Everyday **Mathematics**®

The University of Chicago School Mathematics Project

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

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.

WARM UP

Strengthen fluency

FOCUS

Show what you know

Share and learn together

CHECK THE TARGET

Today's Data

Reflect and share

PRACTICE

Teacher Table

Independent

Collaboration

Flexible Stations

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 LaFlor/Vetta/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

| **1** | **Warm Up** | 5 min | **Materials** |

Mental Math and Fluency
Students convert between units of length.

| **2** | **Focus** | 35–40 min |

Math Message   *Student Reference Book*, p. 328

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.

5.MD.1

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.
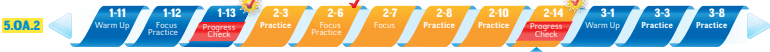
/// Spiral Towards Mastery

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

RIGOR		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
	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.
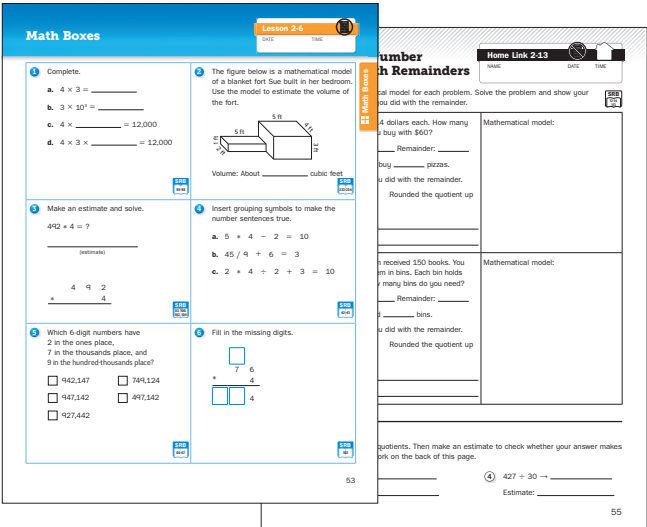
Math Boxes

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.

(t)©KidStock/Blend Images LLC, (b)McGraw-Hill Education

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.

▶ **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 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.
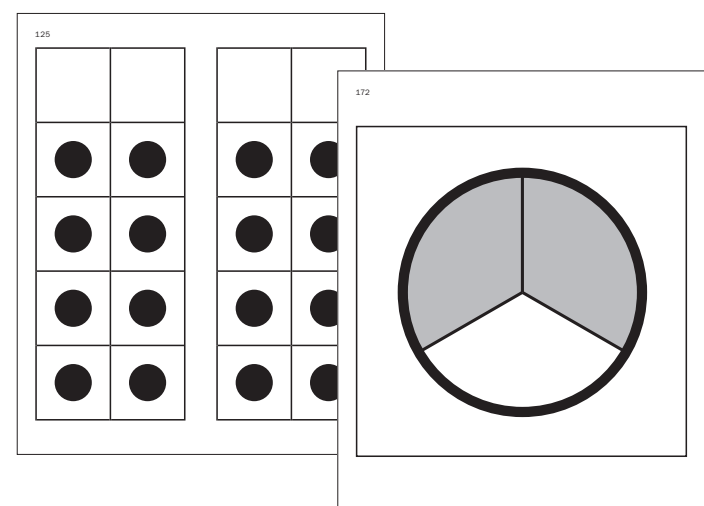

Quick Looks

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.
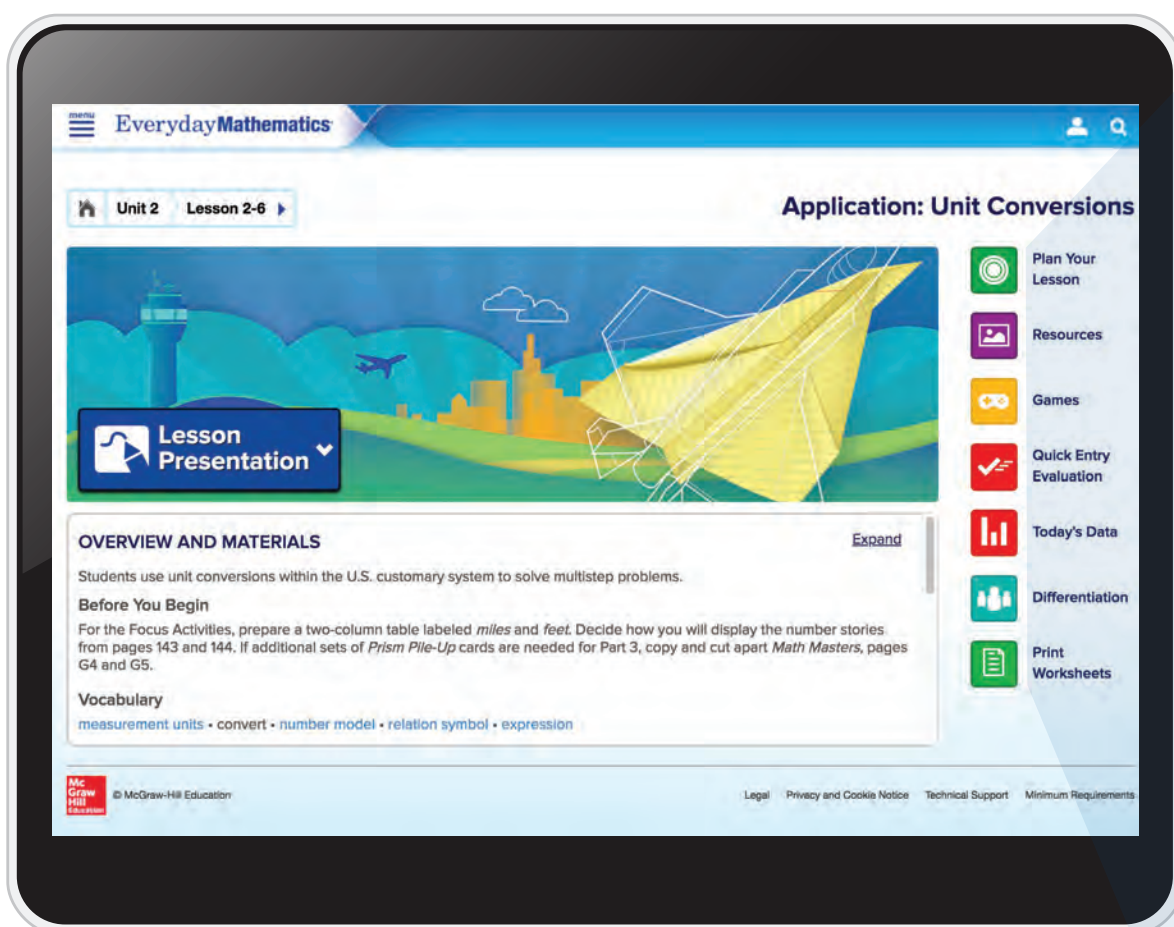
Plan Your Lesson

Review all of the activities for the lesson.

Resources

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

Games

Open online games for fluency practice.

Quick Entry

Easily record evaluations of your students' progress.

Today's Data

Easy access to Data Dashboard reports to drive your daily instruction.

Differentiation

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

Launch Presentation

Editable versions of digital lessons that help you lead instruction.

scottdunlap/iStockvectors/Getty Images

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.
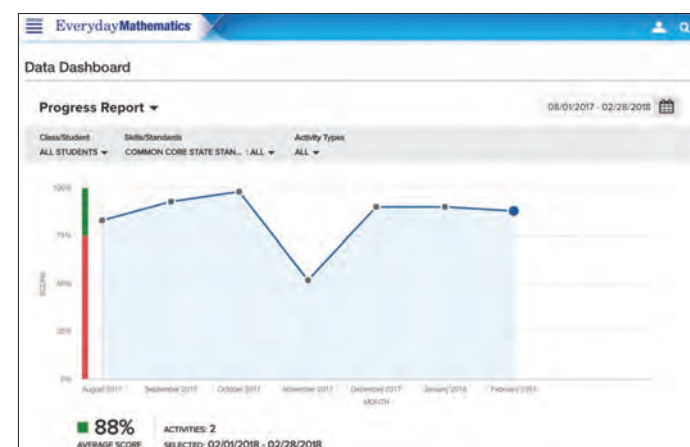

Quick Entry Evaluation Tool

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.

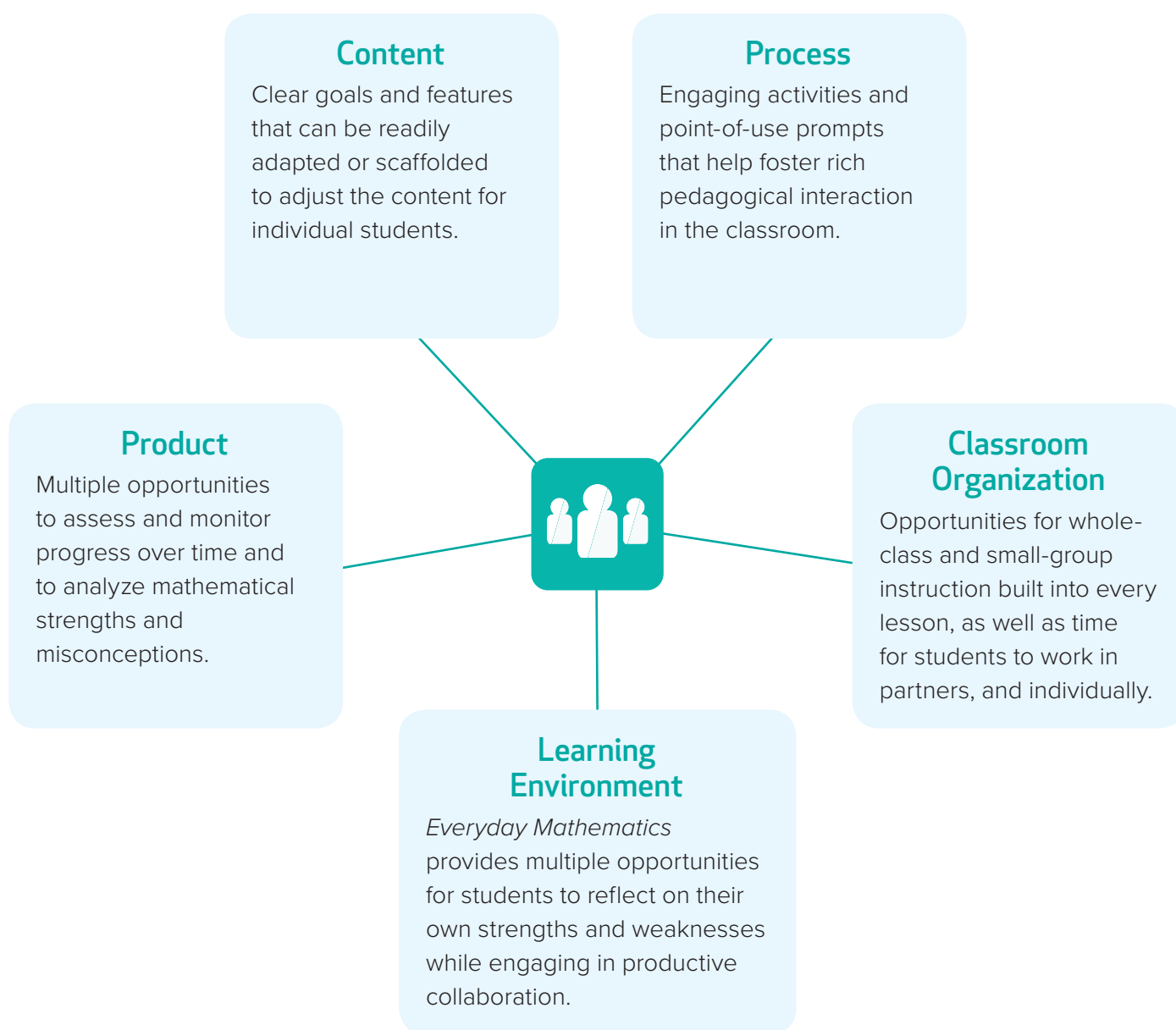*Progress Report*

Recommendations 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

Content

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

Process

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

Product

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

Classroom Organization

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

Learning Environment

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

Differentiation Options

Readiness 5–15 min	Enrichment 15–30 min	Extra Practice 5–15 min
WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT	WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT	WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT
Counting to Convert Inches to Feet	**Writing Unit Conversion Number Stories**	**Converting Units**
5.MD.1, SMP7	5.MD.1	5.OA.2, 5.MD.1
per group: three 12-inch rulers, 36 square pattern blocks	Activity Card 20; *Math Journal 1*, p. 52; *Student Reference Book*, p. 328	Activity Card 21; *Student Reference Book*, p. 328; number cards 1–20 (1 of each); two 6-sid...
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	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.	For more practice w... students roll dice an... 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 ELL Differentiation Support

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.

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

2 Focus

▶ **Math Message**

ELL **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**

ELL **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

Vocabulary

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

Academic Terms
conversion / unit
section

Content Terms
convert / measurement units
expression / number model
feet / relation symbol

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

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.

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
	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 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. 112 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.
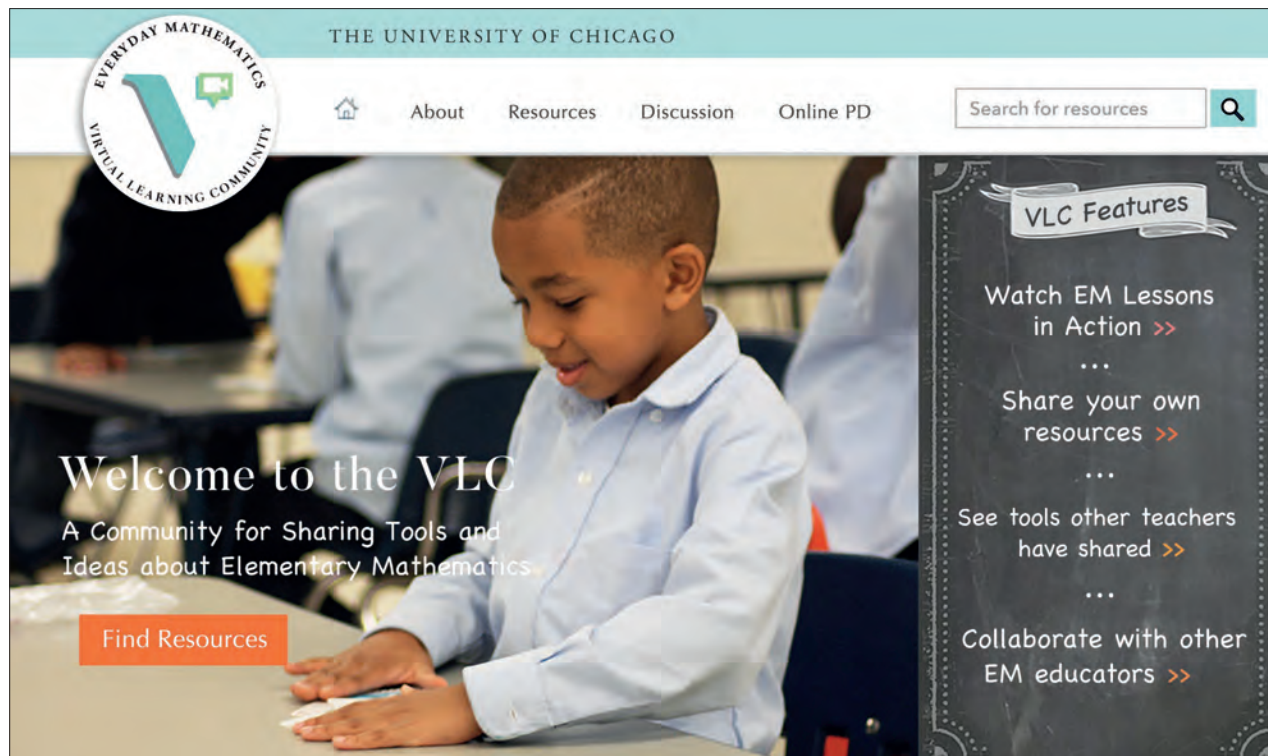
Resources

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.
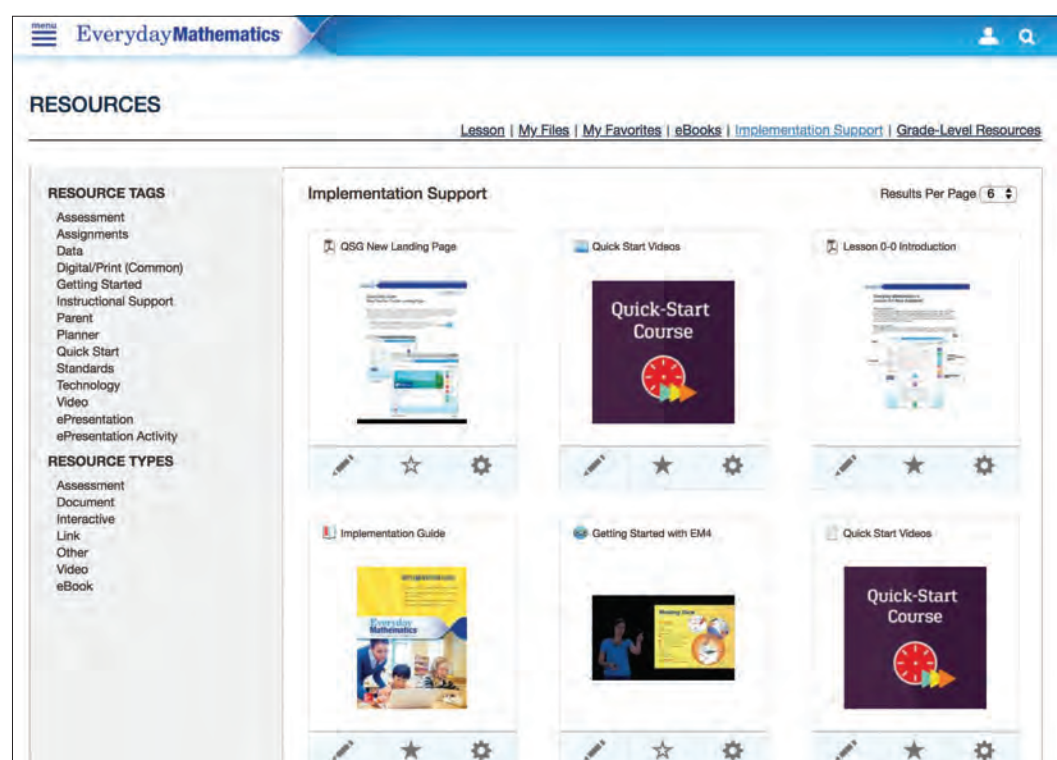
Getting Ready to Teach
Fourth Grade Everyday Mathematics

Welcome to *Fourth 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 4 has **112 lessons** in 8 units. Plan to spend 60–75 minutes every day on math so that you complete **3–4 lessons each week** and **one unit every 4–5 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, students 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-xxvii 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 4–9 to distribute early in the school year.
- Review the **Beginning-of-Year Assessment** on pages 76–79 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 begins on page 2.

Lesson Types

Fourth Grade Everyday Mathematics includes three 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.

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

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 students 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 students to think creatively about a problem. They address both content and process/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 students. • Note that some students 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 students answer orally, with gestures, or on slates or tablets that provide practice towards fluency.	• Select the levels that make sense for your students and customize for your class. • Spend 5 or fewer minutes on this feature.

Part 2: Focus		Description	Tips
Instruction	**Math Message and Math Message Follow-Up**	An introductory activity to the day's lesson that usually requires students 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 students opportunities to discuss their strategies.	• Consider where and how you will display the Math Message and how students will record their answers. **2 Focus** 30–40 min ▸ **Math Message** *Math Journal 1, p. 32* *Find the perimeter of the square shown at the top of journal page 32. Convert your answer to inches.* ▸ **Developing Formulas for the Perimeter of Rectangles** *Math Journal 1, p. 32* WHOLE CLASS / SMALL GROUP / PARTNER / INDEPENDENT **Math Message Follow-Up** Remind students that the **perimeter** is the length of a boundary of a closed shape. Direct them to use their fingers to • Maintain high cognitive demand by expecting students 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 students explore and engage in new content (skills, concepts, games).	• Encourage students 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 Process and Practice Standards. `Go Online` to the *Implementation Guide* for information on 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 students would benefit from differentiation activities. • Consider Assessment Check-Ins as "fair to grade" in most cases. `Go Online` to record students' 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 students to meet expectations for standards. This is an essential part of the distributed practice in *Everyday Mathematics*. • Plan for all students to play *Everyday Mathematics* games at least 60 minutes per week. `Go Online` to the *Implementation Guide* for tips to ensure that all students 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 that reviews skills and concepts which students have seen prior to that point in the program. Preview Math Boxes anticipate content in the upcoming unit.	• Aim to have students 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 students 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 students who struggle and challenge students who are ready.
	Differentiation Support	Offers two online pages of specific differentiation ideas for each lesson, as well as ELL suggestions and scaffolding for students 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 students, not solely English language learners
	English Language Learners (ELL)	Provides activities and point-of-use ideas for supporting students 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 4 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
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
Geometry 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 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

Manipulative Kits and eToolkit

The table below lists the materials that are used on a regular basis throughout *Fourth 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**
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	1 set; 5 beakers in each set	✔
Clock Faces	Not in kit	✔
Connectors	1 pack of 2,000	
Counters, Double-Sided	Not in kit	✔
Counters; Translucent (red, yellow, blue, green)	5 packs of 200	
Dice, Dot	2 packs of 12	✔
Dice, Polyhedral	Not in kit	✔
Dice, 10-Sided, numbered 0–9	25 dice	✔
Everything Math Deck	15 decks	✔
Fraction Circle Pieces	25 sets	✔
Geoboards, Two-Sided, 7" by 7"	8 geoboards	✔
Marker Boards	25 boards	
Measuring Cups: Cup, Pint, Quart, Gallon	1 set	
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 Sets	Not in kit	✔
Play Money Coin Set	1 set	✔
Protractor, Half-Circle	25 protractors	✔
Rocker (Pan) Balance	Not in kit	✔
Rubber Bands	1 pack of 400	
Ruler, 12 in.	1 set of 25 rulers	
Tape Measure, Retractable	15 tape measures	

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, operationalizing them in ways that are appropriate for elementary students. See pages EM6–EM9 for a full view of the practice standards and the related GMPs.

Standards for Mathematical Process and Practice

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 4	*Everyday Mathematics* Grade 4 Lessons*
Operations and Algebraic Thinking 4.OA	
Use the four operations with whole numbers to solve problems.	
4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	**2-6, 2-8, 2-9,** 2-12, 4-8, 4-10, 5-6, 5-9, 6-11 (3-1, 3-3, 3-13, 4-6, 4-9, 4-12, 6-2, 6-4)
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.[1]	**2-6, 2-8, 2-9,** 2-12, **3-12, 4-1,** 4-8, 5-3, 5-9, 6-3, 6-6, 6-11, **7-2** (3-2, 3-4, 3-11, 3-13, 4-6, 4-12, 6-8)
4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.	**1-5, 1-6, 1-7, 1-9,** 1-10, 2-6, 3-3, 3-4, **4-2,** 4-9, **4-12,** 5-5, **5-13, 6-5, 6-8, 7-7, 7-12, 8-1,** 8-4, **8-9,** 8-10 (1-11, 1-12, 2-8, 2-9, 2-11, 2-12, 2-13, 3-5, 3-6, 3-7, 3-8, 3-10, 4-9, 4-11, 4-13, 5-1, 5-3, 5-10, 6-1, 6-2, 6-3, 6-4, 6-10, 6-11, 6-13, 7-9, 7-13, 8-6, 8-7, 8-8)
Gain familiarity with factors and multiples.	
4.OA.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	**2-3, 2-4, 2-5,** 2-8, 2-9, 2-10, 2-13, 3-1, **3-2,** 3-3, **3-4,** 3-5, 3-6, 3-8, 3-9, 3-11, 3-12, 4-1, 4-2, 4-3, 4-11, 4-12, **6-1, 6-3, 6-7,** 7-5 (2-6, 2-7, 2-12, 4-6, 4-8, 4-13, 6-10)
Generate and analyze patterns.	
4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	**1-8, 2-1, 2-4, 2-6, 2-13, 3-2, 3-4,** 3-10, 4-2, 6-8, **7-9** (1-1, 1-3, 1-10, 2-11, 6-1, 6-3, 7-5, 7-7, 7-11, 7-13)
Number and Operations in Base Ten[2] 4.NBT	
Generalize place value understanding for multi-digit whole numbers.	
4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.*	**1-1, 1-2, 1-4, 1-8,** 1-13, 2-3, 2-7, 3-6, **4-1, 4-5, 6-1** (1-3, 2-11, 2-13, 3-8, 3-11, 3-13, 4-3)

[1]See Glossary, Table 2.
[2]Grade 4 expectations in this strand are limited to whole numbers less than or equal to 1,000,000.

Content Standards for Mathematics for Grade 4	Everyday Mathematics Grade 4 Lessons*
4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**1-1, 1-2, 1-3, 1-4,** 1-5, 1-6, **1-7,** 1-8, **1-9,** 1-10, 1-11, 1-12, 1-13, 2-1, 2-2, 2-3, 2-4, 2-6, 2-7, 2-8, 2-9, 2-11, 2-12, 2-13, 3-1, 3-3, 3-5, 3-6, 3-7, 3-8, 3-10, **4-3,** 4-5, **4-6,** 4-7, **4-8, 4-9, 4-10,** 4-12, 4-13, 5-1, 5-7, 6-2, **6-7,** 7-3, 8-8 (3-5, 3-9, 3-12, 4-1, 4-11, 8-10)
4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.	**1-3, 1-4, 1-5,** 1-6, **1-10,** 1-12, 2-2, 3-2, 3-7, 3-9, 3-12, 3-13, **4-2,** 4-6, **4-12, 5-13, 6-4, 6-7,** 8-10 (1-1, 1-7, 1-8, 1-13, 2-5, 2-7, 3-1, 3-3, 3-10, 4-9, 4-11, 4-13, 8-9)
Use place value understanding and properties of operations to perform multi-digit arithmetic.	
4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	1-1, 1-2, 1-3, **1-4, 1-5, 1-6, 1-7,** 1-8, **1-9, 1-10,** 1-12, **1-13,** 2-1, **2-2,** 2-3, 2-4, 2-5, **2-7,** 2-8, **2-9,** 2-10, 2-12, **2-13,** 3-3, 3-4, 3-6, 3-7, 3-8, 3-11, 3-13, 4-1, **4-2, 4-3, 4-4, 4-6, 4-7, 4-8, 4-9, 4-10, 4-11, 4-12,** 5-1, 5-5, 5-6, 5-7, 5-11, 5-12, **5-13, 6-2, 6-4,** 6-5, **6-7,** 6-10, **6-11, 7-1,** 7-3, 7-4, **7-7,** 7-8, 7-12, **8-1, 8-2, 8-3,** 8-4, 8-6, 8-8, 8-11, **8-12, 8-13** (1-11, 2-6, 2-11, 3-1, 3-5, 3-10, 4-5, 4-13, 5-2, 5-3, 5-4, 5-8, 5-9, 5-10, 6-1, 6-3, 7-2, 7-6, 7-11, 7-13, 8-5, 8-7, 8-9, 8-10)
4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**1-1,** 1-8, **1-10, 1-13, 2-1, 2-2, 2-3, 2-4, 2-5,** 2-6, **2-7, 2-8, 2-9,** 2-10, 2-11, 2-12, **2-13,** 3-1, 3-2, 3-3, 3-4, 3-5, 3-8, 3-9, 3-11, 3-12, **4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-10, 4-11, 4-12, 4-13,** 5-1, 5-4, 5-5, 5-7, 5-8, 5-10, 5-12, **5-13, 6-1, 6-2, 6-3, 6-4, 6-6,** 6-7, 6-9, 6-11, 6-12, **6-13, 7-1,** 7-2, 7-3, 7-4, **7-5, 7-8, 8-1,** 8-3, 8-4, 8-7, 8-8, **8-9,** 8-10, 8-11, **8-13** (1-2, 1-4, 3-10, 3-13, 5-2, 5-3, 5-9, 5-11, 6-5, 6-8, 7-6, 7-7, 7-9, 7-11, 7-12, 7-13, 8-2, 8-5, 8-6, **8-12**)
4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**2-3, 2-4, 2-5,** 2-8, 3-4, **4-4, 4-7,** 4-11, 4-12, 5-9, 5-12, 5-13, **6-1, 6-2, 6-3, 6-4, 6-5,** 6-6, **6-7, 6-8,** 6-10, 6-13, **7-1,** 7-5, 7-6, **7-7, 7-8, 7-9,** 7-10, 7-11, **8-1,** 8-4, 8-5, 8-6, 8-9, 8-10, 8-12, **8-13** (4-1, 5-10, 6-9, 6-11, 6-12, 7-2, 7-4, 7-12, 7-13, 8-2, 8-7, 8-11, 8-12)
Number and Operations—Fractions³ 4.NF	
Extend understanding of fraction equivalence and ordering.	
4.NF.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	**3-1, 3-2, 3-3, 3-4,** 3-5, **3-6, 3-8,** 3-9, 3-11, 3-13, 4-9, 4-11, 5-1, 5-2, **5-4, 5-5,** 5-7, 5-8, 5-9, 5-11, 6-6, 6-7, 6-8, 6-12, **7-13, 8-13** (2-10, 3-7, 3-12, 4-1, 4-3, 4-5, 4-7, 5-3, 5-6, 6-4, 6-5, 7-10)

³Grade 4 expectations in this strand are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Content Standards for Mathematics for Grade 4	Everyday Mathematics Grade 4 Lessons*
4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**3-1, 3-3, 3-5, 3-6, 3-7,** 3-11, 4-9, 5-11, 6-6, 6-7, 6-8, 6-11, 6-12, **7-2,** 7-3, 7-7, **7-10, 7-13,** 8-5, **8-9, 8-10, 8-11** (2-10, 4-2, 4-4, 4-7, 5-1, 5-2, 5-3, 5-4, 6-10, 8-6, 8-8)
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	
4.NF.3 Understand a fraction a/b with a > 1 as a sum of fractions $1/b$.	**3-8, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9,** 5-10, 5-13, 6-1, 6-3, 6-5, 6-6, 6-9, **6-12,** 6-13, 7-1, **7-2,** 7-3, 7-5, **7-6,** 7-8, 7-9, 7-10, **7-11, 7-12, 7-13,** 8-1, 8-2, **8-5, 8-6, 8-7, 8-8, 8-9, 8-10, 8-11,** 8-12, **8-13** (2-10, 4-10, 5-11, 5-12, 6-2, 6-4, 6-5, 6-6, 6-7, 6-8, 6-10, 7-3, 7-4, 7-5, 7-7, 8-2, 8-3, 8-4, 8-12)
4.NF.3a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	**5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8,** 5-9, 5-10, 5-13, 6-1, 6-3, 6-9, **6-12,** 6-13, 7-1, **7-2, 7-6,** 7-8, 7-9, **7-10, 7-12, 7-13,** 8-1, 8-5, **8-6,** 8-7, 8-9 (4-10, 5-11, 5-12, 6-2, 6-4, 6-5, 6-6, 6-8, 6-10, 7-3, 7-4, 7-5, 7-7, 7-9, 7-11, 8-2, 8-3, 8-4, 8-8, 8-10, 8-12)
4.NF.3b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*	**3-8, 5-1, 5-2, 5-3, 5-4, 5-6, 5-7, 5-8, 6-12, 8-13** (4-10, 5-5)
4.NF.3c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	**5-4, 5-8, 5-9,** 6-1, 6-3, **6-12,** 6-13, 7-1, 7-6, 7-8, 7-9, **7-10, 7-11, 7-12, 7-13, 8-5, 8-6,** 8-7, **8-8,** 8-9, **8-10,** 8-12, **8-13** (5-6, 5-11, 5-13, 6-5, 6-6, 6-7, 6-9, 6-10, 7-5, 7-6, 7-7, 7-8, 8-2, 8-4, 8-12)
4.NF.3d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	**5-3, 5-4, 5-7, 5-8, 6-12,** 7-1, **7-6,** 7-9, **7-10, 7-11, 7-12, 8-5, 8-6, 8-7, 8-8, 8-9, 8-10, 8-11** (5-5, 5-6, 5-9, 5-11, 5-12, 5-13, 6-9, 6-10, 7-2, 7-3, 7-4, 7-5, 7-7, 7-13, 8-12, 8-13)
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	**6-13, 7-2, 7-3, 7-4, 7-5, 7-6,** 7-7, 7-9, **7-10, 7-11, 7-12,** 7-13, 8-1, 8-2, 8-3, 8-4, 8-5, **8-6, 8-7, 8-8, 8-9, 8-10, 8-11,** 8-12, **8-13** (7-8, 8-4)
4.NF.4a Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*	**7-3, 7-4, 8-13** (7-5, 7-6, 7-8, 8-1, 8-3)
4.NF.4b Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*	**6-13, 7-2, 7-3, 7-4, 7-5, 7-6,** 7-7, 7-9, **7-10, 7-11, 7-12,** 7-13, 8-1, 8-2, 8-3, 8-5, **8-6, 8-7, 8-8, 8-9, 8-10, 8-11,** 8-12, **8-13** (7-1, 7-8, 8-2, 8-4)
4.NF.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	**6-13, 7-2, 7-3, 7-4, 7-5, 7-6,** 7-9, **7-10, 7-11, 7-12,** 8-2, **8-7, 8-8, 8-9, 8-10, 8-11** (6-8, 7-1, 8-6, 8-12, 8-13)

Content Standards for Mathematics for Grade 4	Everyday Mathematics Grade 4 Lessons*
Understand decimal notation for fractions, and compare decimal fractions.	
4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[4] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*	**3-10, 5-5,** 6-13, 7-1, 7-4, **8-7,** 8-8, **8-13** (5-6, 5-8, 6-6, 7-6, 7-8, 8-5)
4.NF.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*	**3-8, 3-9, 3-10, 3-11, 3-12, 3-13,** 4-7, 4-10, 4-13, 5-3, 5-4, **5-5,** 5-8, 5-13, 6-2, 6-10, 6-11, 6-13, 7-11, **7-12,** 8-4, **8-7, 8-13** (5-2, 6-4, 7-10, 8-6, 8-8, 8-9)
4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	**3-8, 3-10, 3-11, 3-12, 3-13,** 4-13, 5-3, 5-4, 6-5, 6-12, 6-13, 7-11 (4-5, 4-7, 5-6, 5-8, 5-11, 5-13, 6-7, 6-9, 6-11, 7-12)
Measurement and Data 4.MD	
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	
4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*	**1-10, 1-13, 2-7, 3-11, 3-12, 4-4,** 4-6, **4-7, 4-8,** 5-10, 5-11, 5-12, **6-6, 6-12, 7-1, 7-2, 7-5, 7-8, 7-10, 7-11,** 8-4, **8-7, 8-9, 8-10, 8-11** (2-1, 2-2, 2-3, 2-4, 2-5, 2-9, 2-12, 3-1, 3-2, 3-3, 3-4, 4-1, 4-2, 4-3, 4-5, 5-1, 5-2, 5-3, 5-4, 5-5, 5-7, 5-9, 5-13, 6-8, 7-3, 7-13, 8-1, 8-2, 8-3, 8-5, 8-12, 8-13)
4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	**1-10, 2-7, 3-1, 3-8, 3-12, 3-13, 4-4,** 4-6, **4-7, 4-8, 5-7,** 5-12, **6-6, 6-12, 7-1, 7-2, 7-5, 7-8, 7-10, 7-11, 7-12,** 8-5, **8-6, 8-7, 8-8, 8-9, 8-10, 8-11** (1-11, 1-13, 2-1, 2-2, 2-3, 2-4, 2-5, 2-9, 2-11, 2-12, 2-13, 4-2, 4-5, 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-8, 5-9, 5-11, 5-13, 6-2, 7-3, 7-4, 7-13, 8-2, 8-4, 8-12, 8-13)
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	**1-13, 2-2,** 2-10, 3-8, 4-1, **4-3, 4-6, 4-9, 4-11, 6-2, 6-3, 6-4,** 7-9, 8-5, **8-6, 8-7, 8-8, 8-9** (1-10, 2-4, 2-5, 2-6, 2-7, 2-8, 2-11, 2-13, 3-6, 3-10, 4-2, 4-4, 4-8, 5-9, 5-10, 5-12, 7-10, 8-12)

[4]Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

Content Standards for Mathematics for Grade 4	*Everyday Mathematics* Grade 4 Lessons*
Represent and interpret data.	
4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	**5-9,** 7-9, **7-13, 8-5** (4-10, 6-6, 6-8, 6-10, 7-5, 7-7, 8-6, 8-8)
Geometric measurement: Understand concepts of angle and measure angles.	
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:	**5-10, 5-11, 6-9, 6-10, 6-11,** 7-4, 7-12, 8-11 (6-1, 6-3, 7-1, 7-2, 7-3, 7-10)
4.MD.5a An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	**5-10, 5-11, 6-9, 6-10, 6-11,** 7-4, 7-12, 8-11 (6-1, 6-3, 7-1, 7-3, 7-10)
4.MD.5b An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	**5-10, 5-11, 6-9, 6-10, 6-11,** 7-4, 7-12, 8-11 (7-1, 7-3)
4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	**6-9, 6-10, 6-11,** 7-4, 7-12, **8-2,** 8-11 (6-13, 7-1, 7-2, 7-3, 7-10, 8-1, 8-3, 8-10)
4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	**6-11,** 7-12, **8-2, 8-3,** 8-11 (7-2, 7-4, 7-6, 7-8, 8-1, 8-5, 8-7, 8-9, 8-12)

Content Standards for Mathematics for Grade 4	*Everyday Mathematics* Grade 4 Lessons*
Geometry 4.G	
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	**1-11, 1-12,** 2-7, **2-11,** 3-12, **5-10, 5-11, 6-9, 6-10, 6-11, 8-2, 8-8** (1-13, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-8, 3-4, 3-5, 3-6, 3-7, 3-8, 4-5, 4-7, 4-9, 4-10, 4-12, 5-6, 5-8, 6-13, 7-1, 7-2, 7-3, 7-4, 7-10, 8-1, 8-3)
4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	**1-12, 1-13, 2-10, 2-11,** 3-10, 3-12, 4-4, **4-11,** 8-4 (3-2, 3-4, 7-6, 8-1, 8-4)
4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	**2-12, 5-12, 8-4, 8-8** (3-9, 3-12, 4-10, 6-6, 6-8, 7-6, 7-8, 7-10)

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** 11, 33, 42, 45, 46, 47, 48, 49, 53, 54, 55, 57, 59, 60, 61, 62, 63, 65, 66, 67, 72, 74, 75, 80, 81, 97, 98, 139, 151, 153, 154, 155, 157, 158, 161, 163, 165, 167, 169, 171, 195, 221, 222, 223, 224, 225, 229, 230, 247, 249, 250, 251, 253, 254, 265, 337, 339, 343, 347, 349, 350, 351, 352, 353, 355, 356, 357, 359, 371, 372, 373, 374, 375, 383, 395, 396, 397, 398, 399, 401, 402, 403, 404, 405, 441, 443, 444, 447, 459, 465, 472, 475, 477, 478, 517, 520, 527, 549, 550, 553, 556, 557, 558, 559, 569, 571, 572, 573, 575, 576, 577, 588, 594, 596, 597, 599, 615, 617, 623, 676, 677, 678, 679, 681, 684, 685, 687, 691, 692, 693, 694, 695, 697, 699, 700, 701, 716, 717, 721, 753, 754, 755, 756, 757, 765, 766, 768, 769, 771, 772, 773, 779, 789, 795, 796, 805, 806, 807, 812, 813, 815, 817, 823, 825, 826, 828, 831, 832, 834
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** 5, 6, 13, 15, 21, 23, 27, 28, 29, 39, 45, 51, 69, 71, 82, 88, 89, 91, 92, 93, 94, 95, 97, 98, 100, 106, 107, 121, 122, 123, 124, 125, 127, 129, 131, 133, 134, 135, 137, 139, 141, 145, 167, 169, 170, 171, 173, 175, 181, 182, 183, 185, 191, 195, 222, 223, 224, 227, 229, 230, 231, 233, 235, 236, 237, 238, 239, 241, 260, 265, 268, 269, 271, 273, 277, 278, 279, 280, 281, 283, 284, 285, 286, 291, 292, 293, 301, 337, 340, 341, 359, 361, 362, 363, 369, 371, 375, 378, 379, 380, 387, 389, 447, 448, 450, 451, 453, 454, 455, 456, 457, 459, 460, 461, 462, 463, 465, 467, 468, 469, 471, 472, 473, 474, 475, 477, 478, 479, 481, 482, 483, 484, 485, 487, 488, 489, 490, 491, 497, 501, 503, 505, 550, 552, 553, 562, 564, 566, 567, 586, 587, 590, 599, 605, 615, 617, 618, 619, 620, 623, 625, 626, 627, 650, 651, 655, 656, 658, 659, 661, 664, 665, 666, 667, 669, 671, 673, 675, 676, 677, 678, 679, 689, 709, 710, 711, 712, 713, 715, 721, 722, 723, 724, 725, 727, 731, 763, 777, 779, 787, 793, 795, 796, 797, 799, 801, 802, 805, 811, 817, 835

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** 39, 111, 127, 151, 152, 153, 154, 155, 157, 158, 233, 255, 257, 258, 259, 262, 265, 266, 268, 284, 287, 293, 302, 303, 305, 371, 381, 383, 390, 391, 395, 441, 457, 481, 509, 517, 549, 555, 583, 611, 691, 709, 753, 807, 819, 820
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** 27, 45, 167, 173, 175, 176, 177, 182, 197, 221, 222, 223, 224, 225, 227, 248, 250, 251, 253, 254, 255, 257, 261, 262, 263, 271, 272, 273, 275, 277, 301, 304, 329, 337, 365, 368, 389, 459, 493, 494, 495, 496, 497, 499, 519, 520, 521, 544, 549, 556, 579, 580, 581, 582, 583, 586, 590, 593, 602, 618, 619, 620, 621, 623, 624, 625, 626, 627, 649, 697, 707, 710, 711, 712, 713, 715, 721, 727, 729, 730, 731, 760, 761, 762, 763, 779, 781, 783, 784, 785, 793, 801, 803, 805, 809, 812, 813, 814, 815, 818, 821

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, 17, 33, 34, 35, 36, 77, 79, 80, 81, 101, 121, 137, 163, 164, 165, 233, 236, 238, 239, 241, 257, 271, 283, 289, 295, 296, 297, 298, 299, 365, 367, 368, 369, 443, 444, 445, 448, 449, 450, 499, 501, 502, 503, 505, 507, 579, 581, 582, 583, 593, 600, 601, 602, 603, 605, 608, 609, 611, 649, 650, 652, 655, 663, 672, 673, 681, 682, 683, 684, 685, 687, 688, 689, 698, 699, 700, 717, 718, 759, 765, 766, 767, 768, 772, 773, 781, 793
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** 23, 24, 28, 33, 39, 41, 42, 43, 51, 52, 57, 69, 70, 74, 85, 86, 89, 93, 94, 95, 119, 121, 127, 134, 139, 147, 149, 161, 165, 167, 180, 181, 185, 186, 187, 188, 192, 193, 227, 245, 267, 278, 281, 287, 289, 290, 291, 295, 297, 298, 301, 305, 331, 332, 333, 334, 335, 337, 343, 344, 345, 346, 347, 350, 351, 352, 353, 355, 356, 359, 365, 377, 383, 393, 397, 398, 399, 451, 457, 499, 503, 505, 508, 509, 517, 519, 520, 521, 547, 559, 569, 570, 571, 572, 573, 575, 576, 577, 579, 591, 593, 595, 599, 603, 605, 608, 609, 614, 615, 617, 621, 653, 661, 663, 673, 695, 697, 701, 725, 728, 729, 731, 757, 759, 781, 783, 785, 797, 799, 809, 817, 821, 831, 834

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 13, 15, 16, 17, 18, 19, 22, 24, 25, 31, 35, 36, 37, 43, 49, 51, 52, 53, 55, 56, 57, 59, 60, 61, 62, 63, 65, 66, 67, 69, 75, 81, 84, 89, 91, 95, 97, 101, 119, 121, 123, 124, 125, 127, 129, 133, 137, 140, 141, 143, 145, 146, 147, 148, 149, 151, 153, 154, 155, 157, 158, 171, 177, 182, 185, 186, 187, 188, 189, 191, 193, 194, 195, 197, 198, 199, 200, 201, 231, 233, 239, 241, 242, 243, 244, 245, 263, 269, 275, 277, 283, 287, 289, 293, 295, 301, 305, 325, 327, 328, 329, 331, 335, 341, 347, 359, 362, 363, 369, 377, 379, 381, 385, 386, 387, 389, 391, 392, 393, 399, 405, 445, 453, 463, 481, 485, 487, 511, 512, 513, 514, 515, 543, 545, 546, 547, 553, 555, 561, 564, 565, 567, 585, 591, 593, 597, 609, 611, 612, 613, 615, 623, 627, 653, 663, 667, 669, 675, 697, 701, 703, 704, 705, 706, 707, 719, 760, 762, 775, 776, 777, 778, 779, 787, 789, 790, 791, 797, 799, 803, 811, 815, 823, 824, 825, 828, 829, 831

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 91, 99, 201, 243, 325, 327, 328, 401, 561, 585, 611, 665, 666, 679, 703, 705, 706, 707, 738, 739, 766, 767, 768, 769, 771, 772, 773

Mastery Expectations

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

- Understanding and fluency with multi-digit multiplication, and understanding of dividing to find quotients with multi-digit dividends.
- Understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers.
- Understanding that geometric figures can be analyzed and classified based on their properties.
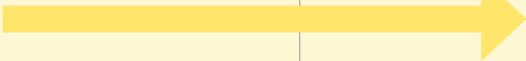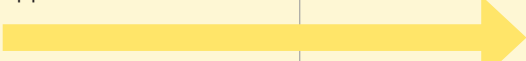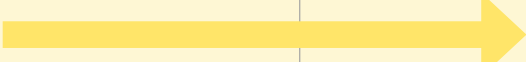
Standards	First Quarter Benchmark Expectations for Units 1 and 2	Second Quarter Benchmark Expectations for Units 3 and 4	Third Quarter Benchmark Expectations for Units 5 and 6	Fourth Quarter Benchmark Expectations for Units 7 and 8
4.OA.1	Recognize comparison situations that are multiplicative.	Interpret a multiplication equation as a multiplicative comparison and represent statements of multiplicative comparisons as multiplication equations. (Does not address division.)	⭐ Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	Ongoing practice and application.
4.OA.2	Identify a number story as additive or multiplicative and explain how they know.	Solve multiplicative comparison number stories using multiplication.	⭐ Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	Ongoing practice and application.
4.OA.3	Solve addition and subtraction multistep number stories. Articulate a plan for solving addition and subtraction multistep number stories. Assess the reasonableness of answers to addition and subtraction multistep number stories by comparing them to an estimate.	Make sense of multistep number stories involving addition, subtraction and multiplication. Articulate a plan for solving addition, subtraction and multiplication multistep number stories. Assess the reasonableness of answers to addition, subtraction and multiplication multistep number stories by comparing them to an estimate.	Solve multistep addition, subtraction and multiplication number stories. Model addition, subtraction and multiplication equations, using a letter for the unknown. Assess the reasonableness of answers to addition, subtraction and multiplication multistep number stories by comparing them to an estimate.	⭐ Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.

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
4.OA.4	Identify more than one factor pair for composite numbers less than 40. Write multiples of a 1-digit number. Identify prime and composite numbers less than 40.	⭐ Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	Ongoing practice and application. ➡	
4.OA.5	Apply an addition, subtraction, multiplication, or division rule to a "What's My Rule?" table and extend simple shape patterns. Predict the features of the next number or shape.	Apply an addition, subtraction, multiplication, or division rule to a "What's My Rule?" table and extend simple shape patterns. Identify simple number or shape patterns that were not explicit in the original rule.	Apply an addition, subtraction, multiplication, or division rule to a "What's My Rule?" table and extend simple shape patterns. Identify simple number or shape patterns that were not explicit in the original rule.	⭐ Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*
4.NBT.1	Recognize the relationships between place values that are up to 100 times as large as another place.	⭐ Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*	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 and 8
4.NBT.2	Read and identify places in numbers through the hundred thousands. Read number names through the hundred thousands. Read numbers in expanded form through hundred thousands and write numbers in expanded form through thousands. Compare and order multidigit whole numbers though hundred thousands to the thousands place or larger. Record multidigit whole-number comparisons using >, <, or = though hundred thousands to the thousands place or larger.	★ Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, = and < symbols to record the results of comparisons.	Ongoing practice and application.	→
4.NBT.3	Round numbers through the hundred thousands to the thousands place or larger.	★ Use place value understanding to round multi-digit whole numbers to any place.	Ongoing practice and application.	→
4.NBT.4	Use U.S. Traditional addition to solve 4-digit + 4-digit problems. Use U.S. Traditional subtraction to solve 4-digit – 4-digit problems but not explain.	★ Fluently add and subtract multi-digit whole numbers using the standard algorithm.	Ongoing practice and application.	→

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
4.NBT.5	Use fact extensions to multiply by a multiple of 10.	Accurately multiply 2-digit by 1-digit whole numbers. Use fact extensions to multiply by a multiple of 10.	Accurately multiply a 3-digit number by a 1-digit number and 2-digit numbers by a multiple of 10. Illustrate and explain multiplication by a 1-digit number. Use fact extensions to multiply by a multiple of 10, 100, or 1,000.	⭐ Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NBT.6	No expectations of mastery at this point.	No expectations of mastery at this point.	Accurately divide a 2-digit number by a 1-digit number and illustrate. Explain division of a 2-digit number by a 1-digit number.	⭐ Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
4.NF.1	No expectations of mastery at this point.	Explain why any two fractions through 12ths are equivalent using a model. Identify that the number and size of the parts differ in equivalent fractions through 12ths.	⭐ Explain why a fraction a/b is equivalent to a fraction $(n × a)/(n × b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	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).

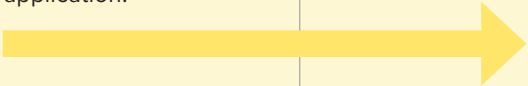⭐ Mastery expected during this quarter.

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 and 8
4.NF.2	No expectations of mastery at this point.	Use a visual model to recognize that comparing fractions with different denominators is comparing a different number of shares within the same whole. Compare and order fractions using a model. Record fraction comparisons using >, =, or <. Justify comparisons of fractions with different denominators using a visual model.	⭐ Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Ongoing practice and application.
4.NF.3	No expectations of mastery at this point.	See the mastery expectation statements for the substandards for this standard. Students who are meeting expectations for all of the substandards are meeting expectations for this standard.	See the mastery expectation statements for the substandards for this standard. Students who are meeting expectations for all of the substandards are meeting expectations for this standard.	⭐ Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
4.NF.3a	No expectations of mastery at this point.	Join and separate parts referring to the same whole.	Join and separate parts referring to the same whole. Add fractions with like denominators using manipulatives. Subtract fractions with like denominators using manipulatives.	⭐ Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

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
4.NF.3b	No expectations of mastery at this point.	Decompose fractions and represent decompositions with an equation. Explain the decomposition by using a visual fraction model.	⭐ Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*	Ongoing practice and application.
4.NF.3c	No expectations of mastery at this point.	No expectations of mastery at this point.	Add mixed numbers with like denominators using manipulatives and visual fraction models. Subtract mixed numbers with like denominators using manipulatives and visual fraction models.	⭐ Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
4.NF.3d	No expectations of mastery at this point.	No expectations of mastery at this point.	Add and subtract fractions in number stories using manipulatives and visual fraction models.	⭐ Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4.NF.4	No expectations of mastery at this point.	No expectations of mastery at this point.	See the mastery expectation statements for the substandards for this standard. Students who are meeting expectations for all of the substandards are meeting expectations for this standard.	⭐ Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

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).

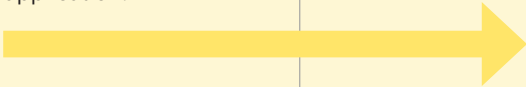⭐ Mastery expected during this quarter.

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 and 8
4.NF.4a	No expectations of mastery at this point.	No expectations of mastery at this point.	Apply understanding of repeated addition and multiplication to work with unit fractions.	⭐ Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*
4.NF.4b	No expectations of mastery at this point.	No expectations of mastery at this point.	Solve problems involving multiplying a fraction by a whole number using repeated addition.	⭐ Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
4.NF.4c	No expectations of mastery at this point.	No expectations of mastery at this point.	Represent a word problem involving multiplication of a fraction by a whole number using addition.	⭐ Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*
4.NF.5	No expectations of mastery at this point.	Understand that fractions with a denominator 10 can also be expressed as a fraction with denominator 100.	Add two fractions with denominators 10 and 100 using a model.	⭐ Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*

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
4.NF.6	No expectations of mastery at this point.	Represent decimals to hundredths using a preferred model. Represent decimals to the hundredths with base-10 numerals. Attempt to translate between decimal notation and fractions with denominators 10 or 100 without a model.	⭐ Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*	Ongoing practice and application.
4.NF.7	No expectations of mastery at this point.	Recognize that decimal comparisons require same-size wholes using a concrete model. Compare and order using a model. Record decimal comparisons. Justify comparisons of decimals using a model.	⭐ Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	Ongoing practice and application.
4.MD.1	Express conversions of time and customary units of length in a 2-column table and explain the relationship.	Express conversions of length, time, capacity and mass in a 2-column table and explain the relationship.	Express conversions of length, time, capacity, mass and weight in a 2-column table and explain the relationship.	⭐ Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*

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 and 8
4.MD.2	Solve number stories involving customary units of length and units of time.	Solve number stories involving customary units of length, time, money, and metric units of length, capacity, and mass. Solve number stories involving metric units of length involving simple fractions or decimals.	Solve number stories involving customary units of length and weight, units of time, money, and metric units of length, capacity, and mass. Solve number stories involving metric units of length involving simple fractions or decimals.	⭐ Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
4.MD.3	Find the perimeter using a strategy. Find the area using a strategy.	⭐ Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	Ongoing practice and application. →	
4.MD.4	No expectations of mastery at this point.	No expectations of mastery at this point.	Organize and represent data in fractions of a unit $\left(\frac{1}{2}\text{ and }\frac{1}{4}\right)$ on line plots. Solve addition and subtraction problems involving halves and quarters of a unit by using the information presented in a line plot.	⭐ Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

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
4.MD.5	No expectations of mastery at this point.	No expectations of mastery at this point.	See the mastery expectation statements for the substandards for this standard and for standard 4.G.1. Students who are meeting expectations for all of the substandards and 4.G.1 are meeting expectations for this standard.	⭐ Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
4.MD.5a	No expectations of mastery at this point.	No expectations of mastery at this point.	Identify benchmark rotations such as $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$, and full turns. Understand the degree as an angle that is $\frac{1}{360}$ of a circle.	⭐ An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
4.MD.5b	No expectations of mastery at this point.	No expectations of mastery at this point.	Recognize that angles are measured in iterations of one-degree angles.	⭐ An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.6	No expectations of mastery at this point.	No expectations of mastery at this point.	Measure angles within a given range after estimating angle. When given one ray, sketch an angle.	⭐ Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

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 and 8
4.MD.7	No expectations of mastery at this point.	No expectations of mastery at this point.	Expect students to recognize angle measures as additive within benchmark angles measuring 90- and 180-degrees. Add and subtract to find unknown angle measures within benchmark angles measuring 90- and 180-degrees.	⭐ Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
4.G.1	Draw and label points, lines, line segments, and rays with help from the Student Reference Book. Correctly identify right angles.	Identify lines, line segments, and rays alone or within figures. Draw and represent right angles and identify other angles as acute or obtuse. Draw, represent, and identify perpendicular and parallel lines.	⭐ Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	Ongoing practice and application.

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
4.G.2	Identify properties of line segments and angles within quadrilaterals. Identify right angles within triangles.	⭐ Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	Ongoing practice and application.	
4.G.3	Identify at least one line of symmetry in two-dimensional symmetric figures.	Attempt to use a line of symmetry to draw a complete figure. Identify at least one line of symmetry in two-dimensional symmetric figures.	Recognize that a line of symmetry divides a figure into two matching parts. Identify line symmetric and non-line symmetric figures.	⭐ Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

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, students explore place-value concepts for multidigit whole numbers.

Major Clusters

4.OA.A Use the four operations with whole numbers to solve problems.

4.NBT.A Generalize place value understanding for multi-digit whole numbers.

4.NBT.B Use place value understanding and properties of operations to perform multi-digit numbers.

Supporting Clusters

4.MD.A Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

McGraw-Hill Education

Focus

Focus

Focus

In Unit 6, students explore the relationship between multiplication and division by developing a method for dividing whole numbers and solving division number stories. They are introduced to protractors and explore using them to measure and construct angles.

Major Clusters

4.OA.A Use the four operations with whole numbers to solve problems.

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

4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Supporting Clusters

4.OA.B Gain familiarity with factors and multiples.

4.OA.C Generate and analyze patterns.

4.MD.C Geometric measurement: understand concepts of angle and measure angles.

Unit 7 | **Multiplication of a Fraction by a Whole Number; Measurement 636**

In Unit 7, students formalize their understanding of multiplying a fraction by a whole number and use this knowledge to solve problems in real-world scenarios.

Major Clusters

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

4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

4.NF.C Understand decimal notation for fractions, and compare decimal fractions.

Supporting Clusters

4.OA.C Generate and analyze patterns.

4.MD.A Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.MD.B Represent and interpret data.

Unit 2 Organizer

Multiplication and Geometry

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, students explore various applications for multiplication. They classify shapes by properties and develop formulas for finding the area of a rectangle.

Major Clusters

4.OA.A Use the four operations with whole numbers to solve problems.

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

Supporting Clusters

4.MD.A Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

4.G.A Draw and identify lines and angles, and classify shapes by properties of their lines and shapes.

Process and Practice Standards

SMP6 Attend to precision.

SMP7 Look for and make use of structure.

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
4.OA.1	In Grade 3, students use arrays, drawings, equal groupings, and other strategies to solve number stories involving multiplicative situations.	Students will encounter multiplicative comparisons in practice activities. Students model multi-step number stories and real-world contexts using expressions with grouping symbols throughout Grade 5.
4.OA.2	In Grade 3 and in Unit 1, students solve number stories involving additive comparisons, using drawings and equations.	Students will continue to solve number stories involving multiplicative comparisons in different contexts. In Unit 5, students revisit multiplicative-comparison number stories involving whole numbers. In Unit 7, students work with fractions as they solve number stories involving multiplicative comparisons.
4.OA.4	In Grade 3, students learn multiplication and division facts using a variety of strategies. They begin to use arrays, fact families, patterns, skip counting, and equal grouping to discover factor pairs of numbers less than 100.	Students will regularly use factors and multiples in numbers stories, problems, and games. In Unit 3, students use factors and multiples in finding equivalent fractions. In Unit 6, factors are used as students learn partial-quotient division. In later grades, students find greatest common factors and least common multiples.
4.OA.5	In Grade 4, students developed a rule for solving multiplication problems involvinga Students use number patterns to solve the open-response problem in Unit 1. In Grade 3, students identify patterns in the multiplication table and relate them to multiplication strategies and properties of multiplication. multiples of 10.	In Unit 3, students look for patterns in sets of equivalent fractions and develop a rule for finding equivalent fractions. In Units 6 and Unit 7, they develop rules involving geometric patterns and figurate numbers. In Grade 5, students use rules, tables, and graphs to extend patterns and solve real-world problems.
4.G.2	In Unit 1, students use properties of rectangles to develop formulas for the perimeter of rectangles. In Grade 3, students sort and describe polygons based upon their attributes and identify subcategories of quadrilaterals and triangles.	Students review properties of right triangles and other polygons in Unit 3. In Unit 4, students explore properties of rectilinear figures. In Grade 5, students use properties of triangles to create a triangle hierarchy.

Planning for Rich Math Instruction

RIGOR		**2-1** Square Number Patterns	**2-2** The Area Formula for Rectangles	**2-3** Factors and Factor Pairs	**2-4** Multiples
	Conceptual Understanding	**Patterns in square numbers** Finding Arrays, pp. 122–124 Finding Other Square Numbers, pp. 124–125	**Area and perimeter of rectangles** Finding Area and Perimeter, pp. 128–129 Connecting to the Area Formula, pp. 129–130	**Factor pairs** Reviewing Factors and Products, p. 134 Finding Factor Pairs, p. 135	**Multidigit multiplication** Finding Multiples, pp. 140–141 Exploring Factors and Multiples, pp. 141–142
	Procedural Skill and Fluency	Mental Math and Fluency, p. 122 Playing *Subtraction Target Practice,* p. 125 Home Link 2-1, p. 125 Enrichment, p. 121 Extra Practice, p. 121	Mental Math and Fluency, p. 128 Playing *Rugs and Fences,* pp. 130–131 Home Link 2-2, p. 131	Mental Math and Fluency, p. 134 Finding Factor Pairs, p. 135 Playing *Factor Captor,* p. 136 Playing *Fishing for Digits,* p. 137 Enrichment, p. 133 Extra Practice, p. 133 Home Link 2-3, p. 137	Mental Math and Fluency, p. 140 Playing *Buzz and Bizz-Buzz,* p. 142 Home Link 2-4, p. 143 Enrichment, p. 139 Extra Practice, p. 139
	Applications	Journal p. 36, #5	Journal p. 38, #1, #2	Journal p. 40, #5	Enrichment, p. 139
	Rich Tasks and Mathematical Reasoning	Finding Arrays, pp. 122–124 Finding Other Square Numbers, pp. 124–125 Playing *Subtraction Target Practice,* p. 125 Enrichment, p. 121 Extra Practice, p. 121	Playing *Rugs and Fences,* pp. 130–131 Enrichment, p. 127	Playing *Factor Captor,* p. 136 Enrichment, p. 133	Exploring Factors and Multiples, pp. 141–142 Enrichment, p. 139
	Mathematical Discourse	Finding Arrays, pp. 122–124 Summarize, p. 125 Playing *Subtraction Target Practice,* p. 125	Finding Area and Perimeter, p. 128 Connecting to the Area Formula, pp. 129–130 Playing *Rugs and Fences,* pp. 130–131 Summarize, p. 131	Finding Factor Pairs, p. 135 Summarize, p. 136	Finding Multiples, pp. 140–141 Exploring Factors and Multiples, pp. 141–142
	Distributed Practice	Mental Math and Fluency, p. 122 Playing *Subtraction Target Practice,* p. 125 Math Boxes 2-1	Mental Math and Fluency, p. 128 Playing *Spin-and-Round,* p. 131 Math Boxes 2-2	Mental Math and Fluency, p. 134 Playing *Fishing for Digits,* p. 137 Math Boxes 2-3	Mental Math and Fluency, p. 140 Identifying Place Value in Whole Numbers, p. 143 Math Boxes 2-4
	Differentiation Support	Differentiation Options, p. 121 ELL Support, p. 121 Online Differentiation Support 2-1 Common Misconception, p. 123	Differentiation Options, p. 127 ELL Support, p. 127 Online Differentiation Support 2-2 Adjusting the Activity, p. 128 Academic Language Development, p. 130	Differentiation Options, p. 133 ELL Support, p. 133 Online Differentiation Support 2-3 Adjusting the Activity, p. 135	Differentiation Options, p. 139 ELL Support, p. 139 Online Differentiation Support 2-4 Adjusting the Activity, p. 141 Academic Language Development, p. 142

Red text = Game

2-5 Prime and Composite Numbers	**2-6** Open Response — Little and Big (2-Day Lesson)	**2-7** Units of Time	**2-8** Multiplicative Comparisons	
Prime and composite numbers Defining Prime and Composite Numbers, pp. 146–147 Classifying Prime and Composite Numbers, p. 147	**Multiplicative reasoning** Solving the Open Response Problem, pp. 152–153 Home Link 2-6, p. 159	**Conversions between units of time** Converting Hours, Minutes, and Seconds, pp. 162–164	**Multiplication equations as comparisons** Sharing Comparison Statements, pp. 168–169 Representing Comparison Statements as Equations, pp. 169–170	**Conceptual Understanding**
Mental Math and Fluency, p. 146 Defining Prime and Composite Numbers, pp. 146–147 Classifying Prime and Composite Numbers, p. 147 Developing a Strategy for *Factor Captor*, pp. 147–148 Playing *Factor Bingo*, p. 148 Home Link 2–5, p. 149 Enrichment, p. 145 Extra Practice, p. 145	Home Link 2-6, p. 159	Converting Hours, Minutes, and Seconds, pp. 162–164 Solving Time Number Stories, pp. 164–165 Home Link 2–7, p. 165 Enrichment, p. 161	Creating and Interpreting Statements and Equations, p. 170 Playing *Factor Captor*, p. 171 Home Link 2-8, p. 171 Differentiation Options, p. 167	**Procedural Skill and Fluency**
Journal p. 46, #6	Solving the Open Response Problem, pp. 152–153 Home Link 2-6, p. 159	Converting Hours, Minutes, and Seconds, pp. 162–164 Solving Time Number Stories, pp. 164–165 Home Link 2–7, p. 165 Enrichment, p. 161	Representing Comparison Statements as Equations, pp. 169–170 Creating and Interpreting Statements and Equations, p. 170 Enrichment, p. 167	**Applications**
Defining Prime and Composite Numbers, pp. 146–147 Developing a Strategy for *Factor Captor*, pp. 147–148 Enrichment, p. 145	Making Conjectures and Arguments, pp. 151–152 Solving the Open Response Problem, pp. 152–153 Reengaging in the Problem, p. 157 Revising Work, p. 158	Enrichment, p. 161	Representing Comparison Statements as Equations, pp. 169–170 Creating and Interpreting Statements and Equations, p. 170 Enrichment, p. 167	**Rich Tasks and Mathematical Reasoning**
Defining Prime and Composite Numbers, pp. 146–147 Developing a Strategy for *Factor Captor*, pp. 147–148	Making Conjectures and Arguments, pp. 151–152 Setting Expectations, p. 157 Reengaging in the Problem, p. 157	Enrichment, p. 161	Sharing Comparison Statements, p. 168 Representing Comparison Statements as Equations, pp. 169–170	**Mathematical Discourse**
Mental Math and Fluency, p. 146 Playing *Factor Bingo*, p. 148 Math Boxes 2-5	Mental Math and Fluency, p. 151 Math Boxes 2-6	Mental Math and Fluency, p. 162 Drawing Lines, Line Segments, and Angles, p. 165 Math Boxes 2-7	Mental Math and Fluency, p. 168 Playing *Factor Captor*, p. 171 Math Boxes 2-8	**Distributed Practice**
Differentiation Options, p. 145 ELL Support, p. 145 Online Differentiation Support 2-5 Adjusting the Activity, p. 147 Academic Language Development, p. 146	ELL Support, p. 152 Adjusting the Activity, p. 153, 158 Common Misconception, p. 153 Academic Language Development, p. 152	Differentiation Options, p. 161 ELL Support, p. 161 Online Differentiation Support 2-7 Academic Language Development, p. 164	Differentiation Options, p. 167 ELL Support, p. 167 Online Differentiation Support 2-8 Adjusting the Activity, p. 168, 170 Academic Language Development, p. 170	**Differentiation Support**

RIGOR

Red text = Game

Planning for Rich Math Instruction

		2-9 Multiplicative Comparison Number Stories	**2-10** Classifying Triangles	**2-11** Classifying Quadrilaterals	**2-12** Finding Line Symmetry
RIGOR	**Conceptual Understanding**	**Multiplicative comparisons** Reviewing Multiplicative Comparisons, pp. 174–175 Solving Multiplication Comparison Problems, pp. 175–176	**Classification of two-dimensional figures** Reviewing Properties of Triangles, pp. 180–181 Classifying Triangles by Angle Properties, pp. 181–182	**Classification of two-dimensional figures** Sorting Quadrilaterals, pp. 186–187	**Line symmetry** Introducing Line Symmetry, pp. 192–193 Finding Lines of Symmetry, p. 193
	Procedural Skill and Fluency	Mental Math and Fluency, p. 174 Solving Multiplication Comparison Problems, pp. 175–176 Playing *How Much More*, p. 176 Playing *Buzz and Bizz-Buzz,* p. 177 Home Link 2-9, p. 177 Enrichment, p. 173 Extra Practice, p. 173	Mental Math and Fluency, p. 180 Playing *Rugs and Fences*, p. 182	Journal p. 60, #1, #3, #4	Playing *How Much More*, p. 195
	Applications	Solving Multiplication Comparison Problems, pp. 175–176 Playing *How Much More,* p. 176 Home Link 2-9, p. 177 Enrichment, p. 173		Journal p. 60, 3, 4	Journal p. 62, 2, 3, 4
	Rich Tasks and Mathematical Reasoning	Solving Multiplication Comparison Problems, pp. 175–176 Enrichment, p. 173	Classifying Triangles by Angle Properties, pp. 181–182 Enrichment, p. 179	Sorting Quadrilaterals, pp. 186–187 Playing *Polygon Capture*, p. 188 Home Link 2-11, p. 189 Enrichment, p. 185	Exploring Lines of Symmetry, p. 194 Enrichment, p. 191
	Mathematical Discourse	Reviewing Multiplicative Comparisons, pp. 174–175 Solving Multiplication Comparison Problems, pp. 175–176	Classifying Triangles by Angle Properties, pp. 181–182 Enrichment, p. 179	Sorting Quadrilaterals, pp. 186–187 Discussing the Quadrilateral Sort, pp. 187–188 Playing *Polygon Capture*, p. 188	Summarize, p. 194
	Distributed Practice	Mental Math and Fluency, p. 174 Playing *Buzz and Bizz-Buzz*, p. 177 Math Boxes 2-9	Mental Math and Fluency, p. 180 Playing *Rugs and Fences*, p. 182	Mental Math and Fluency, p. 186 Playing *Number Top-It*, p. 189 Math Boxes 2-11	Mental Math and Fluency, p. 192 Playing *How Much More*, p. 195 Math Boxes 2-12
	Differentiation Support	Differentiation Options, p. 173 ELL Support, p. 173 Online Differentiation Support 2-9 Adjusting the Activity, p. 174 Academic Language Development, p. 175	Differentiation Options, p. 179 ELL Support, p. 179 Online Differentiation Support 2-10 Adjusting the Activity, p. 181 Academic Language Development, p. 180	Differentiation Options, p. 185 ELL Support, p. 185 Online Differentiation Support 2-11 Adjusting the Activity, p. 188 Common Misconception, p. 187 Academic Language Development, p. 186	Differentiation Options, p. 191 ELL Support, p. 191 Online Differentiation Support 2-12 Adjusting the Activity, p. 193 Common Misconception, p. 194

Red text = Game

Notes

2-13

Finding the Pattern

Number and shape patterns

Applying Rules, pp. 198–199

Reviewing Variations of the "What's My Rule?" Routine, pp. 199–200

Mental Math and Fluency, p. 198

Applying Rules, pp. 198–199

Reviewing Variations of the "What's My Rule?" Routine, pp. 199–200

Practicing Addition and Subtraction, p. 201

Home Link 2-13, p. 201

Journal p. 66, #3, #4

Reviewing Variations of the "What's My Rule?" Routine, pp. 199–200

Exploring Shape Patterns, pp. 200–201

Enrichment, p. 197

Extra Practice, p. 197

Reviewing Variations of the "What's My Rule?" Routine, pp. 199–200

Exploring Shape Patterns, pp. 200–201

Mental Math and Fluency, p. 198

Practicing Addition and Subtraction, p. 201

Math Boxes 2-13

Differentiation Options, p. 197

ELL Support, p. 197

Online Differentiation Support 2-13

Academic Language Development, p. 199

**2-14 Assessment
Unit 2 Progress Check**

Lesson 2-14 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 students' performance on the standards.

Data Use the Data Dashboard to view students' progress reports.

Unit 2 Materials

Lesson	*Math Masters*	Activity Cards	Manipulative Kit	Other Materials
2-1	pp. 51–53; TA10 (optional); TA11–TA12; G10	16–17	per partnership: number cards 0–9 (4 of each), counters; per group: 40 centimeter cubes	slate; per partnership: calculator; scissors; tape
2-2	pp. 54–57; TA11; G5–G6; G11–G14	18	centimeter cube; centimeter ruler; 6-sided die; 36 square pattern blocks; number cards 0–9 (4 of each)	slate; scissors; colored pencils; paper; straightedge
2-3	pp. 58–59; G7; G15–G17; G19		centimeter cubes; number cards 2–9 (4 of each); counters	slate; calculator
2-4	pp. 58; 60–61; TA13; G18	19	chips or counters; centimeter cubes; number cards 2–10 (2 of each)	slate
2-5	pp. 62–64; TA14–TA15; G19	20–21	counters; number cards 2–9 (4 of each); centimeter cubes	slate; colored pencils or crayons
2-6	pp. 65–66; 67 (optional); 68; TA8			Standards for Mathematical Practice Poster; 10 small (1 1 _ 4 in.) paper clips; Guidelines for Discussion Poster; scissors, glue, colored pencils (optional); selected samples of students' work; students' work from Day 1
2-7	pp. 69–70; TA9	22		analog clock with second hand; calculator; slate; paper
2-8	pp. 71–74; TA16; G15–G16		counters	slate; calculator; scissors; paper clips
2-9	pp. 75–77; TA17; G20–G21		6-sided die	slate
2-10	pp. 78–79; G11–G14	23	fraction circles; Geometry Template*	slate; paper; geometry kits (see *Before You Begin* in Lesson 1-12)
2-11	pp. 80–82; TA18–TA19; G2–G4; G22–G26	24	geoboard; rubber bands; number cards 0–9 (4 of each); Geometry Template*	slate: straightedge; scissors; *Geometry Concentration* Cards from Lessons 1-11 and 1-12 (optional)
2-12	pp. 83–88; G20–G21	25	6-sided die; pattern blocks; Geometry Template*	slate; scissors; straightedge; paper
2-13	pp. 89–90; TA20–TA21	26–27	pattern blocks	slate; calculator (optional); paper
2-14	pp. 91–96; *Assessment Handbook,* pp. 12–19		fraction circles	

Literature Link   Optional Books: 2-13 *Two of Everything*

Go Online ▸ for a complete literature list in Grade 4.

☑ Assessment Check-In

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

✅ **Evaluation Quick Entry** Record students' performance online.

📊 **Data** View reports online to see students' progress towards mastery.

Lesson	Task Description	Content Standards	Processes and Practices
2-1	Use multiplication to generate square number patterns.	4.NBT.5	
2-2	Find the area of a rectangle.	4.NBT.5, 4.MD.3	
2-3	Find at least two factors for 2-digit numbers.	4.OA.4, 4.NBT.5	
2-4	Identify multiples of numbers other than 10.	4.OA.4, 4.NBT.5	
2-5	Identify factors of a number in the 1–39 range.	4.OA.4, 4.NBT.5	
2-6	Use multiplicative reasoning to make a correct prediction.	4.OA.2	SMP3
2-7	Convert hours to minutes and minutes to seconds.	4.MD.1	
2-8	Use equations to make multiplicative comparisons.	4.OA.1, 4.NBT.5	
2-9	Determine whether a comparison is additive or multiplicative.	4.OA.1, 4.OA.2	
2-10	Identify right angles.	4.G.2	
2-11	Identify the properties of polygons.	4.G.2	SMP7
2-12	Identify line symmetry in shapes.	4.G.3	
2-13	Solve "What's My Rule?" tables.	4.OA.5, 4.NBT.4, 4.NBT.5	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 4 Unit 2 Planning Webinar
This webinar provides a preview of the lessons and content in this section. Watch this video with your grade-level colleagues and plan together under the guidance of an *Everyday Mathematics* author.

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

A Teacher's Perspective on Algorithms in EM
After teaching a lesson on multi-digit algorithms, a fourth-grade teacher explains how she approaches teaching new algorithms to students.

For more resources, go to the VLC Resources page and search for Grade 4.

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.
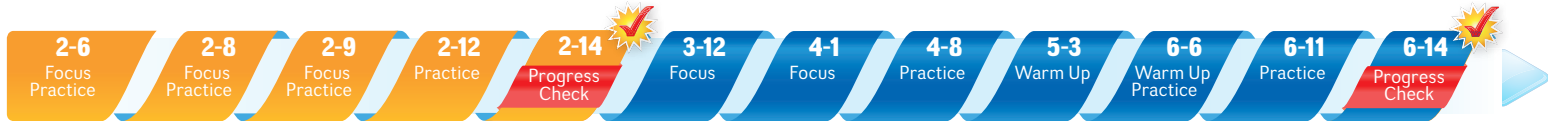
Operations and Algebraic Thinking

4.OA.1 | 2-6 Focus | 2-8 Focus Practice ✓ | 2-9 Focus Practice ✓ | 2-12 Practice | 4-8 Practice | 4-10 Practice | 5-6 Warm Up | 5-9 Practice | 6-1 Practice | 6-3 Warm Up | 6-11 Practice | 6-14 Progress Check

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to recognize comparison situations that are multiplicative.

Full Mastery of 4.OA.1 expected by the end of Unit 6.

4.OA.2 | 2-6 Focus Practice | 2-8 Focus Practice | 2-9 Focus Practice | 2-12 Practice | 2-14 Progress Check ✓ | 3-12 Focus | 4-1 Focus | 4-8 Practice | 5-3 Warm Up | 6-6 Warm Up Practice | 6-11 Practice | 6-14 Progress Check ✓

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to identify a number story as additive or multiplicative a B nd explain how they know.

Full Mastery of 4.OA.2 expected by the end of Unit 6.

4.OA.4 | 2-3 through 2-5 Focus Practice ✓ | 2-8 Practice | 2-9 Practice | 2-13 Warm Up | 2-14 Progress Check ✓ | 3-2 Focus Practice | 3-3 Practice | 3-4 Warm Up Focus Practice | 3-6 Warm Up | 3-11 Warm Up | 4-1 Warm Up
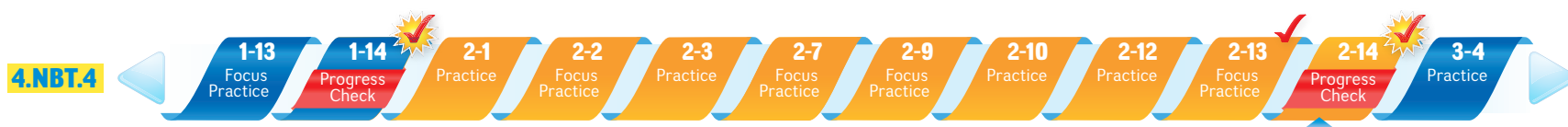
⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to identify more than one factor pair for composite numbers less than 40, write multiples of a 1-digit number, and identify prime and composite numbers less than 40.

Full Mastery of 4.OA.4 expected by the end of Unit 4.

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

Number and Operations in Base Ten

4.NBT.4

| 1-13 Focus Practice | 1-14 Progress Check ✓ | 2-1 Practice | 2-2 Focus Practice | 2-3 Practice | 2-7 Focus Practice | 2-9 Focus Practice | 2-10 Practice | 2-12 Practice | 2-13 Focus Practice ✓ | 2-14 Progress Check | 3-4 Practice |

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to use the U.S. traditional addition and subtraction algorithms to solve 4-digit + 4-digit and 4-digit — 4-digit problems.

Full Mastery of 4.NBT.4 expected by the end of Unit 4.

4.NBT.5

| 1-10 Focus Practice | 1-13 Focus Practice | 2-1 through 2-5 Warm Up Focus Practice ✓ | 2-6 Practice | 2-7 through 2-9 Warm Up Focus Practice ✓ | 2-10 Warm Up Practice | 2-12 Practice | 2-13 Warm Up Focus Practice ✓ | 2-14 Progress Check | 3-3 Practice |

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to use fact extensions to multiply by a multiple of 10.

Full Mastery of 4.NBT.5 expected by the end of Unit 8.

Geometry

4.G.2

| 1-12 Focus Practice | 1-13 Focus | 2-10 Focus Practice ✓ | 2-11 Focus Practice | 2-14 Progress Check | 3-4 Practice | 3-10 Practice | 3-12 Practice | 4-4 Practice | 4-11 Focus | 4-14 Progress Check | 8-8 Focus |

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to identify properties of line segments and angles within quadrilaterals and identify right angles within triangles.

Full Mastery of 5.MD.1 expected by the end of Unit 4.

4.G.3

| 2-12 Focus Practice ✓ | 2-14 Progress Check | 3-9 Practice | 4-10 Practice | 5-12 Focus Practice ✓ | 5-14 Progress Check | 6-6 Practice | 6-14 Progress Check | 7-8 Practice | 8-4 Focus Practice ✓ | 8-8 Focus | 8-14 Progress Check |

⭐ **Progress Towards Mastery** By the end of Unit 2, expect students to identify at least one line of symmetry in 2-dimensional symmetric figures.

Full Mastery of 4.G.3 expected by the end of Unit 8.

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

Mathematical Background:
Content

▶ Multiplication and Multiplicative Comparison
(Lessons 2-1, 2-3 through 2-6, 2-8, and 2-9)

In Unit 2 students work with multiplication in a variety of different contexts. Arrays have been featured as "pictures" of products since *Second Grade Everyday Mathematics*. For multiplication, the number of rows and the number of columns in an array are factors, and the total number of objects in the array is the product. (*See margin.*)

What may be new to fourth graders in Lesson 2-1 is linking arrays to *square numbers,* or numbers for which arrays have the same number of rows and columns. **4.NBT.5** In Lesson 2-3 students are introduced to the concept of factors and factor pairs. Factors are numbers that are multiplied together, and factors have many applications. The terms *prime number, composite number,* and *square number* are all defined in terms of their factors. Lesson 2-4 introduces the concept of multiples. A *multiple* of a number is the product of that number and some other whole number. Every multiple of a number is evenly divisible by its factors. **4.OA.4** Students extend their understanding of factors and multiples in Lesson 2-5 as they examine prime and composite numbers. **4.OA.4**

In Lessons 2-6, 2-8, and 2-9 students learn to interpret multiplication equations as multiplicative comparisons, and conversely, to represent statements of multiplicative comparisons as multiplication equations. **4.OA.1** The concept of multiplicative comparison becomes more accessible in context, as in the following number story: *Jane has 3 pretzels. Jack has 4 times as many pretzels as Jane. How many pretzels does Jack have?* Multiplicative comparison problems contain two quantities: in this problem, Jane's set of pretzels and Jack's set of pretzels. The two quantities are related to each other: one quantity is a number of times as large as the other. **4.OA.2** The unknown quantity can be determined from the comparison. Students' work with multiplicative comparisons lays the groundwork for future study of algebra.

Students play games to practice multiplication skills in various contexts. *Factor Captor* and *Factor Bingo* both involve identifying factors of whole numbers 1–100. *Buzz* and *Bizz-Buzz* helps students identify multiples of given 1-digit numbers. *How Much More?* provides practice interpreting multiplicative comparison number stories and differentiating from additive comparison number stories.

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.


2-by-6 array
$2 \times 6 = 12$
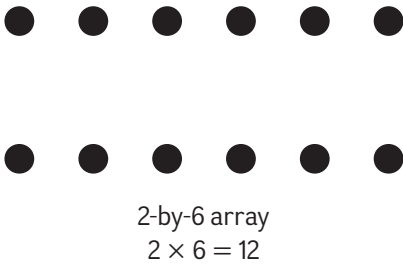
Unit 2 Vocabulary

acute triangle	factor pair	prime number
additive comparison	formula	product
adjacent	function machine	properties
argument	input	quantity
attribute	isosceles triangle	rectangular array
column	line of symmetry	right triangle
comparison statement	line symmetry	row
composite number	multiple	rule
composite unit	multiplicative comparison statement	scalene triangle
conjecture		square array
divisibility	multiplicative relationship	square number
equilateral triangle	obtuse triangle	symmetrical
factor	output	"What's My Rule?"

▶ ## Measurement (Lessons 2-2 and 2-7)

Lesson 2-2 explores another application of multiplication, introducing the formula for finding the area of a rectangle. **4.MD.3** It is essential that students understand the concept of area before being introduced to the formula. Lesson 2-2 links conceptual work done in previous grades to a meaningful understanding of why application of the formula results in the value of the area. Working with a diagram of a rectangle divided into unit squares helps students see the one-to-one correspondence between the number of squares in a row and the units measuring the length of the rectangle, as well as the correspondence between width and the number of columns. (*See margin.*)

By following the conceptual development of formulas, students gain insight into the ideas and relationships behind them. This understanding in turn makes it less likely for students to confuse area and perimeter, or to select the wrong formula to apply to a given problem. Students who understand where formulas come from are more likely to remember them, and understanding reinforces the idea that mathematics makes sense.

Students play *Rugs* and *Fences* to practice using formulas for finding area and perimeter in the context of real-world and mathematical examples. **4.MD.1, 4.MD.3**
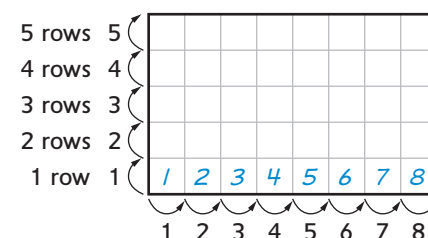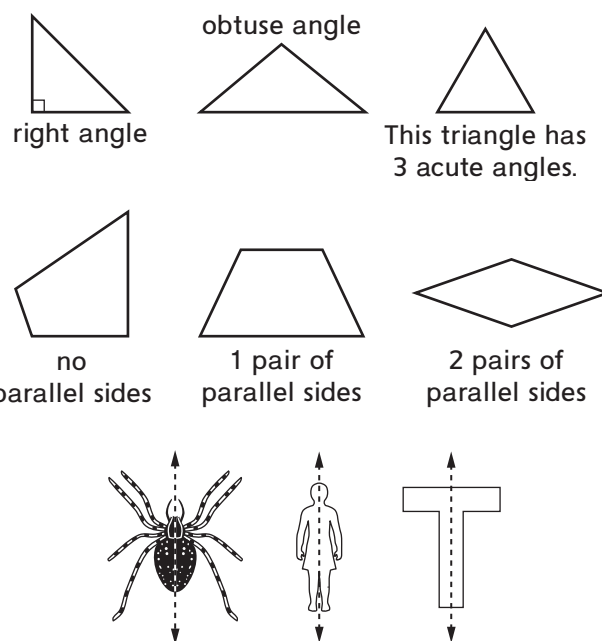
▶ Geometry (Lessons 2-10 through 2-12)

In Unit 2 students build on their knowledge of geometric attributes and begin classifying shapes according to properties. Geometry instruction at this level relies heavily on vocabulary, so students must be adept in their use of key words. Frequently review vocabulary introduced in Unit 1, including *acute, right,* and *obtuse angle,* and *parallel line segment.* Vocabulary can be reviewed quickly in a variety of ways, such as having students use gestures to demonstrate different types of angles or represent each property in a sketch.

In Lesson 2-10 students review common properties of triangles and construct them, focusing on types of angles: right, obtuse, and acute. **4.G.2** They discover that a triangle can only have one right angle.

In Lesson 2-11 students classify quadrilaterals based on whether they have parallel lines. **4.G.2** Sorting by pairs of parallel sides may not occur to most students, as the concept of parallel is relatively new and abstract. It may help to focus on parallel sides as a property. For example, find groups of quadrilaterals that do not all fit into any one classification related to one property, and ask whether all of them would fit according to a different property. If the only shared property is the number of pairs of parallel sides, sorting by pairs of parallel sides is the only method that will accommodate all of them.

In Lesson 2-12 students work with *line symmetry,* in which figures can be divided so that the two halves are mirror images of each other. **4.G.3**

Students explore line symmetry by folding and drawing on paper. Looking for lines of symmetry in triangles and quadrilaterals helps them connect the concept of symmetry to their work in Lessons 2-10 and 2-11.

obtuse angle

right angle

This triangle has 3 acute angles.

no parallel sides

1 pair of parallel sides

2 pairs of parallel sides

▶ Patterns (Lesson 2-13)

In prior grades, students use function machines and tables of values to study arithmetic operations and rules. Function machines help students visualize how a rule associates each input value with an output value. In fourth grade, students continue this work by solving "What's My Rule?" problems. In Lesson 2-13 they are given a rule and then fill in inputs, outputs, or combinations of both. Students focus on identifying patterns not stated explicitly in the rule. **4.OA.5** The complexity of the patterns students describe may vary widely. Allow them time to explore patterns in numbers and to share strategies for discovering patterns.

odd	even	odd	even	odd
1	4	9	16	25

$4 - 1 = 3$ $9 - 4 = 5$ $16 - 9 = 7$ $25 - 16 = 9$

Square Numbers
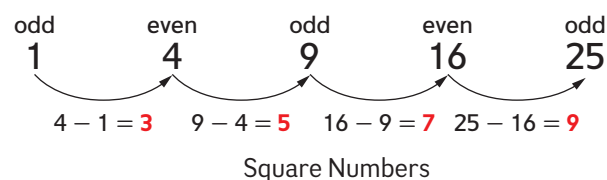
Mathematical Background:
Process and Practice

See below for some of the ways that students engage in SMP6 **Attend to precision** and SMP7 **Look for and make use of structure** through **Operations and Algebraic Thinking, Number and Operations in Base Ten,** and the other mathematical content of Unit 2.

▶ Standard for Mathematical Process and Practice 6

In Unit 2 students define properties of whole numbers and shapes. The expectation is that in doing so, they use "clear labels, units, and mathematical language." GMP6.3 Throughout the unit students are asked to label the properties of numbers using appropriate terminology, such as *factor, multiple, factor pair, prime,* and *composite*. They are also expected to define and label shapes according to their properties, using the terms *parallel, perpendicular, side, angle, acute, obtuse,* and *right*.

In Lesson 2-3 students are expected to clearly identify parts of an array—rows and columns. They identify and label numbers as prime and composite in Lesson 2-5. Lessons 2-11 and 2-12 challenge students to create, sort, and describe shapes according to their properties. These lessons reinforce the importance of using accurate and precise terminology in order to correctly classify shapes.

▶ Standard for Mathematical Process and Practice 7

The majority of the work in Unit 2 addresses whole numbers and their properties. Students "look for and make use of structure" t p p o solve problems. GMP7.1, GMP7.2 Students also examine properties of 2-dimensional shapes in the geometry lessons. GMP7.1, GMP7.2

In the early lessons in the unit, students explore patterns in arrays and then link arrays to various subsets of whole numbers: even numbers, square numbers, and prime numbers. Patterning with array work begins in Lesson 2-1 as students look at square arrays. In Lesson 2-4 they examine patterns in multiples to explore the idea that a whole number is a multiple of each of its factors. In Lesson 2-5 students classify numbers as prime or composite based on the number of factors. Lessons 2-11 and 2-12 have students building and sorting shapes based on their properties. The unit ends with students exploring number and shape patterns. They are asked to extend patterns and create their own based on given rules.

Standards and Goals for Mathematical Process and Practice

SMP6 Attend to precision.
  GMP6.1 Explain your mathematical thinking clearly and precisely.
  GMP6.2 Use an appropriate level of precision for your problem.
  GMP6.3 Use clear labels, units, and mathematical language.
  GMP6.4 Think about accuracy and efficiency when you count, measure, and calculate.

SMP7 Look for and make use of structure.
  GMP7.1 Look for mathematical structures such as categories, patterns, and properties.
  GMP7.2 Use structures to solve problems and answer questions.

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

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

Little and Big

Overview **Day 1:** Students use multiplicative reasoning to make predictions based on information in an open response problem and then make mathematical arguments to support their predictions (conjectures).
Day 2: Students analyze others' conjectures and arguments and then revise their own work.

Day 1: Open Response

▶ **Before You Begin**

Solve the open response problem. Consider the reasoning your students may use to make predictions, or conjectures, and how they might construct arguments to support their conjectures. If possible, schedule time to review students' work and plan for Day 2 of this lesson with your grade-level team.

▶ **Vocabulary**

conjecture • argument

Standards

Focus Clusters
- Use the four operations with whole numbers to solve problems.
- Generate and analyze patterns.

1 Warm Up 5 min

Materials

Mental Math and Fluency Students identify the place value of digits in a given number.		**4.NBT.2**

2a Focus 55–65 min

	Materials	Standards
Math Message Students decide whether suggested rules for a "What's My Rule?" table are correct and make arguments supporting their decisions.	*Math Journal 1*, p. 47	**4.OA.5** **SMP1, SMP3, SMP7**
Making Conjectures and Arguments Students use the terms conjecture and argument in a discussion of the "What's My Rule?" table.	*Math Journal 1*, p. 47; *Student Reference Book,* pp. 10–11; Standards for Mathematical Practice Poster	**4.OA.5** **SMP3, SMP7**
Solving the Open Response Problem Based on information in the problem, students make predictions, or conjectures, about the comparative heights of two dogs, and then make arguments to justify their answers.	*Math Masters*, pp. 65–66, p. 67 (optional); 10 small (1 1 _ 4 in.) paper clips; scissors and glue (optional)	**4.OA.1, 4.OA.2** **SMP1, SMP3, SMP7**

Getting Ready for Day 2 →

Review children's work and plan discussion for reengagement.   *Math Masters*, p. TA8; students' 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

Display 972,681. Ask students to identify the digits in the named places and the values of those digits. *Leveled exercises:*

- ●○○ Which digit is in the thousands place? 2
  What is the value of the digit? 2,000
- ●●○ Which digit is in the ten-thousands place? 7
  What is the value of the digit? 70,000
- ●●● Which digit is in the hundred-thousands place? 9
  What is the value of the digit? 900,000

2a Focus 55–65 min

▶ Math Message

Math Journal 1, p. 47

Complete journal page 47. **GMP1.1, GMP1.3, GMP3.1, GMP7.2**

▶ Making Conjectures and Arguments

Math Journal 1, p. 47; *Student Reference Book,* pp. 10–11

| WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT |

Math Message Follow-Up Have partners share their decisions about each rule and the arguments they made to justify each decision. Remind them that their proposed rule must work in all three rows of the table. Ask: *Do you agree with your partner's arguments? Why or why not?* **GMP3.1, GMP7.2** Answers vary.

Professional Development

The focus of this lesson is **GMP3.1**. A **conjecture** is a type of prediction based on some given information. An **argument** is an explanation that supports or refutes the conjecture. In this lesson students make a conjecture about the height of a dog based on information given in the problem and then write an argument to support their thinking.

Go Online for information about **SMP3** in the *Implementation Guide.*

Math Journal 1, p. 47

"What's My Rule?" — Lesson 2-6

Mr. Cheng's class is trying to figure out the rule for the table below. For the rule to be correct, the rule must work for all the rows.

in	out
1	1
2	3
4	7

In the table below, the first column shows educated guesses, or **conjectures,** for rules that Mr. Cheng's students made. Some rules are correct and some are not.

Circle Yes or No to tell whether the rule is correct. Then write an explanation, or **argument,** for why you think the rule is correct or not.

Conjecture for Rule	Correct? (Circle Yes or No)	Argument
Multiply by 1.	Yes (No)	Sample answer: It doesn't work for the second row, because 2 * 1 = 2, and not 3, so this is not a possible rule. It doesn't work for the third row either.
Add 3.	Yes (No)	Sample answer: While 4 + 3 is equal to 7 for the last row, the rule must work for all three numbers put in. 1 + 3 doesn't equal 1 for the first row.
Double the number you put in and subtract 1.	(Yes) No	Sample answer: It works for all the rows. If you double 1 and subtract 1, you get 2 − 1 = 1. Doubling 2 makes 4; 4 − 1 = 3. Doubling 4 makes 8; 8 − 1 = 7.

4.OA.5, SMP1, SMP3, SMP7   47

Prior to the lesson, preview the Math Message by doing some "What's My Rule?" problems involving simple relationships, such as doubling or adding 10. To prepare for the open response problem, ask students to make measurements of several objects, such as the width of their desk or the length of a book, using the small paper clips they will use in the lesson.

Use pictures and demonstrations to preview vocabulary, such as *side-by-side, paws, dog treats, height,* and *missing.*

Have students turn to *Student Reference Book,* pages 10–11. Read the pages together and remind students that today's Math Message asked them to decide whether someone's conjectures about the rules for the "What's My Rule?" table are correct. Use the Student Reference Book pages to discuss the meaning of *conjecture* and *argument* as a class. Refer students to the Standards for Mathematical Practice Poster for **GMP3.1**.

Academic Language Development Help students understand that the terms *conjecture* and *argument* go hand in hand. Conjectures should be critiqued, and convincing arguments should be made to either support or refute them. In the latter case, the conjecture should be revised based on what was learned from the argument, and then the cycle begins again. Some helpful descriptions for the word *conjecture* are "smart guess" and "reasonable prediction." Some helpful descriptions for the word *argument* are "using mathematical reasons" and "trying to prove." Be sure that students understand that a mathematical argument is not like a social argument, disagreement, or verbal fight.

As a class, review students' conjectures and arguments. Discuss what makes a good argument for each case. For students who struggle verbalizing their explanations, use sentence frames such as the following to help them get started: "The rule is/is not correct because _____."
GMP3.1

> **NOTE** When testing the rules for each input, use correct mathematical notation to represent each trial input. For example, for the rule "Double the number and subtract 1" with the input number 4, write two number sentences: $2 * 4 = 8$ and then $8 - 1 = 7$. Do not write: $2 * 4 = 8 - 1 = 7$ because, although it follows the language students may use, it is not correct: $2 * 4$ does not equal $8 - 1$, and $2 * 4$ does not equal 7.

▶ Solving the Open Response Problem

Math Masters, pp. 65–66

WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT

Distribute *Math Masters,* pages 65–66 and 10 small paper clips to each student. Read the problem as a class and have partners discuss what the problem is asking them to do. Point out that students' predictions are their conjectures and their explanations are their arguments.

Math Masters, p. 65

Little and Big   Lesson 2-6

NAME   DATE   TIME

Ana has two dogs, Little and Big. She had a picture of them sitting side by side, but the dogs ate most of the picture. Most of Big is now missing!

She used dog treats to measure Little's height in the picture, starting at the floor by his paw and going up to the top of his head. Little's height was 2 dog treats.

Ana measured the picture of Big in the same way before the picture was torn, using the same dog treats. Big's height was 6 dog treats.

① Look at the picture of Little. Measure Little's height using paper clips.
   3 paper clips

② Predict the height of Big in the picture if you measured him using the same paper clips.
   9 paper clips

③ Show or tell how you figured out what to predict. You may use diagrams, words, or calculations. Explain your steps carefully.

   Answers vary. See sample students' work on page 159 of the *Teacher's Lesson Guide.*

4.OA.1, 4.OA.2, SMP1, SMP3, SMP7   65

Explain to students that they will use paper clips to measure a picture of a dog named Little and then use that information to predict the height of another dog named Big. Tell them they can use tables or diagrams as part of their written arguments to support their predictions. **GMP3.1** Listen as partners talk, asking them questions as needed. **GMP1.3** For students who struggle making sense of the problem, ask:

- *What was in this picture before the dogs chewed on it?* **GMP1.1** Sample answer: Little and Big were sitting side by side.
- *What do you know about the problem?* **GMP1.1** Sample answer: When Little's picture was measured using dog treats, he was 2 dog treats high. Big was measured as 6 dog treats high. Big is much larger than Little, so Big should be many more paper clips high.
- *What do you need to do for Problem 1?* **GMP1.1** Sample answer: Measure Little with paper clips
- *Then what do you need to do for Problems 2 and 3?* **GMP1.1** Sample answer: Predict how tall Big was in the picture in paper clips and then show or tell how I figured out the result
- *What is the conjecture?* Sample answer: My prediction of Big's height *What is the argument?* Sample answer: How I show or tell how I figured out Big's height

For students who struggle getting started on the mathematics in the problem, ask:

- *How many paper clips tall is Little?* **GMP1.1, GMP1.3** 3 paper clips
- *Is Big's height greater than or less than Little's height in dog treats? In paper clips?* **GMP1.1, GMP1.3** Greater for both
- *How do the paper clips line up with the dog treats?* **GMP1.1, GMP1.3** Sample answers: 3 paper clips line up with 2 dog treats; each dog treat lines up with $1\frac{1}{2}$ paper clips.

> **Differentiate** **Adjusting the Activity**
>
> For students who have trouble manipulating the paper clips, make a paper clip ruler by taping paper clips to a strip of cardboard to make it easier to line them up straight.

Summarize Ask: *Did your argument clearly show that your prediction was true?* Answers vary. *Do you need to revise your prediction?* Answers vary. *Did you use words, pictures, numbers, or something else?* **GMP7.2** Answers vary.

Collect students' work so that you can evaluate it and prepare for Day 2.

Picture of Little
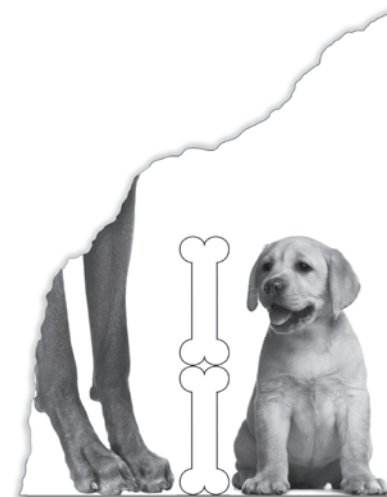
Common Misconception

Differentiate Students may inappropriately use additive reasoning instead of multiplicative reasoning in their comparisons. For example, students may say, "Since Big is 4 dog treats taller than Little, Big must be 4 paper clips taller than Little, or $3 + 4 = 7$ paper clips tall." Give these students another piece of paper and ask them to build Big's height using dog treats (gluing 6 cutout dog treats from *Math Masters*, page 67 onto the paper and then measuring the dog treats in paper clips). Some students will need to derive the multiplicative relationship through physical measurement for quite awhile, while others may start to "see" the "3 times" relationship mentally. **GMP7.2**

Getting Ready for Day 2

Math Masters, p. TA8

Planning a Follow-Up Discussion

Review students' work. Use the Reengagement Planning Form (*Math Masters,* page TA8) and the rubric on page 156 to plan ways to help students meet expectations for both the content and practice standards. Look for work that shows correct multiplicative reasoning or incorrect additive reasoning. Also look for clearly stated arguments, as well as arguments that need clarification.

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

Go Online for sample students' work that you can use in your discussion.

1. Display work, such as Student A's, that shows correct multiplicative reasoning with pictures, tables, calculations, or words to justify a correct answer of 9 paper clips for Big's height. Ask:
    *   *What was this student's prediction?* Big's height is 9 paper clips.
    *   *Summarize this student's argument or explanation.* **GMP1.1, GMP3.1, GMP7.2** Sample answer: The drawing shows and labels 2 dog treats as "Little's height" lined up next to 3 paper clips labeled as "Little's height in paper clips." A label points to the dog treats and says, "This times three equals Big's height, so $3 \times 2 = 6$," and a fourth label points to the line of paper clips and says, "This times three equals Big's height, so $3 \times 3 = 9$."

    *   *How could this student improve the argument?*
        GMP1.3, GMP3.1 Sample answer: It would be clearer if the student labeled all numbers with units, either dog treats or paper clips. The sentences should say, "This (2 dog treats) times three equals Big's height, so $3 \times 2 = 6$ dog treats. This (3 paper clips) times three equals Big's height, so $3 \times 3 = 9$ paper clips."

Sample student's work, Student A
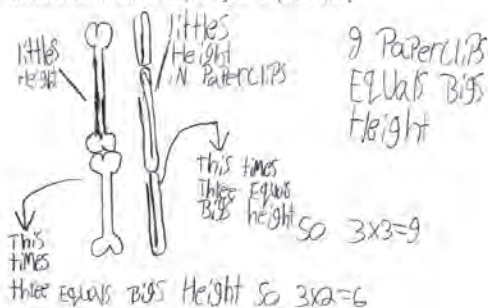
2. Show work, such as Student B's, in which a student inappropriately used additive reasoning yet described the approach reasonably well. Ask:
- *What was this student's prediction?* Big is 7 paper clips high. *Do you agree or disagree?* Disagree
- *What do you think this student was thinking?* Sample answer: This student thought that since Little was 2 dog treats tall and 3 paper clips tall, this means to "+ 1." I think the student added 1 to Big's height of 6 dog treats to get 7 paper clips.
- *How could you help this student better understand the problem?* GMP1.1, GMP7.2 Sample answer: We can line up 6 dog treats with paper clips, and then the student would see that more than 7 paper clips are needed to measure Big's height.

3. Show work, such as Student C's, in which the student's prediction is correct, but the argument is not clear. Ask:
- *What is the conjecture, or prediction, in this response?* 9 paper clips *Is the prediction correct?* Yes.
- *What is the argument?* Sample answer: The student says that since Little is 3 paper clips tall and Big is 6 dog treats, Big must be 3 + 6 = 9 paper clips tall.
- *Does the argument support the prediction? Why or why not?* GMP3.1 No. It does not make sense to add different things together like 3 paper clips to 6 dog treats to get 9 paper clips.
- *How could this response be improved?* GMP1.3, GMP3.1 Sample answer: The student could use paper clips and cutouts of dog treats to see whether the answer makes sense and then revise the answer and explanation.

Planning for Revisions

Have copies of *Math Masters,* pages 65–66 or extra paper available for students to use in revisions. You might want to ask students to use colored pencils so you can see what they revised.

Sample student's work, Student B

1. Look at the picture of Little. Measure Little's height using paper clips.
   _3_ paper clips

2. Predict the height of Big in the picture if you measured him using the same paper clips.
   _7_ paper clips

3. Show or tell how you figured out your prediction. You may use diagrams, words, or calculations. Explain your steps carefully.

Sample student's work, Student C

1. Look at the picture of Little. Measure Little's height using paper clips.
   _3_ paper clips

2. Predict the height of Big in the picture if you measured him using the same paper clips.
   _9_ paper clips

3. Show or tell how you figured out your prediction. You may use diagrams, words, or calculations. Explain your steps carefully.

I know bigs because littles is 3 paper clips bigs is six dog treats 3+6=9

Little and Big

Day 2: Reengagement

▶ **Before You Begin**

Have extra copies of Math Masters, pages 65–66 and some cutouts from page 67 available for students to use as they revise their work.

(2b) Focus 50–55 min

	Materials	
Setting Expectations Students review the open response problem and discuss what a good argument might include. They also review how to discuss others' work respectfully.	Guidelines for Discussions Poster	**SMP1, SMP3, SMP7**
Reengaging in the Problem Students analyze others' predictions and arguments and think about how multiplication can be used to solve the problem.	selected samples of students' work	**4.OA.1, 4.OA.2 SMP1, SMP3, SMP7**
Revising Work Students revise their predictions and arguments based on what they learned in the reengagement discussion.	*Math Masters*, pp. 65–66 (optional); colored pencils (optional); students' work from Day 1	**4.OA.1, 4.OA.2 SMP1, SMP3, SMP7**

✓ **Assessment Check-In** See page 158 and the rubric below. | | **4.OA.2, SMP3**

Expect most students to use multiplicative reasoning to make a correct prediction for the problem identified.

Goal for Mathematical Process and Practice	Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations	Exceeding Expectations
GMP3.1 Make mathematical conjectures and arguments.	Provides an argument in Problem 3 that is • inconsistent with the conjecture in Problem 2; **or** • based on additive reasoning (e.g., Big is 7 paper clips tall because you add 1 paper clip to Little's height in dog treats, so you do the same for Big); **or** • unclear or ambiguous.	Provides an argument in Problem 3 that is consistent with the conjecture in Problem 2 and either • describes or shows in a drawing the relationship between paper clips and dog treats; **or** • uses the multiplicative relationship between Big's and Little's heights to find Big's height in paper clips.	Provides an argument in Problem 3 that is consistent with the conjecture in Problem 2 and both • describes or shows in a drawing the relationship between paper clips and dog treats (e.g., 2 dog treats = 3 paper clips, or 1 dog treat = $1\frac{1}{2}$ paper clips); **and** • uses the multiplicative relationship between Big's and Little's heights to find Big's height in paper clips (e.g., 3×3 or adding $1\frac{1}{2}$ six times).	Meets expectations using **both** words and drawings to explain and show: • the relationship between paper clips and dog treats; **and** • the use of the multiplicative relationship between Big's and Little's heights to find Big's height in paper clips.

(3) Practice 10–15 min

Math Boxes 2-6 Students practice and maintain skills.	*Math Journal 1*, p. 48	See page 158.
Home Link 2-6 **Homework** Students solve number stories involving multiplication.	*Math Masters*, p. 68	**4.OA.3, 4.NBT.2, 4.NBT.5 SMP4**

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

▶ # Setting Expectations

| WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT |

Revisiting Guidelines for Reengagement

To promote a cooperative environment, consider revisiting the class guidelines for discussions that you developed in Unit 1. Review the guidelines and have students reflect on how well they are following them. Solicit additional guidelines from the class. Your revised list might look like the one shown in the margin.

Model some of the following sentence frames to show students appropriate language for discussing other students' work:

- I like how your drawing of dog treats helps me to _____.
- Could you explain what the numbers mean in your _____?
- Something I would like to add to your argument is _____.
- I noticed that _____.

Reviewing the Problem

Review the problem as a class. Remind students that their task was to make a conjecture about Big's height in paper clips and write an argument to support the conjecture. Ask: *What would a good argument include?* **GMP1.1, GMP1.3, GMP3.1, GMP7.2** Sample answers: an explanation of my thinking and how I made my prediction; a drawing of Little and Big comparing their heights in dog treats and paper clips

Explain to students that they are going to make sense of others' conjectures and arguments and compare others' arguments to their own.

▶ # Reengaging in the Problem

| WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT |

Students reengage in the problem by analyzing and critiquing other students' work in pairs and in a whole-group discussion. Have students discuss with partners before sharing with the whole group. Guide this discussion based on the decisions you made in Getting Ready for Day 2. **GMP1.1, GMP1.3, GMP3.1, GMP7.2**

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 class discussions, we can:
- ✔ Make mistakes and learn from them.
- ✔ Change our minds.
- ✔ Ask questions.
- ✔ Listen closely to others' ideas.
- ✔ Share ideas respectfully.
- ✔ Agree and disagree politely.
- ✔ Change our minds about how to solve a problem.
- ✔ Feel confused.
- ✔ Be patient.

▶ Revising Work

Pass back students' work from Day 1. Before students revise anything, ask them to examine their responses 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 predict, or make a conjecture, that Big is 9 paper clips tall?*
- *Did you make a clear argument using words or drawings that fully support your conjecture?* **GMP3.1, GMP7.2**

Tell students they now have a chance to revise their work. Tell them to add to their earlier work using colored pencils or to use another sheet of paper, instead of erasing their original work.

Differentiate   **Adjusting the Activity**

Have students who made satisfactory arguments complete an additional problem. Tell them about Middle, another dog in the picture, who was 4 dog treats tall. Ask: *What would Middle's height be in paper clips?* **GMP7.2**   6 paper clips

Ask students to make a table of the three dogs' heights in dog treats (input) and paper clips (output). A sample table is provided below.

Dog's Name	Height in Treats	Height in Paper Clips
Little	2	3
Middle	4	6
Big	6	9

Ask: *What is the rule for this table? How do you know?* **GMP3.1, GMP7.2**
Sample answer: The rule is the number of treats plus half the number of treats gives the height in paper clips. It works in all three boxes: $2 + 1 = 3$; $4 + 2 = 6$; $6 + 3 = 9$.

Summarize Ask students to reflect on their work and revisions. Ask: *Did you need to revise your prediction (conjecture)? How did you improve your argument?* **GMP1.3, GMP3.1**   Answers vary.

✓ **Assessment Check-In**   4.OA.2

Collect and review students' revised work. Expect them to improve their arguments based on the class discussion. For the content standard, expect most students to use multiplicative reasoning to make a correct prediction of 9 paper clips for Big's height. You can use the rubric on page 156 to evaluate students' revised work for **GMP3.1**.

✓ **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.

Math Journal 1, p. 48

Sample Students' Work—Evaluated

See the sample in the margin. This work meets expectations for the content standard by showing the use of multiplicative reasoning to predict Big's height to be 9 paper clips. With revision, the work meets expectations for the mathematical practice by providing an argument in Problem 3 that is consistent with the correct answer in Problem 2. The student explains the relationship between height measured in dog treats and paper clips (saying that 1 dog treat is $1\frac{1}{2}$ paper clips) and uses the multiplicative relationship between Little's and Big's heights to determine Big's height in paper clips: since Big is 6 dog treats tall, you need to find $1 * 6$ and add that to 6 halves. If the student had also illustrated these features with diagrams, the work would exceed expectations.

Go Online for other samples of evaluated students' work.

3 Practice   10–15 min

▶ Math Boxes 2-6 ✏️

Math Journal 1, p. 48

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

Mixed Practice Math Boxes 2-6 are paired with Math Boxes 2-8.

▶ Home Link 2-6

Math Masters, p. 68

Homework Students solve number stories involving multiplication.

Multiplicative Comparisons

Overview Students create and interpret statements and equations for multiplicative comparisons.

▶ **Before You Begin**

For the Readiness activity, consider copying the Fact Triangles on *Math Masters*, page T16 onto cardstock and saving for future lessons.

▶ **Vocabulary**

comparison statement • quantity • multiplicative comparison statement • multiplicative relationship

1 Warm Up   5 min

	Materials	
Mental Math and Fluency Students identify the values of digits.		**4.NBT.2**

2 Focus   30–40 min

Math Message Students compare two lengths and write statements.	*Math Masters,* p. 71	**4.OA.1, 4.NBT.5**
Sharing Comparison Statements Students explore the language and features of multiplicative comparison situations.	*Math Masters,* p. 71	**4.OA.1, 4.NBT.5** **SMP2**
Representing Comparison Statements as Equations Students describe relationships between quantities and represent them with equations.	slate	**4.OA.1, 4.NBT.5** **SMP1, SMP2**
Creating and Interpreting Statements and Equations Students create and interpret multiplicative comparison statements and equations.	*Math Journal 1,* p. 53	**4.OA.1, 4.OA.2, 4.NBT.5** **SMP2**
✓ **Assessment Check-In** See page 171. Expect most students to solve problems involving multiplication facts outside of number stories.	*Math Journal 1,* p. 53	**4.OA.1, 4.NBT.5**

3 Practice   15–20 min

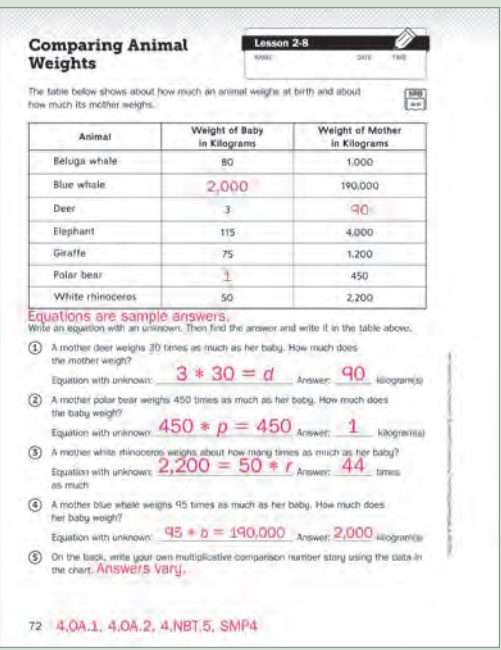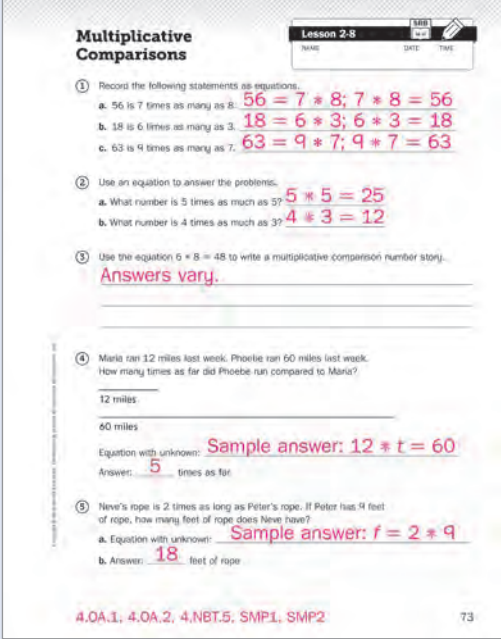|		
Playing *Factor Captor* **Game** Students find factors of larger numbers.	*Student Reference Book,* p. 258; *Math Masters,* pp. G15–G16; counters; calculator	**4.OA.4, 4.NBT.5, 4.NBT.6** **SMP7**
Math Boxes 2-8 Students practice and maintain skills.	*Math Journal 1,* p. 54	See page 171.
Home Link 2-8 **Homework** Students create and interpret multiplicative comparison statements and equations.	*Math Masters,* p. 74	**4.OA.1, 4.OA.2, 4.NBT.4, 4.NBT.5** **SMP1, SMP2**
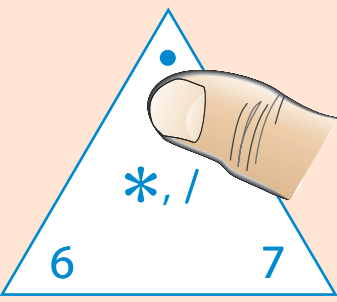
▥ **Go Online** to see how mastery develops for all standards within the grade.

Differentiation Options

Readiness	5–10 min
WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT

Reviewing the "Hard" Facts

4.OA.1, 4.NBT.5, SMP6

Math Masters, p. TA16; scissors; paper clips

For practice with the "harder" multiplication facts, students cut out and practice with the Fact Triangles on *Math Masters,* page TA16.

Encourage partners to use statements like these: "6 times 7 equals what number?" or "What number is 6 times 7?" GMP6.3 You may wish to display these written statements for students' reference.

Enrichment	10–15 min
WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT

Comparing Animal Weights

4.OA.1, 4.OA.2, 4.NBT.5, SMP4

Math Masters, p. 72

To extend work with multiplicative comparisons in real-life contexts, students write multiplication equations representing comparisons based on information about mother and baby animal weights. GMP4.1

Extra Practice	10–15 min
WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT

Multiplicative Comparisons

4.OA.1, 4.OA.2, 4.NBT.5, SMP1, SMP2

Math Masters, p. 73

For additional practice with multiplicative comparison statements, students write a multiplicative comparison number story and write equations representing multiplicative comparisons on *Math Masters,* page 73. GMP1.1, GMP2.3

English Language Learner

Beginning ELL Prior to the lesson, use Total Physical Response activities with short questions to review the comparison words and phrases that will be used in the lesson. For example, say: *Make a pile with 3 counters. Make a new pile with 3 times as many counters. Point to the pile with more/fewer counters. How many more/fewer? How many times as many?* Repeat using other terms like these: x *times as much, twice/half as many,* x *times as far.* Include basic comparison words like *longer/shorter* and *bigger/smaller.*

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

Adjusting the Activity

Differentiate For students who
struggle with writing the statements,
use a sentence frame, such as: "Eve's
ribbon is _____ Maxine's ribbon."
Remind students that their sentences
must be different from the ones
already listed.

Go Online 👥 Differentiation
Support

Math Masters, p. 71

---

1 Warm Up 5 min

▶ Mental Math and Fluency

Display the number 1,754,396. Ask students to identify the digits in certain
places and the values of those digits. *Leveled exercises:*

- ●○○ Which digit is in the ten-thousands place? 5 What is the value
of the digit? 50,000
- ●●○ Which digit is in the hundred-thousands place? 7 What is the value
of the digit? 700,000
- ●●● Which digit is in the millions place? 1 What is the value of the digit?
1,000,000

2 Focus 30–40 min

▶ Math Message

Math Masters, p. 71

Complete Math Masters, *page 71.*

▶ Sharing Comparison Statements

Math Masters, p. 71

| WHOLE CLASS | SMALL GROUP | PARTNER | INDEPENDENT |

Math Message Follow-Up Ask students to share their statements as
you record them. If no one suggests them, be sure to make the following
comparisons:

- The length of Maxine's ribbon is 2 times the length of Eve's ribbon.
- Maxine's ribbon is twice as long as Eve's.
- Two of Eve's ribbons would be equal to the length of Maxine's ribbon.
- Eve's ribbon is half the length of Maxine's because 8 is half of 16.

Explain that these statements are called **comparison statements.**
They include information about both **quantities,** or amounts, being
compared. Point out comparison words and ideas: *shorter than, longer
than, two of this will equal that, two times as long as*, and so on. Help
students recognize that the two quantities are in a relationship with
each other—one quantity is *a number of times as long as* the other. The
relationship involves multiplication, so these specific statements are called
multiplicative comparison statements.

Display the following statement: *A DVD costs $15 and a book costs $5.*
Ask students to make multiplicative comparison statements about the two
objects. Expect statements like the following:

- The DVD costs 3 times as much as the book.
- Three books equal the cost of one DVD.

We can use equations to show the relationships between two quantities. Ask: *What equation can you write to describe the relationship between the DVD and the book?* Sample answers: $5 * 3 = 15$; $15 = 5 * 3$

Be sure to discuss how specific parts of each equation represent specific parts of the situation and model. **GMP2.3** Ask: *What does the 5 represent?* The cost of the book *What does the 3 represent?* The number of times more the DVD costs than the book *What does the 15 represent?* The cost of the DVD Conclude by emphasizing the multiplicative thinking behind the comparison situation. Ask: *What is the mathematical relationship between the costs of the two items?* The cost of the DVD is 3 times that of the book.

Direct students' attention back to the Math Message. Ask: *What equation can you write to describe the relationship between the two lengths?* **GMP2.1, GMP2.3** Sample answers: $8 * 2 = 16$; $16 = 2 * 8$

▶ Representing Comparison Statements as Equations

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

Display the following problem: *Scarlett has 7 crayons in her pencil box. Liam has 4 times as many crayons as Scarlett. How many crayons does Liam have?* Allow time for students to solve on their slates.

Ask students what strategies they used to solve the problem. Share and discuss different approaches, including doubling and modeling with arrays. 7 doubled is 14; 14 doubled is 28.
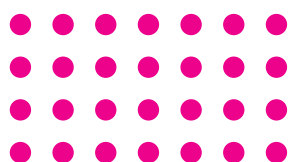
4 groups of 7 = 28

Remind students that they have used multiplication to solve different types of problems: equal groups, arrays, and area models. Tell them that another type of multiplication problem focuses on comparing two quantities. It involves showing that one quantity is a specific *number of times as many* or *as much as* the other.

In the problem above, students compare the number of crayons in Liam's box to the number of crayons in Scarlett's box and use the idea of a *number of times,* or the **multiplicative relationship,** to solve it.

To emphasize the multiplicative relationship, ask:

- *Whose number of crayons is greater?* Liam's *How do you know?* Sample answer: He has 4 times the number Scarlett has.
- *How many times as great?* 4
- *Will Liam have more or fewer than 7 crayons?* More Have students explain their thinking. **GMP1.1** Sample answer: The problem says Liam has 4 times as many as Scarlett. I know that *times* in this problem means multiplication, so he must have more.

Adjusting the Activity

Differentiate   Provide students who try to solve *as they read* with this checklist:

- Read the whole problem.
- Identify what the question is asking.
- Identify what is unknown.
- Solve.

This will help them identify the items being compared and what the question is asking. Problem 3 on journal page 53, for example, needs to be read entirely before solving.

Academic Language Development

Provide sentence frames for discussing multiplicative comparison problems: "The problem compares _____ to _____." "I know _____ is _____ times as much as _____." "The relationship between the two numbers is _____."

Math Journal 1, p. 53

Multiplicative Comparisons
Lesson 2-8

Complete the problems below. **Equations are sample answers.**

1. 42 is 6 times as much as 7. Record as an equation.
   $42 = 6 * 7$

2. What number is 4 times as much as 9? Record as an equation. $4 * 9 = 36$

Solve each number story. Write an equation and use a letter to stand for the unknown.

3. Jon's marble rolled 48 inches. Alana's marble rolled 12 inches. Jon's marble rolled how many times as far as Alana's?

   48 inches
   12 inches

   a. Write an equation with an unknown to represent this comparison. $48 \div 12 = r$
   b. Answer: **4** times as far

4. Samara has 5 times as many apples as Asher. If Asher has 9 apples, how many does Samara have?
   a. Equation with unknown: $S = 9 * 5$
   b. Answer: **45** apples

5. Sally is 21 years old. Tonya is 3 times as old as Sally. How old is Tonya?
   a. Equation with unknown: $21 * 3 = T$
   b. Answer: **63** years old

6. Write a comparison number story using the equation $8 * 5 = 40$.
   Sample answer: Tracey has $8 in her purse. Her mother has 5 times as much money in her purse. How much money does Tracey's mother have?

4.OA.1, 4.OA.2, 4.NBT.5, SMP2   53

Guide students to use equations to represent the comparison situation in the number story. Consider modeling using counters.

- *What number is 4 times as many as 7?* 28
- *What equation can we write to represent this situation?* **GMP2.1**
  $c = 4 * 7$; or $4 * 7 = c$

Display the equation $3 * 9 = 27$ and the problem below:

> Will has 9 CDs. Jeremy has 3 times as many CDs as Will. How many CDs does Jeremy have?

Discuss the following:

- *Does the equation represent the situation in the number story?* Yes. *How do you know?* Sample answer: The equation tells us that 3 times as many as 9 is 27, which correctly matches the situation in the number story.
- *What is the comparison being made in this number story?* The number of CDs Jeremy has is being compared to the number of CDs Will has.
- *How do you know that one quantity in this equation is a number of times as many as another quantity in this equation?* Sample answers: The problem says that the number of CDs Jeremy has is 3 times as many as 9; 27 is 3 times as many as 9.

Now display the equation $20 = 5 * 4$. Have students determine how this equation can represent a comparison. Ask:

- *20 is 5 times as much as what number?* 4 *20 is 4 times as much as what number?* 5 So we can say that 20 is 4 times as much as 5; or 20 is 5 times as much as 4.
- *What comparison number story can you create to match this equation?* Sample answer: Jamal has 5 books on his shelf. His older brother Balta has 4 times as many books. How many books does Balta have?

Repeat this procedure as needed with other equations, prompting students to create and record comparison statements/situations for different multiplication equations. **GMP2.1, GMP2.3** Remind them that each equation involves two quantities (one of the factors and the product) and another number (the other factor) that represents *how many times as much* or *how many times as many*.

▶ ## Creating and Interpreting Statements and Equations

Math Journal 1, p. 53

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

Students work in pairs to complete journal page 53. **GMP2.1**

Math Journal 1, p. 54

Assessment Check-In 4.OA.1, 4.NBT.5

Math Journal 1, p. 53

This lesson introduces students to multiplicative comparison situations involving verbal statements and equations. At this stage, expect students to solve Problems 1 and 2, which involve multiplication facts outside the context of number stories. As the language may be difficult for students, some may struggle with the story contexts in the other problems on the page. Help students who struggle break down each story into three numeric parts: the product, the factor, and the number representing "how many times as many."

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

Summarize Have students share their comparison number stories from Problem 6 on journal page 53.

3 Practice 15–20 min

▶ Playing *Factor Captor*

Student Reference Book, p. 258; *Math Masters*, pp. G15–G16

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

Factor Captor is an effective way for students to practice finding factors. GMP7.1, GMP7.2 See Lesson 2-3 for additional information.

| Differentiate | **Game Modifications** | Go Online | Differentiation Support |

▶ Math Boxes 2-8

Math Journal 1, p. 54

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

Mixed Practice Math Boxes 2-8 are paired with Math Boxes 2-6.

▶ Home Link 2-8

Math Masters, p. 74

Homework Students create and interpret multiplicative comparison statements and equations. GMP1.1, GMP2.1, GMP2.3

Math Masters, p. 74

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
Students complete the Self Assessment.

Assessment Handbook, p. 12

2a Assess   35–50 min

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

Assessment Handbook, pp. 13–15

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

Assessment Handbook, p. 16

Standards	Goals for Mathematical Content (GMC)	Lessons	Self Assessment	Unit 2 Assessment	Unit 2 Challenge
4.OA.2	Solve number stories involving multiplicative comparison.	2-6, 2-8, 2-9	5	5	
4.OA.4	Find all factor pairs for a whole number in the range 1–100.	2-3	2	1b	
	Determine whether a whole number is a multiple of a given 1-digit number.	2-4	2	2	
4.OA.5	Generate a number or shape pattern that follows a given rule.	2-13	9	9	
4.NBT.4	Subtract multidigit whole numbers fluently using the standard algorithm.	2-7			1a, 1b
4.NBT.5	Multiply a whole number of up to four digits by a 1-digit number and a 2-digit number by a 2-digit number.	2-1 to 2-5, 2-7 to 2-9, 2-13	2, 3	1a, 2, 3a, 4a, 9	1a, 1b, 2a
	Illustrate and explain multiplication strategies and calculations.	2-1, 2-7	1	1a, 4b	
	Multiply a whole number by a multiple of 10, 100, or 1,000.	2-7	4	4a	
4.MD.1	Know relative sizes of measurement units; express measurements in a larger unit in terms of a smaller unit.	2-7	4	4a, 4b	
4.MD.2	Solve number stories involving whole numbers of measured quantities.	2-7			1a, 1b
4.MD.3	Apply area formulas for rectangles.	2-2	3	3a, 3b	2a, 2b
4.G.1	Draw, represent, and identify angles, including right, acute, and obtuse angles.	2-7, 2-10		6, 7	
	Draw, represent, and identify perpendicular and parallel lines.	2-7		7	
4.G.2	Classify 2-dimensional figures based on line segments or angles.	2-10, 2-11	7	7	
	Recognize right triangles as a category, and identify right triangles.	2-10		6	
4.G.3	Identify line-symmetric figures and draw lines of symmetry.	2-12	8	8	
	Goals for Mathematical Process and Practice (GMP)				
SMP1	Make sense of your problem. **GMP1.1**	2-6, 2-8		5	
SMP6	Explain your mathematical thinking clearly and precisely. **GMP6.1**		6	3b, 4b	2b

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

1 Warm Up 5–10 min

▶ Self Assessment

Assessment Handbook, p. 12

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

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

NAME   DATE   TIME   Lesson 2-14 ✔

Unit 2 Self Assessment

Think about each skill listed below. Assess your own progress by checking the most appropriate box.

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 Make arrays. MJ1 35, 39			
② Find factors and multiples. MJ1 39, 41			
③ Find the area of rectangles. MJ1 37			
④ Change from hours to minutes. MJ1 49			
⑤ Know whether to add or multiply when comparing two things. MJ1 53, 55			
⑥ Explain my mathematical thinking clearly and precisely.			
⑦ Identify properties of a quadrilateral. MJ1 59			
⑧ Identify a line of symmetry. MJ1 61			
⑨ Solve a "What's My Rule?" table. MJ1 63			

12 *Assessment Handbook*

Assessment Handbook, p. 12

2a Assess 35–50 min

▶ Unit 2 Assessment

Assessment Handbook, pp. 13–15

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

Students 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 students' progress on the Mathematical Process and Practice Standards.

NAME   DATE   TIME   Lesson 2-14 ✔

Unit 2 Assessment

① **a.** Draw all of the arrays for 16.

in
↓

Rule

↓
out

b. List all the factors of 16. ___1, 2, 4, 8, 16___

② List the first 10 multiples of 9.

___9___ ___18___ ___27___ ___36___ ___45___ ___54___ ___63___ ___72___
___81___ ___90___

Assessment Masters   **13**

NAME   DATE   TIME   Lesson 2-14 ✔

Unit 2 Assessment (continued)

③ Find the area of the rectangle.
   a. Length: ___6___ cm
          Width: ___3___ cm

          Area: ___18___ square centimeters

          (rectangle: 6 cm, 3 cm)

   b. Explain how you found the area.
   Sample answer: I multiplied the length times the width, and I got 18.

④ **a.** Find the number of minutes.

Hours	Minutes
1	60
4	240
7	420
9	540

   b. Explain how you found how many minutes are in 7 hours.
   Sample answer: I know that there are 60 minutes in 1 hour. So if there are 7 hours, I need to multiply 60 by 7. That's 420.

⑤ Should you add or multiply to find the answer to the question below? Explain.
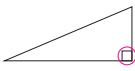   Leland read for 20 minutes.
   Katalina read 8 times as long.
   How long did Katalina read?
   Multiply, because she read 8 times as many minutes, not 8 more minutes.

14 *Assessment Handbook*

NAME   DATE   TIME   **Lesson 2-14** ✓

Unit 2 Assessment (continued)
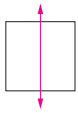
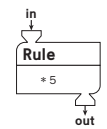⑥ Circle any right angles or write *none*.　⑦ Name 2 properties of the quadrilateral.

Sample answer: It
has 2 pairs of
parallel sides. It has
4 right angles.

⑧ Draw at least one line of symmetry in the shape. Sample answer:

⑨ Solve this "What's My Rule?" table.

in
↓
Rule
* 5
↓
out

In	Out
2	10
4	20
7	35
12	60

Assessment Masters **15**

NAME   DATE   TIME   **Lesson 2-14** ✓

Unit 2 Challenge

① The Ironman Triathlon is a long-distance race in which participants swim 2.4 miles, bike 112 miles, and run 26.2 miles without a break. In 2012, the men's winner of the triathlon completed the race in 8 hours, 18 minutes, and 37 seconds. The women's winner had a time of 9 hours, 15 minutes, and 54 seconds.
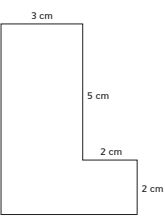
a. How much faster was the men's winning time than the women's winning time, in seconds?
3,437 _____ seconds

b. Participants in the Ironman Triathlon must finish the race in 17 hours. How many seconds did the men's winner have left before time ran out?
31,283 _____ seconds

② a. Find the area.

3 cm

5 cm

2 cm

2 cm

Area: __25__ square centimeters

b. Explain how you found the area. Sample answer: I divided the shape into 2 rectangles, found the area of each, and added the 2 areas together.

16 Assessment Handbook

Differentiate　**Adjusting the Assessment**

Item(s)	Adjustments
1	To scaffold Item 1, have students use cubes to build the arrays.
2	To scaffold Item 2, have students use a Multiplication/Division Facts Table to identify the multiples.
3	To extend Item 3, have students find the perimeter of the rectangle.
4	To scaffold Item 4, have students use a clock to count the number of minutes.
5	To extend Item 5, have students record an equation with an unknown to represent the problem.
6	To scaffold Item 6, have students tear off a square corner from a piece of paper to help them identify the right angle in the right triangle.
7	To scaffold Item 7, have students refer to the poster of geometry terms to help them determine the properties.
8	To extend Item 8, have students draw all lines of symmetry.
9	To extend Item 9, have students create their own "What's My Rule?" table.

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 114–115 or the online Spiral Tracker for details on Unit 2 focus topics and the spiral.

▶ Unit 2 Challenge (Optional)

Assessment Handbook, p. 16

WHOLE CLASS	SMALL GROUP	PARTNER	**INDEPENDENT**

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

Day 2: Cumulative Assessment

2b Assess   35–45 min

Materials

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

Assessment Handbook, pp. 17–19

Standards	Goals for Mathematical Content (GMC)	Cumulative Assessment
4.OA.3	Solve multistep number stories involving the four operations, interpreting any remainders.	9
	Model number stories with equations, using a letter for the unknown.	9
	Assess the reasonableness of answers to number stories and other problems.	9
4.NBT.1	Recognize the relationship between the places in whole numbers.	2b
4.NBT.2	Read, write, and identify places in numbers.	1a–1f, 2a
	Compare and order multidigit whole numbers.	3a, 3b
	Record multidigit whole-number comparisons using >, =, or <.	3a, 3b
4.NBT.3	Use place-value understanding to round whole numbers to any place.	4a, 4b
4.NBT.4	Add multidigit whole numbers fluently using the standard algorithm.	5a, 5b, 9
	Subtract multidigit whole numbers fluently using the standard algorithm.	6a, 6b, 9
4.NBT.5	Multiply a whole number of up to four digits by a 1-digit number and a 2-digit number by a 2-digit number.	7a, 8
4.MD.1	Know relative sizes of measurement units; express measurements in a larger unit in terms of a smaller unit.	8
4.MD.2	Solve number stories involving whole numbers of measured quantities.	8
4.MD.3	Apply perimeter formulas for rectangles.	7a, 7b
	Goals for Mathematical Process and Practice (GMP)	
SMP6	Explain your mathematical thinking clearly and precisely. **GMP6.1**	4b, 7b, 8, 9
SMP7	Use structures to solve problems and answer questions. **GMP7.2**	4b

3 Look Ahead   10–15 min

Materials

Math Boxes 2-14: Preview for Unit 3
Students preview skills and concepts for Unit 3.

Math Journal 1, p. 67; fraction circles

Home Link 2-14
Students take home the Family Letter that introduces Unit 3.

Math Masters, pp. 91–96

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

NAME   DATE   TIME   **Lesson 2-14** ✓

Unit 2 Cumulative Assessment

① In the number 967,481 . . .

a. the digit 4 is in the ___**hundreds**___ place.

b. the digit 1 is in the ___**ones**___ place.

c. the digit 9 is in the ___**hundred-thousands**___ place.

d. the digit 7 is in the ___**thousands**___ place.

e. the digit 8 is in the ___**tens**___ place.

f. What is the value of the digit 6? ___**60,000**___

② a. Write a number that has . . .

• 9 in the hundreds place
• 2 in the ten-thousands place
• 9 in the ones place
• 8 in the thousands place
• 0 in the tens place
• 4 in the hundred-thousands place

___**4**___ ___**2**___ ___**8**___ ___**9**___ ___**0**___ ___**9**___

b. How many times as large is the 9 in the hundreds place as the 9 in the ones place?

___**100**___ times as large

③ Write <, >, or =.

a. 555,644 ___**<**___ 556,604

b. 980,008 ___**>**___ 908,080

Assessment Masters   **17**

NAME   DATE   TIME   **Lesson 2-14** ✓

Unit 2 Cumulative Assessment (continued)

④ a. Round 275,264 to the nearest . . .

10,000. ___**280,000**___

100,000. ___**300,000**___

1,000. ___**275,000**___

b. Explain how you rounded 275,264 to the nearest hundred-thousand.

Sample answer: First I found the digit in the hundred-thousands place. That's a 2. Then I looked at the digit to the right, and that was 7. The 7 in the ten-thousands place makes the 200,000 round up to 300,000.

⑤ Use U.S. traditional addition.

a. 364 + 278 = ___**642**___

b. 459
  + 733
  1,192

⑥ Use U.S. traditional subtraction.

a. 974 − 645 = ___**329**___

b. 436
  − 227
  209

18   Assessment Handbook

2b Assess   35–45 min

▶ Cumulative Assessment

Assessment Handbook, pp. 17–19

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

Students complete the Cumulative Assessment. The problems 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 problems indicate adequate progress at this point in the year.

Monitor students' progress on the standards using the online assessment and reporting tools.

Generic rubrics in the *Assessment Handbook* appendix can be used to evaluate students' progress on the Mathematical Process and Practice Standards.

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

Differentiate   Adjusting the Assessment

Item(s)	Adjustments
1–3	To scaffold Items 1–3, have students use a place-value flip book.
4	To scaffold Item 4, have students circle the digit in the place being rounded and then draw an arrow to the digit to the right.
5, 6	To scaffold Items 5 and 6, have students solve the problems using a method of their choice.
7	To extend Item 7, have students find the area of the rectangle.
8	To extend Item 8, have students determine the number of yards Lance jumped.
9	To scaffold Item 9, have students model the problem with base-10 blocks.

Advice for Differentiation

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

Go Online:

✓ **Quick Entry Evaluation** Record children's progress and to see trajectories toward mastery for these standards.

📊 **Data** Review your children's progress reports. Differentiation materials are available online to help you address children's needs.

▶ **Math Boxes 2-14:** Preview for Unit 3

Math Journal 1, p. 67

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

Mixed Practice Math Boxes 2-14 are paired with Math Boxes 2-10. 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 2-14:** Unit 3 Family Letter

Math Masters, pp. 91–96

Home Connection The Unit 3 Family Letter provides information and activities related to Unit 3 content.
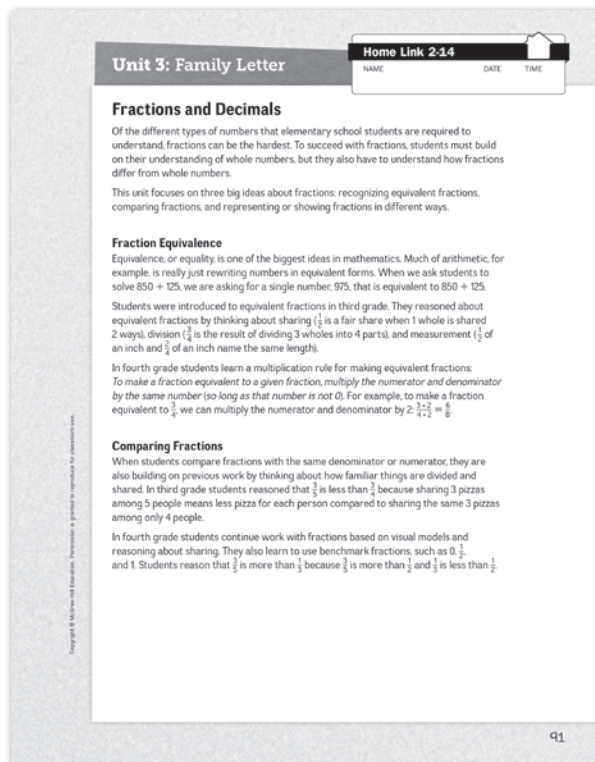
Math Masters, pp. 91–96

NAME   DATE   TIME   **Lesson 2-14** ✔

Unit 2 Cumulative Assessment (continued)

⑦ **a.** Find the perimeter of the square.

6 inches

Answer: __24__ inches

b. Explain how you found the perimeter. Sample answer: I multiplied 6 times 4.

⑧ In gym class students were doing the standing long jump. Lance's jump measured 5 feet. He thinks that he jumped 50 inches. Is he correct? Explain how you know. Sample answer: He is not correct. There are 12 inches in every foot, not 10. If he jumped 5 feet, then he jumped 60 inches because 12 ∗ 5 = 60.

⑨ Safir had 150 markers. He gave 24 to Sofie, 29 to Sharon, and 22 to Jonas, and he donated 68 to the class. How many does he have left for himself?

Estimate: Sample answer: 150 − 25 − 25 − 25 − 70 = 5

Answer: __7__ markers

Explain how you solved the problem. Answers vary.

Is your answer reasonable? Explain how you know. Sample answer: Yes. My estimate was 5 and my answer was 7, so they were close.

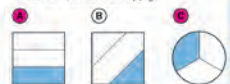Assessment Masters   **19**

Math Boxes Preview for Unit 3   Lesson 2-14

① Use your fraction circles to solve.

How many purple fraction pieces does it take to cover a red circle? 10 purples
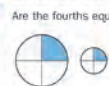
② Which figure shows ⅓ shaded? Fill in the circle next to ALL that apply.
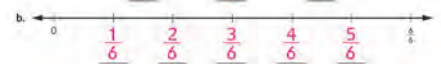
Ⓐ Ⓑ Ⓒ

③ Circle the larger fraction.

④ One fourth of each circle is shaded. Are the fourths equal? No.

Explain your answer. Sample answer: I can see the shaded sections are different sizes. When you compare fractions, the fractions must refer to the same whole.
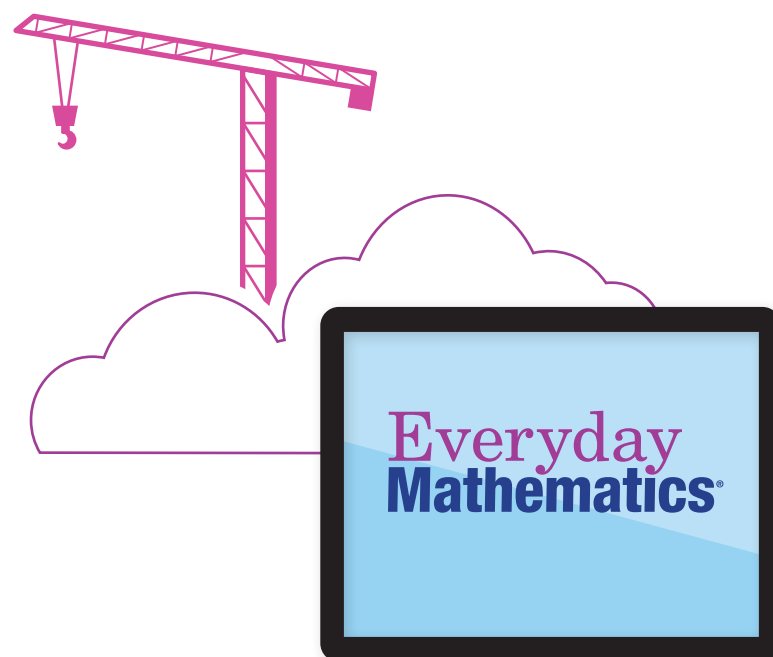
⑤ Fill in the missing fractions on the number lines.

a. 0 — $\frac{1}{4}$ — $\frac{2}{4}$ — $\frac{3}{4}$ — $\frac{4}{4}$

b. 0 — $\frac{1}{6}$ — $\frac{2}{6}$ — $\frac{3}{6}$ — $\frac{4}{6}$ — $\frac{5}{6}$ — $\frac{6}{6}$

① 4.NF.1 ② 4.NF.1 ③ 4.NF.2 ④ 4.NF.2, SMP6
⑤ 4.NF.2, 4.NF.3

67

GRADE

4

Everyday
Mathematics®

Everyday Mathematics. How Children Learn.

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

everydaymath.com

Mc Graw Hill