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GREAT MINDS™

EUREKA MATH²®

Getting Started Guide

Level 7 Module 1

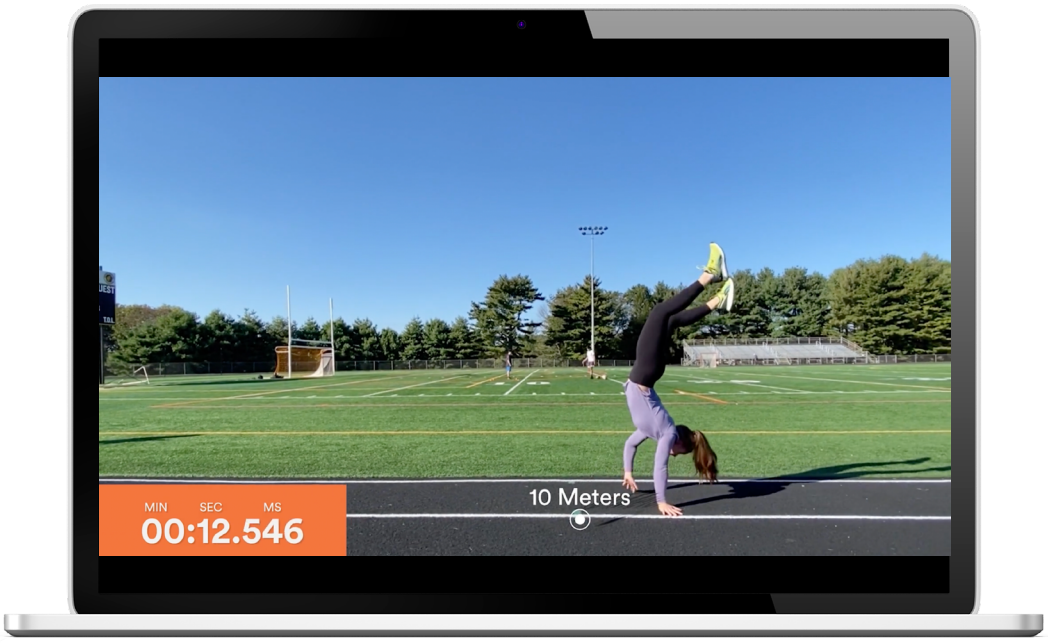
Getting *Started*

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 7 Module 1.

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 7 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 7 features the photograph of the ancient Egyptian game known as the *Game of Hounds and Jackals, ca. 1814–1805 BCE,* 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 7 Module 1, the Overview begins on page 2. The Overview pages note any previous knowledge students use and build upon in the module, summarize the student learning taking place in each topic in the module, and show where in the curriculum students will next access the module's learning to build new layers of understanding and more complex knowledge.

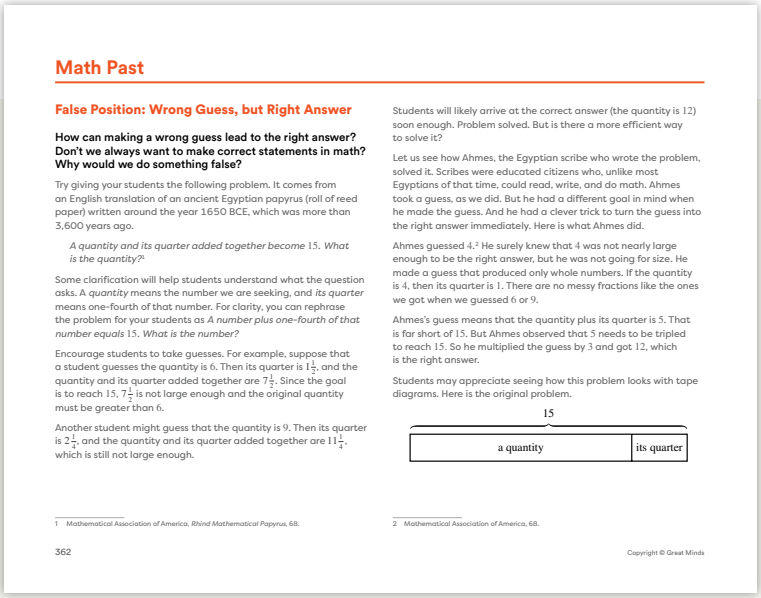
Following the Overview is the Why section. The Why section gives insight into the decisions made during the writing of the module, helping you understand the underlying structure of the module, the flow of the content, and the coherence of the different parts of the curriculum.

What Does Understanding *Look Like?*

Beginning on page 8, 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 in interpreting student work in the module. The Proficiency Indicators begin on page 362 in the Level 7 Module 1 *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 engaging students in the history of mathematics. The Math Past summary for Level 7 Module 1 begins on page 362 of the *Teach* book.



Math Past

False Position: Wrong Guess, but Right Answer

How can making a wrong guess lead to the right answer? Don't we always want to make correct statements in math? Why would we do something false?

Try giving your students the following problem. It comes from an English translation of an ancient Egyptian papyrus (roll of reed paper) written around the year 1650 BCE, which was more than 3,600 years ago.

> *A quantity and its quarter added together become 15. What is the quantity?*[1]

Some clarification will help students understand what the question asks. A *quantity* means the number we are seeking, and *its quarter* means one-fourth of that number. For clarity, you can rephrase the problem for your students as *A number plus one-fourth of that number equals 15. What is the number?*

Encourage students to take guesses. For example, suppose that a student guesses the quantity is 6. Then its quarter is $1\frac{1}{2}$, and the quantity and its quarter added together are $7\frac{1}{2}$. Since the goal is to reach 15, $7\frac{1}{2}$ is not large enough and the original quantity must be greater than 6.

Another student might guess that the quantity is 9. Then its quarter is $2\frac{1}{4}$, and the quantity and its quarter added together are $11\frac{1}{4}$, which is still not large enough.

Students will likely arrive at the correct answer (the quantity is 12) soon enough. Problem solved. But is there a more efficient way to solve it?

Let us see how Ahmes, the Egyptian scribe who wrote the problem, solved it. Scribes were educated citizens who, unlike most Egyptians of that time, could read, write, and do math. Ahmes took a guess, as we did. But he had a different goal in mind when he made the guess. And he had a clever trick to turn the guess into the right answer immediately. Here is what Ahmes did.

Ahmes guessed 4.[2] He surely knew that 4 was not nearly large enough to be the right answer, but he was not going for size. He made a guess that produced only whole numbers. If the quantity is 4, then its quarter is 1. There are no messy fractions like the ones we got when we guessed 6 or 9.

Ahmes's guess means that the quantity plus its quarter is 5. That is far short of 15. But Ahmes observed that 5 needs to be tripled to reach 15. So he multiplied the guess by 3 and got 12, which is the right answer.

Students may appreciate seeing how this problem looks with tape diagrams. Here is the original problem.

1 Mathematical Association of America, *Rhind Mathematical Papyrus*, 68.

2 Mathematical Association of America, 68.

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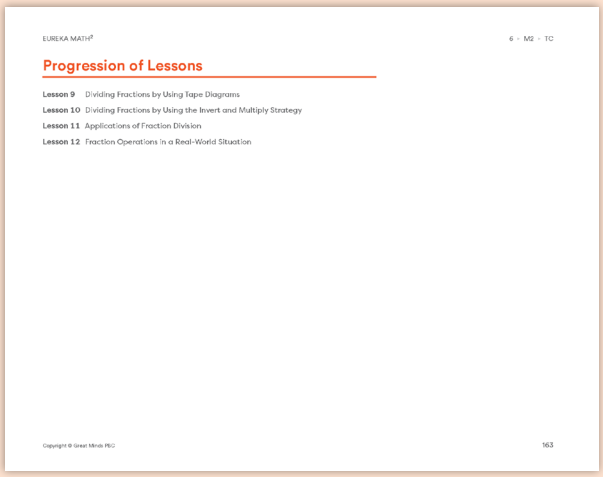
Dive into a *Topic*

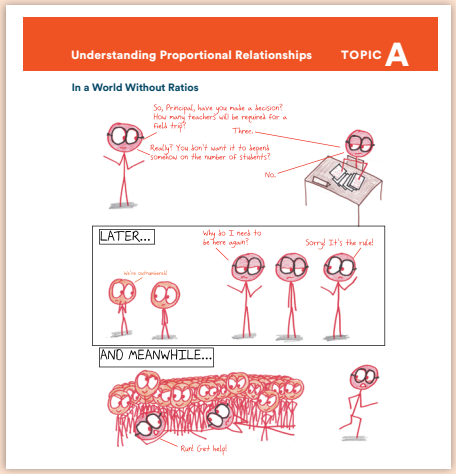
It's time to dive into a topic to better understand the *Eureka Math²* learning design. On page 2 in Level 7 Module 1, we begin with Topic A: Understanding Proportional Relationships. Every topic begins with an overview that summarizes the development expected as students engage with the upcoming content. In the Topic A overview, the teacher can see that students apply ratio reasoning to recognize that sets of equivalent ratios represent proportional relationships. Students then identify proportional relationships in tables, graphs, equations, and written descriptions. The teacher can also see how this learning will continue throughout the topic with the sequence of related lessons. There is also a brief Progression of Lessons list on page 11.

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 math by piquing curiosity in a humorous context. In Level 7 Module 1 Topic C, this feature starts on page 5 of the *Learn* book.


EUREKA MATH²

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.

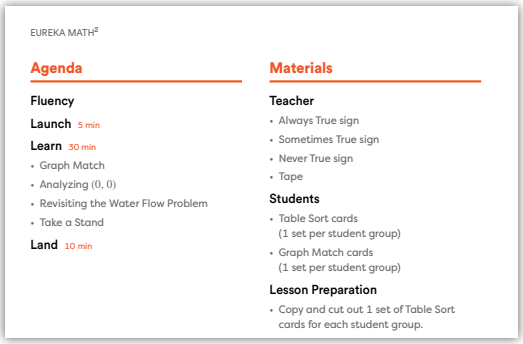
- **Fluency** opens each lesson and provides distributed practice with previously learned material. This practice prepares students for new learning by activating prior knowledge and bridging small learning gaps.
- **Launch** creates an accessible entry point to the day's learning with activities that 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 58 helps teachers prepare to teach Level 7 Module 1 Lesson 4.

- 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

Learn 30 min

- Graph Match
- Analyzing (0, 0)
- Revisiting the Water Flow Problem
- Take a Stand

Land 10 min

Materials

Teacher

- Always True sign
- Sometimes True sign
- Never True sign
- Tape

Students

- Table Sort cards (1 set per student group)
- Graph Match cards (1 set per student group)

Lesson Preparation

- Copy and cut out 1 set of Table Sort cards for each student group.

Page 59 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 4 Fluency exercise on page 60, students graph points to prepare for identifying proportional relationships represented as graphs.

In Launch, students are introduced to the lesson by using table sort cards, a hands-on manipulative located in the *Teach* book on page 77. Manipulatives provide students with kinesthetic learning opportunities to help them visualize the mathematical concept under study. During this activity, students work together to sort the tables into two categories: proportional and not proportional. As groups finish sorting, they record anything they notice about the tables in each category. Students then share what they noticed about the tables in each category.

In Learn, students examine graphs of proportional relationships and generalize about their characteristics. Again, teachers will distribute one set of Graph Match cards to each group found on page 78 of the *Teach* book. Students will then match each graph card to one of the tables they sorted into proportional and not proportional categories. Each graph has exactly one matching table. The Learn portion of the lesson ends with students participating in the Take a Stand routine. Here, students summarize their learning from the activity by considering what they know to be true about the graphs of proportional relationships and participate in a discussion about the topic.

To facilitate the discussion, the teacher will draw students' attention to the signs hanging in the classroom: Always True, Sometimes True, and Never True, and will then present the statement, "Graphed lines represent proportional relationships." Students are asked to stand beside the sign that best describes their thinking. When all students are standing near a sign, they will discuss why they chose that sign. Each group will then share reasons for their selection. Before students begin this work, teachers should note the teacher margin note provided on page 70, which provides guidance on how to facilitate the activity and outlines examples of some suggested outcomes.

Teacher Note

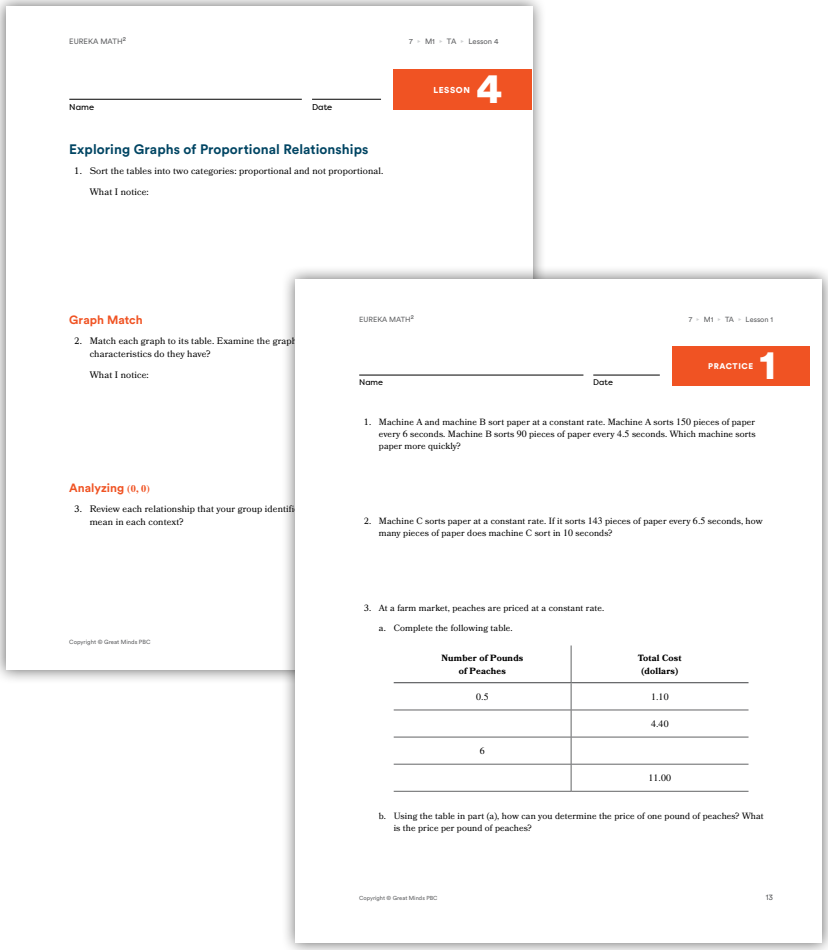
Although the discussion should land on recognizing that graphed lines sometimes represent proportional relationships, make sure to acknowledge the correct thinking of other rationales.

For example, some students may justify standing by Always True because proportional relationships are always represented by lines. This rationale signifies that the student is misinterpreting the statement but is demonstrating a correct understanding of the characteristics of the graph of a proportional relationship.

The Student Experience: *Learn*

On page 45 of the *Learn* book, students begin the Launch portion of the lesson. Notice the Lesson 4 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 you've come to expect from Great Minds curricula. We have reduced wordiness—eliminating unnecessary wording—and we have been intentional in our language choices and sentence length.



EUREKA MATH² 7 • M1 • TA • Lesson 4

Name Date

LESSON 4

Exploring Graphs of Proportional Relationships

1. Sort the tables into two categories: proportional and not proportional.

   What I notice:

Graph Match

2. Match each graph to its table. Examine the graph characteristics do they have?

   What I notice:

Analyzing (0, 0)

3. Review each relationship that your group identifi mean in each context?

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EUREKA MATH² 7 • M1 • TA • Lesson 1

Name Date

PRACTICE 1

1. Machine A and machine B sort paper at a constant rate. Machine A sorts 150 pieces of paper every 6 seconds. Machine B sorts 90 pieces of paper every 4.5 seconds. Which machine sorts paper more quickly?

2. Machine C sorts paper at a constant rate. If it sorts 143 pieces of paper every 6.5 seconds, how many pieces of paper does machine C sort in 10 seconds?

3. At a farm market, peaches are priced at a constant rate.

   a. Complete the following table.

Number of Pounds of Peaches	Total Cost (dollars)
0.5	1.10
	4.40
6	
	11.00

   b. Using the table in part (a), how can you determine the price of one pound of peaches? What is the price per pound of peaches?

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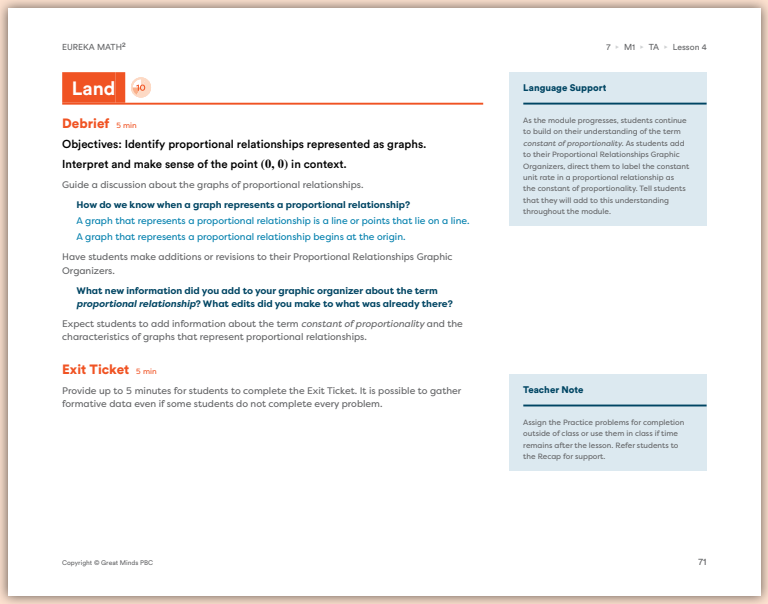

EUREKA MATH² 7 • M1 • TA • Lesson 4

Land 10

Debrief 5 min

Objectives: Identify proportional relationships represented as graphs.

Interpret and make sense of the point (0, 0) in context.

Guide a discussion about the graphs of proportional relationships.

How do we know when a graph represents a proportional relationship?

A graph that represents a proportional relationship is a line or points that lie on a line.

A graph that represents a proportional relationship begins at the origin.

Have students make additions or revisions to their Proportional Relationships Graphic Organizers.

What new information did you add to your graphic organizer about the term *proportional relationship*? What edits did you make to what was already there?

Expect students to add information about the term *constant of proportionality* and the characteristics of graphs that represent proportional relationships.

Exit Ticket 5 min

Provide up to 5 minutes for students to complete the Exit Ticket. It is possible to gather formative data even if some students do not complete every problem.

Language Support

As the module progresses, students continue to build on their understanding of the term *constant of proportionality*. As students add to their Proportional Relationships Graphic Organizers, direct them to label the constant unit rate in a proportional relationship as the constant of proportionality. Tell students that they will add to this understanding throughout the module.

Teacher Note

Assign the Practice problems for completion outside of class or use them in class if time remains after the lesson. Refer students to the Recap for support.

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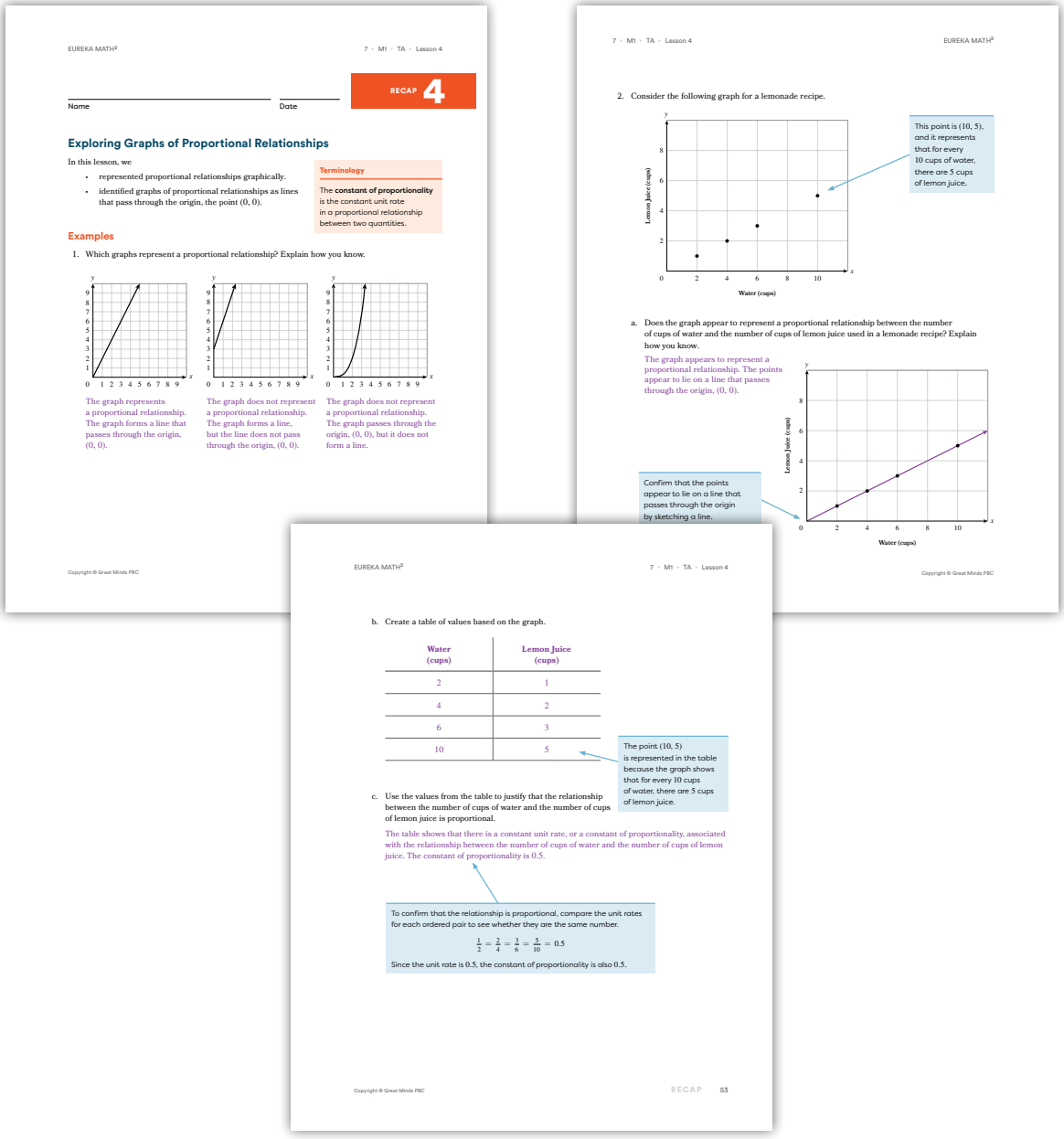
After students complete the launch and learn portions of the lesson, including the hands-on, manipulative table sort and graph sort cards, the class comes back together for the Land portion of the lesson. For Lesson 4, this section begins on page 71 of the *Teach* book. In this section of the lesson, 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 49 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 7 › M1 › TA › Lesson 4

Name Date

RECAP 4

Exploring Graphs of Proportional Relationships

In this lesson, we

- represented proportional relationships graphically.
- identified graphs of proportional relationships as lines that pass through the origin, the point (0, 0).

Terminology

The **constant of proportionality** is the constant unit rate in a proportional relationship between two quantities.

Examples

1. Which graphs represent a proportional relationship? Explain how you know.

The graph represents a proportional relationship. The graph forms a line that passes through the origin, (0, 0).

The graph does not represent a proportional relationship. The graph forms a line, but the line does not pass through the origin, (0, 0).

The graph does not represent a proportional relationship. The graph passes through the origin, (0, 0), but it does not form a line.

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7 › M1 › TA › Lesson 4 EUREKA MATH²

2. Consider the following graph for a lemonade recipe.

This point is (10, 5), and it represents that for every 10 cups of water, there are 5 cups of lemon juice.

Lemon Juice (cups)

Water (cups)

a. Does the graph appear to represent a proportional relationship between the number of cups of water and the number of cups of lemon juice used in a lemonade recipe? Explain how you know.

The graph appears to represent a proportional relationship. The points appear to lie on a line that passes through the origin, (0, 0).

Confirm that the points appear to lie on a line that passes through the origin by sketching a line.

Lemon Juice (cups)

Water (cups)

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EUREKA MATH² 7 › M1 › TA › Lesson 4

b. Create a table of values based on the graph.

Water (cups)	Lemon Juice (cups)
2	1
4	2
6	3
10	5

The point (10, 5) is represented in the table because the graph shows that for every 10 cups of water, there are 5 cups of lemon juice.

c. Use the values from the table to justify that the relationship between the number of cups of water and the number of cups of lemon juice is proportional.

The table shows that there is a constant unit rate, or a constant of proportionality, associated with the relationship between the number of cups of water and the number of cups of lemon juice. The constant of proportionality is 0.5.

To confirm that the relationship is proportional, compare the unit rates for each ordered pair to see whether they are the same number.

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{5}{10} = 0.5$$

Since the unit rate is 0.5, the constant of proportionality is also 0.5.

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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.

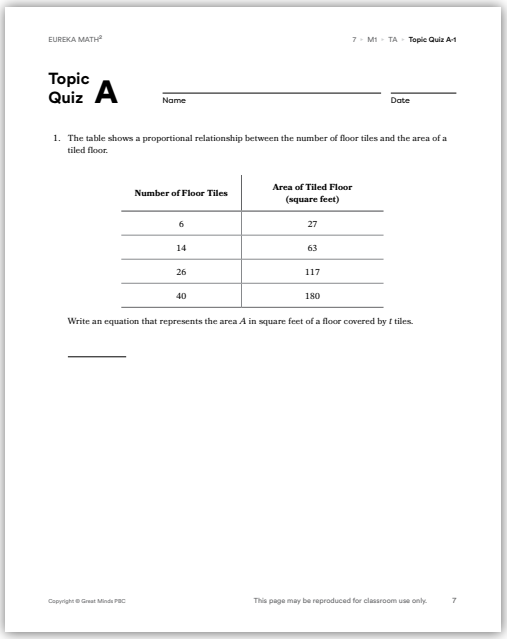
- **Topic Quizzes** are short sets of items that assess proficiency with the major concepts and skills from the topic. These include Depth of Knowledge (DOK) 1 and 2 items. Topic Quizzes are intended for digital administration, with a paper-based option.

  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 7 • M1 • TA • Topic Quiz A-1

Topic Quiz A Name _____ Date _____

1. The table shows a proportional relationship between the number of floor tiles and the area of a tiled floor.

Number of Floor Tiles	Area of Tiled Floor (square feet)
6	27
14	63
26	117
40	180

Write an equation that represents the area A in square feet of a floor covered by t tiles.

_____

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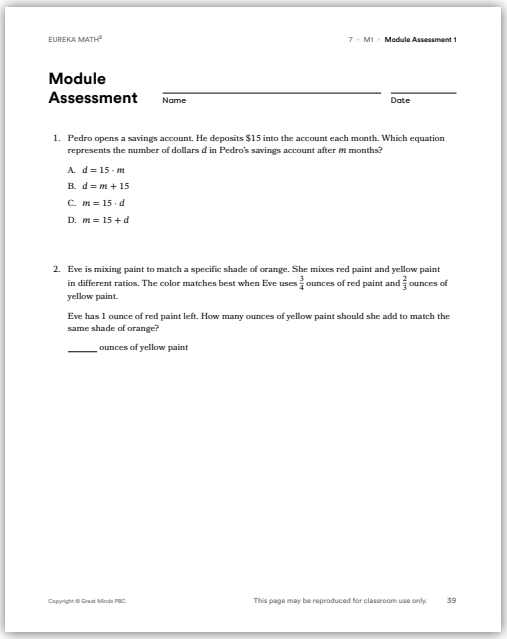

EUREKA MATH² 7 • M1 • Module Assessment 1

Module Assessment Name _____ Date _____

1. Pedro opens a savings account. He deposits $15 into the account each month. Which equation represents the number of dollars d in Pedro's savings account after m months?

   A. $d = 15 \cdot m$
   B. $d = m + 15$
   C. $m = 15 \cdot d$
   D. $m = 15 + d$

2. Eve is mixing paint to match a specific shade of orange. She mixes red paint and yellow paint in different ratios. The color matches best when Eve uses $\frac{3}{4}$ ounces of red paint and $\frac{2}{3}$ ounces of yellow paint.

   Eve has 1 ounce of red paint left. How many ounces of yellow paint should she add to match the same shade of orange?

   _____ ounces of yellow paint

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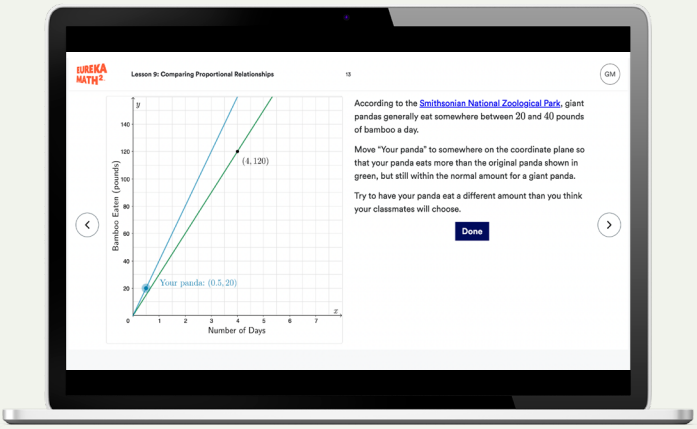
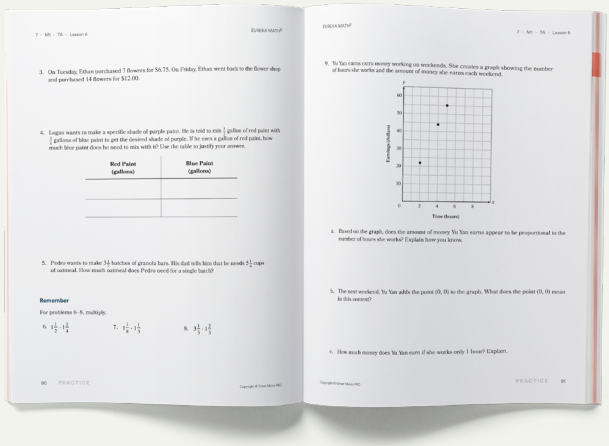
Raising the Bar to the *Second Power*

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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