

The University of Chicago School Mathematics Project



REVIEWER'S GUIDE & LESSON SAMPLER

GRADE

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.

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The Everyday Mathematics Classroom

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

Each lesson activity includes recommendations for one or more grouping options, helping you create a flexible, dynamic learning environment every day.



An Investment in How Your Children Learn

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

The Everyday Mathematics Difference

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

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Lesson Overview and Components

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Correlations and Mastery Expectations

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 2-6	Applicatio Verview Students use un ultistep problems.	n: Unit Conver nit conversions within the U.S. customa	Sions ry system to solve
 Before You Begin For Part 2, prepare a two stories from pages 143 a cut apart Math Masters Vocabulary measurement units • c 	o-column table labeled <i>miles</i> and nd 144. If additional sets of <i>Prism</i> pages G4 and G5. onvert • number model • relati	feet. Decide how you will display the number Pile-Up cards are needed for Part 3, copy and on symbol • expression	Standards Focus Clusters • Write and interpret numerical expressions. • Perform operations with multi-digit whole numbers and with decimals to hundredths.
1 Warm Up	5 min	Materials	 Convert like measurement units within a given measurement system.
Mental Math and Flu Students convert be	Jency ween units of length.		5.MD.1
2 Focus	35–40 min		
Math Message		Student Reference Book, p. 328	5.MD.1

Focus Clusters

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

Major Clusters

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

Focus

In this unit, students explore patterns in the base-10 place-value system numbers. Students are also introduced to U.S. traditional multiplication

Major Clusters

5.NBT.A Understand the place value system.

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

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

Process and Practice Standards

SMP1 Make sense of problems and persevere in solving them. **SMP6** Attend to precision.

Focus

In Unit 2, students explore patterns in the base-10 place-value system and ways of representing large numbers. Students are also introduced to U.S. traditional multiplication and review partialquotients 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 mymheducation.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



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.
5.0A.2	In Unit 1, students represented the volumes of rectangular prisms using expressions. They also wrote expressions to record calculations in the game <i>Name That Number</i> . 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.

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Rigorous Content

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

	Pla	anning for	Rich Matl	h Instructi	on
		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
RIGOR	Procedural Skill and Fluency	Home Link 2-1, p. 115	Journal p. 44, #1	Math Message, p. 124 Using Powers of 10 to Multiply, p. 124 Readiness, p. 123 Extra Practice, p. 123	Mental Math and Fluency, p. 130 Math Message, p. 130 Introducing U.S. Traditional Multiplication, p. 130 Multiplying 2-Digit Numbers by 1-Digit Numbers, p. 132 Home Link 2-4, p. 133 Readiness, p. 129 Enrichment, p. 129 Extra Practice, p. 129
	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	Daily	Math	Focus	Summarize	Practice
Activity	Routines	Message	Activities		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 t curiosity ab- explore nun relationship	builds on student but patterns to abers, shapes, and s between them.	Stude repres and re simple arithm	nts work with syr sentations for qua elationships, mod e situations, and l netic skills.	nbolic antities el ouild	Student to mode underst as direc arithme	ts use symbo el problem sit tanding of fur ct proportion, etic concepts	lic representati tuations, build t ndamental relat and master ele and skills.	ions heir ions such ementary

Be the Teacher They Will Always Remember

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



Math Talk

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

"I can share my solution!"

Collaboration

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





Perseverance and Productive Struggle

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

"I can do this!"

Hands-on Exploration

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



The Everyday Mathematics Lesson

Lessons are designed to help teachers facilitate instruction and engineered to accommodate flexible grouping models. The three-part, activity-driven lesson structure helps you easily incorporate researchbased 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.



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.

2-Day Lesson 1-3 Open Response and Reengagement Quilt Area Day 1: Students Day 2: Students	nake sense of two different answers discuss and compare some solutions :	to an area problem. Ind revise their work.
Day 1: Open Response • Before You Begin Deben draw wa actual square foot for display and collect pictus achedule time to review students' work and plan for Day 2 of this Warm Up Smin	Construction of the second sec	Standards Focus Clusters • Apply and extend previous understandings of multiplication and division. • Convert like measurement units within a given measurement system.
Mental Math and Fluency Students convert between feet and inches.		5.MD.1
2a) Focus 55-65 min		
Math Message Students find the number of square inches in a square for and in $\frac{1}{4}$ square foot.	Math Journal 1, p. 8; ruler (optional); chart paper (optional)	5.MD.1 SMP4
Finding Area in Two Units Students discuss strategies for finding the area of a squar	Math Journal 1, p. 8; square foot and square inch (optional); Class Data Pad	5.MD.1 SMP3, SMP4

Open Response and Reengagement Lessons

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



Games

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



Activity Cards

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



Quick Looks

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

Online Resources

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

The Teacher Center

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



Launch Presentation

Editable versions of digital lessons that help you lead instruction.

Plan Your Lesson

Review all of the activities for the lesson.

Resources

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

Games

Open online games for fluency practice.

Quick Entry

Easily record evaluations of your students' progress.

Today's Data

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

Differentiation

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

The Student Learning Center

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



Lesson Content

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

My Reference Book

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

eToolkit

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

Geometer's Sketchpad Activities and EM Games Online

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

Tutorial Videos

Demonstrations of concepts and skills.

EM at Home

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

Data Driven Instruction

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



Ongoing Assessments

Assessment Check-In Daily lesson based assessment opportunities.

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

Periodic Assessments

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

- **Unit Assessments** Assess students' progress toward mastery of concepts, skills, and applications in the current unit.
- **Self Assessments** Allow students to reflect on their understanding of content and process/practice standards that are the focus of the unit.
- **Challenge Problems** Extend important ideas from the unit, allowing students to demonstrate progress beyond expectations.
- **Cumulative Assessments** Assess students' progress toward mastery of content and process/ practice standards from prior units.
- **Open Response Assessments** Provide information about students' performance on longer, more complex problems and emphasize the process and practice standards for mathematics.

Benchmark Assessments Beginning of Year, Mid-Year, and End of Year benchmarks follow the same format as Unit Assessments.

Ma Pro	th Box eview f	es or Ui	nit 3			Lesson 2-9 Date Time	
•	Complete. in 2 5 10 8	out 4 10 20 16	Rule × 2	out SRB N3	2	$ \begin{array}{l} \text{Write each number in expanded} \\ \text{form.} \\ \text{Example: } 579 = \frac{500 + 70 + 9}{251} \\ 251 = \frac{200 + 50 + 1}{425} \\ 425 = \frac{400 + 20 + 5}{600 + 40 \text{ or}} \\ 640 = \frac{600 + 40 \text{ or}}{600 + 40 + 0} \end{array} $	
6	Cross off n Add at leas	ames tha t 2 differ	it do not t ent names	ielong. s.	4	Solve. $12 = 2 \times 6$	

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.

				and to	rack progress to	ward maste
)	Warm	Up 5-10 min		Materials		
	Self Assess Students con	nent nolete the Self Assessment.		Assessment	Handbook, p.	14
)	Assess	35-50 min				
ł	Unit 2 Asses	sment effect mastery expectations to this point.		Assessment	Handbook, pj	o. 15–18
	Unit 2 Challe Students ma	nge (Optional) y demonstrate progress beyond expectations.		Assessment	Handbook, pj	o. 19–20
	Standards	Goals for Mathematical Content (GMC)	Lessons	Self Assessment	Unit 2 Assessment	Unit 2 Challeng
	5.0A.1	Write numerical expressions that contain grouping symbols.	2-6		8	
	5.0A.2	Model real-world and mathematical situations using simple expressions.	2-6		8	4
		Interpret numerical expressions without evaluating them.	2-7			1a
	5.NBT.1	Understand the relationship between the places in multidigit numbers.	2-1, 2-2	1,2	1, 2, 6	
	5.NBT.2	Use whole-number exponents to denote powers of 10.	2-2, 2-3	3	4	
		Multiply whole numbers by powers of 10; explain the number of zeros in the product.	2-2, 2-3, 2-9, 2-10	4	3a, 5a, 5b	1b
	5.NBT.5	Fluently multiply multidigit whole numbers using the standard algorithm.	2-4 to 2-9	5	10, 11	2
	5.NBT.6	Divide multidigit whole numbers.	2-10 to 2-13	6	9, 12, 13	3
		Illustrate and explain solutions to division problems.	2-11 to 2-13	7	9	3
	5.MD.1	Convert among measurement units within the same system.	2-6		7,8	4
		Use measurement conversions to solve multi-step, real-world problems.	2-6		8	4
		problems.				

Record

A full suite of tools including rubrics and class checklists are available to help you track your students' progress.

E E	veryday Mathem a	atics						4 Q
esson 2-1	3 (Day 1): Assess: U	nit 2 Assessment						
Add No	otes	Anna Z.	Brian L.	Danny P.	Ellie C.	Janet G.	Jordan R.	Josephine Z.
	Score All -	Score -	Score +	Score -	Score -	Score -	Score -	Score -
Score -	Problem 1	м	M	NM	A	NM	м	M
Score 🗸	Problem 2 – Content	NM	M	м	м	м	A	РМ
Score 🗸	Problem 2 – Practices	м	РМ	NM	РМ	м	NM	РМ
Score -	Problem 3	м	M	NM	РМ	м	м	M
Score +	Problem 4	м	РМ	м	м	м	м	M
Score -	Problem 5	м	м	м	м	м	м	M
Score -	Problem 6	NM	м	A	м	м	РМ	NM

Quick Entry Evaluation Tool

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

Report

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



Recommendations Report







Grade Card Report

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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



Different	iation	Options						
Readiness	5–15 min	Enrichment	15–30 min	Extra Practi	се	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 Convers	sion Number	Converting Units				
5.MD.1, SMP7		Stories		5.0A.2, 5.MD.1				
per group: three 12-inch rulers,		5.MD.1		Activity Card 21;				
36 square pattern blocks		Activity Card 20;	1	Student Reference Book,				
To explore unit conversions usin	ig a	Math Journal I, p. 52; Sti Book p. 328	udent Reference	p. 328; number card (1 of each): two 6-sid				
concrete model, students count	how many	=		(i or each), two o sid	Engli	sh Lano	guage Learner	
1-inch square pattern blocks are	equal to	To extend their work wi	th unit conversions,	For more practice v				
square pattern blocks to each q	students write unit conversion number			students roll dice ar Beginning ELL To familiarize students with U.S. customary m			iarize students with U.S. customary <i>measurement units</i> and	
explaining that each pattern blo	explaining that each pattern block is 1 inch			write expressions to conversions for example, label a 1-feet rules with the word rules and the units of mass				
long. Have students line up the l	olocks from	other's number stories.		calculations and nui	foot = 12 ir	nches. Other i	useful measurement tools to label and display include a yardstic	
	ada an an d			and the state of t	and a measu	uring 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





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.

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.

Supporting Rich Mathematical Instruction

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

Unit 2 Organizer **Planning for Rich Math Instruction** 2-1 Understanding Place Value 2-2 Exponents and Powers of 10 2-3 Applying Po 2-4 U.S. Tra wers of 10 ace Value, p. 113 nal n 44 # Using Po p. 124 ss, p. 123 Aultiplying 2-Digit Nur Digit Numbers, p. 132 Link 2-4, p. 13 hment, p. 129 Extra Practice, p. 129 Multiplying 2-Digit Num 1-Digit Numbers, p. 132 Estimating w p. 125 Solving a Real-W Problem, p. 121 Writing and Comp Expressions, p. 127 Home Link 2-3, p. 127 . ent. p. 123 Math Message p 118 Estimating with Powers of 10 Math Message, p. 130 Journal p. 40: Writi ntroducing High-Nu . 120 ment, p. 111 richment, p. 123 ers of 10, p. 118 Top-It, p. 114 Connecting Expanded Form an Exponential Notation, p. 120 Mental Math and Fluency, p. 118 Mental Math and Fluency, p. 112 Mental Math and Fluency, p. 124 Mental Math and Fluency, p. 130 Finding Volumes of Rectangular Prisms, p. 115 Math Boxes 2:1, p.115 Solving a Real-World Volume Problem, p.121 Math Boxes 2-2, p. 121 Writing and Comparing Expressions, p. 127 Math Boxes 2-3, p. 127 Playing Number Top-It, p. 133 Math Boxes 2-4 n 133 Differentiation Options, p. 123 tion Options, p. 11 ons, p. 129 ELL Support, p. 111 ELL Support, p. 117 ELL Support. p. 123 ELL Support, p. 129 tion Support 2-3 Online Diffe Online Diff Online Diffe ation Sun Adjusting the Activity, p. n Mis ption, p. 125 ting the Activity, p. 132 Academic Language Development, p. 113 Adjus Academic Language Developr p. 125 Unit 2 | Whole Number Place Value and Operatio Red text = Gam

Planning

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

Preparing

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



Support

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



Resources

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



Getting Ready to Teach Sixth Grade Everyday Mathematics

Welcome to *Sixth 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 6 has **107 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 3–5 weeks.**

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

This pacing also gives you time to go deep, to create a classroom culture that values and supports productive struggle. You can expect your students to do their own thinking, to solve problems they have not been shown how to solve, to make connections between concepts and procedures, to explain their thinking, and to understand others' thinking. Creating such a classroom culture takes time, and 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 2–7) 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.
- Copy the **Unit 1 Family Letters** on *Math Masters*, pages 2–5 to distribute early in the school year.
- Review the **Beginning-of-the-Year Assessment** on pages 82–87 in the *Assessment Handbook* and consider when you will administer it.

Goonline 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

Sixth 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 table 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, with partners, as a small group, 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 Descrip		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. Istrofusion and the state of the state state of the state of the state of the state of the state of	

Par	t 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. 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.

Par	t 3: Practice	Description	Tips
Instruction	Practice Activity	An opportunity to practice previously taught skills and content through a practice page or a game.	 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 <i>Everyday Mathematics</i>. Plan for all students to play <i>Everyday Mathematics</i> games at least 60 minutes per week. Go Online to the <i>Implementation Guide</i> for tips to ensure that all students have ample game time. See also the Virtual Learning Community (VLC) to observe many <i>Everyday Mathematics</i> games in action.
	Math Boxes	A daily <i>Math Journal</i> 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
c	Adjusting the Activity	Allows for differentiated instruction by offering modifications to lesson activities.
Differentiatio	Common Misconception	Offers point-of-use intervention tips that address common misconceptions.
	Game Modifications	Provides suggestions 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 <i>Everyday Mathematics</i> 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, general 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	 Online tools and virtual manipulatives for dynamic instruction A complete list of Grade 3 eTools on page xxix 		
ePresentations	Ready-made interactive white board lesson content to support daily instruction		
<i>Math Masters</i>	Reproducible masters for lessons, Home Links, Family Letters, and games		
Classroom Posters	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	• Online resource with information on implementing the curriculum		
✓ digital			
print			
Virtual Learning	• An online community, sponsored and facilitated by the Center for Elementary		
Community	Mathematics and Science Education (CEMSE) at the University of Chicago, to		
🗹 digital	network with other educators, and share best practices		
print	• 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	• A collections of tips and tools to help you communicate to families about <i>Everyday Mathematics</i>	
✓ digital○ print	 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 <i>Everyday Mathematics</i> games
Activity Cards ✓ digital ✓ print	• Directions for students for Explorations, Differentiation Options, and other small- group activities
Student Learning Center ✓ digital print	 Combines Student Math Journal, Student Reference Book, eToolkit, 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 programs 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 <i>Everyday Mathematics</i> 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 *Sixth 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	1 big cube	~
Base-10 Flats	6 packs of 10 flats	~
Base-10 Longs	5 packs of 50 longs	 ✓
Base-10 Cubes	10 packs of 100 cubes	 ✓
Compass, Helix	Not in kit	 ✓
Centimeter Connecting Cubes	1 pack of 1,000	 ✓
Dice, Dot	4 packs of 12	 ✓
Dice, Polyhedral	1 pack of 6	 ✓
Double Pan Balance	1 balance	 ✓
Everything Math Deck	15 decks	 ✓
Geoboard, Two-Sided, 7" x 7"	6 geoboards	 ✓
Geometric Solids (geosolids)	6 sets of 12 solids	 ✓
Marker Boards	25 boards	
Metersticks, Dual Scale	2 packs of 10	
Number Line, –35 to 180	1 number line (in 3 parts)	~
Pattern Blocks	2 sets of 250	~
Rulers, 12 in.	2 packs of 5 rulers	

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 5.0A	Everyday Mathematics Goals for Mathematical Content			
Cluster Write and interpret numerical expressions.				
5.0A.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.			
5.0A.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 $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ 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.				
5.0A.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 one	GMC Generate numerical patterns using given rules. GMC Identify relationships between corresponding terms of two patterns. GMC Form ordered pairs from corresponding terms of patterns and graph them.			

Goals for Mathematical Content

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

Goals for Mathematical Practice

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

Standards for Mathematical Process and Practice	Everyday Mathematics Goals for Mathematical Process and Practice
1 Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems wina a different method, and they	 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.
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. 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, to be an end area to be better and the set of the

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.



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 5.0A.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	Second Quarter	Third Quarter	Fourth Quarter
	Benchmark Expectations	Benchmark Expectations for	Benchmark Expectations	Benchmark Expectations
	for Units 1 and 2	Units 3 and 4	for Units 5 and 6	for Units 7 and 8
5.0A.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 6	Everyday Mathematics Grade 6 Lessons*			
Ratios and Proportional Relationships 6.RP				
Understand ratio concepts and use ratio reasoning to solve problems.				
6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2 : 1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."	2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 3-8, 3-10, 3-13, 4-1, 5-1, 5-3, 5-10, 6-3, 6-10, 7-5, 7-8, 8-2, 8-3, 8-4, 8-8 (3-6)			
6.RP.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."	2-13, 2-14, 5-10, 6-3, 7-2, 8-1, 8-5 (3-8)			
6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 3-1 , 3-5, 3-8, 3-9, 3-10, 3-11, 3-13, 4-1, 4-2, 4-4, 4-12, 5-1, 5-4, 5-6, 5-7, 5-10, 5-11, 6-3, 6-10, 7-2, 7-5, 7-6, 7-7, 7-8, 7-9, 7-11, 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-8, 8-9			
	(1-10, 1-15, 3-2, 3-3, 3-4, 3-6, 3-7, 3-12, 3-14, 4-3, 4-6, 4-8, 4-10, 4-11, 4-14, 5-2, 5-8, 5-12, 6-1, 6-2, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, 6-12, 7-1, 7-3, 7-10, 7-12, 8-10)			
6.RP.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the	2-13, 2-14, 3-5, 3-10, 3-11, 4-2, 4-4, 5-10, 6-3, 6-10, 7-5, 7-6, 7-8, 7-9, 8-2, 8-6, 8-8			
coordinate plane. Use tables to compare ratios.	(2-12, 3-1, 3-3, 4-6, 4-8, 5-2, 5-4, 7-10)			
6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	2-13, 5-10, 7-2, 7-5, 7-6, 7-7, 8-1, 8-5, 8-9			
	(3-2, 3-4, 3-6, 3-8, 3-13, 4-10, 4-12, 4-14, 5-6, 5-8, 5-11, 6-5, 6-7, 6-8, 6-9, 6-10, 6-12, 7-1, 7-3)			
6.RP.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	3-8, 3-9, 3-10, 3-11, 4-12, 5-4, 5-11, 7-2, 7-7			
	(3-12, 4-1, 4-2, 4-3, 4-4, 4-11, 5-2, 5-8, 5-10, 5-12, 6-2, 6-4, 6-8, 7-1, 7-3, 7-8, 7-10, 8-2, 8-6, 8-8, 8-10)			
6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units	2-11, 2-13, 3-1, 4-2, 5-4, 5-10, 5-11, 7-5, 7-6, 8-1, 8-5			
appropriately when multiplying or dividing quantities.	(1-10, 1-15, 4-6, 4-8, 6-6, 6-10, 7-9, 7-11, 8-3)			
The Number System 6.NS				
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.				
6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving	2-5, 2-6, 2-7, 2-8, 3-2, 3-12, 4-5, 6-4, 6-7			
division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How	(1-10, 1-14, 1-15, 2-2, 2-4, 2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 3-1, 3-3, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 4-2, 4-4, 4-6, 4-10, 4-12, 4-13, 4-14, 5-1, 5-2, 5-3, 5-4, 5-6, 5-10, 5-11, 6-1, 6-3, 7-4, 7-5, 7-8, 8-3, 8-6, 8-8, 8-10)			

¹Expectations for unit rates in this grade are limited to non-complex fractions.

wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?

Content Standards for Mathematics for Grade 6

Everyday Mathematics Grade 6 Lessons*

Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.	1-2, 1-3, 1-4, 1-5, 1-8, 1-9, 2-5, 2-9, 2-11, 3-1, 3-5, 3-6, 3-9, 5-7, 6-7, 7-2, 7-5, 8-9
	(1-2, 1-7, 1-12, 1-14, 2-3, 2-6, 2-8, 2-9, 2-10, 2-12, 2-14, 2-15, 3-1, 3-3, 4-5, 4-6, 4-7, 4-8, 4-10, 4-12, 5-1, 5-6, 7-1, 7-3, 7-11, 8-5, 8-7, 8-9)
6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	1-2, 1-3 , 1-4, 1-5, 2-6, 2-7, 2-8, 2-10, 3-1 , 3-2 , 3-3 , 3-4 , 3-6 , 3-7 , 4-1, 4-9, 4-11, 4-13, 5-2 , 5-8, 6-5, 6-7, 6-9, 7-2, 7-4, 7-6, 7-8, 7-9, 8-5
	(1-1, 1-5, 1-6, 1-7, 1-8, 1-9, 1-10, 1-11, 1-12, 1-13, 1-14, 2-1, 2-2, 2-3, 2-5, 2-11, 2-15, 3-8, 3-10, 3-11, 3-13, 3-14, 3-15, 4-5, 4-6, 4-7, 4-8, 4-10, 4-12, 4-14, 5-4, 5-5, 5-7, 5-11, 6-2, 6-4, 6-6, 6-10, 7-1, 7-3, 7-7, 7-10, 7-12, 8-1, 8-2, 8-3, 8-4, 8-6)
6.NS.4 Find the greatest common factor of two whole numbers less than or equal to	1-1, 1-7, 1-10, 1-13, 2-1, 2-2 , 2-3, 2-5, 2-7, 3-9, 4-6 , 4-11, 5-2, 5-8, 6-6
100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8 \text{ as } 4 (9 + 2)$.	(1-2, 1-4, 1-5, 1-7, 1-10, 1-11, 1-12, 1-13, 1-14, 1-15, 2-5, 2-6, 2-7, 2-8, 2-9, 2-12, 2-14, 3-1, 3-3, 3-5, 3-6, 3-7, 3-9, 3-11, 3-12, 3-13, 3-14, 4-2, 4-3, 4-5, 4-6, 4-7, 4-8, 6-2, 6-4, 6-5, 6-7, 7-3, 7-5, 7-9, 7-11, 8-5, 8-7, 8-9)
Apply and extend previous understandings of numbers to the system of rat	tional numbers.
6.NS.5 Understand that positive and negative numbers are used together to describe	1-10, 1-13, 4-12, 4-13, 4-14, 6-2, 8-4
quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	(2-1, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 3-1, 3-3, 3-6, 3-8, 3-10, 4-5, 4-7)
6.NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	1-3, 1-5, 1-10, 1-11, 1-12, 1-13, 1-14, 2-1, 2-4, 2-6, 2-13, 3-2, 3-8, 3-10, 3-14, 4-13, 5-1, 5-2, 5-3, 6-2, 6-7, 7-1, 7-3, 7-9, 7-10, 8-3, 8-4, 8-8
	(1-1, 1-7, 1-15, 2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7, 2-8, 2-9, 2-12, 2-14, 3-1, 3-3, 3-6, 3-8, 3-10, 3-15, 4-1, 4-3, 4-5, 4-6, 4-7, 4-8, 4-15, 5-3, 5-5, 5-7, 5-10, 5-12, 6-11, 7-6, 7-9, 7-10)
6.NS.6a Recognize opposite signs of numbers as indicating locations on opposite sides	1-10, 1-13, 2-4, 3-14, 4-13
of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.	(1-12, 1-14, 2-4, 2-5, 2-7, 3-1, 3-3, 3-6, 3-8, 4-1, 4-5, 4-7, 5-12, 7-9)
6.NS.6b Understand signs of numbers in ordered pairs as indicating locations in	1-14, 3-14, 4-13, 5-1, 5-2, 5-3, 8-3
signs, the locations of the points are related by reflections across one or both axes.	(2-1, 2-3, 2-6, 2-8, 3-10, 4-15, 5-5, 5-7)
6.NS.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a	1-3, 1-5, 1-10, 1-11, 1-12, 1-13, 1-14, 2-1, 2-4, 2-6 , 2-13, 3-2 , 3-8, 3-10, 3-14, 4-13, 5-1, 6-2, 6-7, 7-1, 7-3, 7-9, 7-10, 8-3, 8-4, 8-8
coordinate plane.	(1-1, 1-7, 1-15, 2-2, 2-3, 2-5, 2-7, 2-8, 2-9, 2-12, 2-14, 3-1, 3-3, 3-6, 3-10, 3-15, 4-1, 4-3, 4-5, 4-6, 4-7, 4-8, 5-3, 5-10, 5-12, 6-11, 7-6, 7-10)
6.NS.7 Understand ordering and absolute value of rational numbers.	1-3, 1-10, 1-11, 1-12, 1-13, 2-1, 2-3, 2-6, 2-8, 2-13, 3-1, 4-9, 4-11, 4-12, 4-13, 4-14, 5-3, 5-7, 5-9, 6-1, 6-4, 7-2, 7-5
	(1-1, 1-3, 1-11, 2-9, 2-10, 2-12, 2-14, 2-15, 3-2, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-10, 3-11, 3-12, 3-14, 3-15, 4-1, 4-2, 4-3, 4-4, 4-7, 4-10, 5-1, 5-3, 5-6, 5-8, 5-9, 5-11, 5-13, 6-6, 7-1, 7-8, 7-10)
6.NS.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret $-3 > -7$ as a statement that	1-3, 1-10, 1-11, 1-12, 1-13, 2-1, 2-3, 2-6, 2-8, 3-1, 4-9, 4-12, 4-13, 5-3, 5-7, 6-1, 7-2, 7-5
-3 is located to the right of -7 on a number line oriented from left to right.	(1-1, 1-3, 1-11, 2-9, 2-10, 2-12, 2-13, 2-14, 2-15, 3-2, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 3-10, 3-11, 3-12, 3-14, 3-15, 4-1, 4-2, 4-3, 4-4, 4-7, 4-10, 5-1, 5-3, 5-9, 6-6)
6.NS.7b Write, interpret, and explain statements of order for rational numbers in real-world	2-13, 4-9, 4-11
contexts. For example, write $-3 \circ C > -7 \circ C$ to express the fact that $-3 \circ C$ is warmer than $-7 \circ C$.	(3-6, 3-8, 4-4)
6.NS.7c Understand the absolute value of a rational number as its distance from 0 on the	4-12, 4-13, 4-14, 5-9, 6-4
real-world situation. For example, for an account balance of -30 dollars, write $ -30 = 30$ to describe the size of the debt in dollars.	(5-3, 5-6, 5-8, 5-11, 5-13, 7-1, 7-5, 7-6, 7-8)

Content Standards for Mathematics for Grade 6	Everyday Mathematics Grade 6 Lessons*
6.NS.7d Distinguish comparisons of absolute value from statements about order. For	4-12, 4-13
example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.	(7-5, 7-8, 7-10)
6.NS.8 Solve real-world and mathematical problems by graphing points in all four	1-14, 2-13, 3-8, 4-13, 5-1, 7-1, 7-6, 7-9, 8-3
quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	(4-9, 4-15, 5-7, 5-10, 5-12, 7-2, 7-4, 8-1, 8-3)
Expressions and Equations 6.EE	
Apply and extend previous understandings of arithmetic to algebraic expre	ssions.
6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.	3-11, 4-1, 4-3, 4-5, 4-10, 4-14, 5-5, 5-6, 5-12, 6-1, 6-2, 7-10, 8-5, 8-7
	(4-5, 4-7, 4-8, 4-11, 4-13, 5-1, 5-2, 5-3, 5-4, 5-7)
6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.	2-5 , 3-11, 4-1 , 4-2 , 4-3, 4-4 , 4-5 , 4-6 , 4-7 , 4-8 , 4-10, 5-2 , 5-3 , 5-4 , 5-5, 5-6 , 5-9, 5-12, 6-1 , 6-4, 6-6 , 6-7 , 6-9 , 7-1 , 7-3, 7-8 , 8-1, 8-5, 8-7
	(1-11, 2-2, 2-4, 2-11, 2-13, 3-2, 3-4, 3-10, 3-15, 4-9, 4-10, 4-11, 4-12, 4-13, 4-14, 5-7, 5-8, 5-11, 5-13, 6-2, 6-3, 6-8, 6-12, 7-5, 7-7, 7-9, 8-2, 8-3, 8-4, 8-6, 8-8, 8-10)
6.EE.2a Write expressions that record operations with numbers and with letters standing	4-1, 4-4, 4-5, 4-7, 4-8, 5-6, 5-9, 6-6, 6-9, 8-7
for numbers. For example, express the calculation "Subtract y from 5" as $5 - y$.	(4-10, 4-12, 4-14, 5-5, 5-7, 7-1, 7-3, 8-2, 8-4, 8-6, 8-8, 8-10)
6.EE.2b Identify parts of an expression using mathematical terms (sum, term, product,	2-5, 4-1, 4-5, 4-6, 4-7, 4-8, 4-9, 6-1, 6-2, 6-6, 7-1
factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 ($8 + 7$) as a product of two factors; view ($8 + 7$) as both a single entity and a sum of two terms.	(3-2, 3-4, 5-6, 5-8, 5-11, 6-8, 6-12, 7-5, 7-8)
6.EE.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.	3-11, 4-1, 4-2, 4-3, 4-4, 4-6, 4-10, 5-2, 5-3, 5-4, 5-5, 5-6, 5-9, 5-11, 5-12, 6-1, 6-4, 6-6, 6-7, 7-3, 7-8, 7-10, 8-1, 8-5
	(1-11, 1-13, 2-2, 2-4, 2-11, 2-13, 3-10, 3-15, 4-6, 4-8, 4-11, 4-13, 5-2, 5-4, 5-6, 5-8, 5-9, 5-11, 5-13, 6-1, 6-3, 7-1, 7-7, 7-9, 8-2, 8-3, 8-4)
6.EE.3 Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3(2 + x)$ to produce the	2-5, 4-1, 4-2, 4-6, 4-7, 4-11, 6-3, 6-4, 6-5, 6-6, 6-7, 6-10, 6-11, 7-3, 8-6
to produce the equivalent expression 6 ($4x + 3y$); apply properties of operations to $y + y + y$ to produce the equivalent expression 3y.	(3-10, 3-15, 5-1, 5-3, 5-9, 5-13, 7-6, 7-7, 7-10, 7-12)
6.EE.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example,	4-1, 4-3, 4-4, 4-5, 4-6, 4-7, 5-6, 6-3, 6-4, 6-5, 6-6, 6-7, 6-10, 6-11, 8-7
the expressions $y + y + y$ and 3y are equivalent because they name the same number regardless of which number y stands for.	(3-9, 3-12, 3-14, 6-2, 6-4)
Reason about and solve one-variable equations and inequalities.	
6.EE.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	1-6, 1-8, 2-1, 2-3 , 2-4 , 2-5 , 3-2, 3-3, 3-6 , 3-12, 4-5 , 4-10 , 4-13, 4-14, 5-4, 6-1 , 6-2 , 6-3 , 6-4, 6-5, 6-7 , 6-9 , 6-10 , 6-11 , 7-1 , 7-2 , 7-4 , 7-10, 8-1, 8-3, 8-5
	(1-5, 1-6, 1-7, 1-8, 1-9, 1-10, 1-11, 1-13, 1-14, 1-15, 2-1, 2-2, 2-3, 2-4, 2-6, 2-8, 2-9, 2-11, 2-12, 2-13, 2-14, 3-2, 3-4, 3-5, 3-9, 3-12, 3-14, 4-2, 4-4, 4-11, 4-13, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 6-1, 6-3, 6-4, 6-8, 6-9, 6-11, 6-12, 7-2, 7-4, 7-5, 7-6, 7-8, 7-10, 8-1, 8-3, 8-4, 8-5, 8-7, 8-9)
6.EE.6 Use variables to represent numbers and write expressions when solving a real- world or mathematical problem; understand that a variable can represent an unknown	4-3, 4-4, 4-5, 6-1, 6-2, 6-8, 6-9, 7-3, 7-4, 8-7, 8-9
number, or, depending on the purpose at hand, any number in a specified set.	(5-3, 5-13, 7-5, 7-8, 8-1, 8-2, 8-3, 8-4)
6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.	2-6 , 2-9, 3-2, 3-3 , 3-6 , 3-12, 5-9 , 6-3 , 6-4 , 6-5 , 6-8 , 7-8 , 7-9 , 8-6
	(3-6, 3-8, 3-11, 3-13, 4-5, 4-7, 4-12, 4-14, 5-1, 5-3, 8-1, 8-3, 8-6, 8-8, 8-10)
6.EE.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition	1-10, 4-9, 4-10, 4-11, 4-14, 5-3, 6-2, 7-1, 7-2, 7-10, 8-3
In a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	(5-5, 6-5, 6-6, 6-7, 6-8, 6-10, 6-12, 7-6, 7-7, 7-10, 8-5, 8-7, 8-9)

Content Standards for Mathematics for Grade 6	Everyday Mathematics Grade 6 Lessons*
Represent and analyze quantitative relationships between dependent and in	ndependent variables.
6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	3-1, 4-3 , 4-8, 5-7, 7-3 , 7-4 , 7-6 , 7-8 , 7-9 , 7-10 , 7-11 , 8-2, 8-4, 8-6, 8-7 , 8-8 (5-9, 5-13, 6-6, 6-10)
Geometry 6.G	
Solve real-world and mathematical problems involving area, surface area, a	nd volume.
6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	3-13, 4-6, 5-2, 5-3, 5-4, 5-7, 5-8, 5-12, 7-9, 8-1, 8-5 (4-9, 4-15, 6-5, 6-7, 7-6)
6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = I w h$ and $V = b h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	5-9, 5-10, 5-11, 5-12, 7-9 (4-9, 4-15, 6-6, 6-10, 7-2, 7-4, 7-7, 7-12, 8-6, 8-8, 8-10)
6.G.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	5-1, 6-2, 8-3 (2-8, 3-10, 3-15, 4-9, 4-15, 6-8, 6-12, 8-1, 8-3)
6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	5-5, 5-6, 5-7, 5-12, 7-9 (5-10, 5-12, 6-9, 6-11, 7-2, 7-4, 7-9, 7-11, 8-5, 8-7, 8-9)
Statistics and Probability 6.SP	
Develop understanding of statistical variability.	
6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.	1-1, 1-2, 1-7, 2-2, 3-14, 8-9 (1-6, 1-8, 1-9, 1-11, 1-13, 2-2, 2-4, 4-1, 4-3, 6-2, 6-4)
6.SP.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	1-2, 1-3, 1-4, 1-6, 1-8, 1-12, 1-14, 2-2, 3-4, 3-12, 3-13, 3-14, 8-9 (6-4)
6.SP.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	1-2, 1-3, 1-4, 1-5, 1-8, 1-9, 3-12, 3-14, 4-14 (2-5, 2-9, 2-12, 2-14, 4-12)
Summarize and describe distributions.	
6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	1-2, 1-6, 1-7, 1-8, 1-9, 1-14, 3-4, 3-10, 3-12, 3-13, 3-14, 4-6, 7-4, 8-9
	(1-5, 2-9, 2-11, 2-13, 5-6, 5-8, 5-11)
6.SP.5 Summarize numerical data sets in relation to their context, such as by:	1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 1-11, 1-12, 1-14, 2-2, 2-11, 2-14, 3-4, 3-10, 3-12, 3-13, 3-14, 4-6, 4-14, 6-6, 6-11, 7-2, 7-4, 8-6, 8-8, 8-9 (1-1, 1-8, 2-5, 2-7, 2-9, 2-11, 2-12, 2-13, 2-14, 3-6, 3-8, 3-9, 3-11, 3-12, 3-13, 3-14, 4-10, 4-11, 4-12, 4-13, 4-14, 5-2, 5-3, 5-4, 6-1, 6-2, 6-3, 6-9, 6-10, 6-11, 7-5, 7-8, 7-9, 7-11)
6.SP.5a Reporting the number of observations.	1-6, 1-7, 1-9, 3-12, 3-13, 3-14
	(1-1, 1-3, 2-9, 2-11, 2-13)
6.SP.5b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	1-5, 1-6, 1-7, 1-8, 2-2, 2-14, 3-13, 3-14, 4-14, 8-8
6.SP.5c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	1-2 , 1-3 , 1-4 , 1-5 , 1-6 , 1-8 , 1-9 , 1-11 , 1-12 , 1-14 , 2-2 , 2-11 , 2-14 , 3-4 , 3-10 , 3-12 , 3-13 , 3-14 , 4-6 , 4-14 , 6-6 , 6-11 , 7-2 , 7-4 , 8-6 , 8-8 , 8-9 (1-6, 1-7, 1-8, 2-5, 2-7, 2-12, 2-14, 3-6, 3-8, 3-9, 3-11, 3-12, 3-13, 3-14, 4-10, 4-11, 4-12, 4-13, 4-14, 5-1, 5-2, 5-3, 5-4, 6-1, 6-3, 6-9, 6-10, 6-11, 7-5, 7-8, 7-9, 7-11)
6.SP.5d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	1-5, 1-9, 1-12, 3-10, 3-13, 3-14, 4-6, 6-6 (1-6, 1-8, 2-9, 2-12, 5-2, 5-3, 6-9, 6-11)

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 27, 28, 30, 31, 39, 43, 49, 55, 61, 64, 69, 80, 81, 83, 85, 88, 93, 95, 127, 130, 132, 135, 142, 143, 145, 151, 165, 181, 183, 187, 189, 193, 195, 205, 206, 207, 208, 231, 235, 237, 243, 244, 245, 246, 247, 248, 249, 251, 253, 254, 255, 257, 259, 260, 263, 264, 265, 266, 267, 270, 271, 272, 273, 275, 276, 277, 283, 285, 286, 287, 288, 289, 291, 297, 301, 303, 311, 349, 359, 367, 371, 395, 401, 402, 403, 405, 407, 409, 410, 417, 421, 422, 423, 425, 427, 430, 431, 475, 476, 477, 480, 481, 485, 491, 495, 497, 510, 511, 512, 513, 515, 517, 521, 527, 528, 529, 533, 534, 535, 537, 538, 539, 545, 546, 567, 568, 569, 570, 573, 581, 582, 583, 585, 591, 597, 601, 603, 604, 605, 606, 607, 619, 620, 622, 623, 626, 629, 631, 633, 634, 635, 657, 659, 661, 663, 665, 666, 671, 672, 673, 687, 688, 689, 690, 691, 693, 695, 700, 707, 719, 745, 746, 747, 748, 749, 761, 763, 764, 766, 770, 771, 773, 781, 782, 784, 785, 788

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 21, 23, 25, 27, 28, 33, 40, 42, 45, 47, 48, 49, 51, 53, 54, 55, 57, 58, 59, 60, 61, 75, 86, 87, 88, 89, 93, 94, 95, 97, 136, 137, 139, 141, 142, 143, 144, 145, 147, 148, 153, 154, 155, 159, 160, 161, 162, 163, 166, 177, 179, 184, 185, 186, 190, 191, 192, 193, 195, 196, 197, 201, 205, 206, 207, 208, 209, 231, 232, 233, 234, 235, 237, 238, 239, 240, 241, 279, 281, 282, 283, 286, 287, 288, 289, 291, 292, 294, 295, 298, 299, 300, 303, 304, 306, 307, 308, 311, 312, 313, 314, 315, 317, 318, 319, 320, 321, 347, 349, 356, 357, 358, 359, 361, 362, 363, 364, 365, 374, 375, 376, 377, 385, 389, 391, 392, 395, 396, 397, 398, 401, 403, 404, 405, 407, 408, 409, 411, 413, 417, 479, 487, 495, 497, 499, 500, 501, 503, 504, 506, 511, 512, 586, 587, 592, 593, 594, 603, 620, 622, 625, 629, 657, 658, 659, 660, 671, 672, 673, 703, 704, 705, 706, 707, 709, 711, 712, 713, 715, 716, 717, 718, 719, 721, 722, 723, 724, 725, 745, 746, 747, 748, 749, 753, 754, 757, 758, 761, 763, 765, 766, 781, 782, 783, 784, 785, 787, 788, 789, 791, 793, 794, 795, 796
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 24, 28, 29, 31, 34, 35, 36, 41, 42, 43, 61, 63, 64, 65, 66, 68, 69, 70, 89, 108, 109, 135, 147, 150, 166, 168, 169, 172, 174, 175, 183, 187, 189, 192, 193, 195, 244, 246, 251, 252, 253, 328, 401, 426, 429, 473, 479, 497, 498, 500, 501, 586, 588, 593, 594, 598, 600, 607, 613, 615, 616, 635, 693, 695, 697, 699, 700, 775

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 21, 23, 24, 33, 53, 54, 57, 58, 59, 61, 73, 74, 75, 77, 79, 91, 135, 136, 137, 138, 139, 141, 147, 154, 155, 157, 171, 173, 174, 175, 177, 178, 179, 180, 181, 184, 185, 186, 187, 189, 190, 191, 192, 195, 196, 199, 200, 201, 202, 203, 249, 251, 255, 261, 280, 281, 282, 291, 294, 297, 298, 300, 301, 307, 308, 309, 311, 313, 314, 315, 317, 318, 319, 320, 321, 343, 355, 361, 362, 364, 395, 407, 408, 409, 410, 411, 413, 421, 422, 487, 503, 505, 506, 507, 511, 512, 513, 525, 531, 532, 534, 535, 537, 579, 581, 582, 583, 585, 587, 588, 589, 591, 592, 593, 594, 601, 609, 610, 612, 615, 619, 627, 628, 663, 665, 666, 667, 669, 681, 711, 712, 717, 718, 725, 730, 745, 751, 755, 775, 777, 778, 779, 799, 800, 801, 802, 803

Mathematical Processes and Practices	<i>Everyday Mathematics</i> 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, 16, 17, 31, 45, 81, 82, 83, 91, 123, 129, 135, 137, 139, 177, 178, 179, 180, 181, 183, 199, 203, 205, 231, 234, 426, 430, 431, 492, 493, 503, 525, 535, 595, 627, 628, 658, 659, 660, 661, 663, 669, 672, 673, 675, 676, 677, 678, 679, 681, 683, 684, 685, 707, 752, 753, 754, 758, 759, 763, 797, 799, 800, 802
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 15, 17, 35, 36, 43, 45, 48, 58, 59, 60, 83, 85, 97, 98, 99, 100, 101, 124, 125, 126, 127, 135, 139, 151, 153, 159, 165, 171, 185, 186, 243, 249, 252, 253, 257, 263, 264, 266, 267, 283, 289, 297, 343, 344, 346, 351, 352, 355, 369, 370, 396, 398, 399, 415, 416, 475, 476, 480, 481, 482, 491, 492, 493, 494, 495, 501, 515, 516, 518, 519, 521, 522, 523, 526, 527, 528, 531, 538, 539, 540, 543, 552, 567, 569, 570, 571, 576, 595, 603, 619, 625, 657, 664, 667, 673, 682, 683, 684, 685, 687, 688, 689, 694, 695, 696, 697, 699, 700, 701, 710, 715, 718, 722, 724, 745, 746, 747, 748, 749, 751, 753, 757, 759, 765, 766, 769, 771, 794, 795, 797

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 18, 27, 39, 41, 42, 73, 74, 75, 76, 80, 82, 85, 91, 93, 95, 98, 125, 126, 127, 129, 130, 131, 132, 133, 139, 155, 156, 160, 162, 165, 167, 168, 169, 171, 199, 235, 239, 240, 241, 249, 257, 258, 260, 263, 287, 301, 311, 343, 349, 355, 356, 358, 359, 365, 367, 368, 370, 371, 373, 374, 375, 376, 377, 379, 380, 381, 382, 383, 385, 386, 387, 388, 389, 391, 392, 393, 405, 415, 416, 417, 419, 420, 422, 423, 431, 473, 474, 475, 476, 477, 483, 485, 486, 487, 488, 489, 501, 509, 513, 531, 543, 544, 545, 547, 571, 574, 575, 576, 589, 597, 599, 600, 603, 607, 623, 625, 629, 631, 633, 634, 635, 675, 677, 679, 685, 704, 705, 775, 776, 777, 778, 779

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 79, 95, 97, 98, 99, 199, 315, 345, 346, 351, 353, 355, 356, 358, 359, 367, 369, 370, 371, 375, 376, 379, 381, 382, 419, 480, 481, 482, 483, 509, 513, 533, 534, 569, 570, 580, 582, 610, 612, 613, 615, 616, 617, 620, 622, 676, 677, 678, 757, 781, 782, 783, 785, 788

Mastery Expectations

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

- Connection ratio and rate to whole number multiplication and division.
- Completing understanding of division of fractions and expanding to a system of rational numbers including negative numbers.
- Writing, interpreting, and using expressions and equations.
- Developing understanding of statistical thinking.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.RP.1	Explain the basic concept of a ratio and recognize ratio notation.	Use ratio language to explain the concept of a ratio. Use ratio notation.	Use ratio language to explain the concept of a ratio. Use ratio notation. Use ratio language to describe ratio relationships.	Vunderstand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
6.RP.2	Explain what a unit rate is in the context of a ratio relationship.	Use mathematical language related to unit rates in the context of analyzing ratio relationships	Translate between the unit rate a/b and the ratio $a:b$ ($b \neq 0$). Use rate language to describe ratio relationships.	★ Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger." (Expectations for unit rates in this grade are limited to non- complex fractions.)
6.RP.3	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.	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.	★ Use ratio and rate reasoning to solve real- world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.RP.3a	Complete a ratio/ rate table by finding equivalent ratios and graph the ratios on a coordinate plane.	Make ratio/rate tables and use the tables to solve number stories and problems involving percent.	Make and use ratio/rate tables to compare ratios.	Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
6.RP.3b	Solve problems by finding a unit rate. Solve simple rate problems involving unit rates by using a ratio/rate table.	Solve problems by finding a unit rate. Use unit rates in ratio/ rate tables to solve simple rate problems.	Solve problems by finding a unit rate. Solve rate problems including those involving unit pricing.	Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
6.RP.3c	No expectations for mastery at this point.	Represent a percent using a grid model. Translate between fractions, decimals, and percents. Find the percent of a quantity given the whole. Find the whole when given a part and the percent.	★ Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	Ongoing practice and application.
6.RP.3d	Use ratio reasoning to convert measurement units.	Use ratio reasoning to explain equivalency of measurements within different units.	Recognize and calculate equivalent measurements using ratio reasoning.	★ Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Mastery expected during this quarter.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.NS.1	Represent and solve fraction division word problems using visual models. Compute division of fractions by fractions using common denominators. Make use of the relationship between multiplication and division in the context of fraction operations. Use reciprocals to divide fractions.	Interpret and solve word problems involving division of fractions by fractions using a preferred strategy.	★ Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 Ib of chocolate equally? How many 3/4- cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?	Ongoing practice and application.
6.NS.2	Use division with multi- digit numbers to find the mean of a data set.	Use standard algorithm to solve whole-number division problems.	★ Fluently divide multi- digit numbers using the standard algorithm.	Ongoing practice and application.
6.NS.3	Estimate addition, subtraction, multiplication, and division of whole numbers. Add, subtract, multiply, and divide whole numbers.	Add and subtract multi- digit decimals using the standard algorithm. Multiply and divide multi- digit decimals using the standard algorithm.	★ Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Ongoing practice and application.

Standards	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	Benchmark Expectations	Benchmark Expectations	Benchmark Expectations	Benchmark Expectations
	for Units 1 through 3	for Units 4 and 5	for Units 6 and 7	for Units 8 and 9
6.NS.4	Find the greatest common factor of two whole numbers less than or equal to 100 by listing factors or using the grid method. Find the least common multiple of two whole numbers less than or equal to 12 by listing multiples or using the grid method.	Use area models to describe the structure of the Distributive Property. Recognize and use the distributive property to solve mathematical and real-world problems involving whole numbers.	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).	Ongoing practice and application.
6.NS.5	Find and plot integers on a horizontal or vertical number line. Use integers to represent real-world situations. Explain the meaning of 0 within a context. Explain positive and negative numbers as quantities opposite to each other.	VINDERSTAND THAT positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	Ongoing practice and application.	
6.NS.6	See the mastery	See the mastery	See the mastery	VINDERSTAND A RATIONAL
	expectation statements	expectation statements	expectation statements	number as a point on the
	for the substandards for	for the substandards for	for the substandards for	number line. Extend number
	this standard. Students	this standard. Students	this standard. Students	line diagrams and coordinate
	who are meeting	who are meeting	who are meeting	axes familiar from previous
	expectations for all of	expectations for all of	expectations for all of	grades to represent points
	the substandards are	the substandards are	the substandards are	on the line and in the plane
	meeting expectations for	meeting expectations for	meeting expectations for	with negative number
	this standard.	this standard.	this standard.	coordinates.

Mastery expected during this quarter.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.NS.6a	5.6a Recognize that opposite signs indicate opposite sides of 0 on a number indicating locations	Ongoing practice and application.		
	inte.	O on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3)$ = 3, and that 0 is its own opposite.		
6.NS.6b	Plot and name points in 4 quadrants.	Relate ordered pairs differing only by signs to reflections across the axes.	Vinderstand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	Ongoing practice and application.
6.NS.6c	Use fraction strips to locate equivalent fractions on a number line. Find and position integers and fractions on a horizontal or vertical number line diagram. Find and position pairs of integers on a coordinate plane.	Find and position integers, including fractions and decimals, on a horizontal or vertical number line diagram. Find and position pairs of integers on a coordinate plane.	Find and plot ordered pairs of rational numbers to draw polygons on a coordinate grid.	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
6.NS.7	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 ordering and absolute value of rational numbers.	Ongoing practice and application.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.NS.7a	Plot rational numbers on a number line. Compare rational numbers using a number line.	★ Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right.	Ongoing practice and application.	
6.NS.7b	Write rational-number inequalities to represent a situation in which unit rates are compared.	★ Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write -3° C > -7° C to express the fact that -3° C is warmer than -7° C.	Ongoing practice and application.	
6.NS.7c	No expectations of mastery at this point.	Describe absolute values of rational numbers as distances from 0 on a number line.	★ Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of -30 dollars, write -30 = 30 to describe the size of the debt in dollars.	Ongoing practice and application.
6.NS.7d	No expectations of mastery at this point.	★ Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than −30 dollars represents a debt greater than 30 dollars.	Ongoing practice and application.	

Mastery expected during this quarter.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.NS.8	Graph points in all quadrants of the coordinate plane.	Solve problems by graphing points in all quadrants of the coordinate plane.	Use absolute value to find distances between points that share a coordinate.	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
6.EE.1	No expectations of mastery at this point.	Rename exponential expressions in standard notation.	★ Write and evaluate numerical expressions involving whole-number exponents.	Ongoing practice and application.
6.EE.2	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.	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.	★ Write, read, and evaluate expressions in which letters stand for numbers.
6.EE.2a	No expectations of mastery at this point.	Write algebraic expressions to generalize a basic pattern or represent a situation.	★ Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 - y.	Ongoing practice and application.
6.EE.2b	Use mathematical language to describe how the Commutative Property and the Associative Property are used to multiply fractions.	Apply the Distributive Property to arrive at equivalent expressions by combining one or more parts into a single entity.	k ldentify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.	Ongoing practice and application.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.EE.2c	No expectations of mastery at this point.	Perform operations according to the conventional order of operations . Evaluate simple algebraic expressions by substituting a number for the variable.	Evaluate algebraic expressions by substituting specific values for variables. Evaluate area and volume formulas used in real-world contexts.	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole- number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s^3 and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.
6.EE.3	To prepare for working with algebraic expressions, apply the Distributive Property and the Associative Property to multiplication of fractions.	To prepare for working with algebraic expressions, use the Distributive Property with whole numbers to obtain equivalent expressions.	Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression $3 (2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6 (4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.	Ongoing practice and application.
6.EE.4	No expectations of mastery at this point.	Identify equivalent expressions by recognizing expressions that represent the same value.	key identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.	Ongoing practice and application.

Mastery expected during this quarter.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.EE.5	In preparation for solving equations add, subtract, and multiply fractions fluently.	Determine which values from a specified set, if any, make an equation or inequality true.	Record the solution sets for equations and inequalities using set notation. Use substitution to determine whether a given number in a specified set is a solution to an equation or inequality.	★ Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.6	No expectations of mastery at this point.	Model basic problems by writing algebraic expressions involving variables. Recognize whether a variable stands for one unknown number or a number in a set.	Represent situations using expressions, equations, and inequalities with variables; and use them to solve real-world and mathematical problems.	Vse variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.7	Solve fraction-division problems in real-world contexts.	Write number sentences to estimate the reasonableness of solutions for operations with decimals.	Write simple equations to represent real-world and mathematical problems. Use bar models, pan balances, and inverse operations to solve equations.	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and px = q for cases in which p, q and x are all nonnegative rational numbers.
6.EE.8	No expectations of mastery at this point.	Find and graph solution sets for inequalities on number-line diagrams. Write and graph inequalities to represent constraints or conditions in real-world situations.	Identify inequalities based on solution sets. Describe situations that can be represented by a given inequality.	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.EE.9	No expectations of mastery at this point.	No expectations of mastery at this point.	No expectations of mastery at this point.	★ Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.
6.G.1	No expectations for mastery at this point.	Compose and decompose area models to represent the structure of the distributive property.	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	Ongoing practice and application.
6.G.2	No expectations of mastery at this point.	No expectations of mastery at this point.	Solve problems involving finding the volume of right rectangular prisms with fractional edge lengths. Develop and apply the formulas to find volume of rectangular prisms.	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = I \ w \ h$ and $V = b \ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Mastery expected during this quarter.

PATHWAY TO MASTERY

Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9
6.G.3	No expectations of mastery at this point.	No expectations of mastery at this point.	Traw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.	Ongoing practice and application.
6.G.4	No expectations of mastery at this point.	No expectations of mastery at this point.	Represent three- dimensional rectangular and triangular prisms as nets. Use nets to find surface area of rectangular and triangular prisms in the context of real-world and mathematical problems.	Represent three- dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
6.SP.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.	Ongoing practice and application.		
6.SP.2	Describe the shapes of dot plots and histograms. Recognize that different distributions can have the same mean.	★ Understand that a set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape.	Ongoing practice and application.	
6.SP.3	Distinguish between a measure of center and a measure of variation.	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	Ongoing practice and application.	

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Standards	First Quarter Benchmark Expectations for Units 1 through 3	Second Quarter Benchmark Expectations for Units 4 and 5	Third Quarter Benchmark Expectations for Units 6 and 7	Fourth Quarter Benchmark Expectations for Units 8 and 9	
6.SP.4	Read and draw dot plots and histograms.	Display numerical data in plots on a number line, including dot plots,	Ongoing practice and application.		
		histograms, and box plots.			
6.SP.5	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.	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.	Xummarize numerical data sets in relation to their context, such as by:	
6.SP.5a	Summarize numerical data sets in relation to the number of data points.	★ Reporting the number of observations.	Ongoing practice and application.		
6.SP.5b	Describe the nature of attributes in dot plots, persuasive graphs, and histograms.	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.	Ongoing practice and application.		
6.SP.5c	Find mean, median, and mode as measures of center for a data set. Find the range of a data set, and describe the shape of the distribution of a data set given a table, dot plot, or histogram.	Find the interquartile range for a box plot and use the interquartile range to map a data set to a box plot. Calculate mean absolute deviation and use it to compare data sets. Describe overall patterns in data sets as well as deviations from patterns.	Describe the variability of data shown in tables using box plots and mean absolute deviation.	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.	
6.SP.5d	Determine whether to use mean, median, or mode to summarize data sets.	★ Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	Ongoing practice and application.		

Mastery expected during this quarter.

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Contents

Getting Ready to Teach Sixth Grade Everyday Mathematics

Focus

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In Unit 1, In this unit, students expand their understanding of data concepts and apply their work to real-life situations that require interpreting graphs and calculating data landmarks. Students will also explore categories of numbers, including fractions and negative numbers.

Major Cluster

6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.

Supporting Cluster 6.SP.A Develop understanding of statistical variability.

6.SP.B Summarize and describe distributions.

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McGraw-Hill Education

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In Unit 2, students practice finding greatest common factors and least common multiples. They also develop their skills with fraction multiplication and division as well as rates and ratios.

Major Clusters

6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.

6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

6.EE.B Reason about and solve one-variable equations and inequalities.

Supporting Cluster

6.NS.B Compute fluently with multidigit numbers and find common factors and multiples.

Unit 2 Fraction Operations and Ratios

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2-12	Open Response Blueberry Blast	188
2-13	Using Ratio/Rate Tables	198
2-14	Graphing Ratios	204
2-15	Assessment Unit 2 Progress Check.	.210

Focus

In Unit 3, students continue working with rational numbers. They explore equivalent expressions as numbers written in different forms, perform arithmetic operations, and consider more real-world applications.

Major Clusters

6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.

Supporting Clusters

G.NS.B Compute fluently with multidigit numbers and find common factors and multiples.

3-15

6.SP.B Summarize and describe distributions.

Unit 3 Decimal Operations and Percent

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3-13	Making Box Plots and Finding Interquartile Range	310
3-14	Comparing Data Representations.	316

Assessment Unit 3 Progress Check.

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110

In Unit 4, students consider patterns, equations, properties, and inequalities as a means to introduce algebraic thinking. They review the correct order of operations and apply it to simplifying numerical and algebraic expressions, work with inequalities, and explore applications of absolute value.

Major Clusters

6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.

6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.B Reason about and solve one-variable equations and inequalities.

Unit 4 Algebraic Expressions and Equations

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4-15	Assessment Unit 4 Progress Check	32

Focus

Unit 5 Area and Volume Explorations

460

330

In Unit 5, students explore the concepts of area and volume. They graph polygons on coordinate grids; decompose parallelograms, triangles and other polygons to find area; investigate the surface area and volume of 3-dimensional figures; and consider the relationship between linear, area, and volume measurements.

Supporting Cluster

6.G.A Solve real-world and mathematical problems involving area, surface area, and volume.

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5-10	Volume with Fractions	530
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In Unit 6, In this unit, students develop a sense of how to recognize, understand, and manipulate both expressions and equations. They focus on recognizing equivalent expressions, combining like terms, using set notation to write solutions, and solving equations using a variety of strategies.

Major Clusters

6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.B Reason about and solve one-variable equations and inequalities.

Unit 6 Equivalent Expressions and Solving Equations

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6-11	Comparing Multiple Strategies for Solving Equations	630
6-12	Assessment Unit 6 Progress Check.	636



In Unit 7, students deepen their experience with inequalities; they investigate the use of spreadsheet formulas to solve complex problems; and they begin work with dependent and independent variables.

Major Cluster

6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.

6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.

Unit 7 Variables and Algebraic Relationships

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Major Cluster	8-4	Modeling the Planets in the Solar System	. 762
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6.EE.A Apply and extend previous	8-6	Mobiles and Mathematics	. 774
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6.EE.C Represent and analyze quantitative relationships between dependent and independent variables.

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Unit 1 Organizer

Data Displays and Number Systems

Contents

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	1-2	Creating Dot Plots Students create dot plots and use median and mode to match plots with statistical questions.	20	6.SP.1, 6SP.2, 6.SP.3, 6.SP.4, 6.SP.5, 6.SP.5c	SMP2, SMP3, SMP4
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*The standards listed here are addressed in the **Focus** of each lesson. For all the standards in a lesson, see the Lesson Opener.

In this unit, students expand their understanding of data concepts and apply their work to real-life situations that require interpreting graphs and calculating data landmarks. Students will also explore categories of numbers, including fractions and negative numbers.

Major Cluster

6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.

Supporting Clusters

- 6.SP.A Develop understanding of statistical variability.
- **6.SP.B** Summarize and describe distributions.

Process and Practice Standards

SMP2 Reason abstractly and quantitatively.

SMP3 Construct viable arguments and critique the reasoning of others.



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
6.NS.5	In Grade 4, students identified lines of symmetry and recognized that when a figure is folded along its line of symmetry, the two parts match.	In Unit 4, students will apply their explorations of the symmetry of integers on the number line to using absolute value to compute and compare the distances of integers from 0.
6.SP.1	Although in prior grades students informally collected data to address statistical questions, the lessons in this unit will serve as students' first formal introduction to the concept of statistical questions.	Throughout Grade 6, students will continue to explore, collect, and/or analyze data sets generated to answer statistical questions. In Grade 7, students will use the data gathered from sample populations to address statistical questions.
6.SP.2	Prior to Grade 6, students informally explored the range of data sets. The lessons in this unit will serve as students' first formal introduction to the concept of data distributions.	In Unit 3, students will build on their analysis of data distributions in histograms by analyzing and comparing data sets presented in various representations, including box plots.
6.SP.3	Prior to Grade 6, students informally explored the center, or middle, of data sets. The lessons in this unit will serve as students' first formal introduction to the concept of measures of center.	In Units 3 and 4, students will use measures of center to support their work of matching mystery data sets in different forms, including data represented in tables, histograms, and box plots.
6.SP.4	In Grades 4 and 5, students represented a variety of data sets in the form of line plots.	In Units 3, 4, 7, and 8, students will create, interpret, and compare a variety of data representations, including line plots, tables, histograms, and box plots.
6.SP.5b	Prior to Grade 6, students informally discussed how data sets are constructed, including considering appropriate units of measure associated with the data. The lessons in this unit will serve as students' first formal introduction to describing data attributes.	Throughout Grade 6, students will work with a variety of data sets that involve different units of measure. In Unit 3, they will begin to represent the data in box plots. In Unit 8, they will explore data sets of measurements in the context of anthropometry.
6.SP.5d	Prior to Grade 6, students informally discussed how the shape of a data distribution relates to the center, or middle, of the data set and the range of data. The lessons in this unit will serve as students' first formal introduction to relating the shape of the data distribution to measures of center and variability.	Throughout Grade 6, students will continue to explore, collect, and/or analyze the shape of data distributions as related to measures of center and variability. In Units 3, 4, and 6, students will use measures of center and variability to analyze and compare data sets, as well as to match data sets presented in different forms.

Planning for Rich Math Instruction

1-	1	

1-2

Exploring Statistical Questions Creating Dot Plots

1-3 Introducing the Mean 1-4 Introducing the Mean as a Balance Point

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Comparing Mean, Median, and Mode



Analyzing Persuasive Graphs

1-7 Introducing Histograms

1-8

Examining Shapes of Graphs

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Planning for Rich Math Instruction

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Unit 1 Materials

Lesson	Math Masters	Activity Cards	Manipulative Kit	Other Materials
(1-1)	pp. 2–6; TA2; G2–G3	1	per partnership: 50 counters	slate; stick-on notes; per partnership: calculator
1-2	рр. 7–10; ТАЗ	2	2 dice; per group: meterstick	stick-on notes; slate; scissors; 6 envelopes; straightedge; per group: marker, large sheet of paper
1-3	pp. 11–14; G4–G5	3	number cards 0–10 (4 of each) and 11–20 (1 of each) (or 1 complete Everything Math Deck, if available); ruler or tape measure	slate; $\frac{1}{2}$ oz snack-size box of raisins
1-4	рр. 15–18; ТАЗ		centimeter cubes	slate
1-5	pp. 19–21; G6	4		slate; calculator; per group: stopwatch
1-6	рр. 22–26	5		slate; calculator; computer with graphing software
1-7	pp. 27–30; G13	6	number cards 0–9 (4 of each); number cards 2, 3, 5, 6, 9, and 10 (2 of each)	slate; labeled bins and prepared value cards (see Lesson 1-7 <i>Before You Begin</i>); Class Data Museum; students' dot plots from Lesson 1-2
1-8	pp. 31–34; G7–G8	7	per group: yardstick or tape measure	slate; prepared class data table (see Lesson 1-8 <i>Before You Begin</i>); per partnership: 1 paper clip, calculator, timing device; per group: chart paper
1-9	рр. 35–37; ТА4			slate; Class Data Pad or chart paper; colored pencils (optional); selected samples of students' work; students' work from Day 1
1-10	рр. 38–40	8		slate; number line from -8 to 8 (see Lesson 1-10 <i>Before You Begin</i>); markers or colored pencils
1-11	pp. 41–42; TA5–TA6; G4–G5; G9–G10		number cards 0–9 (4 of each) and 10–20 (1 of each)	slate; demonstration 0–2 fraction strips (see Lesson 1-11 <i>Before You Begin</i>); scissors
1-12	рр. 43–44	9–10	1 complete Everything Math Deck, if available; ruler	slate; calculator; number line with 0 and 1 marked; fraction strips; <i>Math Journal</i> 1, Activity Sheets 1–3 (fraction cards)
1-13	pp. 45–47; G2–G3	11	number cards 1–10 in two colors (2 of each color); per partnership: 50 counters	slate; fraction strips; large floor number line (see Lesson 1-13 <i>Before You Begin</i>); colored pencils in two colors that match the card colors; calculator
1-14	pp. 48–49; TA7; G11	12–13		slate; floor coordinate grid (see Lesson 1-14 <i>Before You Begin</i>); various objects; colored pencils
1-15	pp. 50–53; Assessment Handbook, pp. 5–11			
Go Onlin	erature Link Optional Be	ooks: 1-3	On an Average Day 1-8 Fantastic Book of 1,001	Lists 1-10 Hottest, Coldest, Highest, Deepest

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
1-1	Evaluate questions to determine which ones are statistical.	6.SP.1	
1-2	Identify landmarks on graphical representations.	6.SP.5, 6.SP.5c	SMP2
1-3	Use a redistribution strategy to find the mean.	6.SP.3, 6.SP.5, 6.SP.5c	
1-4	Find the mean of a data set using the balance point.	6.SP.2, 6.SP.5, 6.SP.5c	
1-5	Calculate and compare the mean and median.	6.SP.5, 6.SP.5c	SMP3
1-6	Analyze persuasive elements of graphical displays, including identifying problems with scale.	6.SP.5, 6.SP.5b	SMP6
1-7	Answer questions about the construction of a histogram.	6.SP.5, 6.SP.5b	
1-8	Draw histograms and compare data distributions.	6.SP.4, 6.SP.5, 6.SP.5b	SMP6
1-9	Construct two histograms with different bin widths for one data set.	6.SP.4, 6.SP.5, 6.SP.5c	SMP3
1-10	Use positive and negative numbers to model situations.	6.NS.5	SMP4
1-11	Order and compare fractions using the structure of fraction number lines.	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a	SMP7
1-12	Use a zoom-in representation to label and find fractions between given fractions on a number line.	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a	SMP2
1-13	Name and plot pairs of opposite numbers on a number line.	6.NS.5, 6.NS.6, 6.NS.6a	SMP2
1-14	Plot and record ordered pairs on a coordinate grid.	6.NS.6, 6.NS.6c, 6.NS.8	SMP6

<mark>💦</mark> Virtual Learning Community

vlc.uchicago.edu

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

EM4: Grade 6 Unit 1 Planning Webinar

This webinar provides a preview of the lessons and content in this unit. Watch this video with your grade-level colleagues and plan together under the guidance of an *Everyday Mathematics* author.

Analyzing Data: An Open Response and Reengagement Lesson

Watch one classroom work through an Open Response and Reengagement lesson. Explore the introduction and reengagement in practice.

Fraction Number Lines

In a series of 4 clips, students work their way through all of Lesson 11.

For more resources, go to the VLC Resources page and search for Grade 6.



W 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 1. 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.





Statistics and Probability



Progress Towards Mastery By the end of Unit 1, expect students to recognize a statistical question as one that anticipates variability in the data related to the question.

Full Mastery of 6.SP.1 expected by the end of Unit 1.

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Mathematical Background: Content

Statistical Questions and the Student Reference Book (Lesson 1-1)

Lesson 1-1 focuses on recognition and formulation of statistical questions. **6.SP.1** Statistical questions have many possible answers and can be answered by collecting data. For example, "How many hours of homework do sixth graders at School A, B, and C have each night?" is a statistical question because the number of hours of homework for each sixth grader will generate a data set that helps formulate an answer.

The *Student Reference Book* provides a variety of resources, including information and background on mathematical topics, instructions for calculator use, game directions, and a Real-World Data section. While the *Student Reference Book* is organized for students to find information independently and to take responsibility for their own learning, it also serves as a resource for parents to consult when helping their students at home.

The xxx icon appears on pages in the *Math Journal* and *Math Masters* when the *Student Reference Book* contains information relevant to the topic at hand.

Dot Plots and Data Landmarks (Lesson 1-2)

Lesson 1-2 provides several opportunities for students to read, analyze, and organize data using dot plots. **6.SP.1**, **6.SP.4** As they match graphical representations with given situations, they learn to discuss measures of center and variability that summarize data sets: maximum, minimum, median, mode, and range. (See margin.) **6.SP.2**, **6.SP.5**, **6.SP.5b**, **6.SP.5c** They can use these landmarks as reference points when analyzing and interpreting data on a variety of topics. **6.SP.5**, **6SP.5c**

► The Mean (Lessons 1-3 and 1-4)

In Lesson 1-3 students explore different strategies for finding the mean of a data set and using calculations to make predictions. **6.SP.3**, **6.SP.5**, **6.SP.5**c Students investigate two different methods for finding the mean: redistributing data items until all groups have the same number of items, and adding all the data items and dividing the sum by the number of items. Lesson 1-4 considers the mean as the balancing point of a data set. **6.SP.5**, **6.SP.5**c This idea is represented by an image of a balance point for a platform with two identical figures at equal distances, in opposite directions, from the fulcrum. **6.SP.5**, **6.SP.5**c Students experiment with different balancing situations and develop rules for finding the balance point in these situations. **6.SP.3**, **6.SP.5**c For example, students find that the sum of the distances from the balance point for all of the points on one side has to equal the sum of the distances on the other side.

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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.



Unit 1 Vocabulary

average	map scale	positive number
balance point	maximum	predict
bin	mean	quadrant
cluster	measure of center	range
coordinate grid	median	rational number
counting number	minimum	statistical question
data	mode	statistics
data landmark	negative number	unit fraction
distribution	opposite	variability
dot plot	ordered pair	whole number
histogram	origin	x-coordinate
integer	outlier	y-coordinate

• Measures of Center (Lesson 1-5)

Finding a typical value for a data set (a measure of center) and the spread of the data values (a measure of variation) are central to data analysis. **6.SP.2** The mean, median, and mode are all measures of center. **6.SP.3** Lesson 1-5 focuses on choosing a measure of center based on what students want to show. **6.SP.5**, **6.SP.5**c If all data values in a set are close together, the mean and the median are about the same. However, if a few data values are spread out, the mean and median can be quite different, and one measure might be considered more "typical" than the other. In the example below, Sofia's high income skews the mean—so the median is representative of the data set. Students learn to describe distributions in these terms. **6.SP.5**, **SP.5c**

NOTE Consider setting up a Class Data Museum in your classroom. Ask students to look in newspapers and magazines for examples of graphs that represent real-world data.

Name	Michael	Juan	Kiriko	Jaime	Jonathan	Carmen	Chitra	Lee	Sofia
Yearly Income	\$15,000	\$17,500	\$17,500	\$20,000	\$25,000	\$30,000	\$33,000	\$40,000	\$250,000

Median: \$25,000 Mean: \$49,778 Mode: \$17,500

Persuasive Statistics and Graphs

(Lesson 1-6 through 1-9)

Sometimes graphs are designed to provoke or influence a particular interpretation of a data set. Lesson 1-6 offers opportunities for students to analyze statistical statements and graphs that have been designed to persuade the reader. Students think critically about how the graph's features may have been altered to advance a given view. **6.SP.2**, **6.SP.4**, **6.SP.5**, **6.SP.5b** Lesson 1-7 examines histograms and bar graphs to develop students' understanding of the typical shapes of graphs. **6.SP.2** Students also learn to distinguish between categorical data (for example, their classmates' favorite colors), which is often represented by bar graphs, and numeric data, which is often represented by histograms. **6.SP.1**, **6.SP.4** Although it is easy to see outliers and the general distribution of data in histograms, it is usually impossible to calculate the data set's exact measures of center, spread, and variability.

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Persuasive Statistics and Graphs Continued

because histograms represent this numeric data in intervals. Furthermore, because histograms sort data values into intervals or bins, the structure of a histogram can suggest a desired conclusion about the data. **6.SP.5**, **6.SP.5a**, **6.SP.5b** Lesson 1-8 expands on these ideas by having students analyze and compare the shapes of graphs. **6.SP.2**, **6.SP.5c** Lesson 1-9 builds on students' knowledge of all of these concepts to create opposing mathematical arguments, supported by data landmarks. **6.SP.1**, **6.SP.3**

Number Systems (Lesson 1-10)

Lesson 1-10 reflects on categories of numbers and their applications in real life. **6.NS.5** For example, fractions and decimals are useful for measures that cannot be represented by whole numbers. Negative numbers help make our numbering system more complete and functional by making it possible for us to answer any subtraction problem and to name measures that extend in both directions from the starting (or zero) point. For example, temperatures below zero, elevations below sea level, and losses in business are often represented by negative numbers. Lesson 1-10 focuses on locating these numbers on horizontal or vertical number lines and introduces the idea of negative numbers as the opposites of positive numbers. **6.NS.5**, **6.NS.6**, **6.NS.6**a

Rational Numbers (Lessons 1-11 and 1-12)

Lesson 1-11 closely examines the number line itself. Students expand their understanding of number systems by comparing fractions and locating them on a number line. **6.NS.6**, **6.NS.6**, **6.NS.7**, **6.NS.7** In addition to finding common denominators and writing decimal equivalents, students use fraction strips to explore patterns in, and the structure of, fractions. Lesson 1-12 investigates the idea that it is always possible to find a number between two numbers on a number line by dividing an interval into smaller pieces, or "zooming in" on a number line. **6.NS.7**, **NS.7**a

Plotting Rational Numbers on a Number Line and a Coordinate Grid (Lessons 1-13 and 1-14)

Lessons 1-13 and 1-14 extend students' understanding of rational numbers. Students locate rational numbers on horizontal and vertical number lines. **6.NS.6**, **6.NS.6c** They recognize that numbers with lesser values are to the left, so the larger a negative number "looks," the smaller it is. For example, -4 < -3. They consider the symmetric nature of the number line—the digits representing numbers on the negative side of zero are in the reversed order of those used on the right. **6.NS.6**, **6.NS.6**, **6.NS.6** Students use rational numbers and opposites to quantify real-world situations. **6.NS.7**, **NS.7**

In Lesson 1-14 students plot ordered pairs whose coordinates are rational numbers. **6.NS.6**, **6.NS.6** They locate points and solve problems with ordered pairs in all four quadrants of the coordinate grid. **6.NS.8** Note that the ordered pairs that locate points on a coordinate grid are sometimes called Cartesian coordinates after René Descartes who first used them. *Cartesian coordinate* grids have two number-line axes: the *x*-axis runs horizontally and the *y*-axis runs vertically. They intersect at zero on both axes. Points on the grid are labeled, respectively, with ordered pairs representing the *x* direction and distance and the *y* direction and distance.

Professional Development

Mathematical Background: Process and Practice

See below for some of the ways that students engage in SMP2 Reason abstractly and quantitatively and SMP3 Construct viable arguments and critique the reasoning of others through The Number System and the other mathematical content of Unit 1.

Standard for Mathematical Process and Practice 2

Mathematical representations often clarify relationships and concepts. Throughout Unit 1, students create and use representations, including dot plots, graphs, and number lines. For example, in Lesson 1-3 students represent data so they can redistribute the points and find the mean. Lesson 1-4 uses the image of a platform on a fulcrum to introduce the mean as a balance point. This lesson gives students the opportunity to explore mystery data sets. Lessons 1-7, 1-8, 1-9, and 1-12 investigate how to create histograms that influence our interpretation of data in particular ways. Lessons 1-10 through 1-14 use representations such as number lines and 4-quadrant grids to deepen students' understanding of the number system.

Students also focus on how the same information or concept can be represented in different ways. Lesson 1-7 asks students to compare the pros and cons of using a histogram versus a table to represent the snowfall for a given city. **GMP2.2**, **GMP2.3** Students explore how organizing data into different bin sizes can affect interpretations of the data. **GMP2.2**, **GMP2.3** Lesson 1-12 asks students to consider finding a number between any two different numbers as zooming in on a number line. They compare this representation to how the zoom feature on an Internet map shows a magnified, more detailed portion of the map. **GMP2.3**

Standard for Mathematical Process and Practice 3

Mathematical Process and Practice 3 focuses on making a mathematical argument. Students should be able to construct informal arguments—to tell *how* they know a method or answer or *why* they think as they do. They should also be able to listen to others' arguments, think about whether those arguments make sense, and ask questions.

Unit 1 offers opportunities to construct and evaluate mathematical arguments. In Lesson 1-2 students match dot plots with situations. Students' strategies may focus on the numbers used. (A dot plot titled The Number of People Living in Home, for example, will have smaller numbers and no fractions.) Others may concentrate on the way the numbers are distributed. (A dot plot titled Shoe Size, for example, is likely to be normally distributed.) Students are required to formulate and explain their answer and justify their reasoning with mathematical arguments.

The flip side of making a mathematical argument is listening carefully to the ideas of others. This skill is essential for group work, class discussions, problem-solving-strategy analysis, and games. In addition to setting guidelines for how to have respectful, productive exchanges, this unit provides numerous opportunities for constructive student dialogue where students concentrate on making sense of one another's thinking. **GMP3.2** Lesson 1-9, for instance, discusses what might lead to different interpretations of data.

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Standards and Goals for Mathematical Process and Practice

SMP2 Reason abstractly and quantitatively.

GMP2.1 Create mathematical representations using numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects.

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

GMP2.3 Make connections between representations.

SMP3 Construct viable arguments and critique the reasoning of others.

GMP3.1 Make mathematical conjectures and arguments.

GMP3.2 Make sense of others' mathematical thinking.

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 1–36.



Analyzing Data

Overview Day 1: Students analyze a data set, draw histograms, and then use their results to make a persuasive argument. Day 2: Students examine others' work in a class discussion and then

revise their work.

Day 1: Open Response

Before You Begin

Solve the open response problem as many ways as you can. If possible, schedule time to review students' work and plan for Day 2 of this lesson with your grade-level team.

)	Warm Up	5–10 min	

Materials

slate

Standards

Focus Clusters

- Develop understanding of statistical variability.
- Summarize and describe distributions.

6.NS.2

Mental Math and Fluency Students estimate quotients.

(2a)

Focus 45-55 min

Math Message Students analyze histograms showing final exam scores.	Math Journal 1, p. 33	6.SP.3, 6.SP.5, 6.SP.5a, 6.SP.5c, 6.SP.5d SMP3
Analyzing Histograms Students compare two histograms representing the same data set.	<i>Math Journal 1</i> , p. 33; Standards for Mathematical Process and Practice Poster	6.SP.3, 6.SP.5, 6.SP.5a, 6.SP.5c, 6.SP.5d SMP3
Solving the Open Response Problem Students analyze a data set and use their results to make a persuasive argument.	<i>Math Masters</i> , pp. 35–36	6.SP.3, 6.SP.4, 6.SP.5, 6.SP.5a, 6.SP.5b, 6.SP.5c, 6.SP.5d SMP1, SMP3

Getting Ready for Day 2 ->

Review students' work and plan discussion for reengagement.

Math Masters, p. TA4; students' work from Day 1

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


Mental Math and Fluency

On their slates, have students write estimates for the quotients. *Leveled* exercises: Sample answers given.

●○○ 80 ÷ 7 11;	74 ÷ 12 <mark>6</mark> ;	100 ÷ 8 12
●●○ 128÷9 14 ;	150 ÷ 11 <mark>14</mark> ;	178 ÷ 19 <mark>9</mark>
●●● 233 ÷ 18 13 ;	650 ÷ 110 <mark>6</mark> ;	817 ÷ 45 18

2a) Focus

45–55 min

Math Message

Math Journal 1, p. 33

Complete the Math Message on journal page 33.

Analyzing Histograms

 Math Journal 1, p. 33

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Math Message Follow-Up Briefly review students' answers to Problem 6, and have them discuss the landmarks they used to determine a typical score. Emphasize that, in this case, because there do not appear to be dramatic outliers, both the mean and median can be used to reasonably determine a typical score. The mean will be slightly less than the median because the low scores are farther away from the center than the high scores. This reasoning is consistent with mean as the balance point.

Have students share how they justified their argument that the students did pretty well on the exam. GMP3.1 Ask: Which histogram better supports this point of view? The graph on the left Which features of the graph helped you make your argument? Sample answer: The size of the bins and the width and height of the bars are features that helped me make an argument. The smaller bins provide more detail to show that students had high scores.

In the Math Message, students justified their answers. Making arguments to support their conclusions is a skill that mathematicians often use. Tell students they will practice this skill in today's problem. They will use data to make persuasive graphs and make mathematical arguments using statistics. Refer to **GMP3.1** on the Standards for Mathematical Process and Practice Poster.

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Standards and Goals for Mathematical Process and Practice

SMP1 Make sense of your problems and persevere in solving them.

GMP1.5 Solve problems in more than one way.

SMP3 Construct viable arguments and critique the reasoning of others.

GMP3.1 Make mathematical conjectures and arguments.

GMP3.2 Make sense of others' mathematical thinking.

Professional Development

Each Open Response and Reengagement lesson focuses on one Goal for Mathematical Process and Practice. Through the focus GMPs, each of the Process and Practice Standards will be addressed in the Open Response and Reengagement lessons in Grade 6. The focus of this lesson is GMP3.1. Students will analyze a data set and construct arguments to support each side of a negotiation situation. For information on the Mathematical Process and Practice Standards in this unit, see the Mathematical Background in the Unit Organizer.

Go Online to the *Implementation* Guide for more information about SMP3.

Math Journal 1, p. 33



scored 80–90% and a few more scored 90–100%. The graph on the right only tells you that $\frac{1}{2}$ of the students scored above 50% and that $\frac{1}{4}$ of the students scored above 75%, but you don't know how much above 75% they scored.

33

6.SP.3, 6.SP.5, 6.SP.5a, 6.SP.5c, 6.SP.5d, SMP3

Math Masters, p. 35

Salaries	pany	NAME	on 1-9	DATE	TIME
The management of the Easy E-Read with their employees.	er Compa	ny is prepa	aring to neg	gotiate a ne	w contract
The current salaries for all those		Easy E-Rea	ader Comp	oany Salario	es
working at the company are listed	\$20,000	\$20,000	\$30,000	\$30,000	\$30,000
salaries on the list are for the	\$30,000	\$30,000	\$30,000	\$40,000	\$45,000
managers.	\$45,000	\$50,000	\$50,000	\$50,000	\$50,000
The mean salary for the city	\$65,000	\$75,000	\$75,000	\$105,000	\$130,000
where the company is located L					
of the Teacher's Lesson G	Guide.			9	
 Draw a graph that provides Answers vary. See sampl of the Teacher's Lesson C 	support f le stud Guide.	or the emp ents' w	oloyees' arı YOrk on	gument. pages 6	5-66
b. Draw a graph that provides Answers vary. See sampl of the Teacher's Lesson C	support f le stud Guide.	or the emp ents' w	oloyees' arr rork on	gument. pages 6	5-66

to the *Implementation Guide* for information about Open Response and Reengagement lessons.

Solving the Open Response Problem

Math Masters, pp. 35-36

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Distribute *Math Masters*, pages 35–36. Before they begin working, have students read Problems 1–2. You may also wish to have partners or small groups discuss how someone could develop arguments to support different perspectives. **GMP3.1** Remind students that before they construct an argument for either the employees or management, they need to consider how they will use landmarks and graphs to justify their two arguments. **GMP1.5**, **GMP3.1** Then have students complete the pages independently.

Academic Language Development To encourage use of academic language, ask students what it means to *argue*. Discuss examples of everyday use of the word. For example, two friends might *argue* about which movie to see. Each friend would need to build an *argument* to convince the other about the better movie to watch.

Summarize Have students check that they have written persuasive arguments using mathematical evidence for both the management's and employees' sides of the negotiation. **GMP1.5** Emphasize that an argument can be made for both sides, and students should consider what it means to justify an argument well with statistics. **GMP3.1**

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

English Language Learner Support Prior to the lesson, provide English language learners with an opportunity to practice describing graph distributions. Display a histogram with parts labeled to scaffold understanding of words that are often used to describe graphs. Using gestures and pointing to different parts of the histogram, ask questions such as these: *Which bar is highest? Does the graph skew to, or have more bars on, the left or the right? What does this bin represent? What do the scales on the axes show? Which bin shows an outlier?* If appropriate, include some terms for landmarks, such as *mode, median*, and *mean*. Use gestures and moderate your voice to emphasize important terms and connect the spoken and written words with illustrations. Provide simple sentence frames to scaffold for beginning English language learners to describe parts of the graph, such as "The highest bar is _____" and "The scales on the axes show _____."

Getting Ready for Day 2

Math Masters, p. TA4

Planning a Follow-Up Discussion

Review students' work. Use the Reengagement Planning Form (*Math Masters*, page TA4) and the rubric on page 67 to plan ways to help students meet expectations for content and process/practice standards. Look for common misconceptions, such as misinterpreting data in building an argument, as well as interesting ways students use data to build their arguments.

Limit the number of student work samples you choose to two or three. Both correct and incorrect responses can be useful to discuss. Reengagement need not focus on the entire task, but should depend on students' work and their initial understanding of specific aspects of the activity. 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. Sample answers given.

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

- 1. Show a response such as Student A's that includes a correct argument for Problem 1a using one of the data landmarks. Ask:
 - What argument is this paper trying to make? **GMP3.2** This paper argues that the employees should get a raise.
 - What are the important statements this paper makes to support this argument? The paper says that most people get paid \$30,000, that the average pay is not good, and that the employees are not getting paid as much as the management.
 - What data would better support this argument? **GMP3.1** The company average without the salaries of the top two employees could be compared to the city mean.

Math Masters, p. 36 Easy E-Reader Company Lesson 1-9 Salaries (continued) (2) Management wants salaries to stay the same a. Write a persuasive argument for management's side of the negotiations Write a persuasive argument for management's side of the negotiations. Use data landmarks to support your argument. Sample answer: The median salary at the Easy E-Reader Company is the same as the mean salary for their town. Also, the mean salary at the company (\$50,000) is higher than the mean for their town. Half equal to or greater than the mean salary for the town. Draw a graph that provides support for management's argument. Easy E-Reader Salaries Employees 10 8 6 ъ 4 Number 2 0 15 25 35 45 55 65 75 85 95 105 115 125 135 Salary (thousands of dollars) (3) Explain how your graphs for y (intous and used of used and y). (3) Explain how your graphs for Problems 1-2 support the two opposing arguments. Include a description of what looks different in the two graphs. Sample answer: In the Problem 1 histogram, you can see that the salaries are clustered below \$80,000 and there are only a few above \$100,000. I made the bin widths larger so that the groups of included data are bigger. For the Problem 2 histogram, I made the bins smaller so that you can see two modes. Although one mode is below the town means the other is advanting to looks reasonable. town mean, the other is above it, so it looks reasonable to keep the salaries the same 36 6.SP.3, 6.SP.5, 6.SP.5a, 6.SP.5c, 6.SP.5d, SMP1, SMP3

NOTE Use this information to help you prepare for the reengagement activity on Day 2 of this lesson.

Sample student's work, Student A

1 The employees are negotiating with management for higher salaries.
a. Write a persuasive argument for the employees' side of the negotiations. Use data landmarks to support your argument yes, I think the employees should get payed more because the most money people get payed is 30,000 but the average amount of money people get payed is 30,000 but the average so the employees aren't getting os city =45,000 much morey as the presidant. comp. =50,000 Most people get payed 30,000 but the city gets45,000 dollars.

Sample student's work, Student B

2 Management wants salaries to stay the same.

a. Write a persuasive argument for management's side of the negotiations. Use data landmarks to support your argument. The average for the city is 45,000 and the average that they get is 50,000. More people get paid from 0-109,000 dollars,



- **2.** Show a response for Problem 2a such as Student B's, which includes correct data that is not used well in constructing the argument. Ask:
 - What argument is the paper trying to make? GMP3.2 It says that the company pays the city averages, but there is no argument for management's side.
 - What data does the paper use? The city mean and the company mean, including the top two salaries
 - Based on the data, what argument could this paper make? GMP3.1 The company average is higher than the city's, so there is no need for a raise.
- **3.** Compare and contrast graphs, such as Student C's and Student D's, to determine which graph supports an argument for each side. Ask:
 - Which graph better supports each argument? **GMP3.2** Student C's graph better supports the employees and Student D's better supports the management.
 - How are the graphs constructed differently? Student C's scale has the employees spread out. Student D's scale shows the salaries more bunched together, indicating that most people are paid between \$20,000 and \$60,000.

Planning for Revisions

Have copies of *Math Masters*, pages 35–36 or extra paper available for students to use in revisions. You might want to ask students to use colored pencils so it is easy to distinguish their original work from their revisions.

Analyzing Data

Overview Day 2: Students examine others' work in a class discussion and then revise their work.

Day 2: Reengagement

Before You Begin

Have extra copies available of Math Masters, pages 35-36 for students to revise their work.

		Standards
Focus 50-55 min	Materials	Focus Cluster • Summarize and describe distributions.
Setting Expectations Students review the problem, discuss features of a successful response, and review how to discuss others work respectfully.	Class Data Pad or chart paper s'	SMP3
Reengaging in the Problem Students examine others' work in a class discussion.	selected samples of students' work	6.SP.4, 6.SP.5, 6.SP.5c SMP3
vising Work udents revise their work from Day 1.	<i>Math Masters</i> , pp. 35–36 (optional); students' work from Day 1; colored pencils (optional)	6.SP.4, 6.SP.5, 6.SP.5c SMP1, SMP3
see page 70 and the r xpect most students to construct two histograms an rguments for opposing sides in the problems like tho	ubric below. d use measures of center to support se identified.	6.SP.4, 6.SP.5, 6.SP.5c SMP3

Goal for	Not Meeting	Partially Meeting	Meeting	Exceeding
Mathematical	Expectations	Expectations	Expectations	Expectations
Practice GMP3.1 Make mathematical conjectures and arguments.	 Attempts to make an argument for one or both sides. Constructs graphs that do not generally support any argument. May not have attempted Problem 3. 	 Uses data landmarks effectively to build an argument for at least one side. Constructs a graph that supports the argument. Does not attempt Problem 3, or the explanation may not make sense. 	 Uses data landmarks effectively to build arguments for both sides. Constructs graphs whose features and distributions support the arguments. May not accurately describe the differences between the two graphs in Problem 3. 	 Uses data landmarks effectively, including the mean salary for the city, to build arguments for both sides. Constructs graphs whose features and distributions support the arguments. Clearly describes how the graphs are constructed to represent the opposing arguments in Problem 3.

3 Practice 15-20 min

Math Boxes 1-9 Students practice and maintain skills.	Math Journal 1, p. 34	See page 71.
Home Link 1-9 Homework Students interpret histograms and answer questions.	Math Masters, p. 37	6.SP.5, 6.SP.5a, 6.SP.5c

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

Guidelines for Discussion

During our discussions, we can:

- ✓ Make mistakes and learn from them.
- ✓ Share ideas and strategies respectfully.
- ✓ Change our minds about how to solve a problem.
- ✓ Agree and disagree politely.
- ✓ Ask questions of our teacher and classmates.
- ✓ Feel confused.
- ✓ Listen closely to others' ideas.
- ✓ Be patient.

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.

Features of a Successful Paper

- · Identifies and uses landmarks to make an argument for each side.
- Each argument makes sense and uses statistical evidence to support the argument.
- Constructs two different histograms that support the arguments.
- The explanation in Problem 3 describes how the histograms are constructed differently to support the two opposing arguments.

2b) Focus

Setting Expectations

WHOLE CLASS SMALL GROUP INDEPENDENT

50-55 min

Establishing Guidelines for Reengagement

A significant part of the Day 2 reengagement portion of the lesson is a class discussion about the arguments and graphs students made to support each side. **GMP3.1** To promote a cooperative environment, develop class quidelines for discussion on the Class Data Pad or chart paper. Use and expand the list throughout the year during any group discussion. (See sample poster in the margin.) Use the following sentence frames to model and encourage students to use appropriate language when discussing other students' work:

- I agree because _____.
- I disagree because _____.
- Could you explain _____?
 I wonder why _____?
- This representation is useful because _____

Reviewing the Problem

Briefly review the open response problem from Day 1. As part of the discussion, consider supporting students in generating their own list of features of a successful paper. (See margin.) The list should include a focus on how to construct an argument based on statistical evidence. GMP3.1 Record and display the list of students' ideas. Be prepared to add to the list after the discussion. Refer to the rubric on page 67 to quide the discussion. To begin, ask:

- What were you asked to do? Sample answer: Analyze a data set of salaries, use the analysis to support arguments for two opposing sides in a salary negotiation, and create graphs of the data to support the arguments
- What do you think a good response should include? Sample answer: It should include: Two arguments that make sense based on the data landmarks and the mean for the city; two different histograms that are drawn correctly and support opposing arguments; a clear and complete explanation of how the histograms are drawn differently to support the opposing views.

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. GMP3.1, GMP3.2

After the discussion, if the class generated a list of successful features, consider whether the list requires any changes or additions.

Revising Work

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Distribute students' work from Day 1. Before students revise anything, ask them to examine their responses and decide how their responses might be improved. If you generated a list of features for a successful paper, students may refer to the list in order to decide what to revise. Ask questions like the following to help them organize their revisions. Have partners discuss their responses and give a thumbs-up or thumbs-down based on their own work.

- Did you use the landmarks and the mean to build different arguments for each side that are clear and complete? **GMP1.5**
- Did you use the salary data to create a graph that supports each argument?

Tell students they now have a chance to revise their work. Even students who solved everything correctly should consider how to improve their work. **GMP3.1**

Tell students to add to their earlier work using colored pencils or to use another sheet of paper, instead of erasing their original work. Consider asking them to note or indicate why they made certain changes.

Summarize Have students reflect on their revisions. Have partners discuss and then share their ideas with the class about how their revisions strengthened their use of data to support the arguments in each case and how the revisions helped to clarify their arguments. Answers vary. **GMP3.2**

Sample student's work, "Meeting Expectations"

1 The employees are negotiating with management for higher salaries a. Write a persuasive argument for the employees' side of the negotiations. Use data landmarks to support your argument. The pressident through raise the salaries because the mean salary is not even half as much as the man houses Salary The mode Most employees get 30,000 dollars and the Mark. Mean of the city is 45,000 b. Draw a graph that provides support for the employees' argument. Amount of Monoy Workers get 4 08 employees 5 Money (inthousands) 2 Management wants salaries to stay the same. a. Write a persuasive argument for management's side of the negotiations. Use data landmarks to support your argument. We shouldn't raise the salary because 7 workers get 50,000 \$ or over. get The city has the main of 45,000 and the average of the company is higher than that. b. Draw a graph that provides support for the manager and president's argument. 13 Amount of Morey workers make # 0F workers 32-0 110 140 salacies (thousands) 20 50 80 3 Explain how your graphs for Problems 1–2 support the two opposing arguments. Include a description of what looks different in the two graphs. The First graph is much more specific and really shows the difficience in salaries while the second graph makes it look like everyone is good and makes it look like most people are getting more than they really are.



Assessment Check-In 6.SP.4, 6.SP.5, 6.SP.5c

Math Masters, pp. 35-36

Collect and review students' revised work. For the content standards, expect most students to correctly construct two different histograms and use appropriate measures of center to support the arguments for both sides. You can use the rubric on page 67 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 this lesson.

Sample Students' Work-Evaluated

See the sample in the margin. This paper meets expectations for the content standards because the paper identifies the measures of center and shows successfully constructed graphs that represent the data. The paper meets expectations for the mathematical process and practice standard because it uses measures of center and graphs to support arguments for both employees and management. In addition, the paper attempts to describe how the two graphs are constructed differently to support the opposing arguments. **GMP3.1**

Go Online for other samples of evaluated students' work.



Mixed Practice Math Boxes 1-9 are paired with Math Boxes 1-11 and 1-13.

Home Link 1-9

Math Masters, p. 37

Homework Students study a histogram and answer questions.



Math Masters, p. 37

		Math Jourr	nal 1, p. 34
	Math Boxes	5	Lesson 1-9 DATE TIME
II Math Boxes	 Write a statistic Sample ar Finn has 1⁴/₂ cu so of tra trail mix does f trail mix does f saturding trail mix does f attraturding trail for the saturding trail for the saturding trailing to the saturding trailing trailing to the saturding trailing trail	asoning The Problem 1 grap The water shoots up into the a st three things you know about as the about as a similar the about as a similar the about about a similar the about about about about a similar the about about about about about a similar the about about about about about about a similar the about about about about about about about a similar the about a	althuit Engineer a typical eruption? a typical eruption? b typical eruption? c. 4 + 420 = 420 + 4 <u>True</u> b. 4 + 420 = 8 + 210 <u>True</u> c. 4 + 420 = 1,660 <u>False</u> d. 4 + 420 = 1,660 <u>False</u> d. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>True</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 420 = 40 + 42 <u>true</u> c. 4 + 40 + 40 + 40 + 40 + 40 + 40 + 40 +
	34 ① 6.SP.1 (2) 6.EE.5 (3) 6.NS.3 (4)	6.SP.5, 6.SP.5b, SMP2

Building a Number Line Using Fraction Strips

Overview Students find and plot rational numbers on a number line.

Before You Begin

For Part 2, make a demonstration set of 0-2 fraction strips from Math Masters, page TA6, and have extra copies available. Plan to store students' 0-2 fraction strips for future use.

Vocabulary

Lesson

1-11

2)

3)

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	unit fraction		Standards
1	Warm Up 5-10 min	Materials	Focus Cluster • Apply and extend previous understandings of numbers to the system of rational numbers.
	Mental Math and Fluency	slate	6.NS.7, 6.NS.7a
	Students compare fractions		

Focus

35-40 min

Math Message Students order fractions.		6.NS.7, 6.NS.7a
Ordering Fractions Students share strategies for ordering fractions.		6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a SMP1, SMP7
Making Fraction Strips Students make fraction strips.	<i>Math Masters,</i> p. TA6; demonstration 0–2 fraction strips (see Before You Begin); scissors	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a SMP1, SMP5
Plotting Rational Numbers on a Number Line Students use fraction strips to plot fractions.	<i>Math Journal 1</i> , p. 39; 0–2 fraction strips (from <i>Math Masters,</i> p. TA6)	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a SMP5, SMP7
Assessment Check-In See page 82. Expect most students to be able to use fraction strips to identify fractions between $\frac{1}{6}$ and $\frac{1}{2}$.	Math Journal 1, p. 39	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a, SMP7

Practice 20-25 min

Playing Landmark Shark Game Students practice finding data landmarks.	<i>Student Reference Book</i> , pp. 335–336; <i>Math Masters</i> , pp. G9–G10; number cards 0–9 (4 of each), 10–20 (1 of each)	6.SP.5, 6.SP.5c SMP1, SMP6
Math Boxes 1-11 Students practice and maintain skills.	Math Journal 1, p. 40	See page 83.
Home Link 1-11 Homework Students locate fractions on a number line.	Math Masters, p. 42	6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a

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

Differentiation Options

Readiness	5–15 min	Enrichment	5–15 min	Extra	Pract	ice	5–15 min
WHOLE CLASS SMALL GROUP PARTNER	INDEPENDENT	WHOLE CLASS SMALL GROUP	PARTNER INDEPENDENT	WHOLE CLASS	SMALL GROUP	PARTNER	INDEPENDENT
WHOLE CLASS SMALL GROUP PARTNER Making Fraction Strips to Compare Fractions G.NS.6, G.NS.7, G.NS.7a, SI G.NS.6, G.NS.6c, G.NS.7, G.NS.7a, SI Math Master, p. TA5; scissors To prepare for comparing fraction than and less than 1, students mak use 0–1 fraction strips from Math // page TA5. Students list all the sets equivalent fractions from their stri look for patterns to help generate "rules" for comparing fractions. O-1 Fraction Strips O-1 Fraction Strips Output Output	INDEPENDENT	WHOLE CLASS SMALL GROUP Cooking with Fraction 6.NS.6, 6.NS.6c, 6.NS.7, Math Masters, p. 41 To apply their fraction-cost students find fractions be order to modify a recipe can use their fractions students find fractions students find fractions students find fractions students for their fractions students find fractions students for their fractions students find fractions students students students students students students students students students find fractions students find fractions students studentststudents students students students students students	PARTNER INDEPENDENT INS 6.NS.7a, SMP4 comparison skills, between fractions in extrasource fractions in extrasource fractions in extrasource fractions. 6.MP4.1 They trips or, as an extrasource fractions in extrasource fractions. 6.MP4.1 They trips or, as an extrasource fractions. 6.MP4.1 Import of the following measures: 1000 ad The first was too dry and not sweet here to oppoint neights, write here company available. Sample answer: ad The first was too dry and not sweet here to oppoint neights are to oppoints are toppoints are to oppoints are to oppoint neights	WHOLE CLASS Playing B 6.NS.6, 6. Student R Math Mas pp. G4–G5 To practice Build It. Build-It Ca 5 9 7 12 2 3 3 5	SMALL GROUP Build It NS.6c, 6.NS eference Bo ters, e ordering f $\frac{1}{3}$ $\frac{3}{8}$ $\frac{3}{7}$ $\frac{4}{5}$	PARTNER 5.7, 6.NS.7a, <i>book,</i> p. 322 (r fractions, st 11 12 11 12 1	INDEPENDENT
- m m	10	Onyoya Biladaan H					00000

6.NS.6, 6.NS.6c, 6.NS.7, 6.NS.7a, SMP4

G4

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English Language Learner

Beginning ELL Help students understand *least* and *greatest* by displaying 3, 4, and 5, showing each successive numeral in larger print than the previous. Provide students with two vocabulary cards: one with *least* and *smallest* in small letters and the other with *greatest* and *biggest* in big letters. Ask: *Are these numbers in order? Are they from least to greatest or greatest to least? What comes next?* Encourage students to refer to the vocabulary cards as they order fractions.

TAS

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

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Standards and Goals for Mathematical Process and Practice

- SMP1
 Make sense of problems and persevere in solving them.

 GMP1.6
 Compare the strategies you and others use.
- SMP5 Use appropriate tools strategically. GMP5.2 Use tools effectively and make sense of your results.
- SMP7 Look for and make use of structure. GMP7.2 Use structures to solve problems and answer questions.

Professional Development

Fraction strips can serve as area models or as number-line models. For example, the halves strip is divided into four sections from 0 to 2. We might think of the area of the strip divided into four sections of equal area. Another way to view the model is as a number line with the distance from 0 to 2 divided into four sections of equal length. This lesson focuses on using fraction strips as number-line models.

Warm Up 5-10 min

Mental Math and Fluency

On their slates, have students compare fractions using <, >, or = . *Leveled exercises:*

2 Focus 35-40 min

Math Message

Put the following fractions in order from least to greatest: $\frac{1}{2}, \frac{2}{8}, \frac{3}{4}, \frac{6}{4}, \frac{10}{8}$.

Ordering Fractions

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Math Message Follow-Up Have a volunteer record the fractions in the correct order. $\frac{2}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{10}{8}$, $\frac{6}{4}$ Ask students to explain their strategies for ordering the fractions. **GMP1.6** Expect students to share strategies like the following:

- Change them all to fourths and then compare.
- Compare each fraction to benchmarks such as $\frac{1}{2}$ or 1.
- Convert the fractions to their decimal equivalents and compare.

Explain that today's lesson extends the patterns and structures underlying fraction ordering strategies by inviting students to make and analyze a set of fraction strips. **GMP7.2** In this lesson, students relate ordering fractions to locating and plotting points on a number line.

Making Fraction Strips

Math Masters, p. TA6

WHOLE CLASS SMALL GROUP

INDEPENDENT

Remind students that fractions are rational numbers—that is, numbers that can be written as fractions with integer numerators and denominators (and the denominators cannot be 0). Display a number line with labels 0, 1, and 2. Emphasize the equal spacing of the numbers. Ask students to list fractions that they could equally space on this number line and explain their reasoning. Sample answer: A set of fractions I could equally space would be 0, $\frac{2}{8}$, $\frac{4}{8}$, $\frac{6}{8}$, $\frac{8}{8}$ (or 1), $\frac{10}{8}$, $\frac{12}{8}$, $\frac{14}{8}$, and $\frac{16}{8}$ (or 2). Each fraction is $\frac{2}{8}$ more than the one before it.

PARTNER

Emphasize that one way to think about the fractions on a fraction strip is to focus on the distance each fraction is from 0. Display a thirds strip and demonstrate how to label it. Point out that the endpoints are $\frac{0}{3}$ and $\frac{6}{3}$, which are equivalent to 0 and 2, respectively.

			Thirds			
	4	2	J		÷	,
0	<u>_</u>	<u> </u>	<u>-</u>	4	<u> </u>	0
3	3	3	3	3	3	3

As you label points on the strip, ask questions like the following:

- How should we label the middle tick mark? How do you know? **GMP5.2** We should label it $\frac{3}{3}$, or 1, because $\frac{3}{3}$ (or 1) is half of the distance from $\frac{0}{3}$ to $\frac{6}{3}$.
- How can you find $\frac{1}{3}$ on this fraction strip? Explain. GMP1.6 Sample answer: First fold the strip in half and then fold the halves into thirds.
- If you want to divide the entire strip into thirds, how many sections of equal length will there be on the number line and why? Sample answer: First you fold the strip in half. Then each half is folded twice to get thirds. When you open it, there are 6 sections of equal length.

Have students look at *Math Masters*, page TA6. Ask: *How many wholes are in the first strip*? 2 wholes, or 2 ones

Have students cut out the seven strips along the dashed lines only (each strip has a solid number line in the middle) and then fold and label the strips according to the fraction names. Any equivalent fractions should be written next to (rather than below) each other so that they are still visible when the strips are cut. Some strips have tick marks to guide folding, but sometimes more folds are needed. For example, the sixths strip has thirds marked between $\frac{0}{6}$ and $\frac{6}{6}$ because thirds are difficult to fold. Students must still fold the thirds again (in half) to figure out where sixths belong on the number line. Remind students to partition the strips into sections of equal length with their folds.

Academic Language Development

Have students use their completed 4-Square Graphic Organizers from the previous lesson to support their explanations of whether certain numbers are rational. Provide sentence frames such as these as they discuss: "______ is a rational number because ______ is not a rational number because ______" Encourage students to show evidence from their 4-Square Graphic Organizer to justify their thinking.

Common Misconception

Differentiate The 0–2 fraction strips each represent two whole units. Watch for students who fold as though the strip represents one whole or who number the second whole starting with a unit fraction again. Encourage students to fold the full strip in half first. Explain that half of the strip represents one whole unit. Then students can fold the halved strip. When they open the strip, they should label the sections consecutively.

Go Online Differentiation

Math Journal 1, p. 39

Once students are finished marking and labeling their fraction strips, have them line up their strips and ask them to describe any patterns they notice. Explain that the patterns they describe should help them order fractions. GMP7.2 Highlight the following patterns:

INDEPENDENT

- Larger denominators result in smaller sections on the number line. The effect is similar to a perfectly symmetrical rainbow when you put them in order.
- The numerators increase by 1 as you move away from 0, but the denominators do not change.
- The labels for fractions equivalent to 1 are at the halfway point.
- Because the full length of the strip is equivalent to 2 whole units, the numerator at the right end of every strip is twice the corresponding denominator.
- Each strip is built from a set of equal sections.

Plotting Rational Numbers

on a Number Line

Explain that each of these sections represents a **unit fraction**. A unit fraction is a fraction with a numerator of 1—for example, $\frac{1}{3}$. The thirds strip is composed of thirds. There are a total of six sections, each with a length of $\frac{1}{3}$ of the distance between 0 and 1. Count by thirds as you draw six arcs on the display thirds strip, beginning at $\frac{0}{3}$ and ending at $\frac{6}{3}$.

Have students use their fraction strips to name and order fractions. **GMP5.2** Ask:

• Which fraction is equivalent to $\frac{2}{3}$? $\frac{4}{6}$

• Name a fraction between $\frac{1}{8}$ and $\frac{1}{2}$. Sample answers: $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{6}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{2}{8}$

• Name a fraction between $\frac{1}{4}$ and $\frac{1}{2}$? Sample answers: $\frac{1}{3}, \frac{2}{6}, \frac{3}{8}, \frac{2}{5}$

Then have students use their strips to complete journal page 39.

Math Journal 1, p. 3

Observe as students complete Problem 4a. Expect most students to find fractions between $\frac{1}{6}$ and $\frac{1}{2}$ using the structure of their fraction strips. **GMP7.2** If students have difficulty finding fractions between $\frac{1}{6}$ and $\frac{1}{2}$, consider using the Readiness activity and having them use fraction strips with a length of 1 for the problem.

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

When most students have completed the page, have volunteers share the fractions they found between $\frac{1}{6}$ and $\frac{1}{2}$ (fractions labeled and not labeled on their strips). List their fractions. Ask students whether, as a class, they have used their fraction strips and reasoning to find all possible fractions between $\frac{1}{6}$ and $\frac{1}{2}$. GMP5.2 Sample answer: No, because you can always fold a fraction strip into smaller sections to find another fraction in between.

Summarize Have students consider what fractions would be between $\frac{1}{6}$ and $\frac{1}{2}$ on a hundredths strip. Ask a volunteer to explain how they could find these. Sample answer: You could first find equivalent fractions for $\frac{1}{4}$ and $\frac{1}{2}$: $\frac{25}{100}$ and $\frac{50}{100}$. (Because $\frac{1}{4}$ is between $\frac{1}{6}$ and $\frac{1}{2}$, the fractions will still be between $\frac{1}{6}$ and $\frac{1}{2}$.) Then you find fractions between $\frac{25}{100}$ and $\frac{50}{100}$, such as $\frac{33}{100}$ or $\frac{42}{100}$.

3 Practice 20-25 min

Playing Landmark Shark

 Student Reference Book, pp. 335–336; Math Masters, pp. G9–G10

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Have students play Landmark Shark to practice finding data landmarks.

Observe

- Do students rely on one data landmark?
- Do students have strategies for finding all data landmarks?

Discuss

- How did you choose a data landmark to maximize your bonus points? **GMP6.1**
- Which data landmark did you use most often and why? GMP1.2

Math Journal 1, p. 40

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Mixed Practice Math Boxes 1-11 are paired with Math Boxes 1-9 and 1-13.

Home Link 1-11

Math Masters, p. 42

Homework Students plot rational numbers on number lines and then find rational numbers between two fractions.

Unit 1 Progress Check

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

Day 1: Unit Assessment

Quick Entry Evaluation Record results and track progress toward mastery.

Assessment Handbook, pp. 6–9

Assessment Handbook, p. 10

) Warm Up	5–10 min	Materials
Self Assessment Students complete t	he Self Assessment.	Assessment Handbook , p. 5
Assess	35–50 min	

Unit 1 Assessment

These items reflect mastery expectations to this point.

Unit 1 Challenge (Optional)

Students may demonstrate progress beyond expectations.

Standards	Goals for Mathematical Content (GMC) and Mathematical Process and Practice (GMP)	Lessons	Self Assessment	Unit 2 Assessment	Unit 2 Challenge
6.NS.6,	Find and plot rational numbers on a horizontal or vertical number line.	1-11 to 1-13	7	4	
6.NS.6c	Find and plot ordered pairs of rational numbers on a coordinate plane.	1-14	8	5a, 5b	1, 2
6.NS.7, 6.NS.7a	Describe the relative position of rational numbers on a number line.	1-11, 1-12	7	6–9, 10a, 10b	
6.SP.1	Recognize and formulate statistical questions that anticipate variability in data.	1-1, 1-2, 1-7	1	3a, 3b	
6.SP.2	Recognize that the set of answers to a statistical question has a describable distribution.	1-2 to 1-4, 1-6, 1-8	1	12a, 12b	
6.SP.4	Display numerical data in plots on a number line.	1-2, 1-6 to 1-8	4	1a, 13a	
6.SP.5, 6.SP.5a	Summarize numerical data sets in relation to the number of data points.	1-6, 1-7, 1-9		13b	
6.SP.5, 6.SP.5b	Describe the nature of the attribute under investigation.	1-5 to 1-8	5	11	
6.SP.5, 6.SP.5c	Find measures of central tendency for a data set, such as mean and median.	1-2 to 1-5, 1-8, 1-9	2	1b, 2a, 12c	
	Describe overall patterns in data sets as well as deviations from patterns.	1-8	6	2b, 13c, 13d	
6. SP.5 , 6.SP.5d	Relate choices for measures of center and variability to context.	1-5	3	2b	
	Goals for Mathematical Process and Practice (GMP)				
SMP3	Make mathematical conjectures and arguments. GMP3.1	1-2 to 1-5		11	
	Make sense of others' mathematical thinking. [GMP3.2]	1-9		10b	
SMP4	Use mathematical models to solve problems and answer questions. GMP4.2	1-2, 1-7, 1-8		12a, 12b	1, 2
SMP6	Explain your mathematical thinking clearly and precisely. GMP6.1	1-4, 1-8		2b, 3b	3
	Use clear labels, units, and mathematical language. GMP6.3	1-6, 1-14		10b, 13a	

Self Assessment

Assessment Handbook, p. 5

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Students complete the Self Assessment to reflect on their progress in Unit 1.

Some students may benefit from recalling the types of problems cited in each row of the Self Assessment. Show students where these pointers appear on their Self Assessments. In Unit 2, students begin using these pointers themselves.

		DH1		203.	
Ur	it 1 Self Asses	smei	nt		
Thinl Asse	about each skill listed be ss your own progress by c	low. checking t	the most appropri	ate box.	
	Skills		l can do this on my own and explain how to do this.	l can do this on my own.	I can do thi if I get help or look at an example
1	Recognize, explain, and write a statistical question.	MJ1 2 5-6 26			
2	Find the mean, median, mode, and range of a data set.	MJ1 13,16 25,29			
3	Choose the appropriate landmark to summarize a data set based on the context.	MJ1 16-17			
4	Read or make a dot plot and a bar graph.	MJ1 5-6 28			
5	Interpret a persuasive graph.	MJ1 19-22			
6	Use graphs to ask and answer questions. Describe overall patterns	MJ1 29-31			
0	Order rational numbers on a number line and find rational numbers between numbers.	MJ1 35 47			
8	Plot ordered pairs of rational numbers on a coordinate grid.	MJ1 49-50			

Assessment Handbook, p. 5

Assessment Handbook, p. 6

Assessment Handbook, pp. 6–9

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Students complete the Unit 1 Assessment to demonstrate their progress on the standards covered in this unit.

Go Online for generic rubrics in the *Assessment Handbook* that can be used to evaluate student progress on the Mathematical Process and Practice Standards.

Written assessments are one way students can demonstrate what they know. The table on the next page shows adjustments you can make to the Unit 1 Assessment to maximize opportunities for individual students or for your entire class.

Un	it 1 Assessment (continued)		
4	Plot and label the following	points on the n	umber line.	
	A: -1 B: 2 ¹ / ₂ C: -4	$\frac{3}{4}$ D: $1\frac{1}{2}$	E: opposite of	$3\frac{1}{2}$ F: opposite of -
	C E	А	D	B F
1	<mark>• • • +</mark> _5	+ +	· · · · ·	• + + + + + 5
5	 Plot and label the points coordinate grid. 	on the	+++	y 4 + + + + +
	A: (3, 1) B	$\left(-\frac{1}{2}, 2\frac{1}{2}\right)$		8 .
	C: (-1, -1) D	: (-3 ¹ / ₂ , -2)		
	 Plot a point in the quadr already plotted. 	ant that is not	-4 -3 -	2 -10 1 2 3 4
	Label it E. Answers	vary.		C _2
	Write the coordinates for	r your point.		-3
	,			
For e	ach statement, circle TRUE o	or FALSE. If you	u wish, draw a nu	mber line to help you.
6	-3 is greater than -2.			TRUE FALS
0	Every counting number is a	rational numbe	r.	TRUE FALS
8	There is a rational number b	etween $\frac{1}{2}$ and	<u>3</u> .	TRUE FALS
(9)	A positive number is alwaus	greater than a	negative number	TRUE FALS
0		• • • • • • •		
				Assessment Masters

Assessment Handbook, p.7

Di	fferentia	te Adjusting the Assessment
	ltem(s)	Adjustments
	1	To scaffold Item 1, have students record individual data points on stick- on notes or small pieces of paper. Then have them organize those to help find the landmarks.
	2	To extend Item 2, have students apply what they know about finding the mean and median by asking them to add data points that would make the median the same as the mean.
	3	To scaffold Item 3, ask students to try answering the questions before determining whether they are statistical.
	4, 10	To scaffold Items 4 and 10, have students use their folding number lines from Lesson 1-13 to find the opposite numbers for points <i>E</i> and <i>F</i> (Problem 4) and to order fractions (Problem 10).
	5	To scaffold Item 5, remind students of the elevator analogy: walk horizontally to the elevator first before going up or down in it.
	6–9	To scaffold Items 6–9, have students sketch a number line to determine whether the statements are true or false.
	11	To extend Item 11, have students write an argument to support the claim that River City needs more schools based on the graph shown.
	12, 13	To extend Items 12 and 13, ask students to list the advantages and disadvantages of displaying data in a histogram.

Advice for Differentiation

Because this is the beginning of the school year, all of the content included on the Unit 1 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 8–9 or the online Spiral Tracker for details on Unit 1 focus topics and the spiral.

Go Online for additional information in the Implementation Guide about assessment in Everyday Mathematics, including grading and differentiation.

		Assossment Han	dhaak n 8
		ASSESSITIETIL HATIG	лоок, р. о
NAME	<u>(//)</u> Е	DATE TIME	Lesson 1-15
Uni	it	1 Assessment (continued)	
10 a	a. b.	$\begin{array}{c} \mbox{Order these fractions from least to greatest: $ \frac{7}{8} \cdot \frac{5}{10} \\ \hline \frac{1}{4} & \frac{5}{10} & \frac{8}{12} & \frac{7}{8} & \frac{5}{4} \\ \hline \end{array} \\ \hline \mbox{Finbar says that there are no numbers between $\frac{1}{3}$ \\ \mbox{Why might he think there and what would you tell he Sample answer: He might think th $ are no whole numbers between 3 \\ \hline \mbox{use equivalent fractions. $\frac{7}{24}$ is between $\frac{1}{3}$ \\ \hline \mbox{Use of the sample answer in the sample answer in $\frac{7}{24}$ is between $\frac{1}{3}$ \\ \hline \mbox{Use of the sample answer in $\frac{7}{24}$ is between $\frac{1}{3}$ \\ \hline \end{tabular}$	$ \begin{array}{c} \frac{5}{4}, \frac{1}{4}, \frac{8}{12} \\ \\ \frac{1}{3}, \\ \frac{1}{$
(i) 1 E E t t t The it is The it is The it is t t t t t t t t t t t t t	The abo Bas that Wha you <u>p</u> <u>s</u> <u>c</u> .	e River City News Digest printed this graph bout the population growth from 2005 to 2012. The population doubled. The population doubled. The population doubled. The population doubled. The population doubled. The population increased a lot. Secale on the y-axis shows that not even close to doubling. y-axis does not start at 0. Set the histogram. Sample answers given. Write one statistical question you can answer based on the information in the graph. About how old were Best Actress winners when they won? List one statistical question that you cannot answer from the graph. Do actresses typically win the awa	Population of River City
8	As	Assessment Handbook	
		Assessment Han	dbook p. 9

Unit 1 Challenge (Optional)

Assessment Handbook, p. 10

WHOLE CLASS SMALL GROUP PARTNER

INDEPENDENT

Students can complete the Unit 1 Challenge after they complete the Unit 1 Assessment. The Unit 1 Challenge offers students an opportunity to demonstrate a deeper understanding of the content and process/practice standards addressed so far this year. Do not expect all students to succeed at the Challenge problems. However, student responses to these problems may help you choose appropriate interventions, including Enrichment activities.

TOTAL	DAIE	TIME	Lesson :	1-15	
Jnit 1 Challenge					
Delevia e estas ef lliddes Terre			Deere and Ke	- d	
Plauers take turns quessing whe	re their nartne	r's hidden treasu	re is bu quessi	iura. na	
in ordered pair. The partner repo	orts how many	steps away the	guess is from		
he hidden treasure (counting on	ly vertically an	d horizontally).	-		
Use Renee's and Kendra's guess	ses to locate th	neir partners' hid	den treasures.		
Renee's Guesses		Kendra's G	uesses		
(looking for Kendra's treasu	ire)	(looking for	Renee's treasu	ure)	
(-5, -2) is 10 steps away.		(-1, 4) is 6	steps away.		
(-1, 4) is 12 steps away.		(5, 4) is 12	steps away.		
(2, −5) is 4 steps away.		(-1, -2) is	5 steps away.		
y			y		
++++	+++	+++		+++	
	+++	+++	4	+++	
	+++	+++	3	+++	
2			2		
	- X		-1		
-5 -4 -3 -2 -10 1 2	3 4 5	-5 -4 -3	-2 -10 1 2	3 4 5	
-2	+++	+++	-2	+++	1
	+*+	+++	-3	+++	-
		+++	-4	+++	and and
		+++		+++	
,			,		
 Plot the points on each Hid 	den Treasure g	rid.			
A					
2) Use the guesses to locate	the hidden trea	isure. Put an X c	n each grid wh	ere the	
hidden treasure is located.	write an order	ed pair for the id	cation of each	treasure.	
Location of Kendra's treasu	_{ire:} <u>(4, -3</u>)	Location of	Renee's treasu	_{ire:} (<u>-4, 1</u>)	
 Explain how you used the c 	uesses to loca	ate the treasures			
Sample answer: I 1	Sample answer: I found all the points that were the right				
distance from the	distance from the closest point. Then I tested them to				
see which of those	points w	as where sl	ne hid the	treasure.	

Assessment Handbook, p. 10

Overview Day 2: Administer the Open Response Assessment.

Day 2: Open Response Assessment

Assess	50–55 min	Materials
Solving the O Students use	pen Response Problem data landmarks to compare two data sets.	Assessment Handbook , p. 11
Discussing th The class disc	e Problem usses students' explanations.	Assessment Handbook , p. 11
Standards	Goals for Mathematical Content (GMC)	Lessons
6.SP.5, 6.SP.5c	Find measures of central tendency for a data set, such as mean and median.	1-2 to 1-5, 1-8
6.SP.5, 6.SP.5d	Relate choices for measures of center and variability to context.	1-5

Evaluating Students' Responses

SMP3

Evaluate students' abilities to use mean and median to support their answer and make an argument for the class that performed better. Use the rubric below to evaluate their work based on **GMP3.1**.

Make mathematical conjectures and arguments. **GMP3.1**

Goal for	Not Meeting	Partially Meeting	Meeting	Exceeding
Mathematical	Expectations	Expectations	Expectations	Expectations
Process and Practice GMP3.1 Make mathematical conjectures and arguments.	Does not build a valid argument based on the data.	Uses the total number of jumps to build an argument. May calculate other data landmarks.	Uses correctly calculated data landmarks to build an argument. Uses the mean or median to support the argument. Might also use the total in the argument.	Uses correctly calculated data landmarks to build an argument. Compares the mean and median and possibly other data landmarks for both class data sets to support the argument.

1-2 to 1-5

Math Boxes 1-15: Preview for Unit 2 Math Journal 1, p. 52 Students preview skills and concepts for Unit 2. Math Masters, pp. 50–53 Home Link 1-15 Math Masters, pp. 50–53 Students take home the Family Letter that introduces Unit 2. Math Masters, pp. 50–53

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

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Assessment Handbook, p. 11

Unit 1 Open Response Assessment Comparing Gym Classes

Ms. Green's and Mr. Short's sixth-grade gym classes decided to hold a jumping-jack contest. Students did as many jumping jacks as they could in one minute. The results of the contest are shown below.

Ms. Green's Gym Class		Mr. Sho	ort's Gym Class	
dent #	Number of Jumping Jacks	Student #	Number of Jumping Jacks	
	87	1	72	
	101	2	114	
	62	3	90	
	102	4	120	
	85	5	60	
	114	6	90	
	89	7	70	
	89	8	112	
	149	9	97	
	67	10	104	
	100	11	54	
	73	12	102	
-	90	13	149	
	82	14	67	
	79	15	100	
1	81	16	49	

Ms. Green claims that her class did better. Mr. Short claims that his class did better. With whom do you agree and why? Use data landmarks from both classes to support your reasoning. Show your work. Use another sheet of paper, if needed.

Answers vary. See sample students' work on page 109 of the *Teacher's Lesson Guide*

Assessment Masters 11

Lesson 1-15 🗸

Math Journal 1, p. 52

2b Assess 50-55 min

Solving the Open Response Problem

Assessment Handbook, p. 11

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Before distributing *Assessment Handbook*, page 11, have students review the definitions of different data landmarks. For this task, they will need to calculate and compare data landmarks for two data sets. As they review the definitions, emphasize that students should think about how they can use landmarks to solve the problem. Students should complete the problem independently.

For this task, students need to calculate data landmarks successfully. They will then compare the landmarks for each data set and build an argument. GMP3.1 Encourage students to reason beyond just finding the means for comparison.

Differentiate Adjusting the Assessment

If students need to review finding data landmarks, enlarge and copy the data for each class on different-colored paper. Use index cards to make a label for each landmark. Have students make a dot plot for each data set. After students make the dot plot, have them place the landmark labels in the correct places on the dot plot. You may also have students explain how and why their responses would or would not change if another student who did 90 jumping jacks in one minute were added to each class.

Discussing the Problem

Assessment Handbook, p. 11

WHOLE CLASS SMALL GROUP

PARTNER INDEPENDENT

After students have a chance to complete their work independently, invite them to discuss their explanations with a partner before having a few students share their explanations with the class.

Evaluating Student's Responses

6.SP.5, 6.SP.5c, 6.SP.5d

Collect students' work. For the content standards, expect most students to calculate data landmarks to solve the problem. You can use the rubric shown on page 107 to help evaluate students' work for **GMP3.1**.

See the sample in the margin. This work meets expectations for the content standards because the paper shows correct calculations for all of the measures of center for both classrooms and discusses the use of these measures for analyzing the situation. The work meets expectations for the mathematical process and practice standard because the paper makes an argument that the two classrooms performed at the same level and shows data landmarks selected to supported the argument. **GMP3.1**

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

3 Looking Ahead 10-15 min

Math Boxes 1-15: Preview for Unit 2

Math Journal 1, p. 52

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Mixed Practice Math Boxes 1-15 are paired with Math Boxes 1-10. These problems focus on skills and understandings that are prerequisite for Unit 2. You may want to use information from these Math Boxes to plan instruction and grouping in Unit 2.

Home Link 1-15: Unit 2 Family Letter

Math Masters, pp. 50-53

Home Connection The Unit 2 Family Letter provides information and activities related to Unit 2 content.

Sample student's work, "Meeting Expectations" 110 62,67,73,79,81,82,85, 87,89,89,90,100,101,102,114,49 49,54,60,67,79,78,90,90, 97,100,102,104,112,114,120,49 Ms, Green claims that her class was the best. Mr. Short claims that his class did better. With whom do you agree and why? Use data landmarks from both classes to support your MB. Green Calling tilter the base was used at a landmarks from both classes to support your reasoning. Show your work. Ms. Greens got 14501. I noticed Mode 29. Mod Question answer: Nobody did better because the classes had the same number. Go Online for additional samples of evaluated students' work in the Assessment Handbook Math Masters, pp. 50-53 Home Link 1-15 **Unit 2:** Family Letter **Fraction Operations and Ratios** Numbers, in all their forms, are important in our everyday lives. Unit 2 focuses on the uses of fractions and ratios. The unit begins with a review of factors and multiples. Students learn to 1 the greatest common factors and least common multiples for pairs of numbers, and they use these concepts to solve real-world and mathematical problems. o find these concepts to solve real-world and mathematical problems. Students revisit and apply fraction multiplication. Many of the fractions your child will work with fundes thirds, fourths, suchts eighths rentists twelfths and apply that the student solution. Many of the fractions your child will work with fundes thirds, fourths, suchts eighths rules they four that when one factor is a fraction less than 1, the product is less than one or both factors. Students also review fraction division in the context of real-world and mathematical problems. They four that we fract the original the strength of the product is less than one or both factors. Students review fraction division in the context of real-world and mathematical problems. They are encouraged to use pictures and to estimate in order to make sense of the problems. They use a common denominator algorithm to divide fractions. The emphasis of the fraction-division for example, students splane ach day? Finally, students work with $2\frac{1}{2}$ galons of mik last if a family consumes $\frac{1}{2}$ galons can davie fraction division problem sugh as this. For how many days will $2\frac{1}{2}$ galons of mik last if a family consumes $\frac{1}{2}$ galon each day? Finally, students work with the division of the divisional algorithm in multiplying the dividend of the division problem sugh as the Str advison algorithm further with the division algorithm is divident of the division algorithm is division algorithm in many days will a $\frac{1}{2}$ galons to fraction division. the under the theorem of the end of the composition of the response of the under the theorem of the end of the composition of the exploring ratios. Ratics used without not compare quantities with different units, constitute part of this exploration. In this unit, your child uses ratio representations and ratio notation in many forms to make a variety of comparisons. For example, 45 eggs out of a dozen are brown and the rest are white, then the ratio of brown eggs to white eggs is 5_{-7}^{-7} (or 5 to 0, 7), and the ratio of brown eggs to be the total number of eggs is 5_{-7}^{-7} (for 5 out of 12, erg). Sudents make and use ratio/rate tables to solve real-world and mathematical problems, including measurement-conversion problems. Please keep this Family Letter for reference as your child works through Unit 2. Vocabulary Important terms in Unit 2: dividend The number in divided. For example, in 35 + 5 = 7, the dividend is 35. Sinc In division, the number that divides another number. For example, in 35 + 5 = 7, the divisor is 5. divisor is 5. 50

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