Everyday Mathematics®

The University of Chicago School Mathematics Project

GRADE 3

Mc Graw Hill

REVIEWER'S GUIDE & LESSON SAMPLER

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 of 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

Content

PeopleImages/Getty Images

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.

Daniel LeFlorVetta/Getty Images

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.

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.

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.

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.*

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.

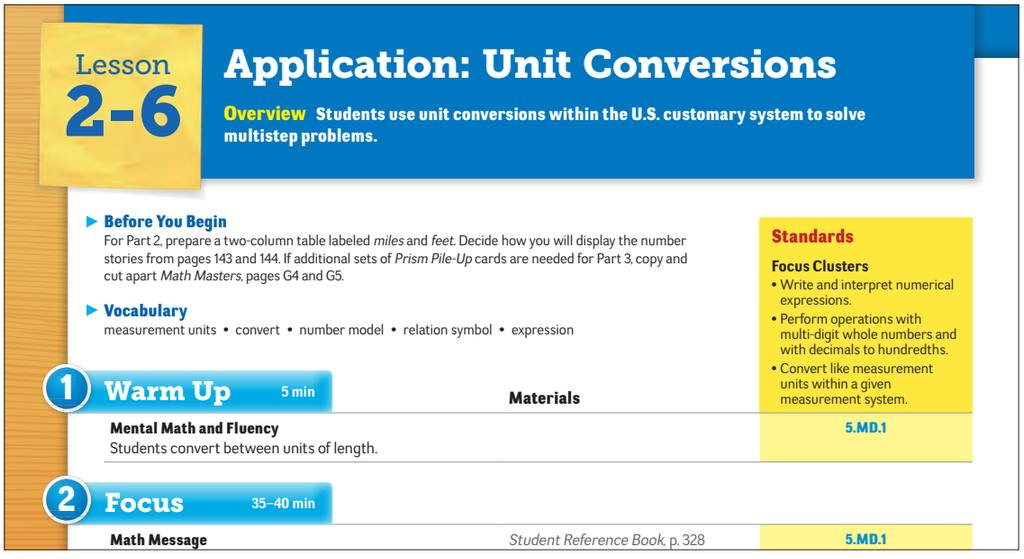
*Tomlinson & Murphy, M (2015). Leading for Differentiation: Growing Teachers Who Grow Kids. ASCD.

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.



Lesson 2-6

Application: Unit Conversions

Overview **Students use unit conversions within the U.S. customary system to solve multistep problems.**

▶ **Before You Begin**

For Part 2, prepare a two-column table labeled *miles* and *feet*. Decide how you will display the number stories from pages 143 and 144. If additional sets of *Prism Pile-Up* cards are needed for Part 3, copy and cut apart *Math Masters*, pages G4 and G5.

▶ **Vocabulary**

measurement units • convert • number model • relation symbol • expression

Standards

Focus Clusters

- Write and interpret numerical expressions.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.
- Convert like measurement units within a given measurement system.

1 Warm Up 5 min — **Materials**

Mental Math and Fluency — 5.MD.1

Students convert between units of length.

2 Focus 35–40 min

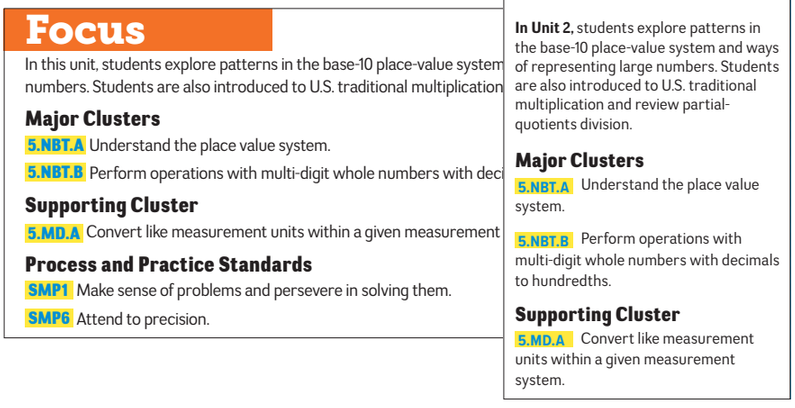
Math Message — *Student Reference Book*, p. 328 — 5.MD.1

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 numbers. Students are also introduced to U.S. traditional multiplication

Major Clusters

5.NBT.A Understand the place value system.

5.NBT.B Perform operations with multi-digit whole numbers with dec

Supporting Cluster

5.MD.A Convert like measurement units within a given measurement

Process and Practice Standards

SMP1 Make sense of problems and persevere in solving them.

SMP6 Attend to precision.

Focus

In Unit 2, 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

5.NBT.A Understand the place value system.

5.NBT.B Perform operations with multi-digit whole numbers with decimals to hundredths.

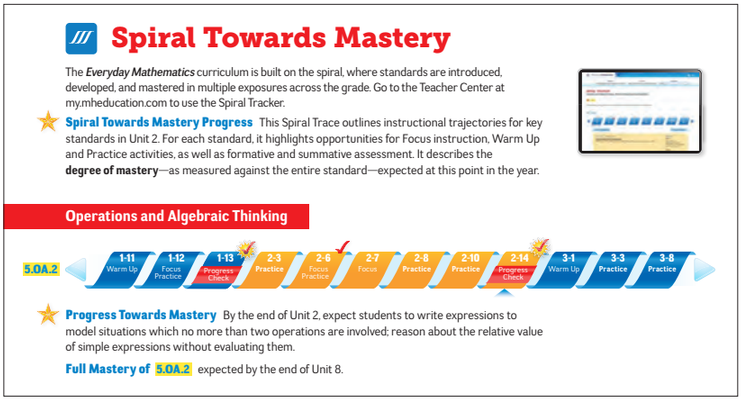
Supporting Cluster

5.MD.A Convert like measurement units within a given measurement system.

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.



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

5.OA.2 — 1-11 Warm Up | 1-12 Focus Practice | 1-13 Progress Check | 2-3 Practice | 2-6 Focus Practice | 2-7 Focus | 2-8 Practice | 2-10 Practice | 2-14 Progress Check | 3-1 Warm Up | 3-3 Practice | 3-8 Practice

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.

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.

	Links to the Past	Links to the Future
5.OA.1	In Unit 1, students reviewed how to use grouping symbols in expressions and how to evaluate expressions with grouping symbols. In Grade 3, students inserted parentheses in number sentences to make them true and evaluated number sentences with parentheses.	In Unit 7, students will use grouping symbols in an expression to model how to solve a multistep problem about gauging reaction time. In Grade 6, students will evaluate expressions and perform operations according to the Order of Operations.
5.OA.2	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.	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.

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.

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

		2-1 Understanding Place Value	2-2 Exponents and Powers of 10	2-3 Applying Powers of 10	2-4 U.S. Traditional Multiplication, Part 1
RIGOR	**Conceptual Understanding**	**The relationship between places in multidigit numbers** Describing Place-Value Relationships, p. 112 Representing Place Value, p. 113	**Exponential notation** Introducing Powers of 10, p. 118	**Estimation** Estimating with Powers of 10, p. 125	**Multidigit multiplication** Introducing U.S. Traditional Multiplication, p. 130
	Procedural Skill and Fluency	Home Link 2-1, p. 115	Journal p. 44, #1	Math Message, p. 124 Using Powers of 10 to Multiply, p. 124 Readiness, p. 123 Extra Practice, p. 123	Mental Math and Fluency, p. 130 Math Message, p. 130 Introducing U.S. Traditional Multiplication, p. 130 Multiplying 2-Digit Numbers by 1-Digit Numbers, p. 132 Home Link 2-4, p. 133 Readiness, p. 129 Enrichment, p. 129 Extra Practice, p. 129
	Applications		Introducing Powers of 10, p. 118 Solving a Real-World Volume Problem, p. 121 Enrichment, p. 117	Estimating with Powers of 10, p. 125 Writing and Comparing Expressions, p. 127 Home Link 2-3, p. 127	Multiplying 2-Digit Numbers by 1-Digit Numbers, p. 132

Problem-based Instruction

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

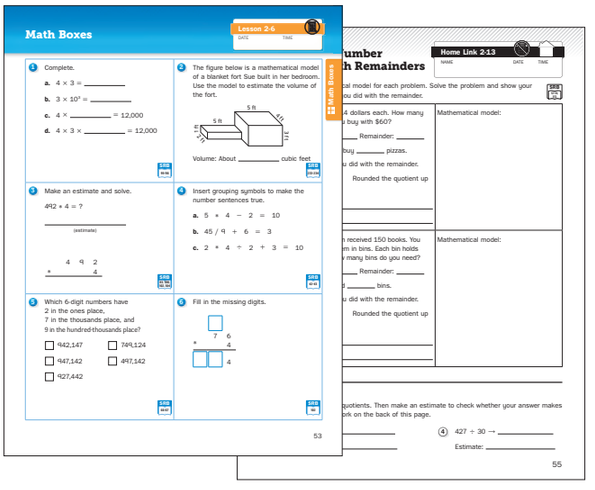
Warm-up Activity	Daily Routines	Math Message	Focus Activities	Summarize	Practice Activities
Lessons begin with a quick, scaffolded Mental Math and Fluency exercise.	Reinforce and apply concepts and skills with daily activities.	Engage in high cognitive demand problem solving activities that encourage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

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.

GRADE	K	1	2	3	4	5	6
	Instruction builds on student curiosity about patterns to explore numbers, shapes, and relationships between them.		Students work with symbolic representations for quantities and relationships, model simple situations, and build arithmetic skills.			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.	

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.

"I can do this!"

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.

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.

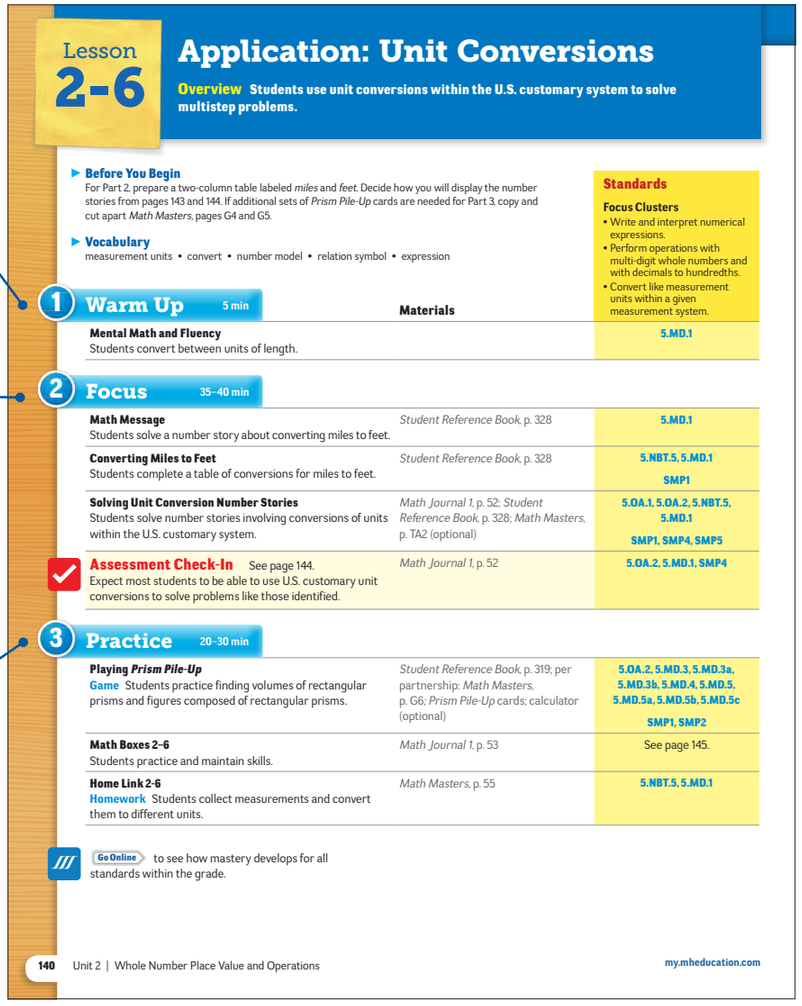
Introduction of New Content
Focus
CONCEPTUAL UNDERSTANDING AND APPLICATION

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.



Lesson 2-6

Application: Unit Conversions

Overview **Students use unit conversions within the U.S. customary system to solve multistep problems.**

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Standards
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1 Warm Up 5 min

	Materials	Standards
Mental Math and Fluency Students convert between units of length.		5.MD.1

2 Focus 35–40 min

Math Message Students solve a number story about converting miles to feet.	*Student Reference Book*, p. 328	5.MD.1
Converting Miles to Feet Students complete a table of conversions for miles to feet.	*Student Reference Book*, p. 328	5.NBT.5, 5.MD.1 SMP1
Solving Unit Conversion Number Stories Students solve number stories involving conversions of units within the U.S. customary system.	*Math Journal 1*, p. 52; *Student Reference Book*, p. 328; *Math Masters*, p. TA2 (optional)	5.OA.1, 5.OA.2, 5.NBT.5, 5.MD.1 SMP1, SMP4, SMP5
Assessment Check-In See page 144. Expect most students to be able to use U.S. customary unit conversions to solve problems like those identified.	*Math Journal 1*, p. 52	5.OA.2, 5.MD.1, SMP4

3 Practice 20–30 min

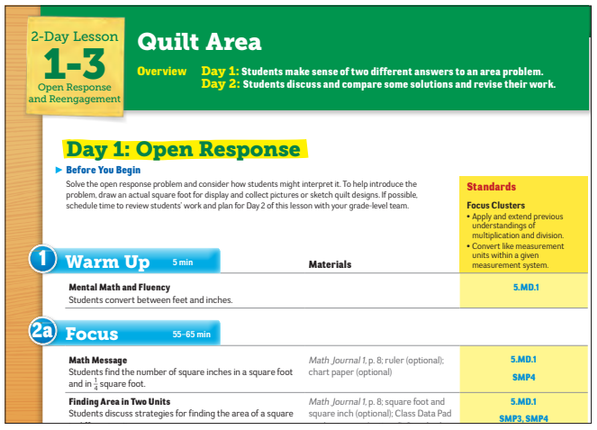
Playing *Prism Pile-Up* **Game** Students practice finding volumes of rectangular prisms and figures composed of rectangular prisms.	*Student Reference Book*, p. 319; per partnership: *Math Masters*, p. G6; *Prism Pile-Up* cards; calculator (optional)	5.OA.2, 5.MD.3, 5.MD.3a, 5.MD.3b, 5.MD.4, 5.MD.5, 5.MD.5a, 5.MD.5b, 5.MD.5c SMP1, SMP2
Math Boxes 2–6 Students practice and maintain skills.	*Math Journal 1*, p. 53	See page 145.
Home Link 2-6 **Homework** Students collect measurements and convert them to different units.	*Math Masters*, p. 55	5.NBT.5, 5.MD.1

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

140 Unit 2 | Whole Number Place Value and Operations my.mheducation.com

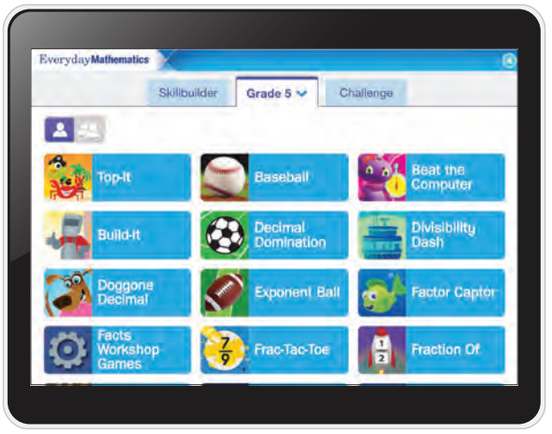
Key Components

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



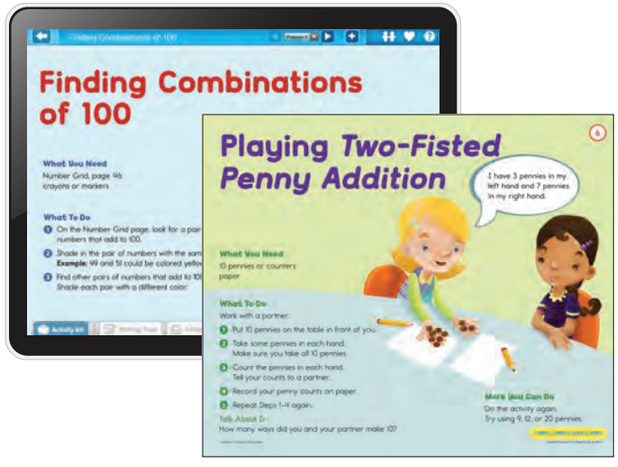
Open Response and Reengagement Lessons

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.



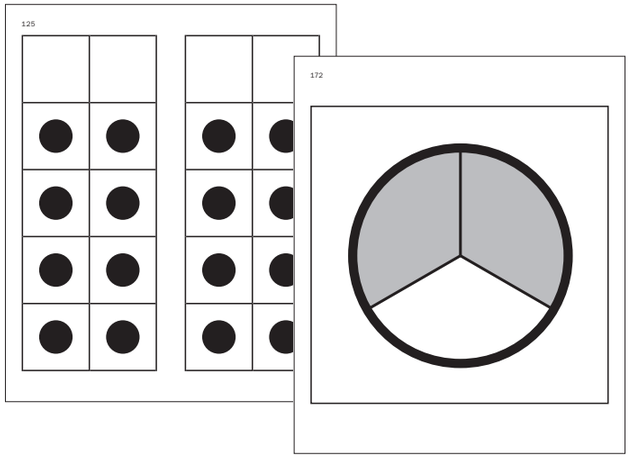
Games

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.



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.



Quick Looks

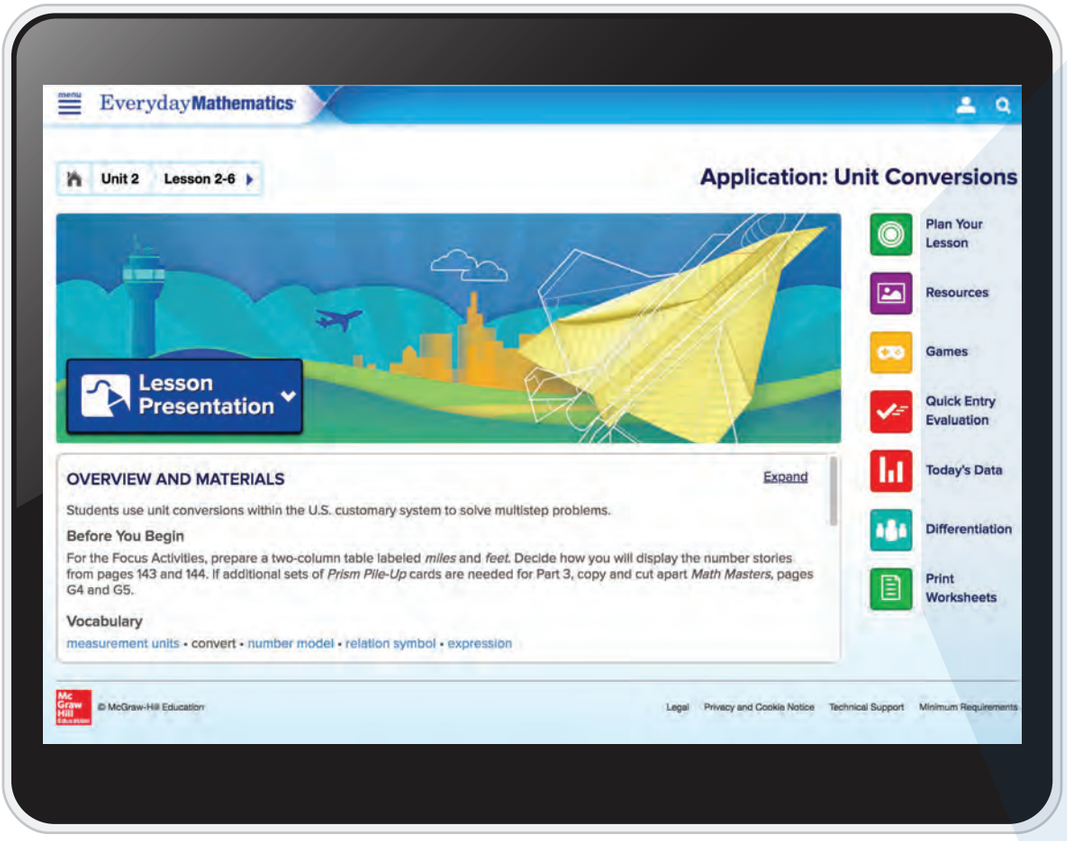
Quick Look activities are routines that help your students develop the ability to recognize a quantity without counting and to decompose numbers in various ways. As they encounter various combinations of numbers, they also develop strategies for basic facts.

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.



Launch Presentation

Editable versions of digital lessons that help you lead instruction.

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.

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.

Geometer's Sketchpad Activities and EM Games Online

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

Tutorial Videos

Demonstrations of concepts and skills.

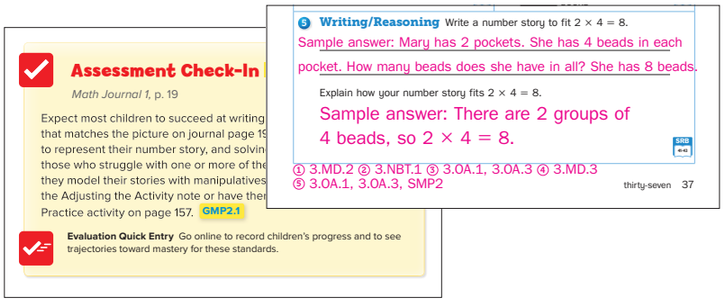
EM at Home

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.

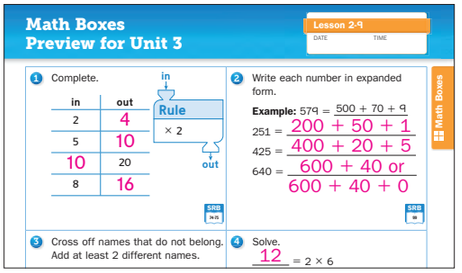
Evaluate



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.



Pre Unit Assessment

Preview Math Boxes Appear in two lessons toward the end of each unit and help you gauge readiness for upcoming content, plan instruction and choose appropriate differentiation activities.

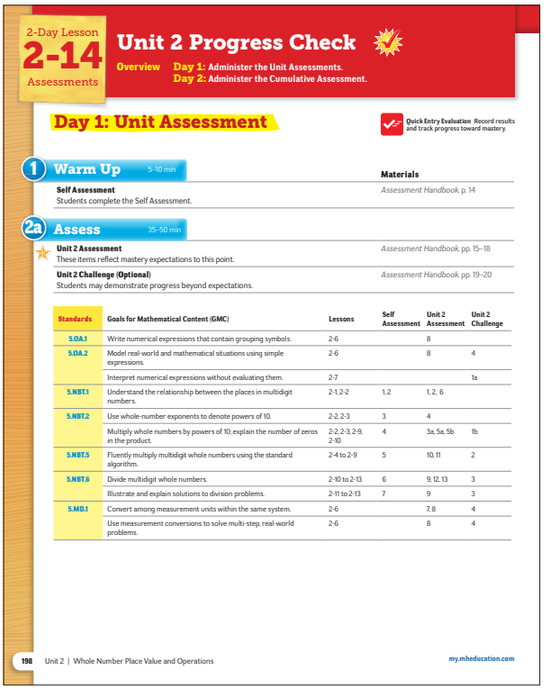
Data Dashboard Through the reports provided in the ConnectED Teacher Center, data recorded in prior units can provide valuable information to inform instruction in the upcoming unit.

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.

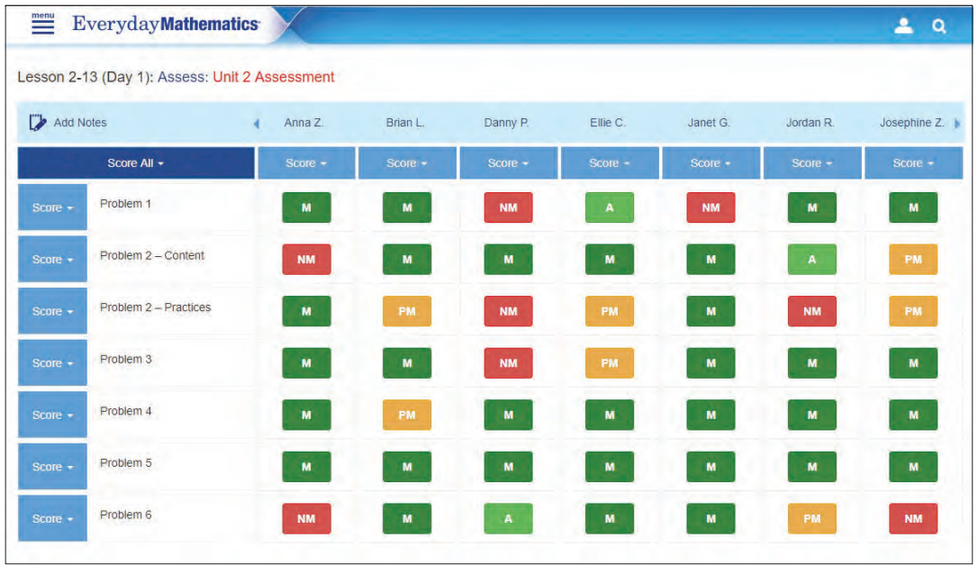
- **Unit Assessments** Assess students' progress toward mastery of concepts, skills, and applications in the current unit.
- **Self Assessments** Allow students to reflect on their understanding of content and process/practice standards that are the focus of the unit.
- **Challenge Problems** Extend 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

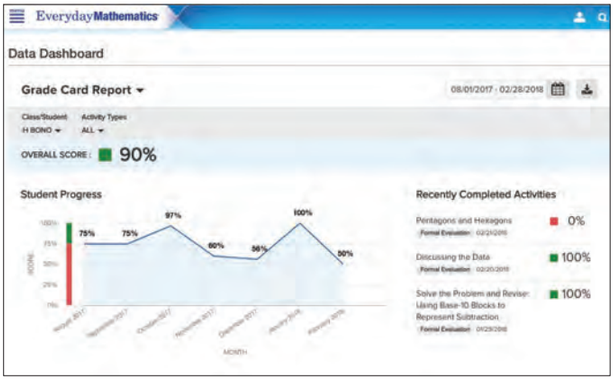
You can quickly and efficiently record evaluations of your students' performance as well as add notes.

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.

Recommendations Report

Progress Report

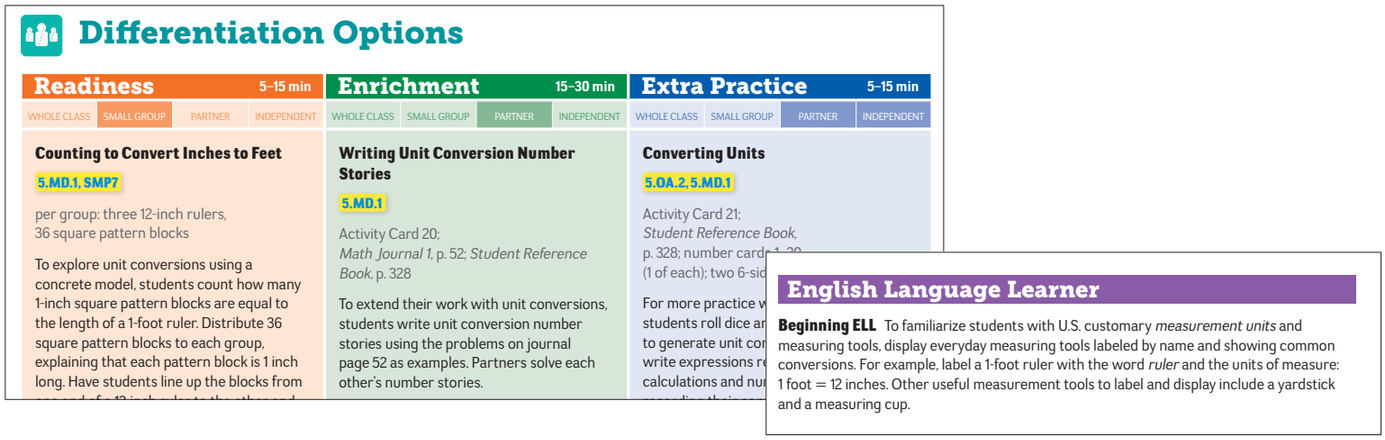


Grade Card Report

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



Differentiation Options

Readiness 5–15 min
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Counting to Convert Inches to Feet

5.MD.1, SMP7

per group: three 12-inch rulers, 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

Enrichment 15–30 min
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Writing Unit Conversion Number Stories

5.MD.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 journal page 52 as examples. Partners solve each other's number stories.

Extra Practice 5–15 min
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Converting Units

5.OA.2, 5.MD.1

Activity Card 21; *Student Reference Book*, p. 328; number card
(1 of each); two 6-sid

For more practice w
students roll dice ar
to generate unit cor
write expressions re
calculations and nu

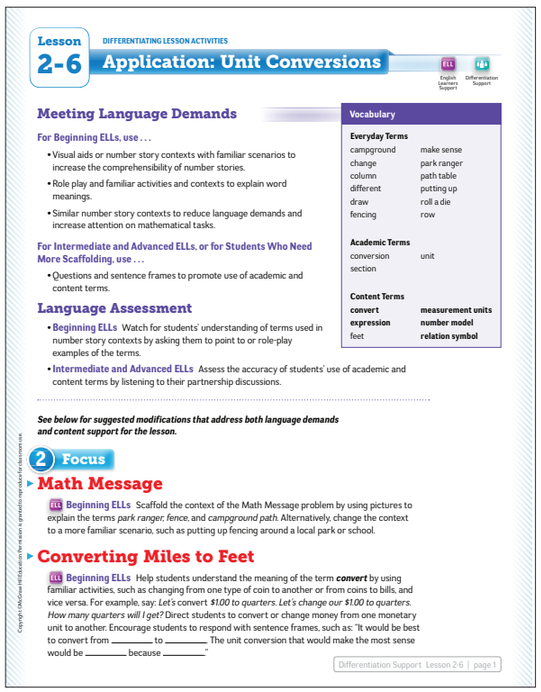
English Language Learner

Beginning ELL To familiarize students with U.S. customary *measurement units* and measuring tools, display everyday measuring tools labeled by name and showing common conversions. For example, label a 1-foot ruler with the word *ruler* and the units of measure: 1 foot = 12 inches. Other useful measurement tools to label and display include a yardstick and a measuring cup.

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 2-6
DIFFERENTIATING LESSON ACTIVITIES
Application: Unit Conversions

Meeting Language Demands

For Beginning ELLs, use . . .
- Visual aids or number story contexts with familiar scenarios to increase the comprehensibility of number stories.
- Role play and familiar activities and contexts to explain word meanings.
- Similar number story contexts to reduce language demands and increase attention on mathematical tasks.

For Intermediate and Advanced ELLs, or for Students Who Need More Scaffolding, use . . .
- Questions and sentence frames to promote use of academic and content terms.

Language Assessment
- Beginning ELLs Watch for students' understanding of terms used in number story contexts by asking them to point to or role-play examples of the terms.
- Intermediate and Advanced ELLs Assess the accuracy of students' use of academic and content terms by listening to their partnership discussions.

Vocabulary

Everyday Terms: campground, change, column, different, draw, fencing, make sense, park ranger, path table, putting up, roll a die, row

Academic Terms: conversion, section, unit

Content Terms: convert, expression, feet, measurement units, number model, relation symbol

See below for suggested modifications that address both language demands and content support for the lesson.

2 Focus

Math Message

Beginning ELLs Scaffold the context of the Math Message problem by using pictures to explain the terms *park ranger*, *fence*, and *campground path*. Alternatively, change the context to a more familiar scenario, such as putting up fencing around a local park or school.

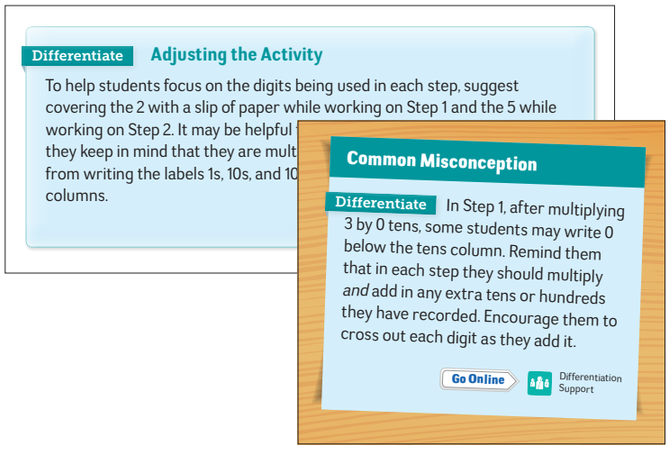
Converting Miles to Feet

Beginning ELLs Help students understand the meaning of the term ***convert*** by using familiar activities, such as changing from one type of coin to another or from coins to bills, and vice versa. For example, say: *Let's* convert *$1.00 to quarters. Let's change our $1.00 to quarters. How many quarters will I get?* Direct students to convert or change money from one monetary unit to another. Encourage students to respond with sentence frames, such as: "It would be best to convert from _____ to _____. The unit conversion that would make the most sense would be _____ because _____."

Differentiation Support Lesson 2-6 | page 1

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
they keep in mind that they are mult
from writing the labels 1s, 10s, and 10
columns.

Common Misconception

Differentiate In Step 1, after multiplying 3 by 0 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 or hundreds they have recorded. Encourage them to cross out each digit as they add it.

Go Online | Differentiation Support

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.

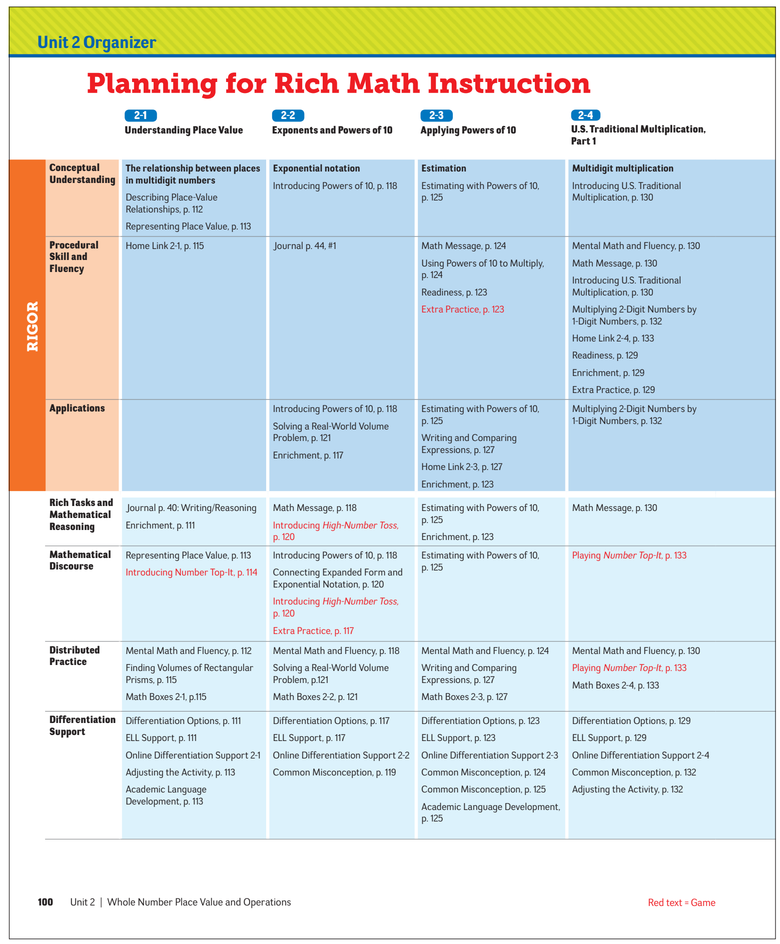
Common Misconceptions Notes that suggest how to use observations of students' work to adapt instruction.

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 every unit.


Unit 2 Organizer

Planning for Rich Math Instruction

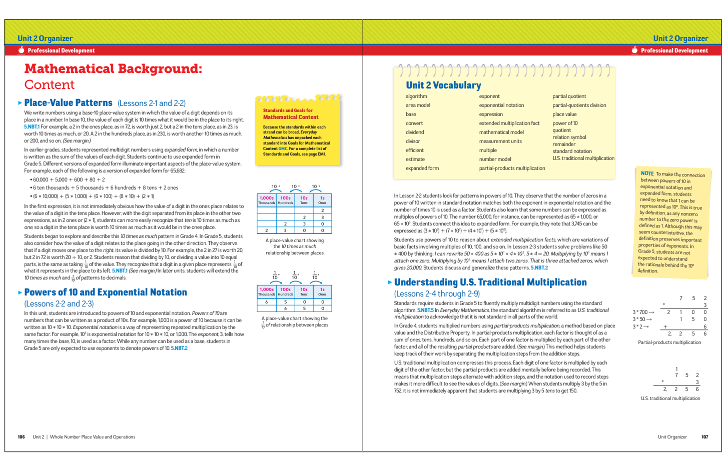
		2-1 Understanding Place Value	2-2 Exponents and Powers of 10	2-3 Applying Powers of 10	2-4 U.S. Traditional Multiplication, Part 1
RIGOR	Conceptual Understanding	**The relationship between places in multidigit numbers** Describing Place-Value Relationships, p. 112 Representing Place Value, p. 113	**Exponential notation** Introducing Powers of 10, p. 118	**Estimation** Estimating with Powers of 10, p. 125	**Multidigit multiplication** Introducing U.S. Traditional Multiplication, p. 130
RIGOR	Procedural Skill and Fluency	Home Link 2-1, p. 115	Journal p. 44, #1	Math Message, p. 124 Using Powers of 10 to Multiply, p. 124 Readiness, p. 123 Extra Practice, p. 123	Mental Math and Fluency, p. 130 Math Message, p. 130 Introducing U.S. Traditional Multiplication, p. 130 Multiplying 2-Digit Numbers by 1-Digit Numbers, p. 132 Home Link 2-4, p. 133 Readiness, p. 129 Enrichment, p. 129 Extra Practice, p. 129
RIGOR	Applications		Introducing Powers of 10, p. 118 Solving a Real-World Volume Problem, p. 121 Enrichment, p. 117	Estimating with Powers of 10, p. 125 Writing and Comparing Expressions, p. 127 Home Link 2-3, p. 127 Enrichment, p. 123	Multiplying 2-Digit Numbers by 1-Digit Numbers, p. 132
	Rich Tasks and Mathematical Reasoning	Journal p. 40: Writing/Reasoning Enrichment, p. 111	Math Message, p. 118 Introducing *High-Number Toss*, p. 120	Estimating with Powers of 10, p. 125 Enrichment, p. 123	Math Message, p. 130
	Mathematical Discourse	Representing Place Value, p. 113 Introducing Number Top-It, p. 114	Introducing Powers of 10, p. 118 Connecting Expanded Form and Exponential Notation, p. 120 Introducing *High-Number Toss*, p. 120 Extra Practice, p. 117	Estimating with Powers of 10, p. 125	Playing *Number Top-It*, p. 133
	Distributed Practice	Mental Math and Fluency, p. 112 Finding Volumes of Rectangular Prisms, p. 115 Math Boxes 2-1, p.115	Mental Math and Fluency, p. 118 Solving a Real-World Volume Problem, p.121 Math Boxes 2-2, p. 121	Mental Math and Fluency, p. 124 Writing and Comparing Expressions, p. 127 Math Boxes 2-3, p. 127	Mental Math and Fluency, p. 130 Playing *Number Top-It*, p. 133 Math Boxes 2-4, p. 133
	Differentiation Support	Differentiation Options, p. 111 ELL Support, p. 111 Online Differentiation Support 2-1 Adjusting the Activity, p. 113 Academic Language Development, p. 113	Differentiation Options, p. 117 ELL Support, p. 117 Online Differentiation Support 2-2 Common Misconception, p. 119	Differentiation Options, p. 123 ELL Support, p. 123 Online Differentiation Support 2-3 Common Misconception, p. 124 Common Misconception, p. 125 Academic Language Development, p. 125	Differentiation Options, p. 129 ELL Support, p. 129 Online Differentiation Support 2-4 Common Misconception, p. 132 Adjusting the Activity, p. 132

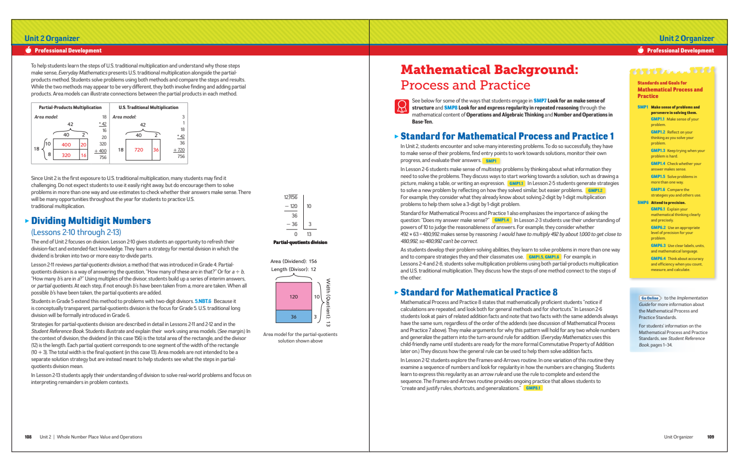
100 Unit 2 | Whole Number Place Value and Operations

Red text = Game

Preparing

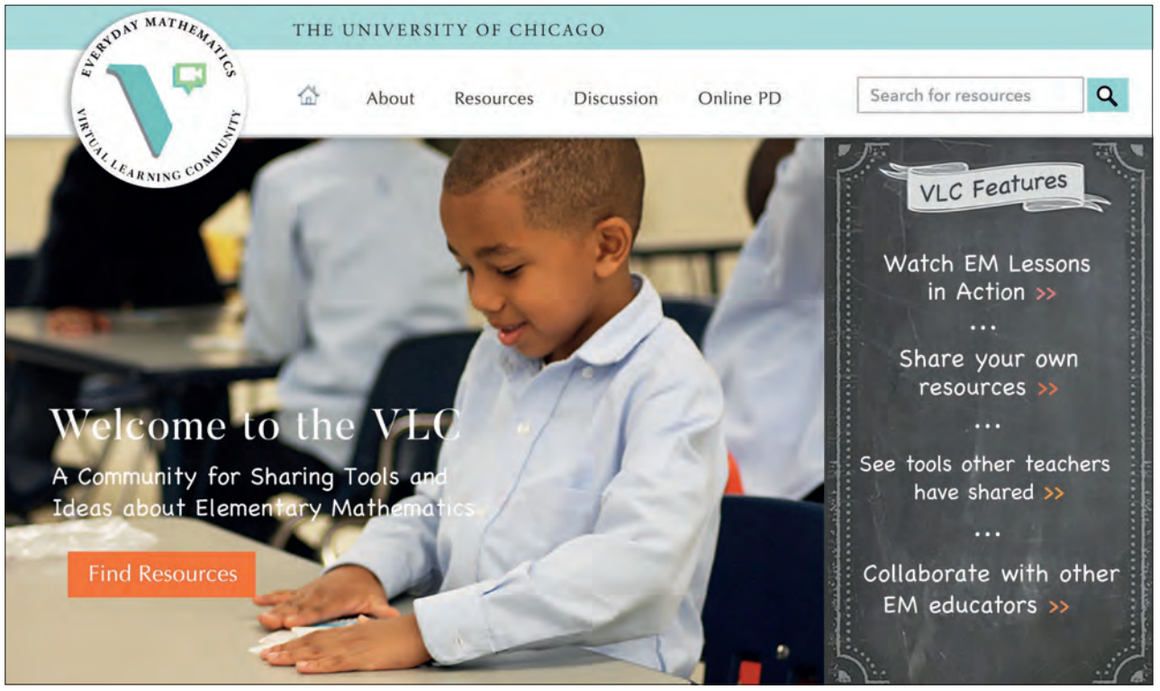
Every Unit Organizer also includes important background information on both content and practice standards to help you confidently deliver instruction.





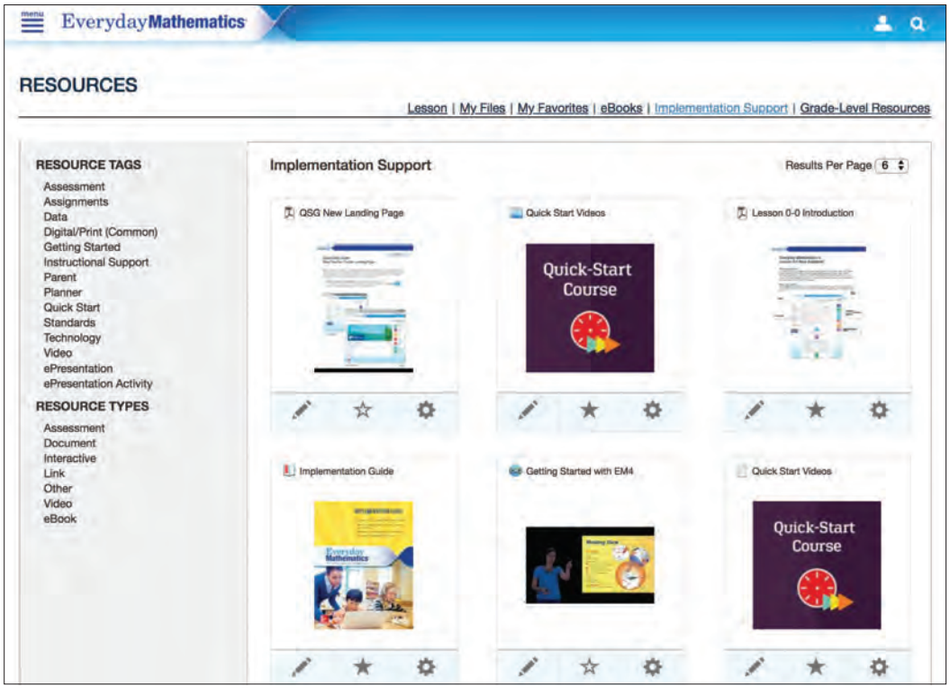
Support

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.

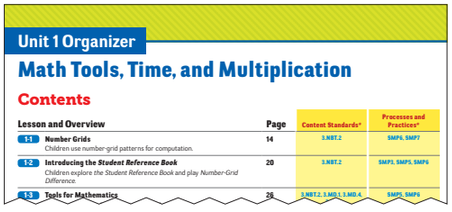
This pacing also gives you time to go deep, to create a classroom culture that values and supports productive struggle. You can expect your students to do their own thinking, to solve problems they have not been shown how to solve, to make connections between concepts and procedures, to explain their 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.

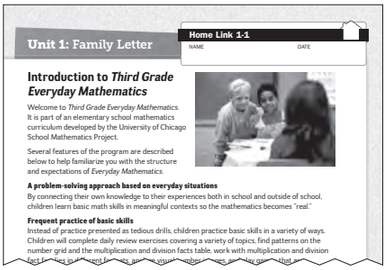

Unit 1 Organizer

Math Tools, Time, and Multiplication

Contents

Lesson and Overview	Page	Content Standards*	Processes and Practices*
1-1 Number Grids Children use number-grid patterns for computation.	14	3.NBT.2	SMP6, SMP7
1-2 Introducing the *Student Reference Book* Children explore the *Student Reference Book* and play *Number-Grid Difference*.	20	3.NBT.2	SMP3, SMP5, SMP6
1-3 Tools for Mathematics	28	3.NBT.2, 3.MD.1, 3.MD.4	SMP5, SMP6

Unit 1 begins on page 2.


Unit 1: Family Letter

Home Link 1-1

NAME DATE

Introduction to *Third Grade Everyday Mathematics*

Welcome to *Third Grade Everyday Mathematics*. It is part of an elementary school mathematics curriculum developed by the University of Chicago School Mathematics Project.

Several features of the program are described below to help familiarize you with the structure and expectations of *Everyday Mathematics*.

A problem-solving approach based on everyday situations

By connecting their own knowledge to their experiences both in school and outside of school, children learn basic math skills in meaningful contexts so the mathematics becomes "real."

Frequent practice of basic skills

Instead of practice presented as tedious drills, children practice basic skills in a variety of ways. Children will complete daily review exercises covering a variety of topics, find patterns on the number grid and the multiplication and division facts table, work with multiplication and division fact [illegible]

Lesson Types

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

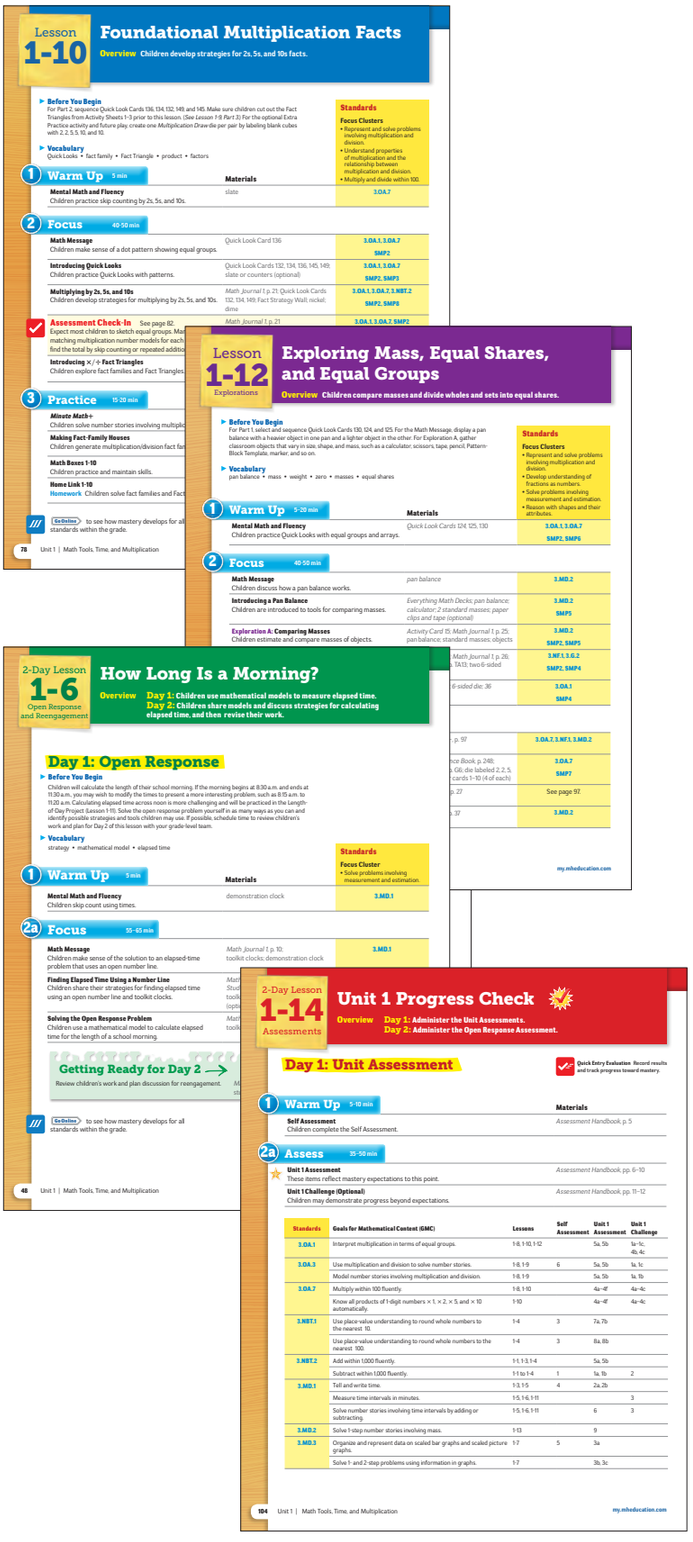
Regular Lessons are the most common lesson type. See the tables on the following pages for details about regular lessons.

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.

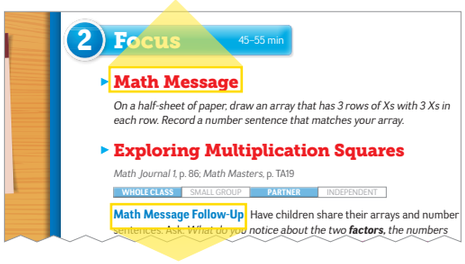


Lesson Parts and Features

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.

Lesson Parts and Features		Description	Tips
Planning	**Lesson Opener**	An outline of the lesson to assist in your planning that includes information on content and standards, timing suggestions, assessment, and materials.	• See **Before You Begin** for preparation tips. • Follow the time allotments for each part of the lesson.
	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		Description	Tips
Instruction	**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		Description	Tips
Instruction	**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.  2 Focus 45–55 min Math Message *On a half-sheet of paper, draw an array that has 3 rows of Xs with 3 Xs in each row. Record a number sentence that matches your array.* Exploring Multiplication Squares *Math Journal 1*, p. 86; *Math Masters*, p. TA19 WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT Math Message Follow-Up Have children share their arrays and number sentences. Ask: *What do you notice about the two* ***factors****, the numbers* • 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.		Description	Tips
Instruction	**Focus Activities**	Two to four main instructional activities, including games, in which children explore and engage in new content (skills, concepts, games).	• Encourage children to discuss and work together to solve problems during focus activities. • 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. • Look for Goals for Mathematical Process and Practice icons. GMP1.1 Use these to facilitate discussions about the processes. Go Online to the *Implementation Guide* for information on Mathematical Process and Practice Standards.
	Assessment Check-In ✓	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.	• Use results to inform instruction. Expectation statements in the Assessment Check-Ins help you decide which children would benefit from differentiation activities. • 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.

Part 3: Practice		Description	Tips
Instruction	**Practice Activity**	An opportunity to practice previously taught skills and content through a practice page or a game in many lessons.	• 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 *Everyday Mathematics*. • Plan for all children to play *Everyday Mathematics* 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 *Everyday Mathematics* games in action.
	Math Boxes	A daily *Math Journal* 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.	• Aim to have children complete Math Boxes with as little teacher support as possible. • Complete Math Boxes at any point during the day.
	Home Link	A daily homework page that provides practice and informs families about the math from that day's lesson.	Encourage children to do these activities with someone at home, such as a parent, caregiver, or sibling.

Differentiation and Language Features		Description and Purpose
Differentiation	**Adjusting the Activity**	Allows for differentiated instruction by offering modifications to lesson activities.
	Common Misconception	Offers point-of-use intervention tips that address common misconceptions.
	Game Modifications	Provides suggestions online for modifying games to support children who struggle and challenge children who are ready.
	Differentiation Support	Offers two online pages of specific differentiation ideas for each lesson, as well as ELL suggestions and scaffolding for children who need it.
Language Notes	**Academic Language Development**	Suggests how to introduce new academic vocabulary that is relevant to the lesson. These notes benefit all children, not solely English language learners.
	English Language Learners (ELL)	Provides activities and point-of-use ideas for supporting children at different levels of English language proficiency.

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

Resource	Description
Teacher's Lesson Guide **(Volumes 1 and 2)** ☑ digital ☑ print	• Comprehensive guide to the *Everyday Mathematics* lessons and assessments • Standards alignment information: digital version includes online tracking of each content standard • Point-of-use differentiation strategies: Readiness, Enrichment, Extra Practice, English Language Learners Support, Academic Language Development, Adjusting the Activity, Game Modifications, Common Misconception • Additional Differentiation Support pages available digitally for virtually every lesson • Unit overviews • Planning and calendar tools
eToolkit ☑ digital ☐ print	• Online tools and virtual manipulatives for dynamic instruction • A complete list of Grade 3 eTools on page xxix
ePresentations ☑ digital ☐ print	• Ready-made interactive white board lesson content to support daily instruction
Math Masters ☑ digital ☑ print	• Reproducible masters for lessons, Home Links, Family Letters, and games
Minute Math+ ☑ digital ☑ print	• Brief activities that require little or no materials; useful for transition times and for spare moments throughout the day
Classroom Posters ☑ digital ☑ print	• Posters that display grade-specific mathematical content

Planning, Instruction, and Assessment (con't)

Resource	Description
Assessment Handbook ☑ digital ☑ print	• Assessment masters for unit-based assessments and interim assessments • Record sheets for tracking individual and class progress
Assessment and Reporting Tools ☑ digital ☐ print	• 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 ☑ digital ☐ print	• Online tool that helps you understand how standards develop across the spiral curriculum

Professional Development

Resource	Description
Implementation Guide ☑ digital ☐ print	• Online resource with information on implementing the curriculum
Virtual Learning Community ☑ digital ☐ print	• 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

Resource	Description
Home Connection Handbook ☑ digital ☐ print	• 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

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

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.

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

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

Standards for Mathematical Content Strand Operations and Algebraic Thinking 5.OA	*Everyday Mathematics* Goals for Mathematical Content
Cluster Write and interpret numerical expressions.	
5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	GMC Write numerical expressions that contain grouping symbols. GMC Evaluate expressions that contain grouping symbols.
5.OA.2 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 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*	GMC Model real-world and mathematical situations using simple expressions. GMC Interpret numerical expressions without evaluating them.
Cluster Analyze patterns and relationships.	
5.OA.3 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.*	GMC Generate numerical patterns using given rules. GMC Identify relationships between corresponding terms of two patterns. GMC Form ordered pairs from corresponding terms of patterns and graph them.

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.

Goals for Mathematical Practice

The authors created Goals for Mathematical Practice (GMP) that unpack the practice standards, operationalizating 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.

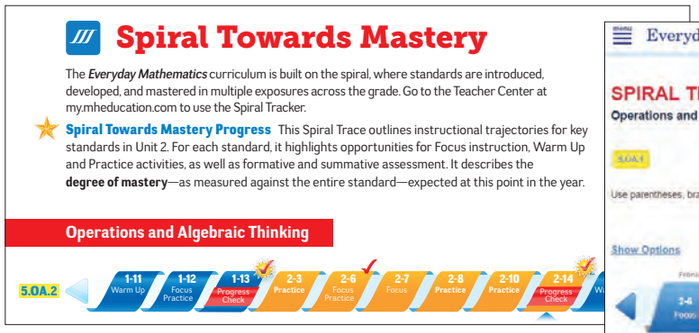
Standards for Mathematical Process and Practice	*Everyday Mathematics* Goals for Mathematical Process and Practice
1 Make sense of problems and persevere in solving them.	
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	GMP1.1 Make sense of your problem. GMP1.2 Reflect on your thinking as you solve your problem. GMP1.3 Keep trying when your problem is hard. GMP1.4 Check whether your answer makes sense. GMP1.5 Solve problems in more than one way. GMP1.6 Compare the strategies you and others use.
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	GMP2.1 Create mathematical representations using numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects.

Track

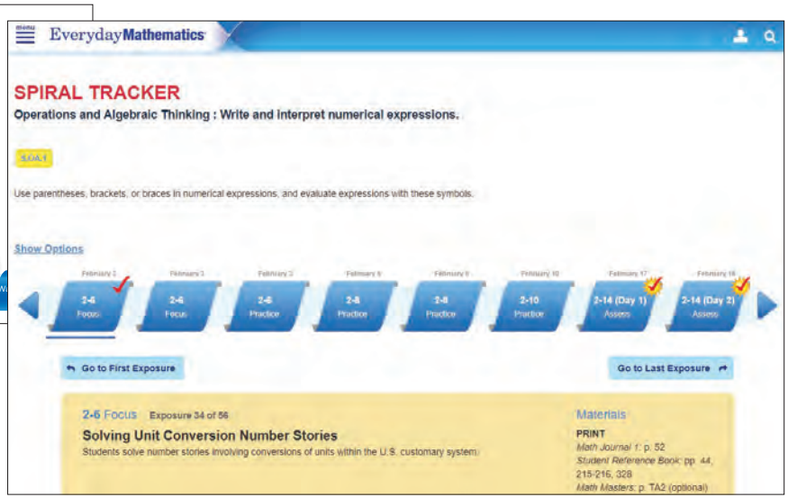
Everyday Mathematics provides the tools you need to easily monitor your students' progress toward mastery.

Visible Learning Trajectories

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



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 xl provide a full picture of how every standard develops across the entire grade.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 and 8
5.OA.1	Use one set of grouping symbols in an expression to model a real-world situation. Evaluate an expression that contains a single set of grouping symbols.	★ Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Ongoing practice and application. →	

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	*Everyday Mathematics* Grade 3 Lessons*
Operations and Algebraic Thinking 3.OA	
Represent and solve problems involving multiplication and division.	
3.OA.1 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.*	**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** (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)
3.OA.2 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.*	**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, 8-3, 8-4, 8-6, 9-6** (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)
3.OA.3 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.[1]	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, 7-2, 7-3, 8-2, 8-3, 8-4, 8-6, 9-2, 9-3, 9-5** (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)
3.OA.4 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 × ? = 48, 5 = ? ÷ 3, 6 × 6 = ?.*	**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 (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)
Understand properties of multiplication and the relationship between multiplication and division.	
3.OA.5 Apply properties of operations as strategies to multiply and divide.[2] *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*	**2-6, 3-10, 3-11, 3-12, 5-4, 5-5, 5-6, 5-9, 5-11, 6-3, 6-7,** 8-3, **9-3, 9-5** (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)
3.OA.6 Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*	**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 (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)

[1]See Glossary, Table 2.
[2]Students need not use formal terms for these properties.

Content Standards for Mathematics for Grade 3	*Everyday Mathematics* Grade 3 Lessons*
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, 1-13, 2-2, 2-3, **2-4, 2-5, 2-6, 2-7,** 2-8, **2-9, 2-10, 2-11,** 2-12, **3-1,** 3-5, 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, 7-6, 7-12, **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 (2-1, 3-3, 3-6, 3-7, 4-6, 4-8, 7-5, 7-7, 7-8, 7-9, 7-10, 7-11, 8-1, 8-8)
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.[3]	**2-2, 2-3, 2-4, 2-5,** 2-10, **3-2, 3-3, 3-4, 3-5, 3-6,** 3-8, 3-9, 4-1, **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 (2-12, 3-1, 3-7, 3-10, 3-12, 3-13, 4-2, 4-4, 4-5, 4-6, 4-8, 4-11, 5-7, 5-8, 6-5, 7-4, 7-5, 7-6, 7-7, 7-8, 7-11, 8-1, 8-2, 8-4, 8-6, 9-3, 9-6)
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** (3-5, 4-5, 6-3)
Number and Operations in Base Ten 3.NBT	
Use place value understanding and properties of operations to perform multi-digit arithmetic.[4]	
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, **3-2, 3-3,** 3-4, 3-5, **3-6** (1-6, 1-8, 1-10, 1-14, 2-2, 2-9, 3-7, 3-9, 3-12, 3-13, 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,** 9-5, **9-6,** 9-7 (1-5, 1-6, 1-9, 1-11, 1-12, 2-6, 2-7, 2-8, 2-9, 3-10, 3-12, 4-2, 4-4, 4-5, 4-8, 4-10, 4-11, 4-12, 5-8, 6-5, 6-6, 6-7, 6-9, 7-5, 7-7, 7-8, 7-10, 7-11, 8-6, 8-7, 9-3)
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** (7-9, 8-6, 8-7, 8-8, 9-6, 9-7)
Number and Operations—Fractions[5] 3.NF	
Develop understanding of fractions as numbers.	
3.NF.1 Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction *a/b* as the quantity formed by a parts of size *1/b*.	**1-12, 2-9, 2-12, 5-1, 5-2, 5-3,** 5-7, 6-4, 6-6, 7-2, **7-4,** 7-5, **7-6,** 7-7, 7-8, 7-9, 7-10, **7-11, 7-12, 8-1, 8-6, 8-7,** 8-8, 9-5 (2-5, 2-7, 2-10, 3-2, 3-4, 4-9, 5-5, 6-5, 6-7, 6-8, 7-1, 7-3, 8-2, 8-3, 8-4, 8-5, 9-2, 9-4, 9-6)

[3]This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
[4]A range of algorithms may be used.
[5]Grade 3 expectations in this strand are limited to fractions with denominators 2, 3, 4, 6, and 8.

Content Standards for Mathematics for Grade 3	*Everyday Mathematics* Grade 3 Lessons*
3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.	**4-3,** 5-2, **7-5, 7-6, 7-9, 7-10, 7-11,** 8-1, **8-7,** 9-5 (6-8, 7-8, 7-12, 8-3, 8-4, 8-5, 8-8, 9-1, 9-2, 9-4, 9-7)
3.NF.2a 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.	**4-3,** 5-2, **7-5, 7-6, 7-9, 7-10,** 7-11, 8-1, 8-5, **8-7,** 9-5 (6-8, 7-8, 8-8, 9-2, 9-4)
3.NF.2b Represent a fraction *a/b* on a number line diagram by marking off a lengths *1/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.	5-2, **7-5, 7-6, 7-9, 7-10, 7-11,** 8-1 8-5, **8-7,** 9-5 (7-8, 7-12, 8-3, 8-4, 8-8, 9-1, 9-2, 9-7)
3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	**5-2, 5-3,** 5-7, 6-4, **7-2, 7-4, 7-5, 7-6, 7-7, 7-8, 7-9, 7-10, 7-11, 8-1,** 8-5, **8-7,** 9-5 (3-4, 5-5, 5-6, 5-10, 6-2, 6-8, 8-2, 8-3, 8-4, 8-6, 8-8, 9-1, 9-2, 9-3, 9-4, 9-7)
3.NF.3a Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	**5-3,** 6-4, **7-2, 7-4, 7-5, 7-7, 7-9, 7-10,** 8-1, 8-5, **8-7,** 9-5 (3-4, 6-2, 7-6, 8-2, 8-3, 8-8, 9-2, 9-4)
3.NF.3b 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.	**5-3,** 5-7, 6-4, 7-2, **7-4, 7-5, 7-7,** 7-8, **7-10,** 8-5, **8-7,** 9-5 (5-5, 6-2, 7-6, 8-2, 8-3, 9-2, 9-4)
3.NF.3c 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.*	**5-2, 5-3,** 5-7, 7-2, **7-4, 7-5, 7-6,** 7-8, **7-9, 7-11, 8-1** (7-7, 8-2, 8-5, 8-6, 8-8, 9-2)
3.NF.3d 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 >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**5-3,** 6-4, 7-2, **7-4, 7-6, 7-7, 7-8,** 7-9, **7-10, 7-11,** 8-1, 8-5, **8-7,** 9-5 (5-6, 5-10, 6-2, 6-8, 8-2, 8-4, 8-6, 8-8, 9-1, 9-2, 9-3, 9-4, 9-7)
Measurement and Data 3.MD	
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	
3.MD.1 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.	**1-3, 1-5, 1-6, 1-11,** 2-1, 2-6, **7-3, 9-4, 9-7** (1-7, 1-8, 1-9, 1-10, 1-12, 1-13, 2-3, 2-5, 2-7, 3-6, 3-8, 3-9, 3-12, 4-1, 4-3, 5-6, 5-10, 6-1, 6-3, 6-8, 6-9, 6-11, 7-2, 7-4, 7-6, 7-8, 7-11, 8-1, 8-4, 8-7, 9-1, 9-2, 9-3)
3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[6] 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.[7]	1-3, **1-12, 1-13,** 2-9, **2-12, 4-3,** 5-4, 6-7, **7-1, 7-2, 7-3,** 7-7, 8-7, 8-8, **9-2, 9-3, 9-4** (2-2, 2-4, 2-6, 2-8, 2-11, 3-6, 3-8, 5-6, 5-10, 6-8, 7-5, 7-10, 7-12, 9-5, 9-6, 9-7)
Represent and interpret data.	
3.MD.3 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.*	**1-7,** 3-6, **3-7, 3-8,** 4-2, 5-5, 5-6, **9-7** (1-9, 1-12, 2-2, 2-4, 2-9, 3-2, 3-4, 3-10, 3-13, 4-4, 8-7)
3.MD.4 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.	**1-3, 4-1, 4-2, 4-3, 4-6, 4-7,** 4-8, **6-5, 8-1,** 8-2 (1-9, 3-11, 4-5, 4-11, 5-2, 5-4, 5-6, 5-10, 6-1, 6-3, 7-9, 8-3, 8-5, 8-8, 9-6)

[6]Excludes compound units such as cm3 and finding the geometric volume of a container.
[7]Excludes multiplicative comparison problems (problems involving notions of "times as much"; see Glossary, Table 2).

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.	
3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.	**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)
3.MD.5a 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.	**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)
3.MD.5b 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.	**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)
3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	**2-12, 3-7, 4-7, 4-8, 4-9, 4-10, 5-1** (3-11, 5-3)
3.MD.7 Relate area to the operations of multiplication and addition.	**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,** 6-5, 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)
3.MD.7a 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.	**3-7, 4-7, 4-8, 4-9,** 5-3 (4-12, 5-1, 5-2, 5-9, 5-11)
3.MD.7b 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.	**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)
3.MD.7c 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.	**5-5, 5-6, 5-11,** 8-3, **9-5** (7-1, 7-3)
3.MD.7d 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.	**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)
Geometric measurement: Recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	
3.MD.8 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.	**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)
Geometry 3.G	
Reason with shapes and their attributes.	
3.G.1 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.	**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)
3.G.2 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.*	**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)

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.

Mathematical Processes and Practices	*Everyday Mathematics* Goals for Mathematical Processes and Practices
1. Make sense of problems and persevere in solving them.	
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.	**Pages** 21, 33, 35, 38, 42, 46, 49, 52, 53, 55, 74, 75, 76, 89, 90, 93, 102, 131, 133, 134, 135, 137, 138, 139, 140, 141, 143, 145, 147, 151, 152, 156, 168, 170, 171, 173, 174, 178, 227, 228, 229, 230, 233, 234, 237, 238, 239, 240, 243, 251, 252, 255, 258, 271, 299, 301, 302, 303, 329, 355, 361, 373, 375, 376, 377, 379, 388, 389, 390, 391, 393, 397, 448, 449, 459, 465, 466, 493, 494, 495, 500, 501, 504, 505, 506, 509, 510, 511, 514, 515, 517, 539, 541, 542, 545, 546, 547, 548, 555, 557, 570, 571, 573, 574, 581, 585, 589, 590, 591, 593, 595, 603, 606, 608, 609, 610, 611, 635, 647, 648, 649, 650, 651, 679, 681, 682, 683, 685, 686, 695, 701, 705, 739, 751, 752, 753, 754, 755, 757, 767, 768, 769, 770, 771, 773, 775, 783, 807, 813, 815, 816, 817, 820, 821, 826, 827, 828, 829, 842, 843, 845, 853
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.	**Pages** 59, 60, 61, 62, 65, 67, 69, 70, 80, 82, 83, 84, 93, 94, 95, 96, 100, 107, 131, 137, 143, 147, 155, 156, 161, 162, 164, 165, 167, 168, 169, 170, 171, 173, 174, 175, 177, 178, 180, 181, 184, 185, 186, 199, 237, 239, 243, 244, 245, 246, 247, 249, 250, 252, 255, 256, 257, 258, 261, 263, 264, 273, 283, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 299, 300, 301, 302, 337, 338, 343, 350, 351, 352, 366, 376, 377, 378, 379, 381, 397, 398, 445, 447, 448, 451, 452, 454, 455, 457, 459, 461, 462, 463, 466, 469, 481, 482, 483, 489, 497, 498, 513, 514, 515, 516, 539, 540, 541, 542, 552, 561, 564, 565, 566, 567, 569, 575, 579, 580, 583, 605, 606, 608, 609, 611, 641, 645, 647, 653, 654, 655, 656, 657, 659, 660, 661, 662, 665, 666, 668, 669, 670, 673, 674, 675, 676, 677, 689, 690, 691, 692, 693, 696, 698, 702, 703, 707, 709, 733, 734, 739, 741, 742, 745, 773, 774, 775, 776, 779, 780, 781, 782, 807, 813, 833, 834, 835, 836, 837

Mathematical Processes and Practices	*Everyday Mathematics* Goals for 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.	**Pages** 23, 27, 73, 81, 99, 163, 178, 192, 197, 243, 246, 247, 279, 289, 310, 325, 349, 446, 451, 471, 473, 493, 494, 513, 551, 577, 579, 587, 600, 601, 602, 641, 645, 648, 649, 650, 653, 665, 673, 677, 695, 697, 698, 751, 752, 753, 754, 755, 757, 758, 759, 819, 823
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.	**Pages** 49, 50, 51, 52, 53, 55, 56, 57, 59, 65, 67, 68, 71, 73, 76, 77, 88, 89, 90, 96, 111, 131, 143, 145, 146, 147, 150, 151, 152, 153, 155, 162, 163, 164, 165, 183, 193, 265, 267, 268, 269, 270, 271, 331, 332, 333, 334, 335, 361, 387, 388, 389, 390, 393, 394, 399, 400, 401, 460, 461, 463, 504, 506, 507, 509, 569, 570, 572, 573, 574, 575, 589, 590, 591, 592, 593, 595, 596, 605, 607, 608, 610, 611, 642, 644, 649, 650, 701, 703, 704, 705, 707, 708, 710, 743, 746, 749, 752, 753, 754, 755, 757, 767, 768, 769, 770, 813, 814, 815, 816, 849, 850, 851, 852

Mathematical Processes and Practices	*Everyday Mathematics* Goals for Mathematical Processes and Practices
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.	**Pages** 15, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 33, 41, 43, 44, 45, 46, 87, 88, 89, 95, 99, 100, 101, 102, 159, 161, 181, 198, 256, 326, 327, 328, 337, 338, 339, 340, 341, 355, 356, 358, 362, 363, 364, 367, 373, 486, 487, 558, 559, 560, 602, 636, 637, 638, 656, 657, 659, 667, 668, 669, 670, 695, 696, 697, 698, 701, 703, 704, 705, 735, 736, 737, 743, 825, 839, 840, 842, 843, 845, 846
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.	**Pages** 16, 18, 19, 24, 29, 31, 34, 35, 41, 42, 43, 44, 45, 47, 61, 62, 67, 69, 73, 79, 87, 93, 94, 100, 107, 128, 129, 144, 145, 149, 153, 156, 157, 158, 159, 162, 183, 184, 195, 196, 198, 225, 227, 228, 229, 230, 231, 233, 234, 238, 239, 240, 241, 249, 261, 262, 263, 264, 265, 268, 269, 271, 275, 276, 282, 283, 285, 286, 293, 300, 325, 326, 327, 328, 332, 334, 338, 355, 356, 357, 361, 362, 364, 365, 369, 370, 371, 376, 382, 383, 384, 385, 387, 388, 391, 393, 395, 398, 399, 400, 401, 445, 449, 451, 452, 454, 455, 456, 457, 463, 465, 466, 467, 471, 497, 498, 504, 506, 509, 513, 514, 539, 541, 542, 546, 547, 549, 552, 553, 554, 555, 558, 559, 560, 563, 569, 587, 603, 636, 637, 638, 641, 642, 643, 654, 661, 662, 665, 666, 667, 674, 676, 677, 689, 690, 691, 692, 693, 696, 711, 733, 734, 735, 736, 737, 739, 740, 742, 745, 761, 765, 771, 781, 782, 807, 809, 811, 817, 819, 821, 822, 823, 825, 835, 836, 840, 842, 845, 849, 851, 852, 853

Mathematical Processes and Practices	*Everyday Mathematics* Goals for Mathematical Processes and Practices
7. Look for and make use of structure.	
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 7×8 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 2×7 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.	**Pages** 15, 17, 18, 21, 27, 79, 84, 85, 97, 125, 126, 127, 128, 129, 149, 155, 161, 177, 183, 184, 186, 189, 190, 191, 192, 199, 221, 222, 223, 224, 225, 249, 273, 274, 275, 276, 279, 280, 281, 285, 286, 287, 288, 289, 290, 291, 293, 294, 295, 296, 297, 303, 343, 344, 345, 346, 347, 349, 350, 351, 352, 353, 355, 357, 359, 371, 372, 377, 378, 379, 381, 383, 384, 399, 401, 452, 459, 465, 466, 467, 468, 469, 471, 472, 473, 474, 475, 476, 477, 479, 480, 481, 482, 483, 485, 486, 487, 488, 489, 493, 497, 498, 499, 500, 501, 514, 515, 517, 543, 557, 558, 563, 577, 578, 579, 580, 584, 585, 586, 587, 589, 590, 591, 592, 593, 595, 596, 600, 601, 602, 603, 679, 680, 681, 682, 683, 685, 686, 737, 741, 742, 743, 745, 747, 748, 761, 762, 763, 764, 765, 777, 781, 782, 807, 808, 810, 819, 821, 822, 823, 833, 835, 836, 837, 849, 860
8. Look for and express regularity in repeated reasoning.	
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.	**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

Mastery Expectations

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

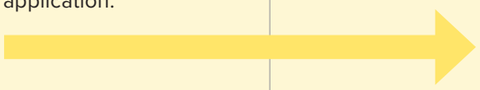
- Understanding of multiplication and division and strategies within 100.
- Understanding of fractions, especially unit fractions.
- Understanding of the structure of rectangular arrays and of area.
- Describing and analyzing two-dimensional shapes.

Standards	**First Quarter** Benchmark Expectations for Units 1 and 2	**Second Quarter** Benchmark Expectations for Units 3 and 4	**Third Quarter** Benchmark Expectations for Units 5 and 6	**Fourth Quarter** Benchmark Expectations for Units 7 through 9
3.OA.1	Represent multiplication as equal groups with concrete objects and drawings.	Represent multiplication as equal groups with arrays.	★ 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.*	Ongoing practice and application.
3.OA.2	Equally share groups of concrete objects. Represent equal shares with drawings.	Represent equal shares with drawings and number models.	★ 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.*	Ongoing practice and application.
3.OA.3	Use skip counting, repeated addition, or multiplication to solve number stories involving equal groups.	Use multiplication or division to solve number stories involving equal groups or equal shares.	Use multiplication and division to solve number stories. Model number stories involving multiplication.	★ 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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.OA.4	Use fact triangles to generate fact families.	Determine the unknown product or factor in multiplication and division equations involving 1s, 2s, 5s, and 10s facts.	Determine the unknown product or factor in multiplication and division equations involving square products, and 0s, 1s, 2s, 3s, 5s, 9s, and 10s facts.	★ 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 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?.*
3.OA.5	No expectations for mastery at this point.	Illustrate the "turn-around rule" (Commutative Property of Multiplication) with arrays and facts.	Use strategies such as adding/subtracting a group, near squares, and doubling to multiply and divide.	★ Apply properties of operations as strategies to multiply and divide. *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*
3.OA.6	No expectations for mastery at this point.	Use multiplication to determine the unknown factor in division equations involving 1s, 2s, 5s, and 10s facts.	Use multiplication to determine the unknown factor in division equations involving 1s, 2s, 5s, 10s, square products, and 0s, 3s, and 9s facts.	★ Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*
3.OA.7	No expectations for mastery at this point.	Know all products of one-digit numbers × 1, × 2, × 5, and × 10.	Know all square products of one-digit numbers. Know all products of one-digit numbers × 0, × 1, × 2, × 3, × 5, × 9, and × 10.	★ 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.

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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.OA.8	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.	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.	Solve 2-step number stories using two of the four operations.	★ 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.
3.OA.9	No expectations for mastery at this point.	No expectations for mastery at this point.	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.	★ 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.*
3.NBT.1	Use open number lines to round 2-digit numbers to the nearest 10 and 3-digit numbers to the nearest 100.	★ Use place value understanding to round whole numbers to the nearest 10 or 100.	Ongoing practice and application. 	
3.NBT.2	Add and subtract within 1000 using tools along with strategies based on place value and/or the relationship between addition and subtraction.	Add and subtract within 1000 using partial-sums addition, and counting-up and expand-and-trade subtraction, or other strategies.	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.	★ 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.
3.NBT.3	No expectations for mastery at this point.	No expectations for mastery at this point.	No expectations for mastery at this point.	★ 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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.NF.1	No expectations for mastery at this point.	No expectations for mastery at this point.	Identify and represent given unit $\left(\frac{1}{b}\right)$ and non-unit $\left(\frac{a}{b}\right)$ fractions using pictures, words, and fraction circles.	★ Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction a/*b* as the quantity formed by *a* parts of size 1/*b*.
3.NF.2; 3NF.2a	No expectations for mastery at this point.	No expectations for mastery at this point.	No expectations for mastery at this point.	★ Understand a fraction as a number on the number line; represent fractions on a number line diagram. 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.
3.NF.2; 3NF.2b	No expectations for mastery at this point.	No expectations for mastery at this point.	No expectations for mastery at this point.	★ Understand a fraction as a number on the number line; represent fractions on a number line diagram. Represent a fraction *a/b* on a number line diagram by marking off *a* lengths 1/*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.
3.NF.3; 3.NF.3a	No expectations for mastery at this point.	No expectations for mastery at this point.	Use fraction circle pieces to determine that equivalent fractions are the same size.	★ 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.

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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.NF.3; 3.NF.3b	No expectations for mastery at this point.	No expectations for mastery at this point.	Use fraction circle pieces to generate simple equivalent fractions	★ Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 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.
3.NF.3; 3.NF.3c	No expectations for mastery at this point.	No expectations for mastery at this point.	No expectations for mastery at this point.	★ 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. *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.*
3.NF.3; 3.NF.3d	No expectations for mastery at this point.	No expectations for mastery at this point.	Use tools, such as fraction circle pieces, to justify the conclusions of fraction comparisons.	★ 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 >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
3.MD.1	Tell and write time to the nearest 5 minutes. Use an open number line or other tools to add time intervals in minutes.	Use open number lines, toolkit clocks, or other strategies to solve problems and number stories involving 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.	★ 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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.MD.2	No expectations for mastery at this point.	No expectations for mastery at this point.	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.	★ 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.
3.MD.3	Use information in a given scaled bar graph to solve one-step "how many more" and "how many less" problems.	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.	★ 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.*	Ongoing practice and application.
3.MD.4	Measure lengths to the nearest inch using rulers marked with whole and half inches.	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.	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.	★ 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.
3.MD.5; 3.MD.5a	No expectations for mastery at this point.	Recognize area as an attribute of plane figures.	★ 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.	Ongoing practice and application.

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.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.MD.5; 3.MD.5b	No expectations for mastery at this point.	Recognize area as an attribute of plane figures.	★ Recognize area as an attribute of plane figures and understand concepts of area measurement. 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.	Ongoing practice and application.
3.MD.6	No expectations for mastery at this point.	★ Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Ongoing practice and application. →	
3.MD.7; 3.MD.7a	No expectations for mastery at this point.	Find the area of a rectangle with whole-number side lengths by tiling it.	★ Relate area to the operations of multiplication and addition. 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.	Ongoing practice and application.
3.MD.7; 3.MD.7b	No expectations for mastery at this point.	No expectations for mastery at this point.	Multiply side lengths to find areas of rectangles.	★ Relate area to the operations of multiplication and addition. 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.
3.MD.7; 3.MD.7c	No expectations for mastery at this point.	No expectations for mastery at this point.	Explain how a given area model, fully labeled, with a side length decomposed into 2 addends can be used to solve a multiplication problem.	★ 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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.

Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 through 9
3.MD.7; 3.MD.7d	No expectations for mastery at this point.	No expectations for mastery at this point.	No expectations for mastery at this point.	★ 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.
3.MD.8	No expectations for mastery at this point.	Solve problems involving perimeters of polygons.	Distinguish between area and perimeter.	★ 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.
3.G.1	No expectations for mastery at this point.	No expectations for mastery at this point.	Understand that shapes in different categories may share attributes that can define a larger category. Recognize specified subcategories of quadrilaterals.	★ 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.
3.G.2	No expectations of mastery at this point.	Partition rectangles into parts with equal areas.	★ 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.*	Ongoing practice and application.

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

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.

Focus

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 112

Focus

In Unit 3, children use place value to develop and practice strategies for addition and subtraction of 2- and 3-digit numbers. They represent multiplication using arrays, and use these representations to develop strategies for solving multiplication facts.

Major Clusters

3.OA.A Represent and solve problems involving 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.

Unit 3 Operations 208

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 are 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.

3.G.A Reason with shapes and their attributes.

Unit 4 Measurement and Geometry 312

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 are to multiplication and to addition.

Unit 5 Fractions and Multiplication Strategies 432

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.

Unit 6 More Operations 526

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

3.G.A Reason with shapes and their attributes.

Unit 7 Fractions 622

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.

3.G.A Reason with shapes and their attributes.

Unit 8 Multiplication and Division 720

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 794

Unit 2 Organizer

Number Stories and Arrays

Contents

*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.

	Links to the Past	Links to the Future
3.OA.2	In Grade 2, children partitioned shapes into equal shares and described the whole as two-halves, three-thirds, or four-fourths.	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.
3.OA.3	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.	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.
3.OA.7	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.	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.
3.NBT.2	In Grade 2, children added and subtracted within 1,000 using concrete models or drawings, partial-sums addition, and expand-and-trade subtraction.	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.

Planning for Rich Math Instruction

RIGOR

	2-1 Extended Facts: Addition and Subtraction	2-2 Number Stories	2-3 More Number Stories	2-4 Multistep Number Stories, Part 1
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	**Number stories** Using the Guide to Solving Number Stories, pp. 132–134	**Number stories** Organizing Number Story Information, pp. 138–139	**Multistep number stories** Exploring Multistep Stories, pp. 145–146
Procedural Skill and Fluency	■ Mental Math and Fluency, p. 126 ■ Math Message, p. 126 Home Link 2-1, p. 129 Differentiation Options, p. 125	■ Mental Math and Fluency, p. 132 Solving Number Stories, pp. 134–135 ■ Playing *Multiplication Draw*, p. 135 Extra Practice, p. 131	■ Mental Math and Fluency, p. 138 Math Message, p. 138 ■ Solving More Number Stories, pp. 140–141 ■ Sorting Fact Triangles, p. 141 Home Link 2-3, p. 141 Readiness, p. 137	■ Mental Math and Fluency, p. 145 Math Message, p. 145 ■ Solving Multistep Stories, pp. 146–147 Differentiation Options, p. 143
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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	Solving Number Stories, pp. 134–135 Journal p. 37, #5 Readiness, p. 131 Enrichment, p. 131	Organizing Number Story Information, pp. 138–139 Solving More Number Stories, pp. 140–141 Journal p. 40, #5 Enrichment, p. 137	Exploring Multistep Stories, pp. 145–146 Solving Multistep Stories, pp. 146–147 Enrichment, p. 143
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■ = Fact Work Red text = Game

2-5 Multistep Number Stories, Part 2	2-6 Equal Groups	2-7 Multiplication Arrays	2-8 Open Response Picturing Division (2-Day Lesson)	
Multistep number stories with two operations Using Number Models as Records, p. 151	**Equal groups** ■ Making Sense of Equal Groups, pp. 156–157 ■ Multiplying by 0 and 1, pp. 157–158	**Understanding multiplication** ■ Exploring Many Arrays, Same Total, pp. 162–163 ■ Representing Number Stories with Arrays, pp. 163–164	**Understanding equal sharing** Comparing Mathematical Representations, pp. 167–169	**Conceptual Understanding**
Mental Math and Fluency, p. 150 ■ Math Message, p. 150 Writing Number Models, p. 153 Playing *Roll to 1,000,* p. 153 ■ Differentiation Options, p. 149	■ Mental Math and Fluency, p. 156 ■ Math Message, p. 156 ■ Extra Practice, p. 155	■ Mental Math and Fluency, p. 162 ■ Introducing *Array Bingo,* pp. 164–165 ■ Extra Practice, p. 161	Mental Math and Fluency, p. 167 ■ Math Message, p. 167 ■ Solving the Open Response Problem, p. 169 ■ Revising Work, p. 174	**Procedural Skill and Fluency**
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RIGOR

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Planning for Rich Math Instruction

	2-9 Modeling Division	2-10 Playing *Division Arrays*	2-11 Frames and Arrows	2-12 Explorations Exploring Fraction Circles, Liquid Volume, and Area
RIGOR				
Conceptual Understanding	**Understanding division** ■ Exploring Sharing Problems, pp. 178–179 Modeling with Division, pp. 179–180	**Understanding division** Exploring Even and Odd with Arrays, pp. 184–185 ■ Introducing *Division Arrays*, pp. 185–186	**Arithmetic patterns** Reviewing Frames and Arrows, pp. 190–191	**Fractional parts of a whole** Introducing Fraction Circles, p. 196 Exploration A: Exploring Fraction Circles, p. 197
Procedural Skill and Fluency	■ Mental Math and Fluency, p. 178 ■ Math Message, p. 178 ■ Dividing to Solve Number Stories, pp. 180–181 ■ Home Link 2-9, p. 181	■ Mental Math and Fluency, p. 184 ■ Introducing *Division Arrays*, pp. 185–186 Solving More Multistep Number Stories, p. 187 Home Link 2-10	■ Mental Math and Fluency, p. 190 Math Message, p. 190 Solving Frames and Arrows, p. 191 Representing Number Stories, p. 193 Home Link 2-11, p. 193 Differentiation Options, p. 189	Mental Math and Fluency, p. 196 Playing *Division Arrays*, p. 199
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■ = Fact Work Red text = Game

Notes

2-13 Assessment
Unit 2 Progress Check

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

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

Literature Link Optional Book: 2-6 *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.

Evaluation Quick Entry Record children's performance online.

Data View reports online to see children's progress towards mastery.

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

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:

UCHICAGO STEM EDUCATION

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.

Key ✓ = Assessment Check-In = Progress Check Lesson = Current Unit = Previous or Upcoming Lessons

3.OA.7

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.

3.OA.8

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

3.NBT.2

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.

Key ✓ = Assessment Check-In = Progress Check Lesson = Current Unit = Previous or Upcoming Lessons

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.

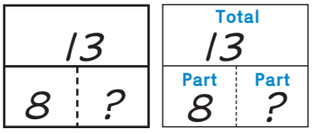
Addition and Subtraction Use Classes In *Everyday Mathematics*, there are three basic use classes for addition and subtraction: *parts and total, change,* and *comparison*. (*See margin.*) Each can be solved using either addition or subtraction, depending on the unknowns. **3.NBT.2** Children were introduced 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**

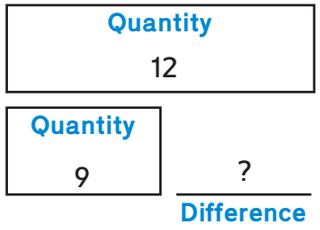
Standards and Goals for Mathematical Content

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.



Parts-and-total diagrams for 13 = 8 + ?

A change diagram for 14 − 5 = 9



A comparison diagram for 12 = 9 + ?

Unit 2 Vocabulary

area
array
arrow rule
change diagram
combinations of ten
comparison diagram
dividend
division
divisor
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." **3.OA.1, 3.OA.2, 3.OA.3** 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. **3.OA.8** 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.

Number Stories and Situation Diagrams *Continued*

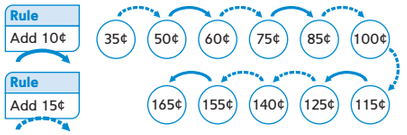
Note that *Everyday Mathematics* uses the term *number model* specifically to mean number sentences, expressions, or equations that model number stories or other real-world situations. When number sentences are presented outside the contexts of number stories, they are not called *number models*. *Number 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 makes 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.

Standards and Goals for Mathematical Process and Practice

SMP1 Make sense of problems and persevere in solving them.

GMP1.1 Make sense of your problem.

GMP1.2 Reflect on your thinking as you solve your problem.

GMP1.4 Check whether your answer makes sense.

GMP1.6 Compare the strategies you and others use.

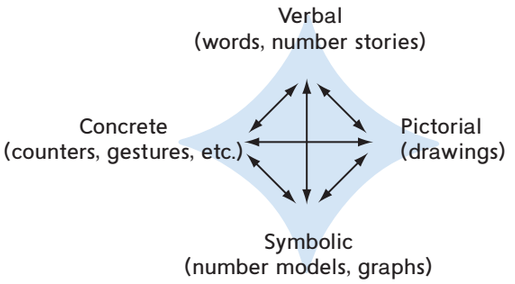
SMP2 Reason abstractly and quantitatively.

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.

Go Online to the *Implementation Guide* for more information about the Mathematical Process and Practice Standards.

For children's information on the Mathematical Process and Practice Standards, see *Student Reference Book,* pages 1–34.



Four problem-solving representations

Lesson
2-7

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

Standards

Focus Clusters

- Represent and solve problems involving multiplication and division.
- Multiply and divide within 100.

1 Warm Up 5–10 min

	Materials	Standards
Mental Math and Fluency Children practice Quick Looks with equal groups and arrays.	Quick Look Cards 131, 132, and 133	3.OA.1, 3.OA.7 SMP2, SMP6

2 Focus 45-50 min

Math Message Children find multiple arrays for 24.	*Math Masters,* p. TA17; counters (optional)	3.OA.2, 3.OA.3
Exploring Many Arrays, Same Total Children discuss how to find all possible arrays for a product.	*Math Masters,* p. TA17; counters (optional)	3.OA.1, 3.OA.3 SMP3, SMP4
Representing Number Stories with Arrays Children draw arrays to represent number stories.	*Math Journal 1,* p. 48; *Math Masters,* p. TA18 and p. TA20 (optional); counters (optional)	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.	*Math Journal 1,* p. 48	3.OA.1, 3.OA.3, SMP2
Introducing *Array Bingo* **Game** Children practice multiplication with arrays and equal groups.	*Student Reference Book,* pp. 232 and 233; *Math Masters,* p. G8; number cards 1–20	3.OA.1, 3.OA.7 SMP2

3 Practice 10-15 min

Minute Math+ Children practice mental math strategies.	*Minute Math®+*	
Math Boxes 2-7 Children practice and maintain skills.	*Math Journal 1,* p. 49	See page 165.
Home Link 2-7 **Homework** Children practice representing array situations.	*Math Masters,* p. 60	3.OA.1, 3.OA.3 SMP4

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

Differentiation Options

Readiness 10–15 min

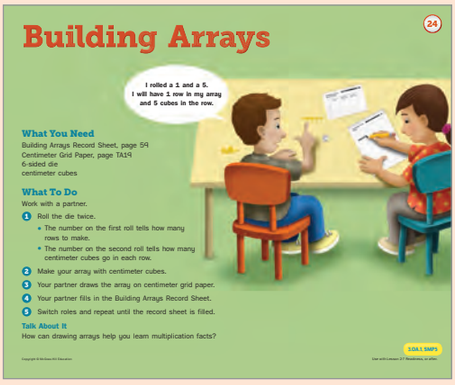
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Building Arrays

3.OA.1, SMP5

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. GMP5.2



Enrichment 10–15 min

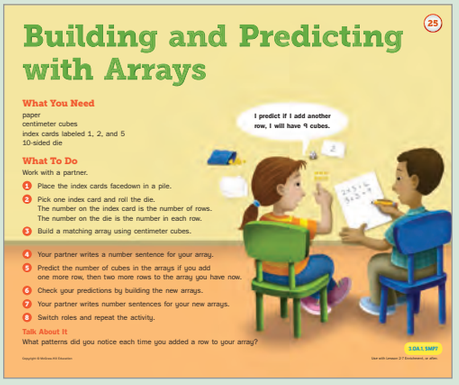
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Building and Predicting with Arrays

3.OA.1, SMP7

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. GMP7.1



Extra Practice 5–15 min

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

Drawing Arrays for Fact Triangles

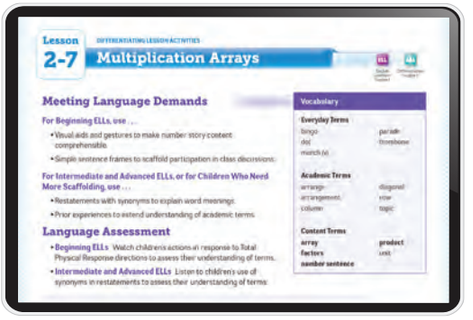
3.OA.1, SMP2

Activity Card 26; Fact Triangles; counters (optional)

To provide practice with multiplication, have children draw arrays for Fact Triangles. GMP2.1, GMP2.2 Have partners talk about how the arrays match each fact family and how the arrays could help them learn multiplication and division facts. GMP2.3

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 *I* 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.

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.

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.

Go Online Differentiation Support

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.
GMP2.2, GMP6.1 Highlight strategies involving equal groups or arrays.

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

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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. GMP4.1 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 $4 \times 6 = 24$, $6 \times 4 = 24$, $3 \times 8 = 24$, $8 \times 3 = 24$, $2 \times 12 = 24$, $12 \times 2 = 24$, $1 \times 24 = 24$, and $24 \times 1 = 24$.

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.* GMP3.1 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

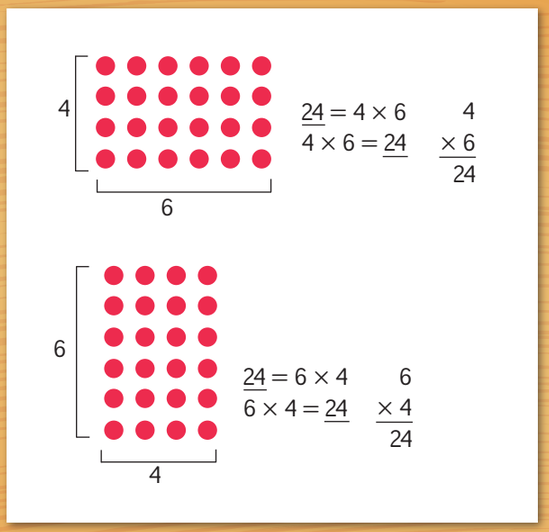
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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.

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.

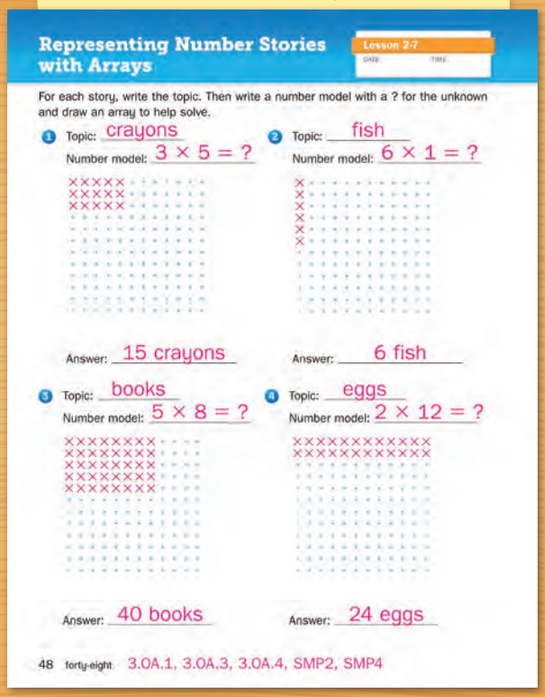
- Write the topic for the story. For example: crayons.
- Record a number model using a question mark to represent the unknown quantity. For example: $3 \times 5 = ?$ or $? = 3 \times 5$. GMP4.1



Academic Language Development

Have children work in partnerships to explain the meaning of the term *array* using the 4-Square Graphic Organizer (*Math Masters,* page TA20) with the headings Definition, Visual Representation/Picture, Non-Example, and Example. Challenge children to use the terms *factor* and *product* in their definitions.

Math Journal 1, p. 48



Representing Number Stories with Arrays

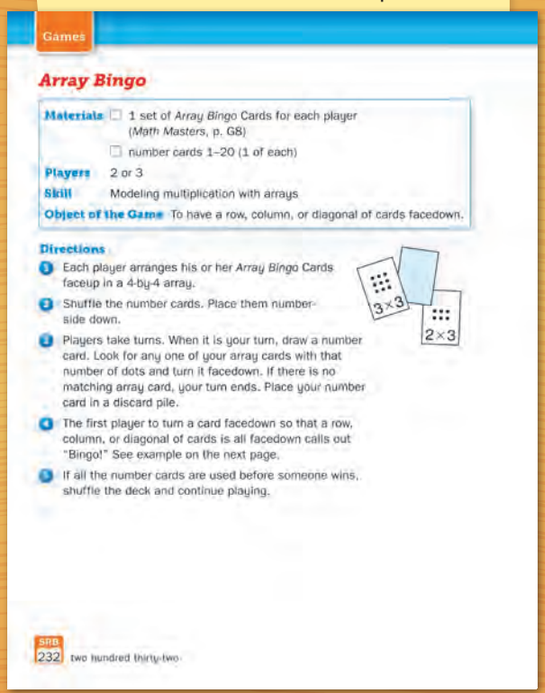
Lesson 2-7

For each story, write the topic. Then write a number model with a ? for the unknown and draw an array to help solve.

1. Topic: crayons
   Number model: 3 × 5 = ?
   Answer: 15 crayons
2. Topic: fish
   Number model: 6 × 1 = ?
   Answer: 6 fish
3. Topic: books
   Number model: 5 × 8 = ?
   Answer: 40 books
4. Topic: eggs
   Number model: 2 × 12 = ?
   Answer: 24 eggs

48 forty-eight 3.OA.1, 3.OA.3, 3.OA.4, SMP2, SMP4

Student Reference Book, p. 232



Games

Array Bingo

Materials ☐ 1 set of *Array Bingo* Cards for each player (*Math Masters*, p. G8)
☐ number cards 1–20 (1 of each)

Players 2 or 3

Skill Modeling multiplication with arrays

Object of the Game To have a row, column, or diagonal of cards facedown.

Directions

1. Each player arranges his or her *Array Bingo* Cards faceup in a 4-by-4 array.
2. Shuffle the number cards. Place them number-side down.
3. Players take turns. When it is your turn, draw a number card. Look for any one of your array cards with that number of dots and turn it facedown. If there is no matching array card, your turn ends. Place your number card in a discard pile.
4. The first player to turn a card facedown so that a row, column, or diagonal of cards is all facedown calls out "Bingo!" See example on the next page.
5. If all the number cards are used before someone wins, shuffle the deck and continue playing.

3×3 2×3

SRB 232 two hundred thirty-two

- 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

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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?*

Differentiate **Game Modifications** Go Online Differentiation Support

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

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

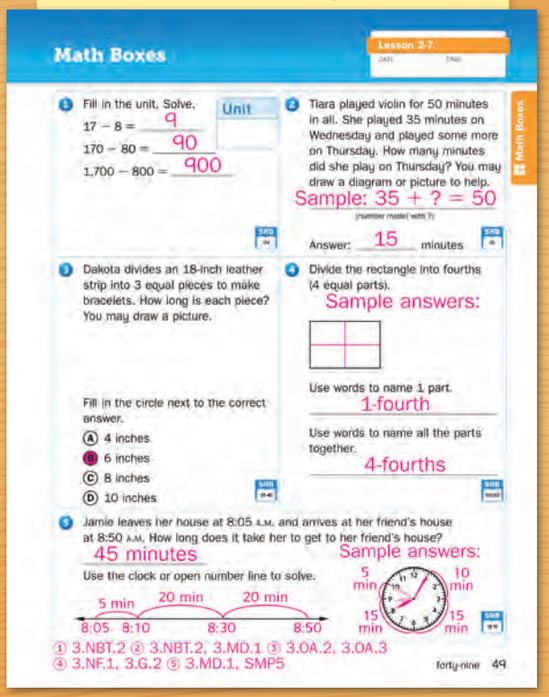
Mixed Practice Math Boxes 2-7 are paired with Math Boxes 2-5.

▶ Home Link 2-7

Math Masters, p. 60

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

Math Journal 1, p. 49


Math Boxes

Lesson 2-7

1 Fill in the unit. Solve.
17 − 8 = 9 Unit
170 − 80 = 90
1,700 − 800 = 900

2 Tiara played violin for 50 minutes in all. She played 35 minutes on Wednesday and played some more on Thursday. How many minutes did she play on Thursday? You may draw a diagram or picture to help.
Sample: 35 + ? = 50
(number model with ?)
Answer: 15 minutes

3 Dakota divides an 18-inch leather strip into 3 equal pieces to make bracelets. How long is each piece? You may draw a picture.
Fill in the circle next to the correct answer.
(A) 4 inches
(B) 6 inches
(C) 8 inches
(D) 10 inches

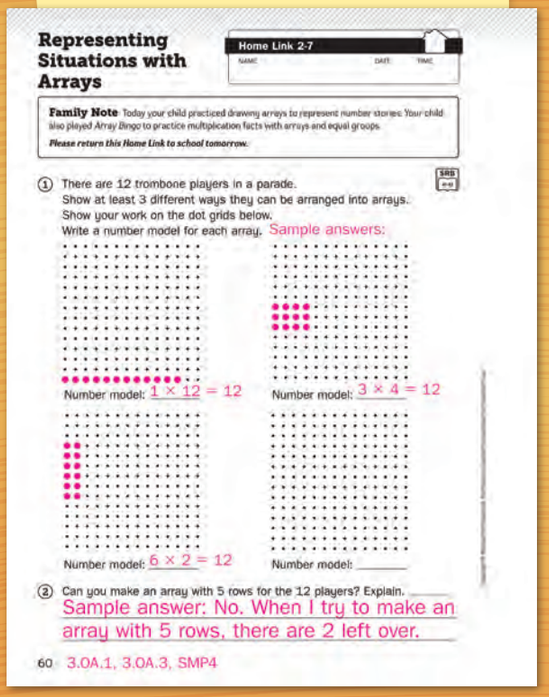
4 Divide the rectangle into fourths (4 equal parts).
Sample answers:
Use words to name 1 part.
1-fourth
Use words to name all the parts together.
4-fourths

5 Jamie leaves her house at 8:05 A.M. and arrives at her friend's house at 8:50 A.M. How long does it take her to get to her friend's house?
45 minutes
Use the clock or open number line to solve.
Sample answers:
5 min, 20 min, 20 min
8:05, 8:10, 8:30, 8:50
5 min, 10 min, 15 min, 15 min

① 3.NBT.2 ② 3.NBT.2, 3.MD.1 ③ 3.OA.2, 3.OA.3
④ 3.NF.1, 3.G.2 ⑤ 3.MD.1, SMP5

forty-nine 49

Math Masters, p. 60


Representing Situations with Arrays

Home Link 2-7

Family Note Today your child practiced drawing arrays to represent number stories. Your child also played *Array Bingo* to practice multiplication facts with arrays and equal groups.
Please return this Home Link to school tomorrow.

① There are 12 trombone players in a parade.
Show at least 3 different ways they can be arranged into arrays.
Show your work on the dot grids below.
Write a number model for each array. Sample answers:

Number model: 1 × 12 = 12
Number model: 3 × 4 = 12
Number model: 6 × 2 = 12
Number model: _____

② Can you make an array with 5 rows for the 12 players? Explain.
Sample answer: No. When I try to make an array with 5 rows, there are 2 left over.

60 3.OA.1, 3.OA.3, SMP4

2-Day Lesson

2-8

Open Response and Reengagement

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

1 Warm Up 5 min

	Materials	Standards
Mental Math and Fluency Children do start-and-stop skip counting.	slate	**Focus Cluster** • Represent and solve problems involving multiplication and division. 3.OA.7

2a Focus 55–65 min

Math Message Children represent and solve an equal-sharing problem.	*Math Journal 1*, p. 50	3.OA.2, 3.OA.3, 3.OA.4 SMP2
Comparing Mathematical Representations Children compare their representations.	*Math Journal 1*, p. 50	3.OA.2, 3.OA.3, 3.OA.4 SMP1, SMP2
Solving the Open Response Problem Children use representations to solve division problems.	*Math Masters*, p. 61; counters; slate and marker; stick-on notes (optional)	3.OA.2, 3.OA.3, 3.OA.4 SMP1, SMP2

Getting Ready for Day 2 →

Review children's work and plan discussion for reengagement. — *Math Masters*, p. TA6; children's work from Day 1

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

1 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

2a 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

WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT

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 **division** number model ($14 \div 2 = ?$ or $14 \div 2 = 7$)

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.

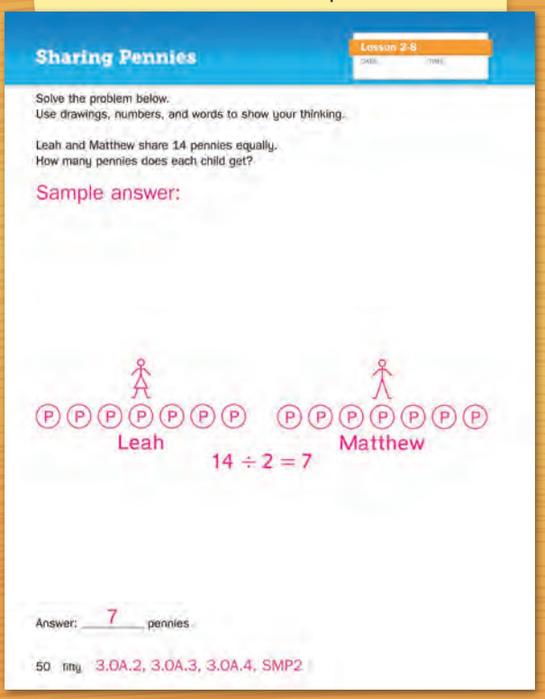
GMP2.2 Make sense of the representations you and others use.

Professional Development

The focus of this lesson is **GMP2.1**. Children represent number stories involving equal shares or equal groups using manipulatives, drawings, words, or number models. Then they make sense of others' representations. For more information on **GMP2.1**, see the Mathematical Background section in the Unit Organizer.

Go Online to the *Implementation Guide* for more information about **SMP2**.

Math Journal 1, p. 50



Sharing Pennies

Lesson 2-8

Solve the problem below.
Use drawings, numbers, and words to show your thinking.

Leah and Matthew share 14 pennies equally.
How many pennies does each child get?

Sample answer:

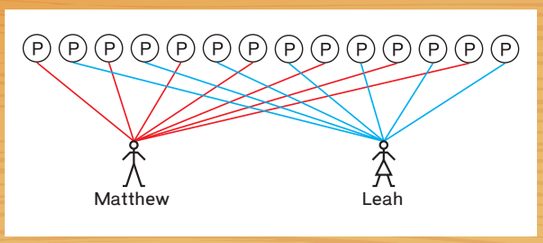
Leah

Matthew

$14 \div 2 = 7$

Answer: 7 pennies

50 fifty 3.OA.2, 3.OA.3, 3.OA.4, SMP2



14 Ⓟ

Leah ● ● ● ● ● ● ●

Matthew ● ● ● ● ● ● ●

14 *pennies*
2 *children*
7 *pennies per child*
0 *pennies remaining*

Leah and Matthew share 14 pennies equally.

- 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

Math Masters, p. 61

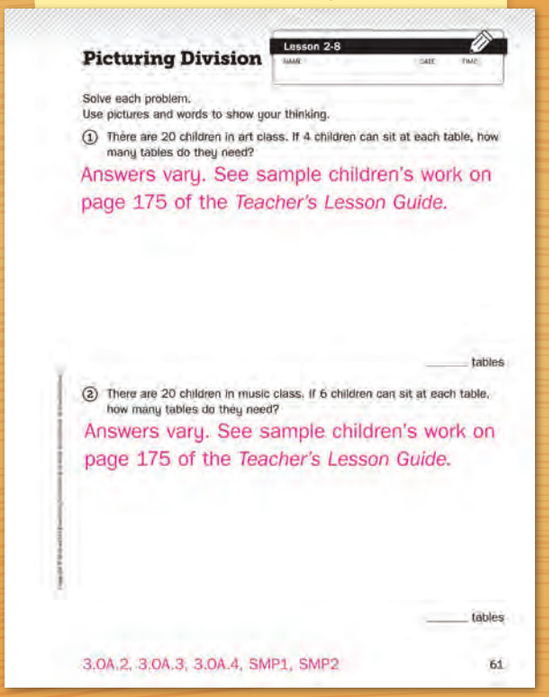
WHOLE CLASS	SMALL GROUP	**PARTNER**	INDEPENDENT

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.

Math Masters, p. 61



Picturing Division

Lesson 2-8

NAME DATE TIME

Solve each problem.
Use pictures and words to show your thinking.

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

Answers vary. See sample children's work on page 175 of the *Teacher's Lesson Guide*.

_____ tables

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

Answers vary. See sample children's work on page 175 of the *Teacher's Lesson Guide*.

_____ tables

3.OA.2, 3.OA.3, 3.OA.4, SMP1, SMP2 61

Common Misconception

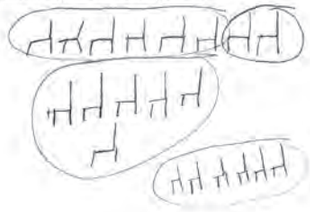
Differentiate Some children may think of 4 as the number of tables (groups), rather than the number of children in each group. Have them review the context of the problem and ask whether their strategies make sense. These children may benefit from using counters to represent children and stick-on notes to represent tables. With these manipulatives, children can create a representation that reflects the number of children at each table to help them determine the total number of tables needed.

Sample child's work, Child A

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

5 tables

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



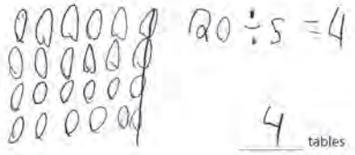
4 tables

Sample child's work, Child B

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

5 tables

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



4 tables

Summarize Ask: *How was your solution for Problem 2 different from your solution for Problem 1?* GMP1.6 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?* GMP1.6, GMP2.2 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?* 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.

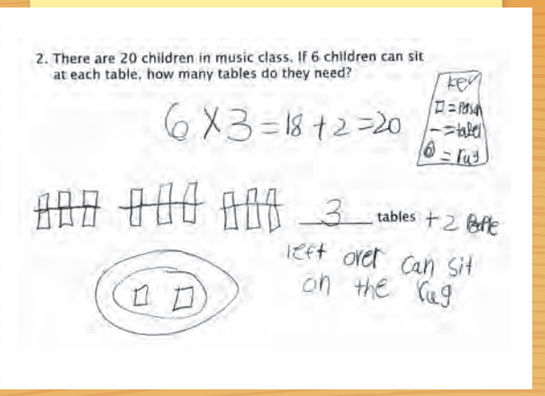
3. Display a child's response that indicates a misconception or incorrect interpretation of what to do with the remainder in Problem 2, such as Child C's work. Ask:

- *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?* 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. 6×3 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.

Sample child's work, Child C



Picturing Division

Overview **Day 2:** **Children discuss representations and solutions and then revise their work.**

Day 2: Reengagement

▶ **Before You Begin**

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

2b Focus 50–55 min

	Materials	Standards Focus Cluster • Represent and solve problems involving multiplication and division.
Setting Expectations Children review the open response problem and discuss what a good response might include. They review how to discuss others' work respectfully.	Guidelines for Discussion Poster	SMP2
Reengaging in the Problem Children discuss other children's representations and solutions.	selected samples of children's work	3.OA.2, 3.OA.3, 3.OA.4 SMP1, SMP2
Revising Work Children revise their work from Day 1.	*Math Masters*, p. 61 (optional); counters; colored pencils (optional)	3.OA.2, 3.OA.3, 3.OA.4 SMP1, SMP2
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.		2.OA.1 SMP8

Goal for Mathematical Process and Practice	Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
GMP2.1 Create mathematical representations using numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects.	Does not provide representations for either Problem 1 or Problem 2, or both representations are incomplete or unclear.	Provides a representation for one of the problems, but not both, that is complete and clearly communicates an equal-grouping strategy.	Provides representations for both Problems 1 and 2 that are complete and clearly communicate equal-grouping strategies and solutions.	Meets expectations and provides a second representation for one of the problems that shows a different strategy.

3 Practice 10–15 min

Math Boxes 2-8 Children practice and maintain skills.	*Math Journal 1*, p. 51	See page 175.
Home Link 2-8 **Homework** Children solve division problems and represent their work with drawings, words, and number models.	*Math Masters*, p. 62	3.OA.2, 3.OA.3, 3.OA.4 SMP2

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

2b Focus 50–55 min

Setting Expectations

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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 _____?
- I wonder why _____.
- I agree/disagree with that because _____.

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?* GMP2.1 Sample answer: It should include representations for both problems that show how that child solved them.

Then tell children that they are going to look at other children's work and think about their different representations and strategies.

Reengaging in the Problem

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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

NOTE These Day 2 activities will ideally take place within a few days of Day 1. Prior to beginning Day 2, see Planning a Follow-Up Discussion from Day 1.

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*

Revising Work

WHOLE CLASS | SMALL GROUP | **PARTNER** | **INDEPENDENT**

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.

Summarize Have children reflect on their work. Ask: *How did you improve your representations?* GMP2.1 Answers vary. *What did you learn from other children's strategies and representations?* GMP1.6 Answers vary.

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.

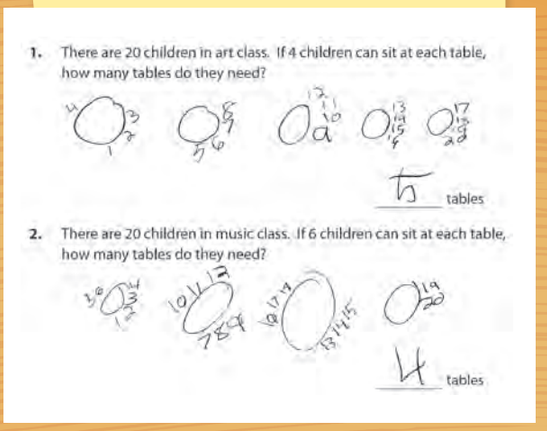
Go Online for optional generic rubrics in the *Assessment Handbook* that can be used to assess any additional GMPs addressed in the lesson.

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.

Sample child's work, "Meeting Expectations"



3 Practice 10–15 min

▸ Math Boxes 2-8

Math Journal 1, p. 51

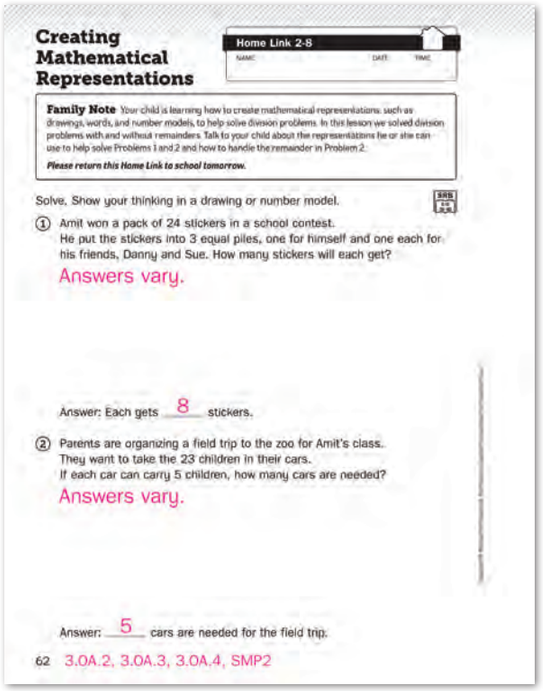
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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


Creating Mathematical Representations

Home Link 2-8

Family Note Your child is learning how to create mathematical representations, such as drawings, words, and number models, to help solve division problems. In this lesson we solved division problems with and without remainders. Talk to your child about the representations he or she can use to help solve Problems 1 and 2 and how to handle the remainder in Problem 2.

Please return this Home Link to school tomorrow.

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

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

Answers vary.

Answer: Each gets 8 stickers.

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

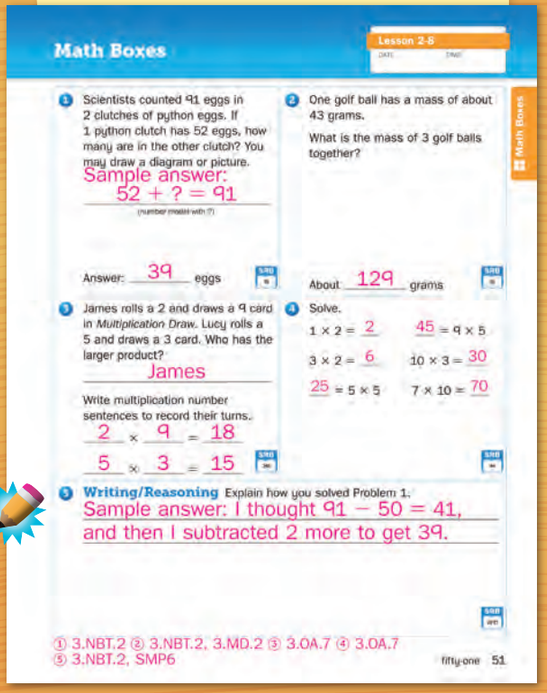
Answers vary.

Answer: 5 cars are needed for the field trip.

62 3.OA.2, 3.OA.3, 3.OA.4, SMP2

Math Masters, p. 62

Math Journal 1, p. 51


Math Boxes

Lesson 2-8

① Scientists counted 91 eggs in 2 clutches of python eggs. If 1 python clutch has 52 eggs, how many are in the other clutch? You may draw a diagram or picture.

Sample answer: 52 + ? = 91

Answer: 39 eggs

② One golf ball has a mass of about 43 grams.

What is the mass of 3 golf balls together?

About 129 grams

③ James rolls a 2 and draws a 9 card in *Multiplication Draw*. Lucy rolls a 5 and draws a 3 card. Who has the larger product?

James

Write multiplication number sentences to record their turns.

2 × 9 = 18

5 × 3 = 15

④ Solve.

1 × 2 = 2 | 45 = 9 × 5

3 × 2 = 6 | 10 × 3 = 30

25 = 5 × 5 | 7 × 10 = 70

⑤ Writing/Reasoning Explain how you solved Problem 1.

Sample answer: I thought 91 − 50 = 41, and then I subtracted 2 more to get 39.

① 3.NBT.2 ② 3.NBT.2, 3.MD.2 ③ 3.OA.7 ④ 3.OA.7 ⑤ 3.NBT.2, SMP6

fifty-one 51

Lesson 2-12 Explorations

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

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.

1 Warm Up 5 min

	Materials	Standards
Mental Math and Fluency Children solve fact extensions.	*slate*	3.NBT.2

2 Focus 40-50 min

Math Message Children examine fraction circles.	*fraction circles (See Before You Begin.)*	SMP6
Introducing Fraction Circles Children name unit fractions.	*fraction circles*	3.NF.1
Exploration A: Exploring Fraction Circles Children explore fraction circles.	*Math Journal 1,* p. 60; fraction circles	3.NF.1 SMP3
Exploration B: Measuring Area Children measure areas of rectangles by counting square inches and square centimeters.	*Activity Card 32; Math Journal 1,* p. 61; *Math Masters,* pp. TA19 and TA22; Everything Math Decks; rectangular items of various sizes; tape (optional)	3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6 SMP6
Exploration C: Comparing Liquid Volume Children compare liquid volumes of containers.	*Activity Card 33; Math Journal 1,* p. 62; assorted containers; 1-liter beaker; paper towels; dishpan; pitcher of water	3.MD.2 SMP5

3 Practice 15-20 min

***Minute Math*+** Children practice mental math strategies.	*Minute Math®+*	
Playing *Division Arrays* **Game** Children group counters equally to practice division.	*Student Reference Book,* pp. 238 and 239; *Math Masters,* p. G9; number cards 6–18 (one of each); counters; 6-sided die	3.OA.2, 3.OA.7 SMP2, SMP7
Math Boxes 2-12 Children practice and maintain skills.	*Math Journal 1,* p. 63	See page 199.
Home Link 2-12 **Homework** Children explore liquid volume and areas.	*Math Masters,* p. 74	3.OA.7, 3.MD.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6

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

Differentiation Options

Readiness 5–10 min

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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.

Enrichment 10–15 min

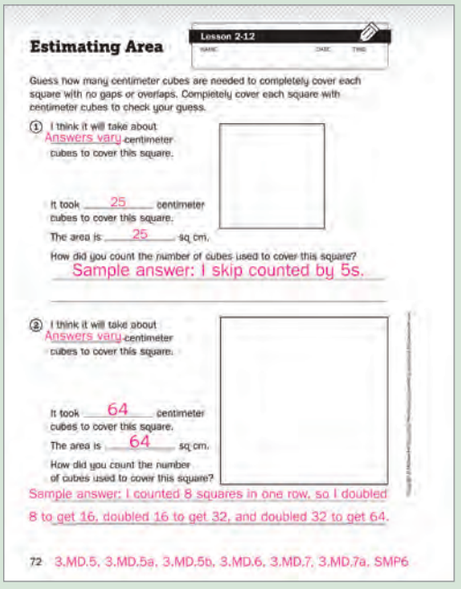
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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



Estimating Area

Lesson 2-12

Guess how many centimeter cubes are needed to completely cover each square with no gaps or overlaps. Completely cover each square with centimeter cubes to check your guess.

1. I think it will take about Answers vary centimeter cubes to cover this square.

It took 25 centimeter cubes to cover this square.
The area is 25 sq cm.
How did you count the number of cubes used to cover this square?
Sample answer: I skip counted by 5s.

2. I think it will take about Answers vary centimeter cubes to cover this square.

It took 64 centimeter cubes to cover this square.
The area is 64 sq cm.
How did you count the number of cubes used to cover this square?
Sample answer: I counted 8 squares in one row, so I doubled 8 to get 16, doubled 16 to get 32, and doubled 32 to get 64.

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

Extra Practice 5–10 min

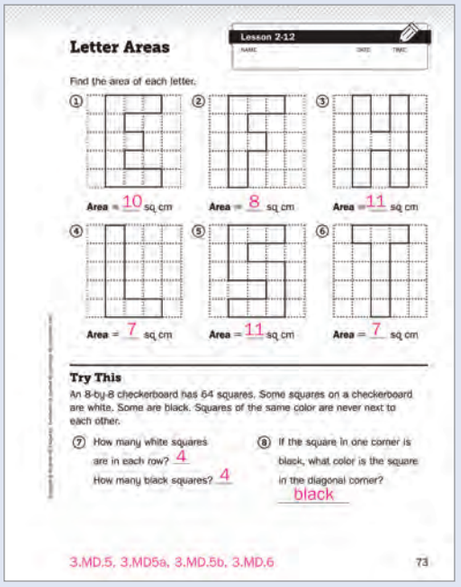
WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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.



Letter Areas

Lesson 2-12

Find the area of each letter.

1. Area = 10 sq cm
2. Area = 8 sq cm
3. Area = 11 sq cm
4. Area = 7 sq cm
5. Area = 11 sq cm
6. Area = 7 sq cm

Try This

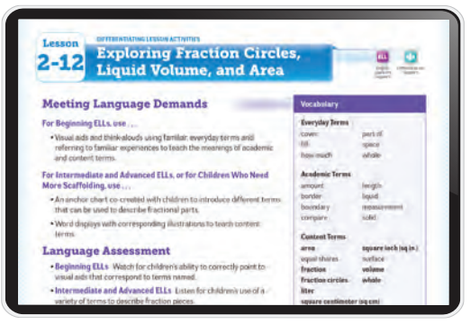
An 8-by-8 checkerboard has 64 squares. Some squares on a checkerboard are white. Some are black. Squares of the same color are never next to each other.

7. How many white squares are in each row? 4
   How many black squares? 4
8. If the square in one corner is black, what color is the square in the diagonal corner? black

3.MD.5, 3.MD5a, 3.MD.5b, 3.MD.6 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?*



Lesson 2-12

Exploring Fraction Circles, Liquid Volume, and Area

Meeting Language Demands

Language Assessment

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
●●○ 72 + ? = 80 8 134 + ? = 140 6 230 − ? = 223 7
●●● 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

WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT

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.

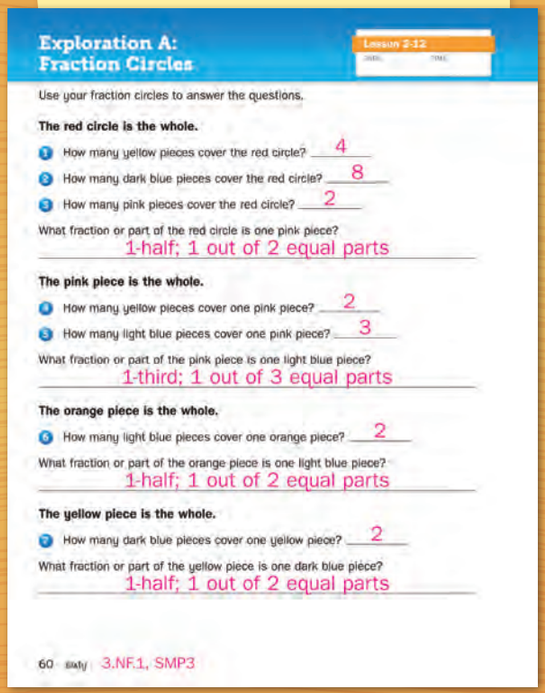
Discuss the total number of pieces for each color. For example, ask: *How many light blue pieces are there?* 6 Emphasize that for each color the pieces are the same size.

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?* 2 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.

Math Journal 1, p. 60



Exploration A: Fraction Circles

Lesson 2-12

Use your fraction circles to answer the questions.

The red circle is the whole.

1. How many yellow pieces cover the red circle? 4
2. How many dark blue pieces cover the red circle? 8
3. How many pink pieces cover the red circle? 2

What fraction or part of the red circle is one pink piece?
1-half; 1 out of 2 equal parts

The pink piece is the whole.

4. How many yellow pieces cover one pink piece? 2
5. How many light blue pieces cover one pink piece? 3

What fraction or part of the pink piece is one light blue piece?
1-third; 1 out of 3 equal parts

The orange piece is the whole.

6. How many light blue pieces cover one orange piece? 2

What fraction or part of the orange piece is one light blue piece?
1-half; 1 out of 2 equal parts

The yellow piece is the whole.

7. How many dark blue pieces cover one yellow piece? 2

What fraction or part of the yellow piece is one dark blue piece?
1-half; 1 out of 2 equal parts

60 3.NF.1, SMP3

▸ Exploration A: Exploring Fraction Circles

Math Journal 1, p. 60

WHOLE CLASS	SMALL GROUP	**PARTNER**	INDEPENDENT

Explain your routine for managing and putting away the fraction circles. To encourage children to think flexibly about the whole, have them follow directions on journal page 60. Have them count the number of same-size pieces that cover different wholes and name unit fractions. Encourage children to make and confirm predictions about part-whole relationships between different fraction circle pieces. Ask: *What fraction of a _____ piece is a _____ piece? How do you know?* GMP3.1 For example, a yellow piece is 1-fourth of the red circle. More formal instruction with fractions will begin in Unit 5.

Differentiate **Adjusting the Activity**

To help children keep track of a particular *whole* when comparing different fraction circle pieces, provide a sentence frame: *___2___ ___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.*

Go Online Differentiation Support

▸ Exploration B: Measuring Area

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

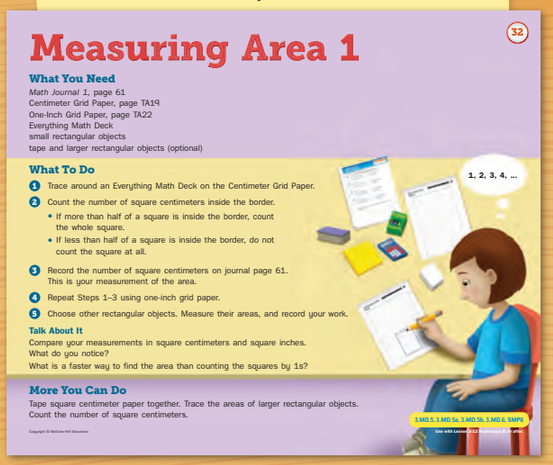
WHOLE CLASS	**SMALL GROUP**	**PARTNER**	**INDEPENDENT**

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.

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).

Activity Card 32


Measuring Area 1

32

What You Need

Math Journal 1, page 61
Centimeter Grid Paper, page TA19
One-Inch Grid Paper, page TA22
Everything Math Deck
small rectangular objects
tape and larger rectangular objects (optional)

What To Do

1. Trace around an Everything Math Deck on the Centimeter Grid Paper.
2. Count the number of square centimeters inside the border.
   - If more than half of a square is inside the border, count the whole square.
   - If less than half of a square is inside the border, do not count the square at all.
3. Record the number of square centimeters on journal page 61. This is your measurement of the area.
4. Repeat Steps 1–3 using one-inch grid paper.
5. Choose other rectangular objects. Measure their areas, and record your work.

Talk About It

Compare your measurements in square centimeters and square inches. What do you notice?
What is a faster way to find the area than counting the squares by 1s?

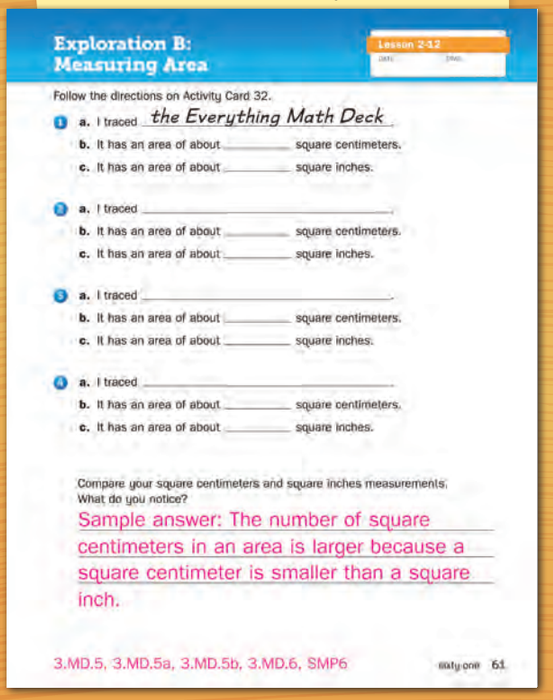
1, 2, 3, 4, ...

More You Can Do

Tape square centimeter paper together. Trace the areas of larger rectangular objects. Count the number of square centimeters.

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

Math Journal 1, p. 61


Exploration B: Measuring Area

Lesson 2-12

Follow the directions on Activity Card 32.

1. a. I traced *the Everything Math Deck*
   b. It has an area of about _____ square centimeters.
   c. It has an area of about _____ square inches.
2. a. I traced _____
   b. It has an area of about _____ square centimeters.
   c. It has an area of about _____ square inches.
3. a. I traced _____
   b. It has an area of about _____ square centimeters.
   c. It has an area of about _____ square inches.
4. a. I traced _____
   b. It has an area of about _____ square centimeters.
   c. It has an area of about _____ square inches.

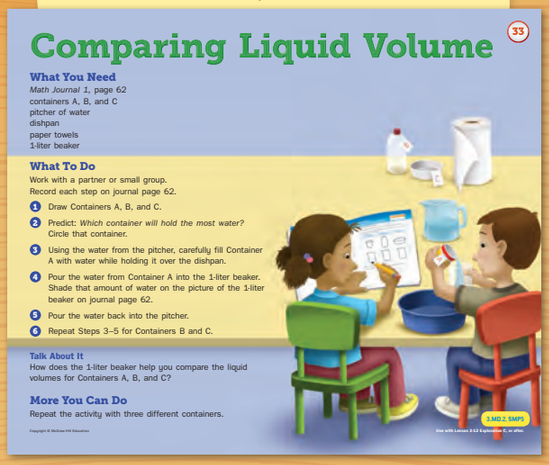
Compare your square centimeters and square inches measurements. What do you notice?

Sample answer: The number of square centimeters in an area is larger because a square centimeter is smaller than a square inch.

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

sixty-one 61

Activity Card 33



Comparing Liquid Volume

33

What You Need

Math Journal 1, page 62
containers A, B, and C
pitcher of water
dishpan
paper towels
1-liter beaker

What To Do

Work with a partner or small group.
Record each step on journal page 62.

1. Draw Containers A, B, and C.
2. Predict: *Which container will hold the most water?* Circle that container.
3. Using the water from the pitcher, carefully fill Container A with water while holding it over the dishpan.
4. Pour the water from Container A into the 1-liter beaker. Shade that amount of water on the picture of the 1-liter beaker on journal page 62.
5. Pour the water back into the pitcher.
6. Repeat Steps 3–5 for Containers B and C.

Talk About It

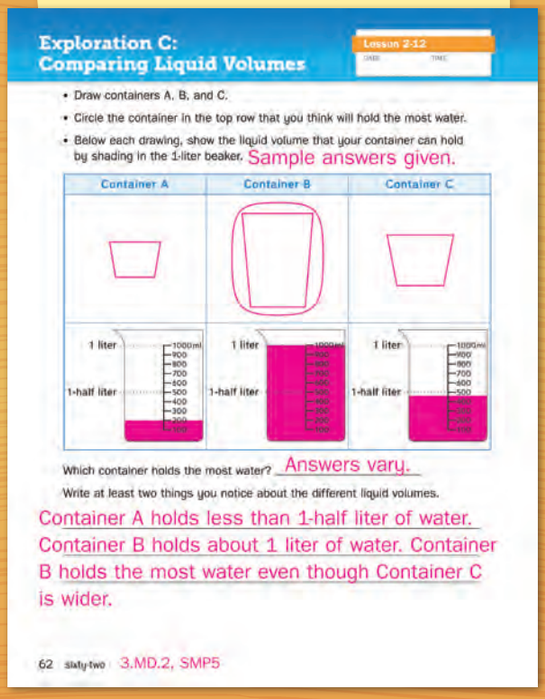
How does the 1-liter beaker help you compare the liquid volumes for Containers A, B, and C?

More You Can Do

Repeat the activity with three different containers.

3.MD.2, SMP5

Math Journal 1, p. 62



Exploration C: Comparing Liquid Volumes

Lesson 2-12

- Draw containers A, B, and C.
- Circle the container in the top row that you think will hold the most water.
- Below each drawing, show the liquid volume that your container can hold by shading in the 1-liter beaker. Sample answers given.

Container A	Container B	Container C
1 liter, 1-half liter	1 liter, 1-half liter	1 liter, 1-half liter

Which container holds the most water? Answers vary.

Write at least two things you notice about the different liquid volumes.

Container A holds less than 1-half liter of water. Container B holds about 1 liter of water. Container B holds the most water even though Container C is wider.

62 sixty-two 3.MD.2, SMP5

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?* GMP6.3 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

WHOLE CLASS | **SMALL GROUP** | **PARTNER** | INDEPENDENT

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. GMP5.2

Summarize Have children share their favorite Exploration activity and describe the math they learned or practiced.

3 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

WHOLE CLASS | **SMALL GROUP** | **PARTNER** | INDEPENDENT

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? GMP2.2

Discuss

- *How do you know if there are leftover counters? Do certain numbers have leftover counters more often than others?* GMP7.1

Differentiate **Game Modifications** Go Online Differentiation Support

▶ Math Boxes 2-12

Math Journal 1, p. 63

WHOLE CLASS | **SMALL GROUP** | **PARTNER** | **INDEPENDENT**

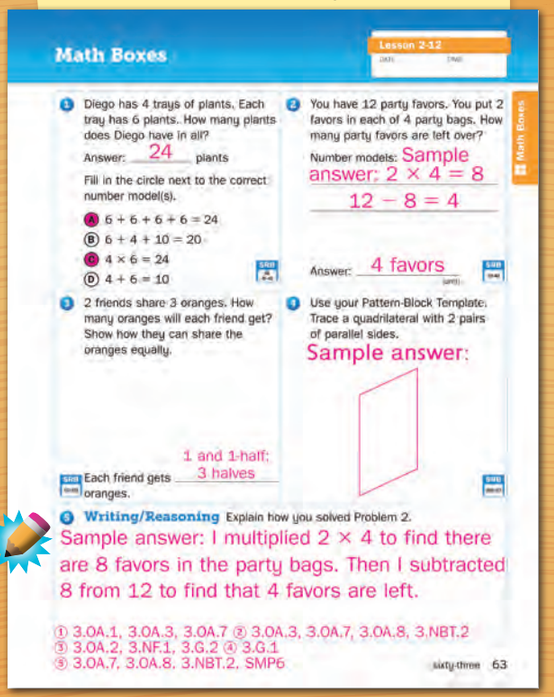
Mixed Practice Math Boxes 2-12 are paired with Math Boxes 2-10.

▶ Home Link 1-12

Math Masters, p. 74

Homework Children explore volume and count squares to find areas.

Math Journal 1, p. 63



Math Boxes

Lesson 2-12

1 Diego has 4 trays of plants. Each tray has 6 plants. How many plants does Diego have in all?
Answer: 24 plants

Fill in the circle next to the correct number model(s).
(A) 6 + 6 + 6 + 6 = 24
(B) 6 + 4 + 10 = 20
(C) 4 × 6 = 24
(D) 4 + 6 = 10

2 You have 12 party favors. You put 2 favors in each of 4 party bags. How many party favors are left over?
Number models: Sample answer: 2 × 4 = 8
12 − 8 = 4
Answer: 4 favors

3 2 friends share 3 oranges. How many oranges will each friend get? Show how they can share the oranges equally.
Each friend gets 1 and 1-half; 3 halves oranges.

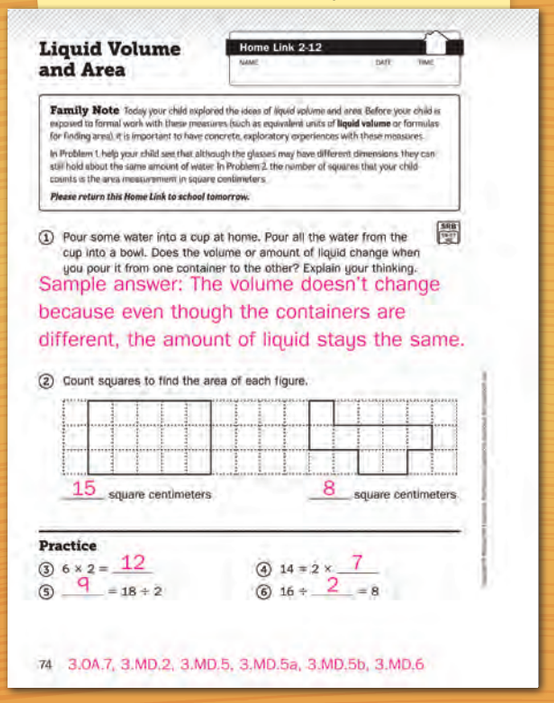
4 Use your Pattern-Block Template. Trace a quadrilateral with 2 pairs of parallel sides.
Sample answer:

5 Writing/Reasoning Explain how you solved Problem 2.
Sample answer: I multiplied 2 × 4 to find there are 8 favors in the party bags. Then I subtracted 8 from 12 to find that 4 favors are left.

1 3.OA.1, 3.OA.3, 3.OA.7 2 3.OA.3, 3.OA.7, 3.OA.8, 3.NBT.2
3 3.OA.2, 3.NF.1, 3.G.2 4 3.G.1
5 3.OA.7, 3.OA.8, 3.NBT.2, SMP6

sixty-three 63

Math Masters, p. 74



Liquid Volume and Area

Home Link 2-12

Family Note Today your child explored the ideas of liquid volume and area. Before your child is exposed to formal work with these measures (such as equivalent units of **liquid volume** or formulas for finding area), it is important to have concrete, exploratory experiences with these measures.

In Problem 1, help your child see that although the glasses may have different dimensions they can still hold about the same amount of water. In Problem 2, the number of squares that your child counts is the area measurement in square centimeters.

Please return this Home Link to school tomorrow.

1 Pour some water into a cup at home. Pour all the water from the cup into a bowl. Does the volume or amount of liquid change when you pour it from one container to the other? Explain your thinking.
Sample answer: The volume doesn't change because even though the containers are different, the amount of liquid stays the same.

2 Count squares to find the area of each figure.
15 square centimeters
8 square centimeters

Practice
3 6 × 2 = 12
4 14 ÷ 2 = 7 × ___
5 9 = 18 ÷ 2
6 16 ÷ 2 = 8

74 3.OA.7, 3.MD.2, 3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6

2-Day Lesson

2-13

Assessments

Unit 2 Progress Check

Overview **Day 1: Administer the Unit Assessments.**
Day 2: Administer the Cumulative Assessment.

Day 1: Unit Assessment

Quick Entry Evaluation Record results and track progress toward mastery.

1 Warm Up 5–10 min

Materials

Self Assessment
Children complete the Self Assessment.

Assessment Handbook, p. 15

2a Assess 35-50 min

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

Assessment Handbook, pp. 16–19

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

Assessment Handbook, pp. 20–21

Standards	Goals for Mathematical Content (GMC)	Lessons	Self Assessment	Unit 2 Assessment	Unit 2 Challenge
3.OA.1	Interpret multiplication in terms of equal groups.	2-6, 2-7	4	8a, 9a, 9b	3a, 3b
3.OA.2	Interpret division in terms of equal shares or equal groups.	2-7 to 2-10	5	10	
3.OA.3	Use multiplication and division to solve number stories.	2-5 to 2-10	4, 5	8a, 9b, 10	3a
	Model number stories involving multiplication and division.	2-5 to 2-7, 2-9, 2-10	4, 5	8a, 9a, 9b, 10	3a, 3b
3.OA.7	Multiply within 100 fluently.	2-4 to 2-7, 2-9, 2-11	6	8a	4
	Know all products of 1-digit numbers × 1, × 2, × 5, and × 10 automatically.	2-6, 2-11		4, 9b	
	Divide within 100 fluently.	2-5, 2-10			2
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 1,000 fluently.	2-1 to 2-5, 2-11	1, 2, 6	1a–1c, 5, 6	1, 2, 4
	Subtract within 1,000 fluently.	2-1 to 2-5, 2-11	1, 2, 6	2a–2c, 3, 5, 6	1

Standards	Goals for Mathematical Process and Practice (GMP)	Lessons	Self Assessment	Unit 2 Assessment	Unit 2 Challenge
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. GMP4.1	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
	Think about accuracy and efficiency when you count, measure, and calculate. GMP6.4	2-6		7, 8a	
SMP7	Look for mathematical structures such as categories, patterns, and properties. GMP7.1	2-1, 2-11		3, 4	
	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

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

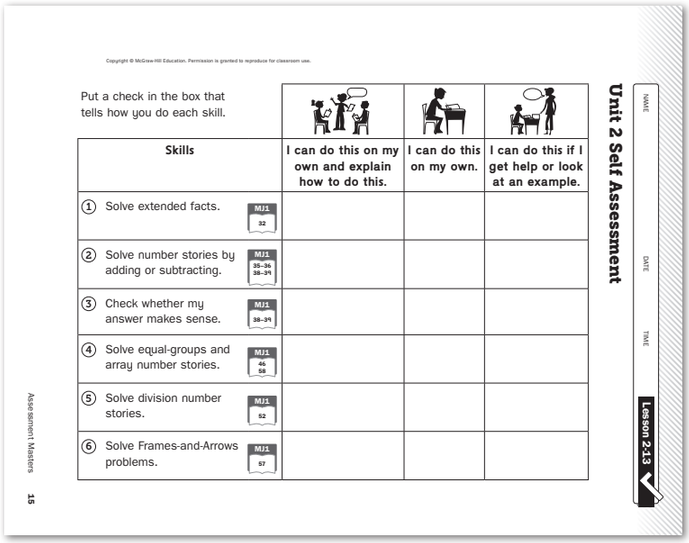
1 Warm Up 5–10 min

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.



Unit 2 Self Assessment

NAME DATE TIME Lesson 2-13

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

Skills	I can do this on my own and explain how to do this.	I can do this on my own.	I can do this if I get help or look at an example.
① Solve extended facts. MJ1 32			
② Solve number stories by adding or subtracting. MJ1 35–36, 38–39			
③ Check whether my answer makes sense. MJ1 38–39			
④ Solve equal-groups and array number stories. MJ1 46, 58			
⑤ Solve division number stories. MJ1 52			
⑥ Solve Frames-and-Arrows problems. MJ1 57			

Assessment Masters 15

Assessment Handbook, p. 15

Assessment Handbook, p. 16

NAME DATE TIME **Lesson 2-13**

Unit 2 Assessment

Fill in the unit box. Then solve.

Unit

① **a.** 3 + 9 = 12

b. 30 + 90 = 120

c. 300 + 900 = 1,200

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 Rule: × 2 or double

2, 4, 8, 16, 32, 64

16 *Assessment Handbook*

2a Assess 35–50 min

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.

NAME DATE TIME **Lesson 2-13**

Unit 2 Assessment (continued)

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.

Total / Part / Part

Start — Change → End

Quantity / Quantity / Difference

⑤ 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
(number model with ?)

Answer: 36 minutes
(unit)

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.

⑥ 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
(number model with ?)

Answer: 12 eggs
(unit)

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

Assessment Masters 17

Assessment Handbook, p. 17

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.

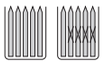
Assessment Handbook, p. 18

NAME DATE TIME **Lesson 2-13**

Unit 2 Assessment (continued)

⑦ Jeremiah read the number story below. Then he drew a picture and wrote two number models to help keep track of his thinking.

Mr. Riley has 2 packs of pencils with 5 pencils in each pack.
He gives 4 of the pencils to his students.
How many pencils does he still have?



$2 \times 5 = 10$
$10 - 4 = 6$

Do Jeremiah's number models fit the number story? Explain your answer.

Yes. Sample explanation: They fit because Mr. Riley had 2 packs of 5 pencils each, and that is 2 × 5 = 10. Then he gave 4 of them away, and that is 10 − 4 = 6. So he has 6 pencils left.

⑧ There are 5 giant balloons in a pack.

a. How many balloons are in 5 packs?
You may draw a picture to help you solve.

Circle the number model that fits the story.
$5 + 5 = ?$ $5 \times 5 = ?$

Answer: 25 balloons (unit)

b. Explain how you solved Problem 8a. Sample answer: I skip counted by 5s and got 25.

18 *Assessment Handbook*

Assessment Handbook, p. 19

NAME DATE TIME **Lesson 2-13**

Unit 2 Assessment (continued)

⑨ You have 2 rows of chairs with 9 chairs in each row.
How many chairs do you have in all?

a. Draw an array on the dot grid to match the story.

b. Circle the number model that fits the story.
$2 \times 9 = ?$ $2 + 9 = ?$

There are 18 chairs (unit) in all.

⑩ Share 20 marbles equally among 5 friends.
Draw a picture to show how you shared the marbles.

Drawings vary.

Each friend gets 4 marbles (unit).

There are 0 marbles (unit) left over.

Assessment Masters 19

Assessment Handbook, p. 20

NAME DATE TIME **Lesson 2-13**

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? + 57

Explain how Lila might use the basic fact. 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. So 423 + 57 = 480.

② Read the number story and circle the pair of number models that fit the story. Then solve.

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? You may draw a picture to help.

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

A 30 ÷ 3 = 10
10 + 6 = 16

B 30 × 3 = 90
90 + 6 = 96

C 30 + 3 = 33
33 + 6 = 39

D 30 − 3 = 27
27 + 6 = 33

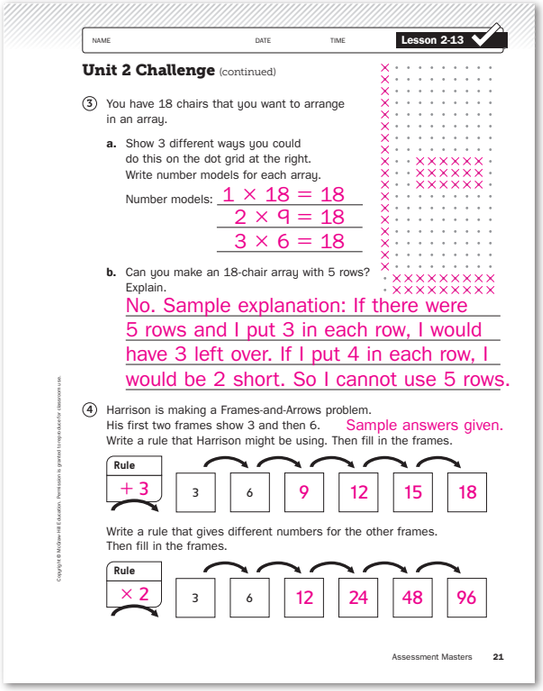
Mike's group now has 16 markers.

Unit 2 Challenge (Optional)

Assessment Handbook, pp. 20–21

WHOLE CLASS | SMALL GROUP | PARTNER | **INDEPENDENT**

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



NAME DATE TIME **Lesson 2-13**

Unit 2 Challenge (continued)

③ 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 × 18 = 18
2 × 9 = 18
3 × 6 = 18

b. Can you make an 18-chair array with 5 rows? Explain.

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.

④ 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.

Rule						
+ 3	3	6	9	12	15	18

Write a rule that gives different numbers for the other frames. Then fill in the frames.

Rule						
× 2	3	6	12	24	48	96

Assessment Handbook, p. 21

Unit 2 Progress Check

Overview **Day 2:** Administer the Cumulative Assessment.

Day 2: Cumulative Assessment

2b Assess 30–50 min

Materials

Cumulative Assessment
These items reflect mastery expectations to this point.

Assessment Handbook, pp. 22–24

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

Materials

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

Math Journal 1, p. 64

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

Math Masters, pp. 75–78

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

Assessment Handbook, p. 22

NAME DATE TIME **Lesson 2-13**

Unit 2 Cumulative Assessment

① Record the time shown on each clock.

a.  5 : 05

b.  7 : 35

c.  12 : 50

② Draw the hands to show the times.

a. 8:15 

b. 8:30 

③ Solve.

a. 2 × 7 = 14

b. 25 = 5 × 5

c. 12 = 2 × 6

d. 7 × 5 = 35

e. 40 = 10 × 4

f. 6 × 10 = 60

g. Explain how you solved 6 × 10. Sample answers: I skip counted by 10s six times. I knew that two 10s make 20, so I added 20 three times. I know that 6 × 10 is 6 tens, which is like 6 base-10 longs, or 60.

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Assessment Handbook, p. 23

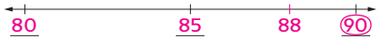
NAME DATE TIME **Lesson 2-13**

Unit 2 Cumulative Assessment (continued)

④ Round each number to the nearest 10.
You may use open number lines to help.

a. 42 40

b. 88 90



c. Explain how you rounded 88 to the nearest 10.
Sample answer: I knew that 80 and 90 were the nearest 10s to 88 and that 88 is closer to 90. So 88 rounded to the nearest 10 is 90.

⑤ Round each number to the nearest 100.
You may use open number lines to help.

a. 490 500

b. 520 500

Assessment Masters 23

2b Assess 35–50 min

Cumulative Assessment

Assessment Handbook, pp. 22–24

WHOLE CLASS | SMALL GROUP | PARTNER | **INDEPENDENT**

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.

Differentiate **Adjusting the Assessment**

Item(s)	Adjustments
1	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.
2	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.
3	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 × 7 becomes 20 × 7.
4	To scaffold Item 4, have children list the multiples of 10 from 0 to 100.
5	To scaffold Item 5, have children list the multiples of 100 from 0 to 1,000.
6	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.

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.

3 Look Ahead 10–15 min

▶ Math Boxes 2-13: Preview for Unit 3

Math Journal 1, p. 64

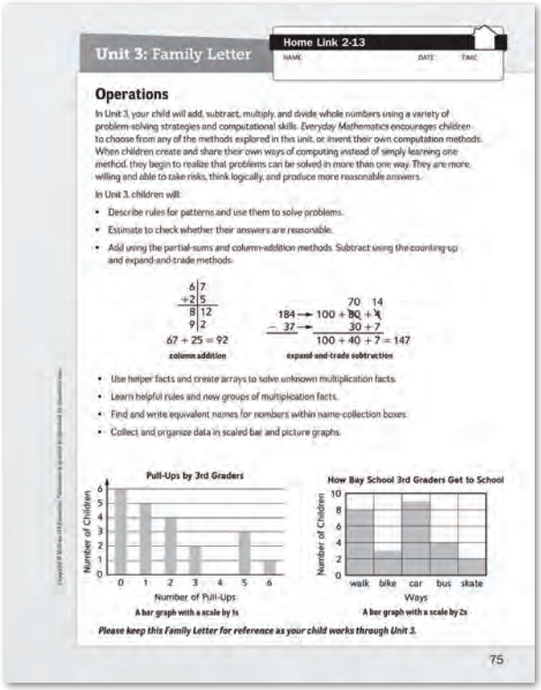
WHOLE CLASS | SMALL GROUP | **PARTNER** | **INDEPENDENT**

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

Math Masters, pp. 75–78

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



Unit 3: Family Letter

Home Link 2-13

NAME DATE TIME

Operations

In Unit 3, your child will add, subtract, multiply, and divide whole numbers using a variety of problem-solving strategies and computational skills. *Everyday Mathematics* encourages children to choose from any of the methods explored in this unit, or invent their own computation methods. When children create and share their own ways of computing instead of simply learning one method, they begin to realize that problems can be solved in more than one way. They are more willing and able to take risks, think logically, and produce more reasonable answers.

In Unit 3, children will:

- Describe rules for patterns and use them to solve problems.
- Estimate to check whether their answers are reasonable.
- Add using the partial-sums and column-addition methods. Subtract using the counting-up and expand-and-trade methods.

$$\begin{array}{r} 67 \\ +25 \\ \hline 812 \\ 92 \end{array}$$

67 + 25 = 92

column addition

$$\begin{array}{r} 184 \\ -\ 37 \\ \hline \end{array} \rightarrow \begin{array}{r} 100 + 80 + 4 \\ 30 + 7 \\ \hline 100 + 40 + 7 = 147 \end{array}$$

expand-and-trade subtraction

- Use helper facts and create arrays to solve unknown multiplication facts.
- Learn helpful rules and new groups of multiplication facts.
- Find and write equivalent names for numbers within name-collection boxes.
- Collect and organize data in scaled bar and picture graphs.

Pull-Ups by 3rd Graders

Number of Children

Number of Pull-Ups

A bar graph with a scale by 1s

How Bay School 3rd Graders Get to School

Number of Children

walk bike car bus skate

Ways

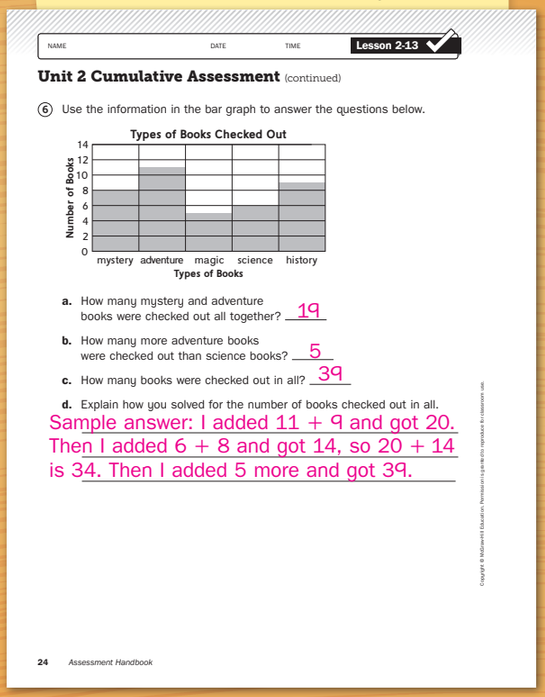
A bar graph with a scale by 2s

Please keep this Family Letter for reference as your child works through Unit 3.

75

Math Masters, pp. 75–78

Assessment Handbook, p. 24



NAME DATE TIME Lesson 2-13

Unit 2 Cumulative Assessment (continued)

⑥ Use the information in the bar graph to answer the questions below.

Types of Books Checked Out

Number of Books

mystery adventure magic science history

Types of Books

a. How many mystery and adventure books were checked out all together? 19

b. How many more adventure books were checked out than science books? 5

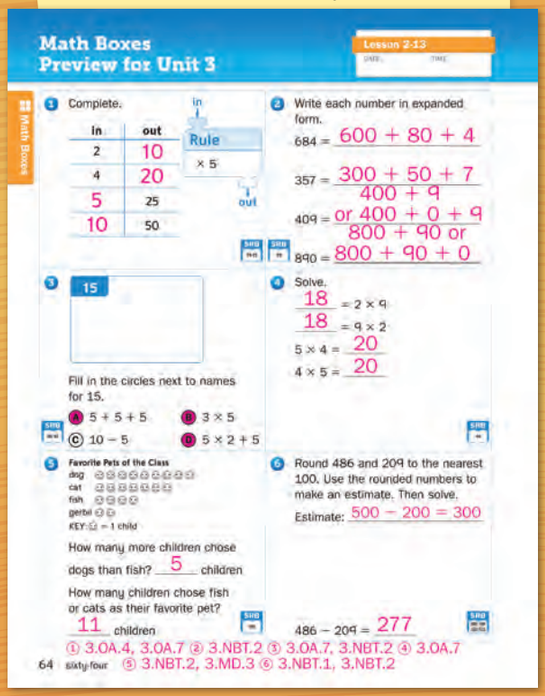
c. How many books were checked out in all? 39

d. Explain how you solved for the number of books checked out in all.

Sample answer: I added 11 + 9 and got 20. Then I added 6 + 8 and got 14, so 20 + 14 is 34. Then I added 5 more and got 39.

24 *Assessment Handbook*

Math Journal 1, p. 64



Math Boxes Preview for Unit 3

Lesson 2-13

DATE TIME

Math Boxes

① Complete.

in	out
2	10
4	20
5	25
10	50

Rule: × 5 (in → out)

② Write each number in expanded form.

684 = 600 + 80 + 4

357 = 300 + 50 + 7 or 400 + 9

409 = 400 + 0 + 9 or 800 + 90

890 = 800 + 90 + 0

③ 15

Fill in the circles next to names for 15.

(A) 5 + 5 + 5 (B) 3 × 5

(C) 10 − 5 (D) 5 × 2 + 5

④ Solve.

18 = 2 × 9

18 = 9 × 2

5 × 4 = 20

4 × 5 = 20

⑤ Favorite Pets of the Class

dog

cat

fish

gerbil

KEY: = 1 child

How many more children chose dogs than fish? 5 children

How many children chose fish or cats as their favorite pet? 11 children

⑥ Round 486 and 209 to the nearest 100. Use the rounded numbers to make an estimate. Then solve.

Estimate: 500 − 200 = 300

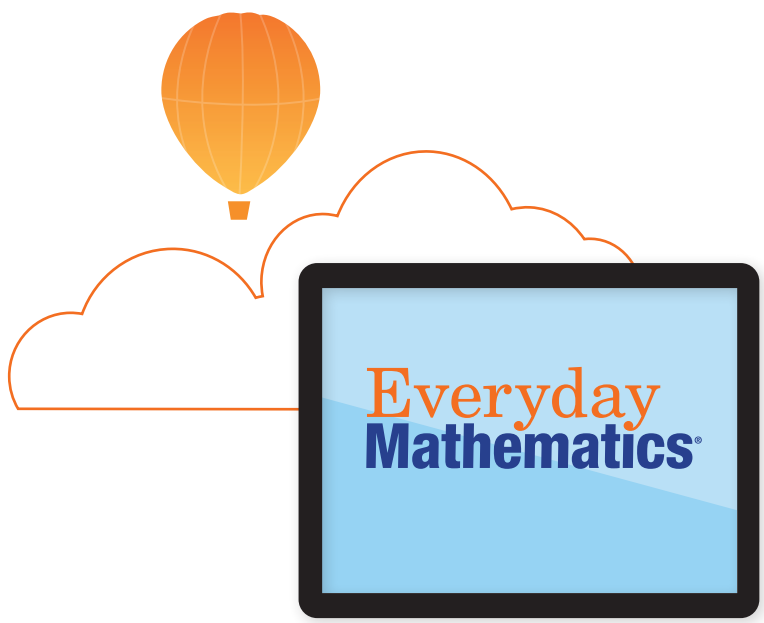
486 − 209 = 277

① 3.OA.4, 3.OA.7 ② 3.NBT.2 ③ 3.OA.7, 3.NBT.2 ④ 3.OA.7 ⑤ 3.NBT.2, 3.MD.3 ⑥ 3.NBT.1, 3.NBT.2

64 sixty-four

GRADE

3



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