solutions.

**NOTE** The Math Message problem is an example of an equal-sharing problem. The number of groups and the total number of objects are known, and the number of objects in each group is to be found. The open response problem is an equal-grouping problem, which is another type of problem that can be solved using division. The number of objects per group and the total number of objects are known. The number of equal groups is to be found. It is important that children have experience with both types of problems, but they do not need to be able to distinguish between them.

### Solving the Open Response Problem

*Distribut Math Masters, p. 61*

| WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT |

Distribute *Math Masters*, page 61. Read each problem with the class and ask partners to briefly discuss what they know from each problem and what they need to find out. Emphasize that children should use representations to show how they solve the problems so someone else can understand their thinking. **GMP2.1** Make slates, markers, and counters available so children can act out the problem, but remind them to record drawings and words that describe their thinking on paper.

As children work, observe their strategies and ask them to explain the meaning of their drawings and words, even if it is clear to you. For children who finish quickly, encourage them to solve the problems using different strategies or representations, such as arrays or number models. **GMP2.1**

Strategies for Problem 2 may be similar to those used for Problem 1. Note how children interpret the **remainder** in this problem. Some children may recognize that they need a fourth table for the remaining 2 children even though it is not full. Other children may choose to seat 5 children at each of the 4 tables. Ask children to be sure their drawings show how many children are at each table. If children suggest that only 3 tables are needed, ask them to explain their thinking and whether all 20 children will have seats at tables.
**Summarize**  
Ask: How was your solution for Problem 2 different from your solution for Problem 1?  
Sample answer: In Problem 1, all the tables were full and the groups came out even. In Problem 2, I put only 2 children at the last table.

Collect children’s work so that you can evaluate it and prepare for Day 2.

---

**Getting Ready for Day 2**

*Math Masters, p. TA6*

**Planning a Follow-Up Discussion**

Review children's work. Use the Reengagement Planning Form (*Math Masters*, page TA6) and the rubric on page 172 to plan ways to help children meet expectations for both the content and process/practice standards. Look for common misconceptions, such as interpreting the remainder in Problem 2 incorrectly, as well as interesting and varied representations of the solutions including drawings, arrays, and number models.

Organize the discussion in one of the ways below or in another way you choose. If children’s work is unclear or if you prefer to show work anonymously, rewrite the work for display.

**Go Online** for sample children’s work that you can use in your discussion.

1. Display two different strategies with correct responses for Problem 1, such as Child A’s work and Child B’s work. Have children compare and contrast the two strategies. Ask:
   - **After looking at their pictures, what can you tell about how these children solved the problem?** Answers vary.
   - **How are their representations different?** Sample answer: Child A drew pictures of tables and children, and Child B did not.
   - **How did Child B represent the tables and children in the picture?** Sample answer: The child drew an array. The child drew a circle for each child and put 4 circles in a row to show 4 children can sit at 1 table. There are 5 rows, so that shows you need 5 tables.
   - **How are the strategies similar?** Sample answer: Both children knew they had 20 children and could only have 4 children at each table.

2. Display two different strategies with correct responses for Problem 2. For example, Child A’s work shows 3 tables with 6 children and 1 table with 2 children, and Child B’s work shows 4 tables with 5 children each. Ask:
   - **How are the strategies of Child A and Child B similar in Problem 2?** Sample answer: They both showed 4 tables were needed for the children.
   - **How are their representations different?** Sample answer: Child A has 6 children at 3 tables and 2 children at 1 table. Child B has 5 children at 4 tables.
• Are both representations correct? \[ \text{GMP1.6, GMP2.2} \] Sample answer: Yes. They are both correct because the problem doesn’t say that you have to put 6 children at each table.

3. Display a child’s response that indicates a misconception or incorrect interpretation of what to do with the remainder in Problem 2, such as Child C’s work. Ask:

• Explain the strategy this child used to find the number of tables needed in Problem 2. Sample answer: The child put 6 children at 3 tables and put the last 2 on the rug.

• Do you agree that the number of tables needed is 3? Why or why not? \[ \text{GMP2.1, GMP2.2} \] Sample answers: I agree that they only need 3 tables because that is all they can fill up; I disagree and think they need 4 tables because it would not be fair for 2 children to sit on the rug.

• Do you think the number sentence accurately represents the problem? Is the number sentence a true number sentence? Sample answer: No. \(6 \times 3\) doesn’t equal \(18 + 2\), so I don’t think you should write it like that. What would you tell this child to improve the number model? Sample answer: You should write two separate number models like this: \(6 \times 3 = 18\) and then \(18 + 2 = 20\). Are the number models true statements now? Yes.

**Planning for Revisions**

Have copies of *Math Masters*, page 61 or extra paper available for children to use in revisions. You might want to ask children to use colored pencils so you can see what they revised.
Day 2: Reengagement

Before You Begin
Have extra copies of Math Masters, page 61 for children to revise their work.

Focus

Setting Expectations
Children review the open response problem and discuss what a good response might include. They review how to discuss others' work respectfully.

Reengaging in the Problem
Children discuss other children's representations and solutions.

Revising Work
Children revise their work from Day 1.

Assessment Check-In
See page 174 and rubric below.
Expect most children to correctly solve the problem in terms of equal groups. Do not expect all children to correctly interpret the remainder at this point.

Goal for Mathematical Process and Practice
GMP2.1
Create mathematical representations using numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects.

Not Meeting Expectations
Does not provide representations for either Problem 1 or Problem 2, or both representations are incomplete or unclear.

Partially Meeting Expectations
Provides a representation for one of the problems, but not both, that is complete and clearly communicates an equal-grouping strategy.

Meeting Expectations
Provides representations for both Problems 1 and 2 that are complete and clearly communicate equal-grouping strategies and solutions.

Exceeding Expectations
Meets expectations and provides a second representation for one of the problems that shows a different strategy.

Practice

Math Boxes 2-8
Children practice and maintain skills.

Home Link 2-8
Homework
Children solve division problems and represent their work with drawings, words, and number models.

Math Journal 1, p. 51
See page 175.

Math Masters, p. 62
3.OA.2, 3.OA.3, 3.OA.4
SMP1, SMP2
Setting Expectations

Revisiting Guidelines for Reengagement
To promote a cooperative environment, consider revisiting the class guidelines for discussion that you developed in Unit 1. Review the guidelines and have children reflect on how well they are following them. Solicit additional guidelines from the class. Your revised list might look like the one in the margin. You may wish to focus on a particular guideline in today’s discussion, such as listening to others’ ideas or asking questions.

Model some of the sentence frames to show children appropriate language for discussing other children’s work:

- I like how you __________.
- I’d like to add __________.
- Could you explain __________?

Reviewing the Problem
Briefly review the open response problem from Day 1. Remind children that their tasks were to solve both of the problems and to use pictures, numbers, and written explanations to show their thinking. Ask: What do you think a complete response needs to include?

Guidelines for Discussion
During our discussions, we can:

✔ Make mistakes and learn from them
✔ Share ideas and strategies respectfully
✔ Agree and disagree politely
✔ Change our minds about how to solve a problem
✔ Feel confused
✔ Ask questions of our teacher and classmates
✔ Listen closely to others’ ideas
✔ Be patient
✔ Take time to think about someone else’s solution without rushing
✔ Use tools to help explain our thinking

Reengaging in the Problem
Children reengage in the problem by analyzing and critiquing other children’s work in pairs and in a whole-group discussion. Have children discuss with partners before sharing with the whole group. Guide this discussion based on the decisions you made in Getting Ready for Day 2.

GMP1.6, GMP2.1, GMP2.2
Revising Work

Pass back children’s work from Day 1. Before children revise anything, ask them to examine their drawings and explanations and decide how to improve them. Ask the following questions one at a time. Have partners discuss their responses and give a thumbs-up or thumbs-down based on their own work.

- Did you show all of your work using drawings, words, or numbers so someone else can understand your thinking? [GMP1.6]
- Do you still agree with your original answers? [GMP2.1]
- Does your partner’s work make sense to you? [GMP2.2]

Tell children they now have a chance to revise their work. Make counters available, but remind children they need to represent their strategies on their papers. Help children see that the strategies shown in the reengagement discussion are not the only strategies they may use. If children produced clear representations on Day 1, encourage them to try new strategies and show their work using pictures and words. Tell children to add to their earlier work using colored pencils or to use another sheet of paper, instead of erasing their original work.


**Assessment Check-In**  3.OA.2, 3.OA.3

Collect and review children’s revised work. Expect children to improve their work based on the class discussion. For the content standards, expect most children to correctly solve Problem 1 in terms of equal groups. Some may struggle more with Problem 2, especially if they chose to put 6 children at 3 tables and needed to decide what to do with the remaining 2 children. Do not expect all children to correctly interpret the remainder at this point. You can use the rubric on page 172 to evaluate children’s revised work for GMP2.1.

**Evaluation Quick Entry**  Go online to record student progress and to see trajectories toward mastery for these standards.

**Go Online**  for optional generic rubrics in the Assessment Handbook that can be used to assess any additional GMPs addressed in the lesson.
Sample Children’s Work—Evaluated
See the sample in the margin. This work meets expectations for the content standards because the child correctly solved Problem 1, interpreting the number story as an equal-grouping problem. The work meets expectations for the mathematical process and practice standard because the drawings for Problems 1 and 2 clearly show the equal-grouping strategy the child used. **GMP2.1**

Go Online for other samples of evaluated children’s work.

3 Practice 10–15 min

▶ Math Boxes 2-8

*MATH JOURNAL 1, p. 51*

<table>
<thead>
<tr>
<th>WHOLE CLASS</th>
<th>SMALL GROUP</th>
<th>PARTNER</th>
<th>INDEPENDENT</th>
</tr>
</thead>
</table>

**Mixed Practice** Math Boxes 2-8 are grouped with Math Boxes 2-6 and 2-11.

▶ Home Link 2-8

*MATH MASTERS, p. 62*

**Homework** Children solve division problems and represent their work with drawings, words, and number models. **GMP2.1**

---

Sample child’s work, “Meeting Expectations”

1. There are 20 children in art class. If 4 children sit at each table, how many tables do they need?

2. There are 20 children in music class. If 6 children sit at each table, how many tables do they need?

---

Creating Mathematical Representations

*Family Note:* Your child is learning how to create mathematical representations, such as drawings, tables, and number models, to help solve division problems. In this lesson, your child solves problems with and without remainders. Talk with your child about the representation she or he can use to show the problem. Remember, a picture is worth a thousand words. Please review this home link to school homework.

**Solve.** Show your thinking in a drawing or number model.

1. **Aimi** won a pack of 24 stickers in a school contest. He put three stickers in 3 equal piles, one for himself and one each for *his* friends, Danny, and Sue. How many stickers will each get?

   **Answers vary.**

2. Parents are organizing a field trip to the zoo for Aimi’s class. They want to take the 23 children in their cars. If each car can carry 5 children, how many cars are needed?

   **Answers vary.**

   62. 3.OA.2, 3.OA.3, 3.OA.4, 3.MD.2

---

Math Journal 1, p. 51

<table>
<thead>
<tr>
<th>Math Boxes 2-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 2-8</td>
</tr>
<tr>
<td>175</td>
</tr>
</tbody>
</table>

---

Math Masters, p. 62

<table>
<thead>
<tr>
<th>Math Masters, p. 62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 2-8</td>
</tr>
<tr>
<td>175</td>
</tr>
</tbody>
</table>
Exploring Fraction Circles, Liquid Volume, and Area

Overview Children explore fraction circles, area measures, and liquid volume in liters.

Before You Begin
Exploration A: Decide how to manage and store the fraction circles. If you do not have fraction circle sets, cut apart Math Journal 1, Activity Sheets 6–8, one set per child. See the Planning Ahead note in Lesson 2–6. Exploration B: Gather small, rectangular items, such as calculators, crayon boxes, and so on. Make available additional copies of Math Masters, pages TA19 and TA22. Exploration C: Mark 1-liter and 1-half liter points on the 1-liter beakers. Gather containers of different sizes and shapes that hold about a half liter (soup can), a liter (large deli container), and less than a half liter (yogurt cup). Each small group will need one of each size, labeled Containers A, B, and C.

Vocabulary
fraction • whole • fraction circles • area • square inch (sq in.) • square centimeter (sq cm) • volume • liter

Warm Up 5 min
Mental Math and Fluency Children solve fact extensions.

Materials
slate

Focus 40–50 min
Math Message Children examine fraction circles.

Introducing Fraction Circles Children name unit fractions.

Exploration A: Exploring Fraction Circles Children explore fraction circles.

Exploration B: Measuring Area Children measure areas of rectangles by counting square inches and square centimeters.

Exploration C: Comparing Liquid Volume Children compare liquid volumes of containers.

Practice 15–20 min
Minute Math+ Children practice mental math strategies.

Playing Division Arrays Game Children group counters equally to practice division.

Math Boxes 2–12 Children practice and maintain skills.

Home Link 2–12 Children explore liquid volume and areas.

Standards
Focus Clusters
• Develop understanding of fractions as numbers.
• Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
• Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Vocabulary
fraction • whole • fraction circles • area • square inch (sq in.) • square centimeter (sq cm) • volume • liter

Units
1 Unit 2 | Unit 194

my.mheducation.com
## Differentiation Options

<table>
<thead>
<tr>
<th>Readiness</th>
<th>5–10 min</th>
<th>Enrichment</th>
<th>10–15 min</th>
<th>Extra Practice</th>
<th>5–10 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOLE CLASS</td>
<td>SMALL GROUP</td>
<td>PARTNER</td>
<td>INDEPENDENT</td>
<td>WHOLE CLASS</td>
<td>SMALL GROUP</td>
</tr>
</tbody>
</table>

### Describing Volume

**3.MD.2**

- empty, transparent 1-liter bottle; water; container for pouring; food coloring (optional)

To provide experience with liquid volume, show children an empty bottle. Ask: *How much liquid is inside?* None. It is empty. Fill the bottle halfway with water and have children describe how full it is. **Sample answers:** Half full, half empty, partially full.

You may want to tint the water with food coloring for visibility. Continue to add and pour out water, having children describe amounts such as less than half full and completely full. Point out that the container does not have to be completely full to describe it as almost full, more than halfway full, and so on.

### Estimating Area

**3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6, 3.MD.7, 3.MD.7a, SMP6**

- Math Masters, p. 72; centimeter cubes

To extend their understanding of area measures and square units, have children estimate the number of centimeter cubes it takes to cover a 5-by-5 centimeter square and an 8-by-8 centimeter square. Have children check their estimates by completely covering the squares with centimeter cubes and explain how they counted the squares. **GMP6.1**

### Finding Letter Areas

**3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6**

- Math Masters, p. 73; centimeter cubes

To provide practice measuring area, have children count the numbers of square centimeters it takes to cover the areas of block letters on Math Masters, page 73.

### English Language Learner

**Beginning ELL** Demonstrate the meaning of cover by showing examples of items that cover each other exactly, such as two playing cards. Demonstrate that you cannot see the covered card hidden below. Show a non-example, such as a small book on top of a larger notebook, asking: *Does the book completely cover the notebook?* No. Extend the idea of covering to Exploration B by asking: *Do the squares completely cover the traced area?* Does the ________ you traced cover a large area?

---

**Differentiation Support** pages are found in the online Teacher’s Center.
Standards and Goals for Mathematical Process and Practice

SMP3 Construct viable arguments and critique the reasoning of others.
GMP3.1 Make mathematical conjectures and arguments.

SMP5 Use appropriate tools strategically.
GMP5.2 Use tools effectively and make sense of your results.

SMP6 Attend to precision.
GMP6.3 Use clear labels, units, and mathematical language.

1 Warm Up 5 min

Mental Math and Fluency

Have children solve fact extension problems mentally and record their answers on slates. Encourage them to think about combinations of 10.

Leveled exercises:

- ○ ○ 70 + ? = 100 30 20 + ? = 100 80 40 + ? = 100 60
- ○ ○ 1,000 – ? = 800 200 1,010 – ? = 990 20 1,250 – ? = 1,160 90

2 Focus 40–50 min

Math Message

Take a set of fraction circles. Examine the pieces and use math language to describe them with a partner. GMP6.3

Introducing Fraction Circles

Math Message Follow-Up Have children share their observations about the fraction circles. Sample answers: The pink pieces are each half of the red circle. Pieces that are the same color are the same size. Same-color pieces cover the red circle. Remind children that a fraction names equal parts of a whole. Explain that the fraction circle pieces can be used to show fractional parts of a whole. Connect this to their experience dividing pancakes into equal shares in Lesson 1-12 Explorations.

Discuss the total number of pieces for each color. For example, ask: How many light blue pieces are there? Emphasize that for each color the pieces are the same size.

Display a pink piece and a yellow piece. Tell children the pink piece is the whole. Ask: How many yellow pieces does it take to cover the entire pink piece? Place the yellow piece on the pink piece. Ask: What part or fraction of the whole is one yellow piece? One out of two parts; 1-half

Explain the Exploration activities and assign groups to each. Plan to spend more of your time with children working on Exploration A.

Academic Language Development Display, say, and have children repeat the word whole. Contrast it with other words that start with wh, such as what, which, and when, noting that the "w" in whole is silent. Display hole and discuss the different meanings of these homophones.
Exploration A: Exploring Fraction Circles

Math Journal 1, p. 60

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Adjust the Activity

To help children keep track of a particular whole when comparing different fraction circle pieces, provide a sentence frame: __ pieces cover one whole __ piece. Model and have children repeat the statements. Then add the fraction names to the description. One yellow piece is 1-half of a pink piece. For example, a yellow piece is 1-fourth of the red circle. More formal instruction with fractions will begin in Unit 5.

Differentiate

To help children keep track of a particular whole when comparing different fraction circle pieces, provide a sentence frame: __ yellow pieces cover one whole __ pink piece. Model and have children repeat the statements. Then add the fraction names to the description. One yellow piece is 1-half of a pink piece.

Exploration B: Measuring Area

Activity Card 32; Math Journal 1, p. 61; Math Masters, pp. TA19 and TA22

Professional Development

Help children connect the discrete view of area (counting unit squares) with a more continuous view of area by sweeping your hand across the surface of objects from boundary to boundary. More formal instruction on area will begin in Unit 4.

Differentiation Support

Have children follow directions on Activity Card 32 to measure and record the areas of different rectangular objects. Explain that the amount of surface inside the borders, or boundary, of each object is called the area. Model tracing around an object on Math Masters, page TA22 and sweeping your hand across the space inside. Then count the squares inside the tracing. Tell children that the number of squares inside the borders is a measurement of the area in square inches. When using Math Masters, page TA19 the measurement of the area is in square centimeters.

As a reference, display Math Masters, page TA19 and label it “Square Centimeters” and Math Masters, page TA22 and label it “Square Inches.” You may also display abbreviations for both units (sq in. and sq cm).
To support children as they find area measures, suggest marking a dot or X inside each square to help keep track of their counts.

Discuss what children notice about the areas of each object in square centimeters and in square inches. Ask: Why is it important to include units in area measures? 

Sample answers: So we know whether the area is in square centimeters or square inches. So we know they are areas and not lengths.

**Exploration C: Comparing Liquid Volume**

Activity Card 33: Math Journal 1, p. 62

Explain that liquid **volume** is the amount of liquid in a container and that a **liter** is a unit of volume.

Briefly introduce the 1-liter beaker, pointing out the marks you made that show 1-half liter (500 mL) and 1 liter (1,000 mL). (See Before You Begin.) Explain that the markings on the beaker’s scale show milliliters, a smaller unit of liquid volume.

**NOTE** Volume measures in milliliters are explored further in Unit 7. Children estimate volume relative to 1 liter in this Exploration.

Emphasize that when the 1-liter beaker is filled to the top line, the volume of the liquid inside is 1 liter. Using a smaller container, gradually fill a 1-liter beaker to show different volumes, such as less than half a liter, about 1-half liter, and about 1 liter. Encourage children to describe the changing volume as you fill the beaker.

Have children follow directions on Activity Card 33 and explain how the 1-liter beaker helps them compare the liquid volume different containers can hold.

**Summarize** Have children share their favorite Exploration activity and describe the math they learned or practiced.
Practice 15–20 min

▶ Minute Math+
To practice mental math strategies, select a Minute Math+ activity.

▶ Playing Division Arrays
Student Reference Book, pp. 238 and 239; Math Masters, p. G9

Have children play Division Arrays to practice division as equal grouping. Refer to Lesson 2-10 and Student Reference Book, page 238 for detailed instructions.

Observe
• Do children build their arrays correctly?
• Do children find the correct score with and without remainders?

Discuss
• How do you know if there are leftover counters? Do certain numbers have leftover counters more often than others?

▶ Math Boxes 2-12
Math Journal 1, p. 63

Mixed Practice Math Boxes 2-12 are paired with Math Boxes 2-10.

▶ Home Link 1-12
Math Masters, p. 74

Homework Children explore volume and count squares to find areas.
Day 1: Unit Assessment

1 Warm Up 5–10 min

Self Assessment
Children complete the Self Assessment.

2a Assess 35–50 min

Unit 2 Assessment
These items reflect mastery expectations to this point.

Unit 2 Challenge (Optional)
Children may demonstrate progress beyond expectations.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Goals for Mathematical Content (GMC)</th>
<th>Lessons</th>
<th>Self Assessment</th>
<th>Unit 2 Assessment</th>
<th>Unit 2 Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.OA.1</td>
<td>Interpret multiplication in terms of equal groups.</td>
<td>2-6, 2-7</td>
<td>4</td>
<td>8a, 9a, 9b</td>
<td>3a, 3b</td>
</tr>
<tr>
<td>3.OA.2</td>
<td>Interpret division in terms of equal shares or equal groups.</td>
<td>2-7 to 2-10</td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3.OA.3</td>
<td>Use multiplication and division to solve number stories.</td>
<td>2-5 to 2-10</td>
<td>4, 5</td>
<td>8a, 9b, 10</td>
<td>3a</td>
</tr>
<tr>
<td></td>
<td>Model number stories involving multiplication and division.</td>
<td>2-5 to 2-7, 2-9, 2-10</td>
<td>4, 5</td>
<td>8a, 9a, 9b, 10</td>
<td>3a, 3b</td>
</tr>
<tr>
<td>3.OA.7</td>
<td>Multiply within 100 fluently.</td>
<td>2-4 to 2-7, 2-9, 2-11</td>
<td>6</td>
<td>8a</td>
<td>4</td>
</tr>
</tbody>
</table>

Know all products of 1-digit numbers × 1, × 2, × 5, and × 10 automatically.

Divide within 100 fluently.

| 3.OA.8     | Solve 2-step number stories involving two of the four operations. | 2-4, 2-5 | 7 | 2 |
| 3.NBT.2    | Add within 1000 fluently.                                      | 2-1 to 2-5, 2-11 | 1, 2, 6 | 1a–1c, 5, 6 | 1, 2, 4 |
|            | Subtract within 1000 fluently.                                 | 2-1 to 2-5, 2-11 | 1, 2, 6 | 2a–2c, 3, 5, 6 | 1           |
Standards

| SMP1  | Check whether your answer makes sense. [GMP1.4] | 2-2, 2-3, 2-5 | 3 | 5, 6 |
| SMP2  | Make sense of the representations you and others use. [GMP2.2] | 2-4, 2-7, 2-8, 2-10 | 7 | 2, 3a, 3b |
| SMP4  | Model real-world situations using graphs, drawings, tables, symbols, numbers, diagrams, and other representations. [GMP4.4] | 2-4, 2-5, 2-7, 2-9 | 9a, 9b, 10 |
| SMP6  | Explain your mathematical thinking clearly and precisely. [GMP6.1] | 2-1 | 7.8b | 1, 3b |
| SMP7  | Think about accuracy and efficiency when you count, measure, and calculate. [GMP6.4] | 2-6 | 7.8a |
| SMP8  | Look for mathematical structures such as categories, patterns, and properties. [GMP7.1] | 2-1, 2-11 | 3, 4 |
| SMP8  | Use structures to solve problems and answer questions. [GMP7.2] | 2-1, 2-10, 2-11 | 1a–1c, 2a–2c | 1 |
| SMP8  | Create and justify rules, shortcuts, and generalizations. [GMP8.1] | 2-6, 2-10 | 3, 4 | 4 |

Self Assessment

Assessment Handbook, p. 15

WHOLE CLASS  SMALL GROUP  PARTNER  INDEPENDENT

Children complete the Self Assessment to reflect on their progress in Unit 2.

Warm Up  5–10 min

Self Assessment

Assessment Handbook, p. 15

Put a check in the box that tells how you do each skill.

Skills

1. Solve extended facts.
2. Solve number stories by adding or subtracting.
3. Check whether my answer makes sense.
4. Solve equal-groups and array number stories.
5. Solve division number stories.

I can do this on my own and explain how to do this.
I can do this if I get help or look at an example.
I can do this on my own.

Assessment Handbook, p. 15

Lesson 2-13  201
Unit 2 Assessment
Assessment Handbook, pp. 16–19

WHOLE CLASS
SMALL GROUP
PARTNER
INDEPENDENT

Children complete the Unit 2 Assessment to demonstrate their progress on the standards covered in this unit.

Generic rubrics in the Assessment Handbook appendix can be used to evaluate children’s progress on the Mathematical Process and Practice Standards.

Unit 2 Assessment
Fill in the unit box. Then solve.

1
a. 3 + 9 = 12
b. 30 + 40 = 70
c. 300 + 1,200 = 1,500

d. 57 - 8 = 49

e. 57 - 8 = 49

Fill in the missing rule or numbers.

2
a. 17 - 8 = 9
b. 27 - 8 = 19
c. 57 - 8 = 49

Fill in the missing rule or numbers.

3
Rule
- 10
74
64
54
44
34
24

4
2 4 8 16 32 64
Rule
× 2
or double

For each number story, write a number model with a ?. Then solve the number story. You may draw diagrams, like those below, or pictures to help.

Maria swam a total of 56 minutes over the weekend. She swam for 20 minutes on Saturday. How many minutes did she swim on Sunday?

Sample answers: 56 - 20 = ?; 20 + ? = 56

Answer: 36 minutes

How do you know your answer makes sense? Sample answers: The minutes on Sunday are less than the total minutes. 36 makes the number model true.

One python clutch has 31 eggs. Another python clutch has 19 eggs. How many more eggs are in the first clutch?

Sample answers: 31 - 19 = ?; 19 + ? = 31

Answer: 12 eggs

How do you know your answer makes sense? Sample answers: The difference is smaller than the larger clutch. 12 makes the number model true.
Differentiate  Adjusting the Assessment

Item(s)  Adjustments
1, 2  To extend Items 1 and 2, have children describe patterns in the fact extensions.
3  To scaffold Item 3, have children use a number grid.
4  To scaffold Item 4, have children use counters to model each frame and then describe how the numbers change. To extend Item 4, have children make up their own Frames-and-Arrows problems.
5  To scaffold Item 5, have children draw a parts-and-total diagram to help organize the story information. Discuss what is known and unknown.
6  To scaffold Item 6, have children draw comparison diagrams to help organize the story information. Discuss what is known and unknown.
7, 8  To scaffold Items 7 and 8, provide squares of paper to represent the packs and counters to represent the pencils and balloons.
9  To scaffold Item 9, have children build the array using counters.
10  To scaffold Item 10, have children model sharing marbles with counters.

Advice for Differentiation
Because this is the beginning of the school year, all of the content included on the Unit 2 Assessment was recently introduced and will be revisited in subsequent units.

Go Online:
Quick Entry Evaluation  Record children's progress and to see trajectories toward mastery for these standards.
Data  Review your children's progress reports. Differentiation materials are available online to help you address children's needs.

NOTE  See the Unit Organizer on pages 118–119 or the online Spiral Tracker for details on Unit 2 focus topics and the spiral.
**Unit 2 Challenge (Optional)**

Children can complete the Unit 2 Challenge after they complete the Unit 2 Assessment.

---

**Unit 2 Challenge (continued)**

You have 18 chairs that you want to arrange in an array.

a. Show 3 different ways you could do this on the dot grid at the right. Write number models for each array.

Number models:

1 \( \times \) 18 = 18

2 \( \times \) 9 = 18

3 \( \times \) 6 = 18


No. Sample explanation: If there were 5 rows and I put 3 in each row, I would have 3 left over. If I put 4 in each row, I would be 2 short. So I cannot use 5 rows.

c. Harrison is making a Frames-and-Arrows problem. His first two frames show 3 and then 6. Sample answers given.

Write a rule that Harrison might be using. Then fill in the frames.

Sample answers given.

<table>
<thead>
<tr>
<th>Rule</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \times ) 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \times ) 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Assessment Handbook, p. 20**

Unit 2 Challenge

1. Lila says that knowing 3 + 7 = 10 helps her solve this problem on her calculator:

Enter 423. Change it to 480. How? 

Sample answer: Knowing 3 + 7 can help because 7 ones added to 3 ones gets to the next ten. Lila can add 423 + 7 to get 430 and then add 50 to get to 480.

2. Read the number story and circle the pair of number models that fit the story. Mike’s group now has 16 markers. You may draw a picture to help.

Mrs. Ball equally shared 30 markers among 3 groups. Mike’s group found 6 more markers. How many markers does Mike’s group have now?

Circle the pair of number models that best fit the story.

A 30 \( \div \) 3 = 10

B 30 \( \times \) 3 = 90

C 30 \( + \) 3 = 33

D 30 \( + \) 6 = 36

Mike’s group now has 16 markers.

---

**Assessment Handbook, p. 21**
## Day 2: Cumulative Assessment

### 2b Assess 30–50 min

**Cumulative Assessment**
These items reflect mastery expectations to this point.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Goals for Mathematical Content (GMC)</th>
<th>Cumulative Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.OA.7</td>
<td>Multiply within 100 fluently.</td>
<td>3a–3f</td>
</tr>
<tr>
<td></td>
<td>Know all products of 1-digit numbers × 1, × 2, × 5, and × 10 automatically.</td>
<td>3a–3f</td>
</tr>
<tr>
<td>3.NBT.1</td>
<td>Use place-value understanding to round whole numbers to the nearest 10.</td>
<td>4a, 4b</td>
</tr>
<tr>
<td></td>
<td>Use place-value understanding to round whole numbers to the nearest 100.</td>
<td>5a, 5b</td>
</tr>
<tr>
<td>3.NBT.2</td>
<td>Add within 1,000 fluently.</td>
<td>6a, 6c</td>
</tr>
<tr>
<td></td>
<td>Subtract within 1,000 fluently.</td>
<td>6b</td>
</tr>
<tr>
<td>3.MD.1</td>
<td>Tell and write time.</td>
<td>1a–1c, 2a, 2b</td>
</tr>
<tr>
<td>3.MD.3</td>
<td>Solve 1- and 2-step problems using information in graphs.</td>
<td>6a–6d</td>
</tr>
</tbody>
</table>

**Goal for Mathematical Process and Practice (GMP)**
- SMP6: Explain your mathematical thinking clearly and precisely.  
  - GMP6.1 | 3g, 4c, 6d  

### 3 Look Ahead 15–20 min

**Math Boxes 2-13: Preview for Unit 3**
Children preview skills and concepts for Unit 3

**Home Link 2-13**
Children take home the Family Letter that introduces Unit 3

---

Go Online to see how mastery develops for all standards within the grade.
### Assess 35–50 min

#### Cumulative Assessment

**Assessment Handbook, pp. 22–24**

Children complete the Cumulative Assessment. The items in the Cumulative Assessment address content from Unit 1. It can help you monitor learning and retention of some (but not all) of the content and process/practice standards that were the focus of that unit, as detailed in the Cumulative Assessment table on page 205. Successful responses to these items indicate adequate progress at this point in the year.

Monitor children’s progress on the standards using the online assessment and reporting tools.

Generic rubrics in the Assessment Handbook appendix can be used to evaluate children’s progress on the Mathematical Process and Practice Standards.

Written assessments are one way children can demonstrate what they know. The table below shows adjustments you can make to the Cumulative Assessment to maximize opportunities for individual children or for your entire class.

<table>
<thead>
<tr>
<th>Differentiate</th>
<th>Adjusting the Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item(s)</td>
<td>Adjustments</td>
</tr>
<tr>
<td>1</td>
<td>To scaffold Item 1, have children match their toolkit clocks to the times shown, determine the hour, and then count the minutes after the hour.</td>
</tr>
<tr>
<td>2</td>
<td>To extend Item 2, have children continue to show times on their toolkit clocks in 15-minute increments and then discuss the placement of the clock hands for each increment.</td>
</tr>
<tr>
<td>3</td>
<td>To extend Item 3, have children multiply one of the factors in each problem by 10 and then figure out the product. For example, $2 \times 7$ becomes $20 \times 7$.</td>
</tr>
<tr>
<td>4</td>
<td>To scaffold Item 4, have children list the multiples of 10 from 0 to 100.</td>
</tr>
<tr>
<td>5</td>
<td>To scaffold Item 5, have children list the multiples of 100 from 0 to 1,000.</td>
</tr>
<tr>
<td>6</td>
<td>To extend Item 6, have children gather data about the books in the class library. Then have them represent that data on a scaled bar graph and ask and answer questions about the data.</td>
</tr>
</tbody>
</table>

#### Advice for Differentiation

Because this is the beginning of the school year, all of the content included on the Cumulative Assessment was recently introduced and will be revisited in subsequent units.

**Go Online:**

- **Quick Entry Evaluation** Record children’s progress and to see trajectories toward mastery for these standards.
- **Data** Review your children’s progress reports. Differentiation materials are available online to help you address children’s needs.
Math Boxes 2-13: Preview for Unit 3

Mixed Practice Math Boxes 2-13 are paired with Math Boxes 2-9. These problems focus on skills and understandings that are prerequisite for Unit 3. You may want to use information from these Math Boxes to plan instruction and grouping in Unit 3.

Home Link 2-13: Unit 3 Family Letter

Home Connection The Unit 3 Family Letter provides information and activities related to Unit 3 content.

- Fully digital options that adapt to your classroom
- Gives each student the opportunity to achieve
- Connects math to the world outside the classroom

everydaymath.com