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GREAT MINDS™

EUREKA MATH²®

Getting Started Guide

Level 6 Module 2

Getting *Started*

This Getting Started Guide provides contextual information as you review *Eureka Math²®*. Follow along as we explore the contents of the *Teach, Learn,* and *Apply* books. The guide also highlights some **key components of the digital experience** that are seamlessly integrated into *Eureka Math²*.

Exponentially *More*

Eureka Math® revolutionized math teaching in the United States. The curriculum has helped students understand the *why* behind the math, not just the *how.* It has become the most widely used K–5 math curriculum in the country—so why would we change it? Because we listened to feedback from our dedicated team of *Eureka Math* teachers throughout the country and studied the findings of current educational research. Armed with this knowledge, we decided to expand the accessibility and efficacy of our materials so that even more students can achieve greatness in math.

Eureka Math² is exponentially more efficient. Exponentially more engaging. Exponentially more accessible. And this adds up to exponentially more knowledge and joy for students and teachers alike.

Teachability² + Engagement² + Accessibility² = Joy²

Thinking and Talking *About Math*

The teacher–writers who crafted *Eureka Math²* realize the value of student discourse. Starting in kindergarten, *Eureka Math²* students engage with the teacher and with one another to make their thinking visible. Students work in pairs and in groups as they engage in a variety of instructional routines and participate in whole class discussions to explore mathematical ideas. The Talking Tool, detailed on the inside cover of every *Learn* book, provides sentence frames and sentence starters to help guide student discourse.

Similar to the Talking Tool, the Thinking Tool, on the inside back cover of the *Learn* book, is a scaffold to support students in developing and applying metacognitive skills. It provides a set of questions students can ask themselves before, during, and after engaging in a task.

Thinking and talking about math helps students develop a deeper understanding of the topics they learn. These activities are key factors in creating an equitable classroom culture—and in helping students find the joy in mathematics.

How Students *Build Knowledge*

Eureka Math² is organized into three coherent stories that build from year to year: *A Story of Units*® for Grade Levels K–5, *A Story of Ratios*® for Grade Levels 6–8, and *A Story of Functions*® for Grade Levels 9–12.

Each grade level is organized into six modules. Within each module, related lessons are organized into topics.

A close look at the module map reveals that the major work of the grade level is delivered earlier in the school year. This allows students to have ample opportunities to establish strong foundational knowledge. *Eureka Math²* reinforces this knowledge later in the year by connecting supporting content to major grade-level work and providing students with real-world context.

Implement with Fidelity and *Confidence*

The same team of teacher–writers who crafted *Eureka Math²* also developed an Implementation Guide to help educators bring the curriculum into their classrooms. The guide provides a detailed map of the resources built into the curriculum and offers advice on preparing to teach each module. **Access the full Grade Level 6–Algebra I/Mathematics I Implementation Guide**.

Below we'll highlight some of the information covered in the Implementation Guide to help you explore *Eureka Math²* Level 6 Module 2.

An Intentional and Meaningful Integration *of Digital Learning*

The *Eureka Math²* writers strategically integrated digital components within Grade Levels 6–Algebra I/Mathematics I lessons so that technology enhances instruction and facilitates powerful mathematical conversations. The curriculum's digital platform includes teacher facilitation slides that display lesson visuals such as mathematical representations, images, videos, or digital interactives. Context videos that show an application of the module's math in real-life scenarios are integrated into the curriculum.

In addition to the wordless context videos and animations, Level 6 incorporates dynamic digital lessons with the *Learn* content about once per topic. These lessons allow students to explore further on their own devices by building mathematical models, documenting their thinking, and sharing within the mathematical community. Digital lessons are meant to be semi-synchronous, meaning students can experiment and reflect on their own and with peers before discussing as a class. As students are documenting their thinking on the presentation slides, teachers can preview student responses on their own devices. Teachers can then display chosen student screens to help facilitate class discussion.

Eureka Math² Equip™, a companion product to *Eureka Math²*, is a digital diagnostic tool that offers a Pre-Module Assessment for every student. It identifies learning gaps and provides teachers with content tailored to address those gaps so that all students can access grade-level content.

Access the Great Minds Digital Platform to review *Eureka Math²* assessments, digital interactives, context videos, and more.

Bringing Fine Art *into Math*

Among all math curricula, *Eureka Math²* is unique in its integration of fine art. The cover of each module features an impressive work of fine art that is visually or conceptually connected to the math. Level 6 features the painting *Paris Street; Rainy Day* by Gustave Caillebotte, and a note on the inside cover helps students understand how the artwork is connected to the math they will learn.

A Map to the *Learning*

Every *Teach* book begins with an Overview. In Level 6 Module 2, the Overview begins on page 2. The Overview notes any previous knowledge students use and build upon in the module, summarizes the student learning taking place in each topic in the module, and shows where in the curriculum students will next access the module's learning to build new layers of understanding and more complex knowledge.

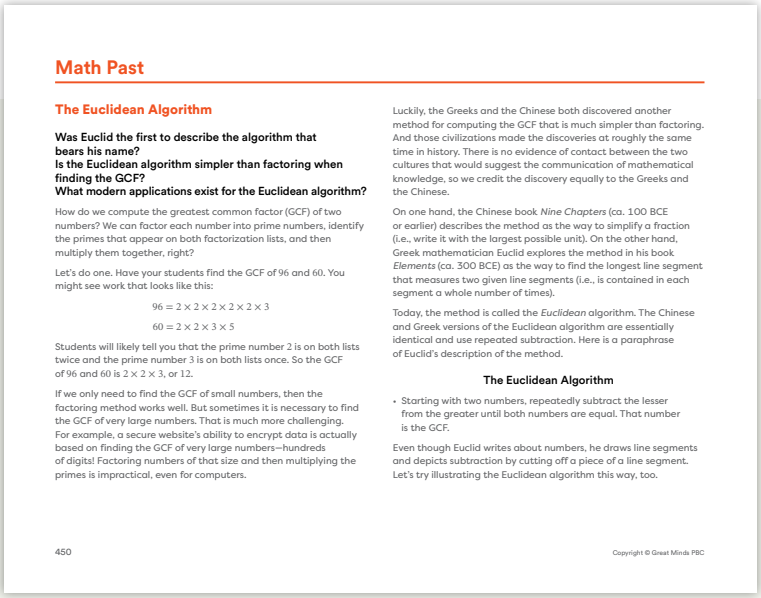
Following the Overview is the Why section. The Why section gives insight into the decisions made during the writing of the module, helping you understand the underlying structure of the module, the flow of the content, and the coherence of the different parts of the curriculum.

What Does Understanding *Look Like?*

Beginning on page 10, the *Teach* book highlights the Achievement Descriptors addressed in the module. Achievement Descriptors are clear, concise, standards-aligned descriptions that detail what students should know and be able to do based on the instruction. The first page of each lesson identifies the Achievement Descriptors aligned with that lesson. Proficiency Indicators for each Achievement Descriptor support teachers with interpreting student work in the module. The Proficiency Indicators begin on page 440 in the Level 6 Module 2 *Teach* book.

History *of the Math*

Math Past is another way that *Eureka Math²* helps students build knowledge—by telling the history of some of the big ideas that shape the mathematics in the module. Math Past frames mathematics as a human endeavor by telling the story of the discipline through artifacts, discoveries, and other contributions from cultures around the world. Math Past provides material that can inform your teaching and offers lesson-specific ideas about how to engage students in the history of mathematics. The Math Past summary for Level 6 Module 2 begins on page 450 of the *Teach* book.



Math Past

The Euclidean Algorithm

Was Euclid the first to describe the algorithm that bears his name?
Is the Euclidean algorithm simpler than factoring when finding the GCF?
What modern applications exist for the Euclidean algorithm?

How do we compute the greatest common factor (GCF) of two numbers? We can factor each number into prime numbers, identify the primes that appear on both factorization lists, and then multiply them together, right?

Let's do one. Have your students find the GCF of 96 and 60. You might see work that looks like this:

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$60 = 2 \times 2 \times 3 \times 5$$

Students will likely tell you that the prime number 2 is on both lists twice and the prime number 3 is on both lists once. So the GCF of 96 and 60 is $2 \times 2 \times 3$, or 12.

If we only need to find the GCF of small numbers, then the factoring method works well. But sometimes it is necessary to find the GCF of very large numbers. That is much more challenging. For example, a secure website's ability to encrypt data is actually based on finding the GCF of very large numbers—hundreds of digits! Factoring numbers of that size and then multiplying the primes is impractical, even for computers.

Luckily, the Greeks and the Chinese both discovered another method for computing the GCF that is much simpler than factoring. And those civilizations made the discoveries at roughly the same time in history. There is no evidence of contact between the two cultures that would suggest the communication of mathematical knowledge, so we credit the discovery equally to the Greeks and the Chinese.

On one hand, the Chinese book *Nine Chapters* (ca. 100 BCE or earlier) describes the method as the way to simplify a fraction (i.e., write it with the largest possible unit). On the other hand, Greek mathematician Euclid explores the method in his book *Elements* (ca. 300 BCE) as the way to find the longest line segment that measures two given line segments (i.e., is contained in each segment a whole number of times).

Today, the method is called the *Euclidean* algorithm. The Chinese and Greek versions of the Euclidean algorithm are essentially identical and use repeated subtraction. Here is a paraphrase of Euclid's description of the method.

The Euclidean Algorithm

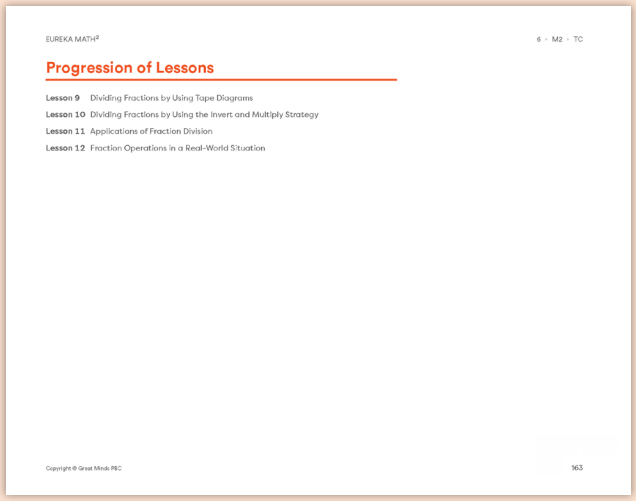
- Starting with two numbers, repeatedly subtract the lesser from the greater until both numbers are equal. That number is the GCF.

Even though Euclid writes about numbers, he draws line segments and depicts subtraction by cutting off a piece of a line segment. Let's try illustrating the Euclidean algorithm this way, too.

Dive into a *Topic*

It's time to dive into a topic to better understand the *Eureka Math²* learning design. On page 162 in Level 6 Module 2, we begin with Topic C: Dividing Fractions Fluently. Every Topic begins with an overview that summarizes the development expected as students engage with the upcoming content. The Topic C overview highlights that in this topic, students develop and use the invert and multiply strategy to divide fractions. Throughout this topic, students build fluency with fraction division, and they divide fractions to solve real-world problems. The teacher can also see how this learning will continue in the topic. There is also a brief Progression of Lessons list on page 163.

Students begin each new topic in the *Learn* book with a Topic Opener, an illustration created in collaboration with Ben Orlin, the author and illustrator of *Math with Bad Drawings*. The Topic Opener is designed to build anticipation for the upcoming math by piquing curiosity in a humorous context. In Module 2 Topic C, the Topic Opener starts on page 111 of the *Learn* book.



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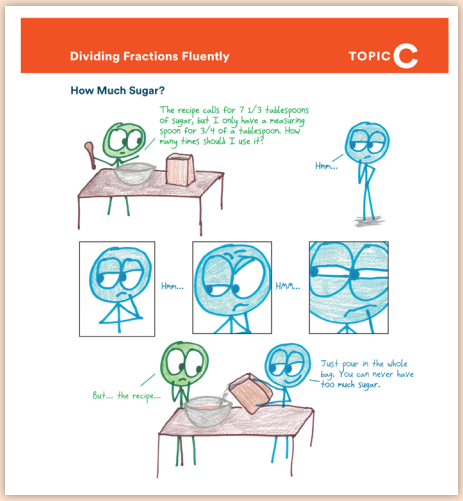
Progression of Lessons

Lesson 9 Dividing Fractions by Using Tape Diagrams
Lesson 10 Dividing Fractions by Using the Invert-and-Multiply Strategy
Lesson 11 Applications of Fraction Division
Lesson 12 Fraction Operations in a Real-World Situation



Lesson Structure *and Support*

Every lesson in Grade Levels 6–Algebra I/Mathematics I is organized into four sections, providing the teacher with a clear lesson plan for the day's learning.

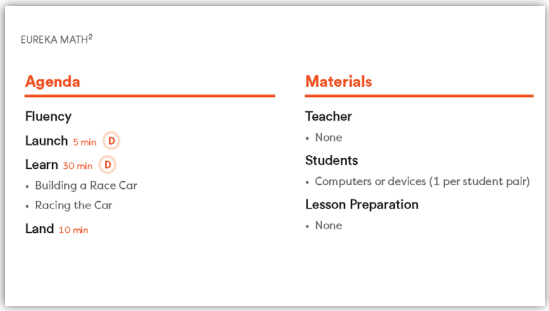
- **Fluency** opens each lesson and provides distributed practice with previously learned material. This practice prepares students for new learning by activating prior knowledge and bridging small learning gaps.
- **Launch** creates an accessible entry point to the day's learning with activities that build context and create productive struggle, which helps build new knowledge.
- **Learn** presents new math concepts related to the lesson objective, usually through a series of instructional segments.
- **Land** provides time for teachers to facilitate a brief closing discussion and for students to complete the Exit Ticket.

Throughout the lesson, margin notes provide information about facilitation, differentiation, and coherence. The curriculum has six types of margin notes: Teacher Notes, Universal Design for Learning, Language Support, Differentiation, Promoting the Standards for Mathematical Practice, and Math Past.

Dive into a *Lesson*

The lesson overview on page 224 helps teachers prepare to teach Lesson 12.

- The **Lesson at a Glance** is a snapshot of the lesson framed through what students should know, understand, and do while engaging with the lesson.
- The **Key Question** helps focus instruction and classroom discourse.
- The **Achievement Descriptors** appear again, this time mapping what students should know and be able to do based on the instruction of the specific lesson to the standards covered.
- An image of the **Exit Ticket** from the end of the lesson shows what this formative assessment includes.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Agenda

Fluency

Launch 5 min (D)

Learn 30 min (D)

- Building a Race Car
- Racing the Car

Land 10 min

Materials

Teacher

- None

Students

- Computers or devices (1 per student pair)

Lesson Preparation

- None

Page 225 lays out the learning agenda as well as the materials list and lesson preparation notes. These are all shared up front to help teachers feel organized and ready for the lesson from the start.

During the Lesson 12 Fluency exercise on page 226, students add, subtract, and multiply mixed numbers to prepare for solving multi-step real-world problems involving fractions.

In Launch, students watch a context video about wood box car racing and the requirements of the cars. Each video in our *Eureka Math²* digital experience has been crafted with special care to ensure representation of students from different backgrounds and with different abilities. These videos do not include spoken words because we want to make them accessible to multilingual learners and striving readers and keep the focus on the math story instead of the dialogue.

In Learn, students choose the shape, wheels, color, and even decals of their own simulated car in an interactive digital lesson. Students determine how each choice affects the accumulated weight of the car by writing and evaluating an expression with fractions. The Learn portion of the lesson ends with students watching a virtual race of the cars made by the class. After the races, students discuss characteristics of the fastest cars.

Students make a series of choices to build a wood box race car and predict which elements will have the greatest effect on speed. Before students begin this work, teachers should note the teacher margin note provided on page 227 that describes the lesson's alignment to Universal Design for Learning (UDL) principles.

UDL: Engagement

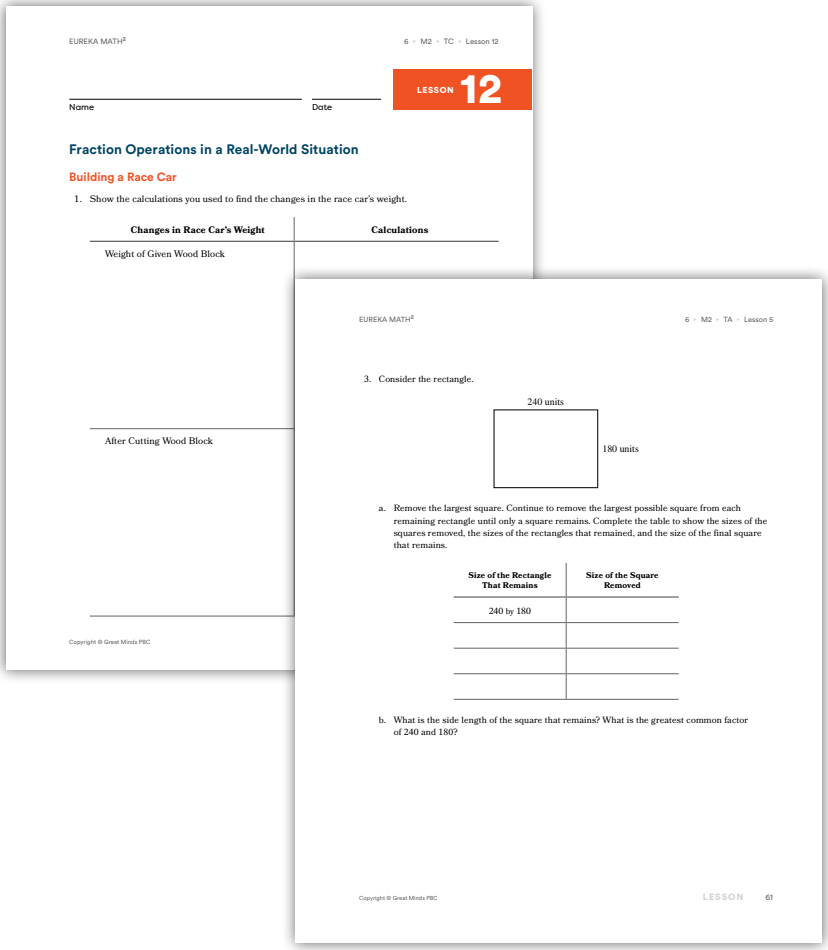
Digital activities align to the UDL principle of Engagement by including the following elements:

- *Engaging and interesting topics.* Students create their own wood box race car and race their car in a virtual class race.
- *Options that promote flexibility and choice.* Students choose different car options to build their car.
- *Immediate formative feedback.* After each choice, students calculate the total weight of the car, trying to keep the final weight under but as close as possible to 6 ounces.

The Student Experience: *Learn*

On page 151 of the *Learn* book, students begin the Launch portion of the lesson. Notice the Lesson 12 heading in the top corner of the page that indicates the beginning of a lesson.

Let's look at readability. You will notice that the student materials are intentionally designed to be readable while maintaining the rigor that you've come to expect from Great Minds curricula. We have reduced wordiness—eliminating unnecessary wording entirely—and we have been intentional in our language choices and sentence length.



EUREKA MATH² 6 › M2 › TC › Lesson 12

Name Date

LESSON 12

Fraction Operations in a Real-World Situation

Building a Race Car

1. Show the calculations you used to find the changes in the race car's weight.

Changes in Race Car's Weight	Calculations
Weight of Given Wood Block	
After Cutting Wood Block	

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EUREKA MATH² 6 › M2 › TA › Lesson 5

3. Consider the rectangle.

240 units

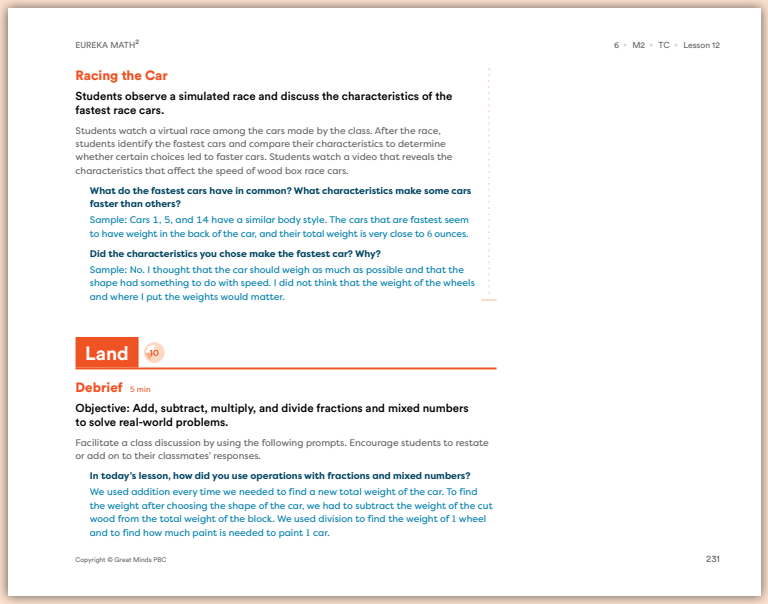
180 units

a. Remove the largest square. Continue to remove the largest possible square from each remaining rectangle until only a square remains. Complete the table to show the sizes of the squares removed, the sizes of the rectangles that remained, and the size of the final square that remains.

Size of the Rectangle That Remains	Size of the Square Removed
240 by 180	

b. What is the side length of the square that remains? What is the greatest common factor of 240 and 180?

Copyright © Great Minds PBC LESSON 61



EUREKA MATH² 6 › M2 › TC › Lesson 12

Racing the Car

Students observe a simulated race and discuss the characteristics of the fastest race cars.

Students watch a virtual race among the cars made by the class. After the race, students identify the fastest cars and compare their characteristics to determine whether certain choices led to faster cars. Students watch a video that reveals the characteristics that affect the speed of wood box race cars.

What do the fastest cars have in common? What characteristics make some cars faster than others?

Sample: Cars 1, 5, and 14 have a similar body style. The cars that are fastest seem to have weight in the back of the car, and their total weight is very close to 6 ounces.

Did the characteristics you chose make the fastest car? Why?

Sample: No. I thought that the car should weigh as much as possible and that the shape had something to do with speed. I did not think that the weight of the wheels and where I put the weights would matter.

Land 10

Debrief 5 min

Objective: Add, subtract, multiply, and divide fractions and mixed numbers to solve real-world problems.

Facilitate a class discussion by using the following prompts. Encourage students to restate or add on to their classmates' responses.

In today's lesson, how did you use operations with fractions and mixed numbers?

We used addition every time we needed to find a new total weight of the car. To find the weight after choosing the shape of the car, we had to subtract the weight of the cut wood from the total weight of the block. We used division to find the weight of 1 wheel and to find how much paint is needed to paint 1 car.

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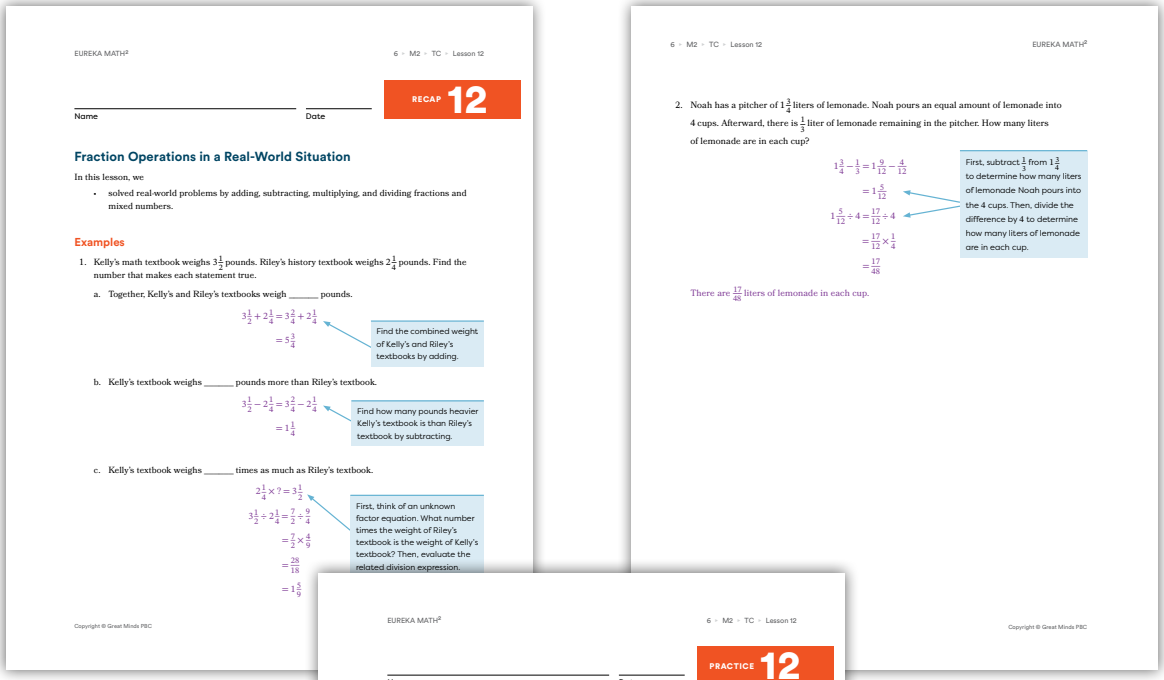
After students complete the integrated digital and print lesson, the class comes back together for the Land portion of the lesson. For Lesson 12, this section begins on page 231 of the *Teach* book. In this portion of the lesson, the teacher facilitates a discussion by using suggested questions related to the lesson's objectives and guides students to synthesize the day's learning. Following the discussion, students complete the Exit Ticket on page 155 of their *Learn* book. This gives teachers a sense of what students understand so they can help make instructional decisions for the next lesson.

Continued Practice *at Home*

Included at the end of each lesson in the *Learn* book is a lesson Recap and more Practice problems with the concepts learned in class.

- **Recaps** summarize the main learning in the lesson. Definitions of any terms introduced in the lesson are included. Each Recap also shows problems like those completed in class and examples of the thinking that helps students solve the problems. Recaps are useful for anyone supporting the student's learning outside of the classroom.
- **Practice** problems provide an additional set of problems organized from simple to complex. These problems interleave and distribute practice, providing students with opportunities to discern and recall which knowledge, concepts, and strategies are appropriate for solving different problems. Practice problems can be completed in the classroom or assigned outside of the classroom.



EUREKA MATH²

6 › M2 › TC › Lesson 12

Name _____ Date _____

RECAP 12

Fraction Operations in a Real-World Situation

In this lesson, we

- solved real-world problems by adding, subtracting, multiplying, and dividing fractions and mixed numbers.

Examples

1. Kelly's math textbook weighs $3\frac{1}{2}$ pounds. Riley's history textbook weighs $2\frac{1}{4}$ pounds. Find the number that makes each statement true.

   a. Together, Kelly's and Riley's textbooks weigh _____ pounds.

   $3\frac{1}{2} + 2\frac{1}{4} = 3\frac{2}{4} + 2\frac{1}{4}$
   $= 5\frac{3}{4}$

   Find the combined weight of Kelly's and Riley's textbooks by adding.

   b. Kelly's textbook weighs _____ pounds more than Riley's textbook.

   $3\frac{1}{2} - 2\frac{1}{4} = 3\frac{2}{4} - 2\frac{1}{4}$
   $= 1\frac{1}{4}$

   Find how many pounds heavier Kelly's textbook is than Riley's textbook by subtracting.

   c. Kelly's textbook weighs _____ times as much as Riley's textbook.

   $2\frac{1}{4} \times ? = 3\frac{1}{2}$
   $3\frac{1}{2} \div 2\frac{1}{4} = \frac{7}{2} \div \frac{9}{4}$
   $= \frac{7}{2} \times \frac{4}{9}$
   $= \frac{28}{18}$
   $= 1\frac{5}{9}$

   First, think of an unknown factor equation. What number times the weight of Riley's textbook is the weight of Kelly's textbook? Then, evaluate the related division expression.

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6 › M2 › TC › Lesson 12 EUREKA MATH²

2. Noah has a pitcher of $1\frac{3}{4}$ liters of lemonade. Noah pours an equal amount of lemonade into 4 cups. Afterward, there is $\frac{1}{3}$ liter of lemonade remaining in the pitcher. How many liters of lemonade are in each cup?

   $1\frac{3}{4} - \frac{1}{3} = 1\frac{9}{12} - \frac{4}{12}$
   $= 1\frac{5}{12}$
   $1\frac{5}{12} \div 4 = \frac{17}{12} \div 4$
   $= \frac{17}{12} \times \frac{1}{4}$
   $= \frac{17}{48}$

   First, subtract $\frac{1}{3}$ from $1\frac{3}{4}$ to determine how many liters of lemonade Noah pours into the 4 cups. Then, divide the difference by 4 to determine how many liters of lemonade are in each cup.

   There are $\frac{17}{48}$ liters of lemonade in each cup.

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EUREKA MATH²

6 › M2 › TC › Lesson 12

Name _____ Date _____

PRACTICE 12

1. Two middle school classes work together to paint a mural in their school. Match each situation with the expression that could be used to answer the question.

Mr. Perez's class paints $\frac{1}{5}$ of the entire mural, which is $\frac{2}{3}$ of the section they must paint. What portion of the entire mural is their section?	$\frac{2}{3} + \frac{1}{5}$
Mrs. Chan's class must paint $\frac{1}{5}$ of the mural. The class paints $\frac{2}{3}$ of their section. What portion of the entire mural does Mrs. Chan's class paint?	$\frac{2}{3} - \frac{1}{5}$
Mrs. Chan's class uses $\frac{2}{3}$ of a gallon of white paint. Mr. Perez's class uses $\frac{1}{5}$ of the gallon of white paint. How much more paint does Mrs. Chan's class use than Mr. Perez's class?	$\frac{1}{5} \times \frac{2}{3}$
Mrs. Chan's class uses $\frac{2}{3}$ of a gallon of white paint. Mr. Perez's class uses $\frac{1}{5}$ of the gallon of white paint. What portion of the gallon of white paint do the classes use altogether?	$\frac{1}{5} \div \frac{2}{3}$

2. Leo's backpack weighs $12\frac{3}{4}$ pounds. Sana's backpack weighs $8\frac{1}{2}$ pounds. Complete each statement.

   a. Together, Leo's and Sana's backpacks weigh _____ pounds.

   b. Leo's backpack weighs _____ pounds more than Sana's backpack.

   c. Leo's backpack weighs _____ times as much as Sana's backpack.

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Assessment with *Eureka Math²*

The assessment system for Grade Levels 6–Algebra I/Mathematics I helps teachers understand student learning by generating data from many perspectives. The system includes three components.

- **Exit Tickets** are formative assessment opportunities that use at least one problem or question to assess whether a student has learned the basic skills and concepts needed for success in upcoming lessons. Items reflect the minimum that students must demonstrate to meet the lesson objective.

  Students complete Exit Tickets independently on paper, with directions or problems read aloud as necessary, and they are not graded. Most students with a basic understanding of the math can finish within 3–5 minutes. Generally, teachers should strictly observe this time frame because a student's inability to finish within 5 minutes can be valuable proficiency information.

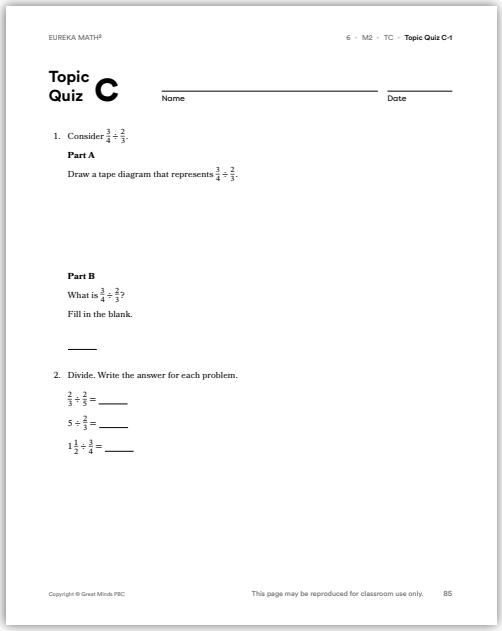
- **Topic Quizzes** are short sets of items that assess proficiency with the major concepts and skills from the topic. These include Depth of Knowledge (DOK) 1 and 2 items. Topic Quizzes are intended for digital administration, with a paper-based option.

  There are three analogous versions of each Topic Quiz available digitally. Analogous versions target the same material at the same level of cognitive complexity. Use the analogous versions as additional practice or retakes after targeted reteaching.

- **Module Assessments** consist of 6–10 items that assess proficiency in the major concepts, skills, and applications taught in the module. Module Assessments represent the most important content, but they may not assess all the strategies and standards taught in the module.

In addition to the assessments above, *Eureka Math² Equip* diagnostic assessments are available for print and digital administration.

Click to review the *Eureka Math²* assessments on the Great Minds Digital Platform.



EUREKA MATH² 6 • M2 • TC • Topic Quiz C-1

Topic Quiz C

Name _____ Date _____

1. Consider $\frac{3}{4} \div \frac{2}{3}$.

Part A

Draw a tape diagram that represents $\frac{3}{4} \div \frac{2}{3}$.

Part B

What is $\frac{3}{4} \div \frac{2}{3}$?

Fill in the blank.

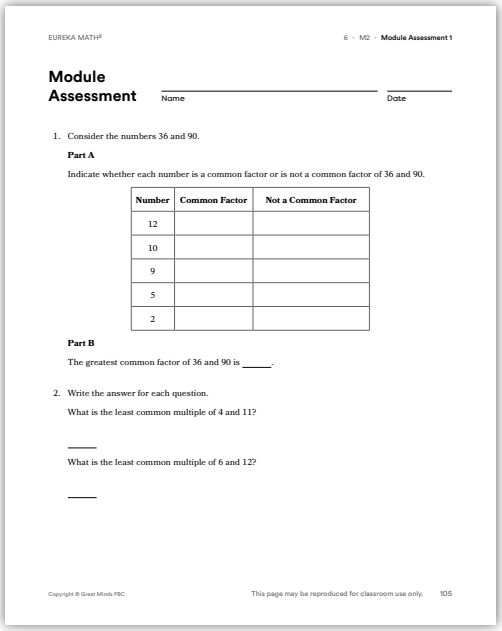
_____

2. Divide. Write the answer for each problem.

$\frac{2}{3} \div \frac{2}{3} =$ _____

$5 \div \frac{2}{3} =$ _____

$1\frac{1}{2} \div \frac{3}{4} =$ _____



EUREKA MATH² 6 • M2 • Module Assessment 1

Module Assessment

Name _____ Date _____

1. Consider the numbers 36 and 90.

Part A

Indicate whether each number is a common factor or is not a common factor of 36 and 90.

Number	Common Factor	Not a Common Factor
12		
10		
9		
5		
2		

Part B

The greatest common factor of 36 and 90 is _____.

2. Write the answer for each question.

What is the least common multiple of 4 and 11?

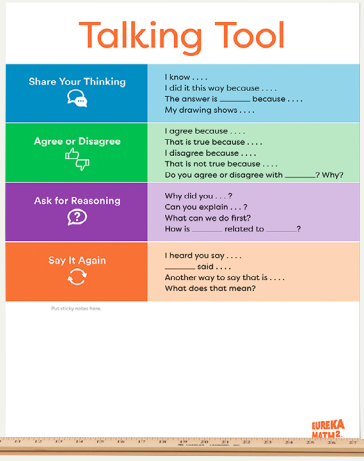
_____

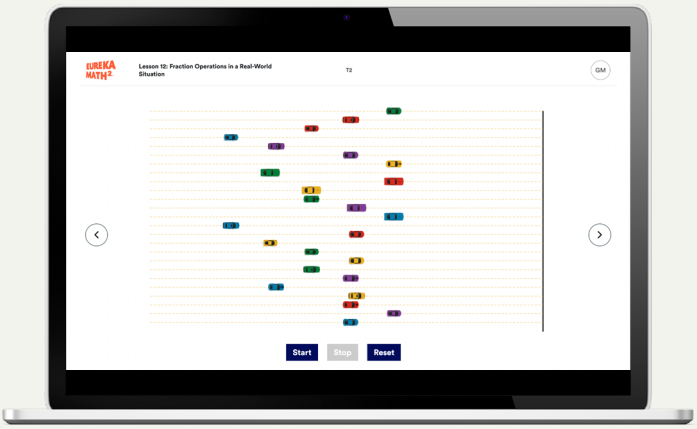
What is the least common multiple of 6 and 12?

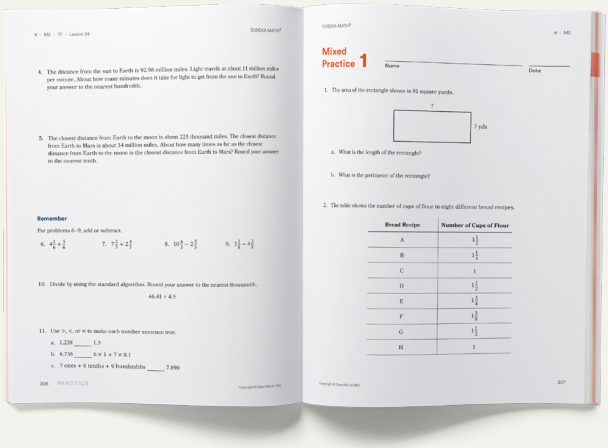
_____

Raising the Bar to the *Second Power*

In the world of math curricula, *Eureka Math²* stands alone. Our curriculum invites student discourse, provides accessibility, and advances equity. Its combination of digital and print resources helps *all* students build a strong foundation of mathematical knowledge that they will build upon, module after module and year after year.







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