Texas Education Agency

STRONG FOUNDATIONS Implementation

Bluebonnet Learning Secondary Math: Teacher Lesson Internalization

La Feria ISD
Middle School Math – 1st Six Weeks
Workshop # 372256
Check In Code: Math

Meet your facilitator

Fernando Rosa

- Region One ESC – Mathematics Specialist
- Masters in Education & Leadership
- 37 years in education
- 14 years - Region One ESC
- Bluebonnet Certified Math Presenter
- Eureka Math Certified Presenter
- Carnegie Math Certified Presenter
- RBIS Certified Presenter
- TCMPC Presenter

Norms for Session

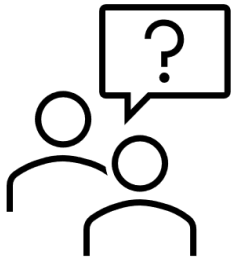
Engagement

This work will support your students. Be an active participant in all learning experiences by sharing your thoughts, asking questions, and keeping your video on as you are able.

Partnership

We are partners and our time is valuable. Please raise your hand and wait until others have finished their thoughts before you begin speaking.

Curiosity



We value your questions and will pause throughout our time together to answer questions in the chat.

Grace

Learning a new product for your subject can be challenging. You won't leave today or even this year as experts. It's okay to walk away without a feeling of closure.

The Planning Process – Backward Design

- Stage 1 – Identify Desired Results
  - ➢ What should the students know and be able to do after this unit?
- Stage 2 – Determine Acceptable Evidence of Learning
  - ➢ How will students demonstrate what they know and can do?
- Stage 3 – Plan Learning Experiences
  - ➢ What learning experiences are needed to equip students with the knowledge and skills?

Teacher Lesson Internalization Protocol

PREWORK

- Reread the Topic Overview and big ideas from internalizing the topic.
- Read the Facilitation Notes.

Purpose of Prework

The Teacher Lesson Internalization Protocol provides a step-by-step process for understanding each lesson prior to teaching, including what students will learn, how students are assessed, and how teachers can support all learners in meeting the rigor of the instructional materials. By using lesson internalization, teachers deepen the understanding developed through the Teacher Module and Topic Internalization Protocol.

STEP 1 Understand the lesson purpose and objectives.

Use the Facilitation Notes and Topic Overview:

Read the Lesson Overview, Texas Essential Knowledge and Skills (TEKS), TEKS Mathematical Process Standards, English Language Proficiency Standards (ELPS), and Essential Ideas. Highlight and/or record your understanding. Determine the knowledge and skills students will gain as a result of this learning experience. Consider both the Learning Together and Learning Individually experiences.

STEP 2 Understand the sequence and pacing of activities.

Use the Facilitation Notes

Read the Facilitation Notes, including the Lesson Structure and Pacing, to understand how the lesson unfolds and identify suggested number of days (pacing) for each lesson as well as the time (pacing) for each activity. Highlight, annotate, and/or record your understanding.

TS

Use a blank copy of the Student Lesson:

- Complete the lesson's Getting Started, Activities, and Talk the Talk to display exemplar responses.
- Determine appropriate locations within the lesson for aligned and appropriately-rigorous, formative assessments, considering the exemplar responses to help determine the placement of Learning Individually days within the Topic Pacing from the Module and Topic Internalization.

STEP 3 Prepare to teach each activity with an activity deep dive.

Use the Lesson

- Examine how each lesson component builds to support the learning of the objective of the topic/lesson.
- Determine the most critical takeaways from each key component and make instructional decisions for lesson delivery aligned to the specific purpose of each component. Use the Stamp the Learning icon to identify appropriate moments in the lesson to model, explain, and communicate the essential ideas to be learned directly and explicitly.
- Create or identify exemplar and example responses to questions and tasks. Use the Problem-Solving Model Graphic Organizer to create an exemplar response and use the Modeling Moment teacher notes to facilitate moments of productive struggle when applicable.
- Examine embedded supports and select the appropriate supports to use in the lesson for diverse learners (emergent bilingual, gifted and talented, and students with disabilities).
- Examine the Skills Practice notes that connect to the lesson. Look at the Skills Practice sections that align to each part of the lesson.

STEP 4 Organize your resources.

Use the Materials portion of the Facilitation Notes

- Locate needed resources, supplies, and/or created materials.
- Identify additional supplies needed for any differentiation strategies or EB Student Tips to offer customizations/supports for groups of students.

TS

Check List for the Internalization Process

1) Read, highlight and annotate the module & topic overviews

2) Review the YAG, pacing guide & annotate any time stamps

3) Review the topic assessemnt, scoring guide & response to student performance documents

4) On the topic assessment, annotate the TEKS, (R or S), pts, skill practice and lesson assignment

5) Use TCMPC to make the STAAR connection & rank the items level of importance (√), (√√) or (√√√).

6) In the skill practice book, select the exercises and problem sets that student will work on during the learning individually days

7) Review the Talk the Talk Activity or select STAAR exit tickets for students to complete after the lesson.

8) Prep for lesson delivery (Slide decks, gather materials, etc…)

GRADE 6: YEAR-AT-A-GLANCE

150-Day Pacing

TEKS Mathematical Process Standards are embedded in every module: 6.1A, 6.1B, 6.1C, 6.1D, 6.1E, 6.1F, 6.1G

1 DAY PACING = 45-MINUTE SESSION

Module	Topic	Pacing*	TEKS*
1 Composing and Decomposing	1: Factors and Multiples	12	**6.2D**, 6.2E, 6.3A, 6.3B, **6.3E**, 6.4F, 6.5C, **6.7A**, **6.7D**, **6.8D**
	2: Shapes and Solids	9	6.8A, 6.8B, 6.8C, **6.8D**
	3: Decimals	5	6.2C, **6.2D**, **6.3E**, **6.8D**
		26	
2 Relating Quantities	1: Ratios and Rates	18	6.4A, **6.4B**, 6.4C, 6.4D, 6.4E, 6.5A, 6.5C, **6.6C**
	2: Percents	8	6.2C, **6.2D**, **6.3E**, 6.4E, 6.4F, **6.4G**, **6.5B**, 6.5C
	3: Unit Rates and Conversions	10	**6.4B**, 6.4D, **6.4H**, 6.5A
		36	
3 Moving Beyond Positive Quantities	1: Signed Numbers and the Four Quadrants	9	6.2A, 6.2B, 6.2C, **6.2D**, **6.11A**
	2: Operating with Integers	13	6.3C, **6.3D**
		22	

6th Gr Math

MODULE 1, TOPIC 1 PACING GUIDE

150-Day Pacing

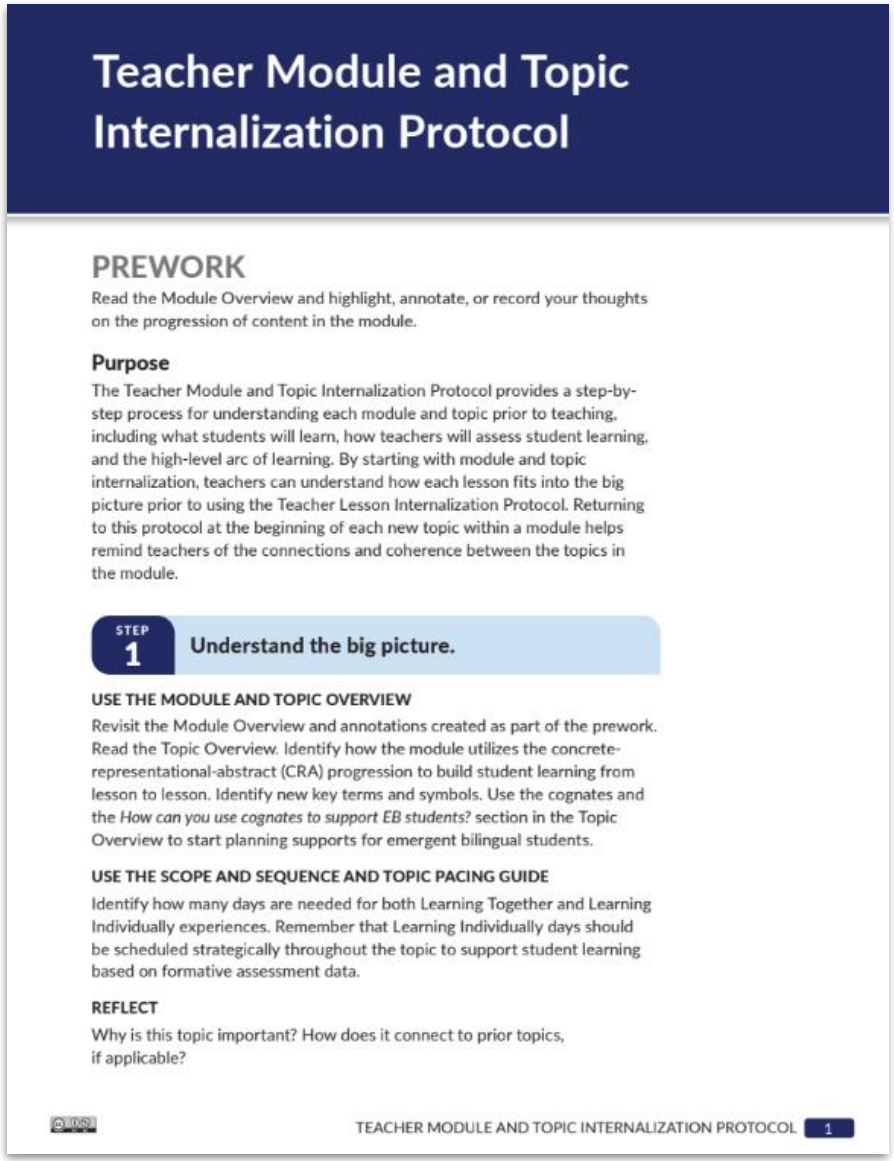
1 DAY PACING = 45-MINUTE SESSION

✪ *This activity highlights a key term or concept that is essential to the learning goals of the lesson.*

Day 1	Day 2	Day 3	Day 4	Day 5
TEKS: **6.7D**, **6.8D**	TEKS: **6.7A**, **6.8D**			TEKS: 6.4F, 6.5C
LESSON 1 Writing Equivalent Expressions Using the Distributive Property GETTING STARTED ✪ ACTIVITY 1 ✪ TALK THE TALK	**LESSON 2** Identifying Common Factors and Common Multiples GETTING STARTED ACTIVITY 1 ✪ ACTIVITY 2 ✪	**LESSON 2** continued ACTIVITY 3 ✪ ACTIVITY 4 ✪ TALK THE TALK	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**LESSON 3** Dividing a Whole into Fractional Parts GETTING STARTED ✪ ACTIVITY 1 ✪ TALK THE TALK ✪
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
TEKS: **6.2D**, 6.4F	TEKS: 6.3B, **6.3E**		TEKS: 6.2E, 6.3A, **6.3E**	
LESSON 4 Benchmark Fractions GETTING STARTED ✪ ACTIVITY 1 ✪ ACTIVITY 2 ✪ TALK THE TALK ✪	**LESSON 5** Multiplying Fractions GETTING STARTED ACTIVITY 1 ✪ ACTIVITY 2 ✪ TALK THE TALK ✪	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**LESSON 6** Fraction by Fraction Division GETTING STARTED ✪ ACTIVITY 1 ✪ ACTIVITY 2 ✪	**LESSON 6** continued ACTIVITY 3 ✪ ACTIVITY 4 TALK THE TALK
Day 11	**Day 12**			
LEARNING INDIVIDUALLY Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**END OF TOPIC ASSESSMENT**			

*Bold TEKS = Readiness Standard

Teacher Module and Topic Internalization Protocol



Teacher Module and Topic Internalization Protocol

PREWORK

Read the Module Overview and highlight, annotate, or record your thoughts on the progression of content in the module.

Purpose

The Teacher Module and Topic Internalization Protocol provides a step-by-step process for understanding each module and topic prior to teaching, including what students will learn, how teachers will assess student learning, and the high-level arc of learning. By starting with module and topic internalization, teachers can understand how each lesson fits into the big picture prior to using the Teacher Lesson Internalization Protocol. Returning to this protocol at the beginning of each new topic within a module helps remind teachers of the connections and coherence between the topics in the module.

STEP 1 Understand the big picture.

USE THE MODULE AND TOPIC OVERVIEW

Revisit the Module Overview and annotations created as part of the prework. Read the Topic Overview. Identify how the module utilizes the concrete-representational-abstract (CRA) progression to build student learning from lesson to lesson. Identify new key terms and symbols. Use the cognates and the *How can you use cognates to support EB students?* section in the Topic Overview to start planning supports for emergent bilingual students.

USE THE SCOPE AND SEQUENCE AND TOPIC PACING GUIDE

Identify how many days are needed for both Learning Together and Learning Individually experiences. Remember that Learning Individually days should be scheduled strategically throughout the topic to support student learning based on formative assessment data.

REFLECT

Why is this topic important? How does it connect to prior topics, if applicable?

Directions

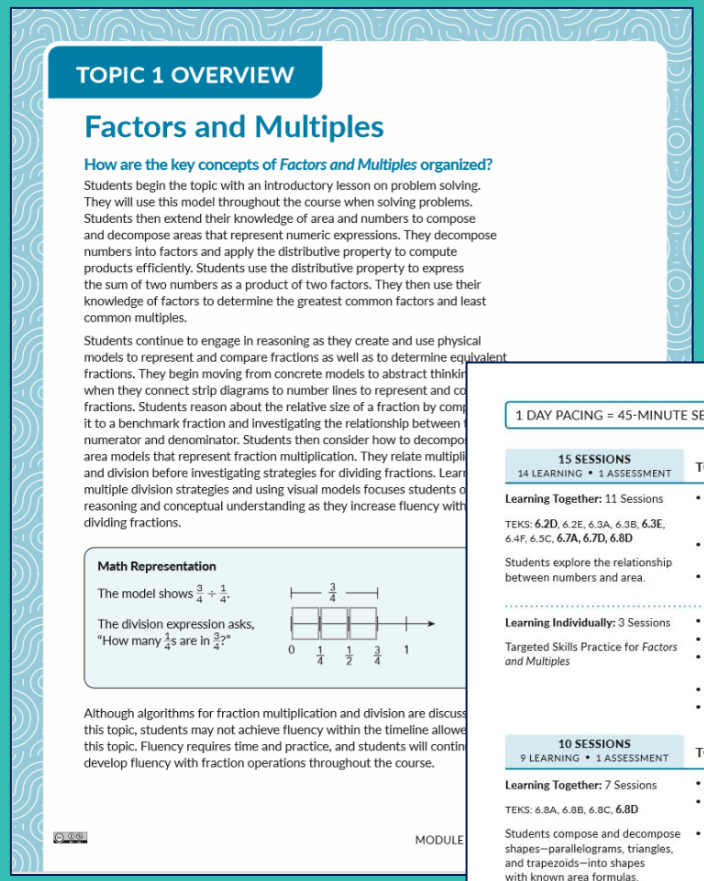
1. Open the Module and Topic Internalization Protocol and the 6th Grade Module 1, Topic 1 Teacher Edition.
2. Read through the protocol and skim through the first 6th Grade Topic: Factors and Multiples. Focus in on Module Overview, Topic Overview and End of Topic Assessment.

Consider and be ready to share:

- **How can this protocol guide you in lesson planning and curriculum alignment?**
- **How does this protocol help ensure students' deep understanding of content?**

STRONG FOUNDATIONS
Implementation

Step 1: Understand the Big Picture



TOPIC 1 OVERVIEW

Factors and Multiples

How are the key concepts of *Factors and Multiples* organized?

Students begin the topic with an introductory lesson on problem solving. They will use this model throughout the course when solving problems. Students then extend their knowledge of area and numbers to compose and decompose areas that represent numeric expressions. They decompose numbers into factors and apply the distributive property to compute products efficiently. Students use the distributive property to express the sum of two numbers as a product of two factors. They then use their knowledge of factors to determine the greatest common factors and least common multiples.

Students continue to engage in reasoning as they create and use physical models to represent and compare fractions as well as to determine equivalent fractions. They begin moving from concrete models to abstract thinkin when they connect strip diagrams to number lines to represent and co fractions. Students reason about the relative size of a fraction by comp it to a benchmark fraction and investigating the relationship between t numerator and denominator. Students then consider how to decompo area models that represent fraction multiplication. They relate multipli and division before investigating strategies for dividing fractions. Learr multiple division strategies and using visual models focuses students o reasoning and conceptual understanding as they increase fluency with dividing fractions.

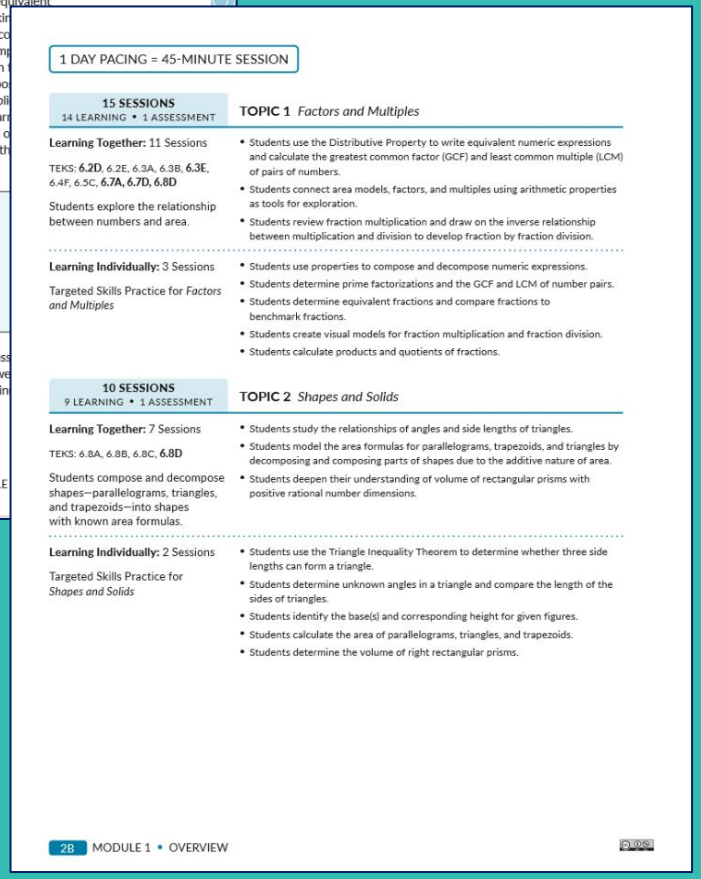
Math Representation

The model shows $\frac{3}{4} \div \frac{1}{4}$.

The division expression asks, "How many $\frac{1}{4}$s are in $\frac{3}{4}$?"

Although algorithms for fraction multiplication and division are discuss this topic, students may not achieve fluency within the timeline allowe this topic. Fluency requires time and practice, and students will contin develop fluency with fraction operations throughout the course.

MODULE



1 DAY PACING = 45-MINUTE SESSION

15 SESSIONS
14 LEARNING • 1 ASSESSMENT

TOPIC 1 *Factors and Multiples*

Learning Together: 11 Sessions

TEKS: **6.2D**, 6.2E, 6.3A, 6.3B, **6.3E**, 6.4F, 6.5C, **6.7A, 6.7D, 6.8D**

Students explore the relationship between numbers and area.

- Students use the Distributive Property to write equivalent numeric expressions and calculate the greatest common factor (GCF) and least common multiple (LCM) of pairs of numbers.
- Students connect area models, factors, and multiples using arithmetic properties as tools for exploration.
- Students review fraction multiplication and draw on the inverse relationship between multiplication and division to develop fraction by fraction division.

Learning Individually: 3 Sessions

Targeted Skills Practice for *Factors and Multiples*

- Students use properties to compose and decompose numeric expressions.
- Students determine prime factorizations and the GCF and LCM of number pairs.
- Students determine equivalent fractions and compare fractions to benchmark fractions.
- Students create visual models for fraction multiplication and fraction division.
- Students calculate products and quotients of fractions.

10 SESSIONS
9 LEARNING • 1 ASSESSMENT

TOPIC 2 *Shapes and Solids*

Learning Together: 7 Sessions

TEKS: 6.8A, 6.8B, 6.8C, **6.8D**

Students compose and decompose shapes—parallelograms, triangles, and trapezoids—into shapes with known area formulas.

- Students study the relationships of angles and side lengths of triangles.
- Students model the area formulas for parallelograms, trapezoids, and triangles by decomposing and composing parts of shapes due to the additive nature of area.
- Students deepen their understanding of volume of rectangular prisms with positive rational number dimensions.

Learning Individually: 2 Sessions

Targeted Skills Practice for *Shapes and Solids*

- Students use the Triangle Inequality Theorem to determine whether three side lengths can form a triangle.
- Students determine unknown angles in a triangle and compare the length of the sides of triangles.
- Students identify the base(s) and corresponding height for given figures.
- Students calculate the area of parallelograms, triangles, and trapezoids.
- Students determine the volume of right rectangular prisms.

2B MODULE 1 • OVERVIEW

STEP 1 **Understand the big picture.**

USE THE MODULE OVERVIEW AND TOPIC OVERVIEW

Revisit the Module Overview and annotations created as part of the prework. Read the Topic Overview. Identify how the module utilizes the concrete-representational-abstract (CRA) progression to build student learning from lesson to lesson. Identify new key terms and symbols. Use the cognates and the *How can you use cognates to support EB students?* section in the Topic Overview to start planning supports for emergent bilingual students.

Consider and be ready to share: **Why is this topic important? How does it connect to prior topics, if applicable?**

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TOPIC 1 *Factors and Multiples*

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MODULE 1 OVERVIEW

TEKS* Addressed:
6.2C, **6.2D,** 6.2E, 6.3A, 6.3B, **6.3E,** 6.4F, 6.5C, **6.7A, 6.7D,** 6.8A, 6.8B, 6.8C, **6.8D**

*Bold TEKS = Readiness Standard

Composing and Decomposing

Sessions: **31**

Why is this module named *Composing and Decomposing*?

Throughout Grade 6, students reason, look for structure, and make connections across mathematical strands. *Composing and Decomposing* begins this work by deepening student understanding of numbers and shapes.

As students become more flexible with shapes and numbers, they will better understand their structure, enabling them to develop problem-solving strategies across mathematical strands.

Students learn to approach a problem by decomposing or composing shapes or numbers already understood.

By Grade 6, students have broken down numbers into sums, differences, products, and quotients. Now, students learn to compose and decompose numeric expressions using the distributive property.

Students have determined the areas of squares and rectangles. Now, they calculate the areas of different figures by composing them from rectangles.

The Research Shows . . .

"Understanding of and proficiency with measurement should flourish in the middle grades, especially in conjunction with other parts of the mathematics curriculum."

Navigating Through Measurement | Page 4

Read and highlight important information in the module overview?

TS

6th Grade

MODULE 1 OVERVIEW

TEKS* Addressed:
6.2C, **6.2D**, 6.2E, 6.3A, 6.3B, **6.3E**, 6.4F, 6.5C, **6.7A**, **6.7D**, 6.8A, 6.8B, 6.8C, **6.8D**

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Compose & decompose numbers

2A

6th Grade

The Research Shows . . .

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Navigating Through Measurement | Page 4

What is the mathematics of *Composing and Decomposing*?

Composing and Decomposing contains three topics: *Factors and Multiples*, *Shapes and Solids*, and *Decimals*. Students examine the relationships between numbers and shapes using area models to solve problems.

They then determine the areas of shapes and the volume and surface area of solids. Throughout, students strengthen their skills with fraction operations and build fluency with decimal operations.

Topic #1: Factors and multiples
Topic 2: Shapes & Solids
Topic 3: Decimals

TS

1 DAY PACING = 45-MINUTE SESSION

Possible Learning Targets

6th Grade

15 SESSIONS
14 LEARNING • 1 ASSESSMENT

TOPIC 1 *Factor*

Bold Teks are Readiness Standards

Learning Together: 11 Sessions

TEKS: **6.2D**, 6.2E, 6.3A, 6.3B, **6.3E**, 6.4F, 6.5C, **6.7A, 6.7D, 6.8D**

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Learning Individually: 3 Sessions

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- Students determine equivalent fractions and compare fractions to benchmark fractions.
- Students create visual models for fraction multiplication and fraction division.
- Students calculate products and quotients of fractions.

2B

6th Grade

How is *Composing and Decomposing* connected to prior learning?

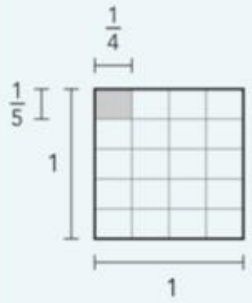
In previous grades, students determined the area of rectangles and used area models to represent the distributive property. They have used this mathematical reasoning to evaluate numeric expressions. Students enter this course with experiences with number and operations in base-ten. They have used previous understandings of multiplication and division to multiply and divide fractions. Specifically, they have done the following things:

- Performed operations with multi-digit whole numbers and with decimals to hundredths
- Multiplied whole numbers by fractions
- Interpreted fractions as division of the numerator by the denominator
- Divided unit fractions by whole numbers and whole numbers by unit fractions

Prior Knowledge

Math Representation

The shaded area represents the fraction $\frac{1}{20}$ because 1 of 20 rectangles is shaded.



So, the shaded area of the rectangle represents the product $\frac{1}{5} \cdot \frac{1}{4} = \frac{1}{20}$.

2C

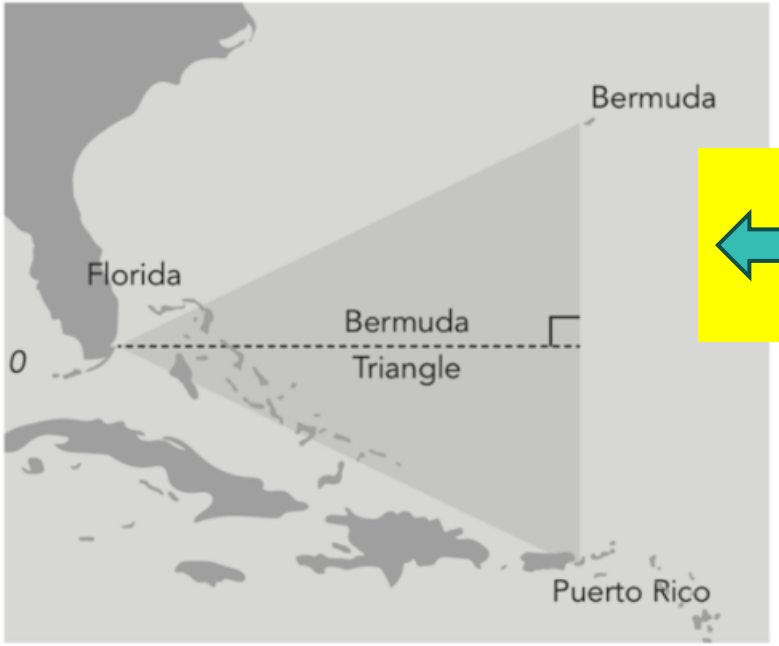
6th Grade

Key Point: Seeing structure in numbers and shapes

Decomposing in future learning?

This module supports future learning by building fluency in multiplying and dividing rational numbers at the beginning of the course, allowing students to practice these skills throughout the course.

Composing and Decomposing sets the stage for seeing structure in numbers and shapes. Students will continue to use fractions and decimals in their work with geometric shapes, percents, expressions, equations, graphs, and statistics. They will revisit area, volume, and surface area as they use one-step equations to solve problems.



Real World Example

STRONG FOUNDATIONS
Implementation

6th Grade

TOPIC 1 OVERVIEW

Factors and Multiples

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Math Representation

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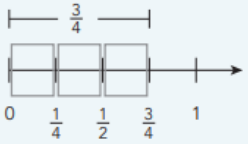

Although algorithms for fraction multiplication and division are discussed in this topic, students may not achieve fluency within the timeline allowed for this topic. Fluency requires time and practice, and students will continue to develop fluency with fraction operations throughout the course.

Read and highlight important information in the Topic I overview?

Math Representation

You can use an area model to represent the product $15 \cdot 27$.

$15 = 10 + 5$

$27 = 20 + 7$

	20	7
10	200	70
5	100	35

This area model shows the product of $15 \cdot 27$ as $(10 + 5)(20 + 7)$.

$15 \cdot 27 = 200 + 100 + 70 + 35 = 405$

What is the entry point for students?

Students enter Grade 6 with experiences using area models to represent multiplication.

The *Factors and Multiples* topic draws on these experiences to formalize the distributive property and decompose numeric expressions. Students' prior work with factor pairs supports their new learning about least common multiples and greatest common factors.

In previous grades, students began their formal study of fractions. They learned to compare and order fractions, determine equivalent fractions, add and subtract fractions with like and unlike denominators, multiply whole numbers by fractions, and divide whole numbers by unit fractions. This topic builds on students' prior experiences with area models, number lines, and fact families to develop visual models for fraction multiplication and division.

Why is *Factors and Multiples* important?

Factors and Multiples focuses on composing and decomposing numbers and expressions. Students will apply the same properties and terminology to algebraic expressions in the **Determining Unknown Quantities** module, where they will use the distributive property to write equivalent algebraic expressions. Throughout upcoming modules in this course, students will continue to develop fluency with whole-number and fraction operations. They will determine equivalent ratios, percents, and unit rates. Students will evaluate expressions and solve equations that include fractions. They will also investigate negative rational numbers written in a variety of forms.

Math Representation

Isabella

$\frac{2}{5}x = 20$

$\frac{\frac{2}{5}x}{\frac{2}{5}} = \frac{20}{\frac{2}{5}}$

$1x = 20\left(\frac{5}{2}\right)$

$x = 50$

Harper

$\frac{2}{5}x = 20$

$\left(\frac{5}{2}\right)\frac{2}{5}x = \left(\frac{5}{2}\right)20$

$1x = 50$

$x = 50$

How does a student demonstrate understanding?

Students will demonstrate an understanding of the standards in *Factors and Multiples* when they can:

- Apply properties of operations to compose and decompose numbers and shapes to understand the relationship between factors and multiples.
- Create equivalent expressions using the commutative and distributive properties.
- Identify the factors of two whole numbers and determine the greatest common factor.
- Identify the multiples of two whole numbers and determine the least common multiple.
- Generate equivalent numerical expressions using whole number exponents and prime factorization.
- Determine and use equivalent fractions to show equal parts of the same whole.
- Represent and compare benchmark fractions using models, including number lines.
- Order positive rational numbers in mathematical and real-world contexts.
- Compute products of fractions multiplied by whole numbers and fractions (including mixed numbers).
- Determine whether a quantity is increased or decreased when multiplied by a fraction greater than one or less than one.
- Compute quotients of fractions divided by whole numbers and fractions (including mixed numbers).
- Interpret quotients of fractions in real-world and mathematical problems.
- Solve real-world problems involving multiplication and division of fractions and mixed numbers using visual models.
- Recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values.
- Use an algorithm to fluently solve multiplication and division problems with fractions.

NEW KEY TERMS

- numeric expression [expresión numérica]
- equation [ecuación]
- distributive property [propiedad distributiva]
- base [base]
- power
- exponent [exponente]
- common factor [factor común]
- prime factorization
- relatively prime [primos relativos]
- greatest common factor (GCF)
- multiple [múltiple]
- commutative property [propiedad conmutativa]
- least common multiple (LCM) [mínimo común múltiplo]
- unit fraction [fracción unitaria]
- equivalent fraction [fracción equivalente]
- benchmark fractions
- algorithm [algoritmo]
- positive rational number [número racional positivo]
- reciprocal [recíproco]
- multiplicative inverse
- complex fraction [fracción compleja]

NEW SYMBOL

Symbol	Description
·	Multiplication dot

How do the activities in *Factors and Multiples* promote student expertise in the TEKS mathematical process standards?

Each topic is written with the goal of creating mathematical thinkers who are active participants in class discourse, so elements of the TEKS mathematical process standards should be evident in all lessons. Students are expected to make sense of problems and work toward solutions, reason using concrete and abstract ideas, and communicate their thinking while providing a critical ear to the thinking of others.

In *Factors and Multiples*, students begin by examining the problem-solving model (6.1B). They will continue to use this model throughout this course. As students continue in this topic, they use precise mathematical language and analyze mathematical relationships to connect and communicate mathematical ideas (6.1F). This topic provides students with formal language for previously learned concepts; this shared language will allow them to communicate more effectively (6.1G). Throughout the topic, students are encouraged to analyze relationships in numbers and shapes. This topic highlights the need for precision in explanations about and computation of fraction division. They will use a variety of strategies to build an understanding of fraction division and determine when each approach is most efficient (6.1C). Students should use reason to consider the relative sizes of numbers and to determine whether their answers make sense. It is important to develop students' disposition early in the course, encouraging them to self-ask, "How is this similar to another concept?" and "Does my answer make sense based on the information given?"

How can you use cognates to support EB students?

Cognates are provided for new key terms when applicable. Encourage students to keep a bilingual math journal, recording reflections and background knowledge on new topics, in either written or verbal format, with added visuals for clarity. Incorporate journal excerpts into a shared word wall or digital bilingual glossary, with a focus on highlighting cognates.

Texas Education Agency

STRONG FOUNDATIONS Implementation

6th Grade

TOPIC 1 OVERVIEW

Read and highlight important information in the Topic I overview?

Factors and Multiples

How are the key concepts of *Factors and Multiples* organized?

Students begin the topic with an introductory lesson on problem solving. They will use this model throughout the course when solving problems. Students then extend their knowledge of area and numbers to compose and decompose areas that represent numeric expressions. They decompose numbers into factors and apply the distributive property to compute products efficiently. Students use the distributive property to express the sum of two numbers as a product of two factors. They then use their knowledge of factors to determine the greatest common factors and least common multiples.

Students continue to engage in reasoning as they create and use physical models to represent and compare fractions as well as to determine equivalent fractions. They begin moving from concrete models to abstract thinking when they connect strip diagrams to number lines to represent and compare fractions. Students reason about the relative size of a fraction by comparing it to a benchmark fraction and investigating the relationship between the numerator and denominator. Students then consider how to decompose area models that represent fraction multiplication. They relate multiplication and division before investigating strategies for dividing fractions. Learning multiple division strategies and using visual models focuses students on reasoning and conceptual understanding as they increase fluency with dividing fractions.

Texas Education Agency

STRONG FOUNDATIONS Implementation

6th Grade

TOPIC 1 OVERVIEW

Factors and Multiples

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Compose & decompose area and numbers to represent numeric expressions

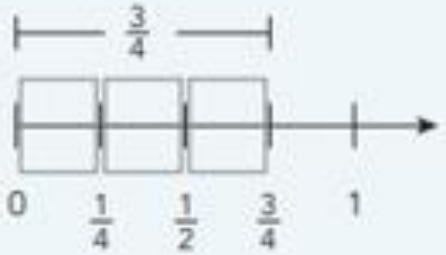
Create and use physical models to represent and compare fractions

Decomposing area models to represent fraction multiplication

Math Representation

The model shows $\frac{3}{4} \div \frac{1}{4}$.

The division expression asks, "How many $\frac{1}{4}$s are in $\frac{3}{4}$?"



Although algorithms for fraction multiplication and division are discussed in this topic, students may not achieve fluency within the timeline allowed for this topic. Fluency requires time and practice, and students will continue to develop fluency with fraction operations throughout the course.

Texas Education Agency

STRONG FOUNDATIONS Implementation

6th Grade

Review the model

Math Representation

You can use an area model to represent the product $15 \cdot 27$.

$15 = 10 + 5$

$27 = 20 + 7$

	20	7
10	200	70
5	100	35

This area model shows the product of $15 \cdot 27$ as $(10 + 5)(20 + 7)$.

$15 \cdot 27 = 200 + 100 + 70 + 35 = 405$

What is the entry point for students?

Students enter Grade 6 with experiences using area models to represent multiplication.

The *Factors and Multiples* topic draws on these experiences to formalize the distributive property and decompose numeric expressions. Students' prior work with factor pairs supports their new learning about least common multiples and greatest common factors.

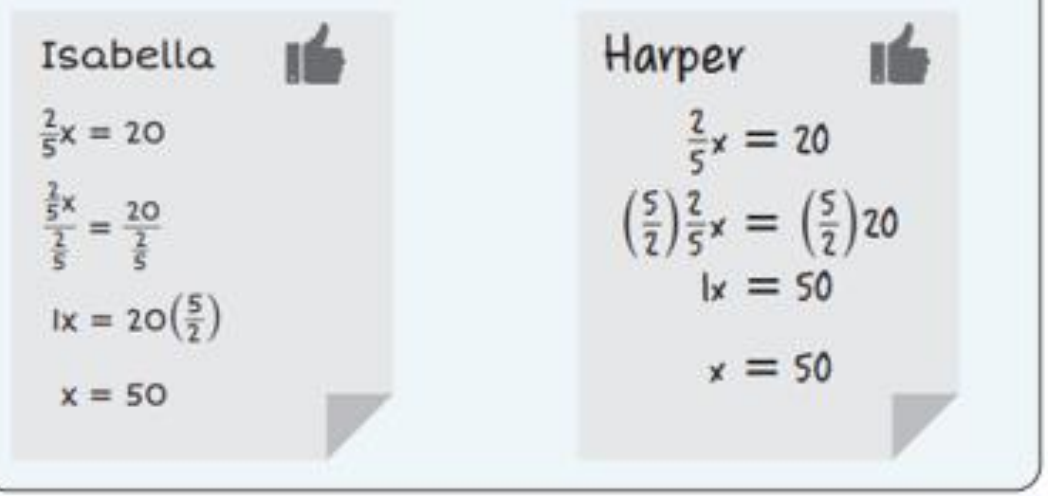
In previous grades, students began their formal study of fractions. They learned to compare and order fractions, determine equivalent fractions, add and subtract fractions with like and unlike denominators, multiply whole numbers by fractions, and divide whole numbers by unit fractions. This topic builds on students' prior experiences with area models, number lines, and fact families to develop visual models for fraction multiplication and division.

Factor pairs, least common multiples & greatest common factors are foundational skill sets

Why is *Factors and Multiples* important?

Factors and Multiples focuses on composing and decomposing numbers and expressions. Students will apply the same properties and terminology to algebraic expressions in the **Determining Unknown Quantities** module, where they will use the distributive property to write equivalent algebraic expressions. Throughout upcoming modules in this course, students will continue to develop fluency with whole-number and fraction operations. They will determine equivalent ratios, percents, and unit rates. Students will evaluate expressions and solve equations that include fractions. They will also investigate negative rational numbers written in a variety of forms.

Math Representation



6th Grade

Formative Assessment: Possible Learning Targets

STRONG FOUNDATIONS Implementation

How does a student demonstrate understanding?

Students will demonstrate an understanding of the standards in *Factors and Multiples* when they can:

- Apply properties of operations to compose and decompose numbers and shapes to understand the relationship between factors and multiples.
- Create equivalent expressions using the commutative and distributive properties.
- Identify the factors of two whole numbers and determine the greatest common factor.
- Identify the multiples of two whole numbers and determine the least common multiple.
- Generate equivalent numerical expressions using whole number exponents and prime factorization.
- Determine and use equivalent fractions to show equal parts of the same whole.
- Represent and compare benchmark fractions using models, including number lines.
- Order positive rational numbers in mathematical and real-world contexts.
- Compute products of fractions multiplied by whole numbers and fractions (including mixed numbers).
- Determine whether a quantity is increased or decreased when multiplied by a fraction greater than one or less than one.
- Compute quotients of fractions divided by whole numbers and fractions (including mixed numbers).
- Interpret quotients of fractions in real-world and mathematical problems.
- Solve real-world problems involving multiplication and division of fractions and mixed numbers using visual models.
- Recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values.
- Use an algorithm to fluently solve multiplication and division problems with fractions.

Texas Education Agency

6th Grade

Key vocabulary and spanish cognates

NEW KEY TERMS

- numeric expression [expresión numérica]
- equation [ecuación]
- distributive property [propiedad distributiva]
- base [base]
- power
- exponent [exponente]
- common factor [factor común]
- prime factorization
- relatively prime [primos relativos]
- greatest common factor (GCF)
- multiple [múltiple]
- commutative property [propiedad conmutativa]
- least common multiple (LCM) [mínimo común múltiplo]
- unit fraction [fracción unitaria]
- equivalent fraction [fracción equivalente]
- benchmark fractions
- algorithm [algoritmo]
- positive rational number [número racional positivo]

How do the activities in *Factors and Multiples* promote student expertise in the TEKS mathematical process standards?

Each topic is written with the goal of creating mathematical thinkers who are active participants in class discourse, so elements of the TEKS mathematical process standards should be evident in all lessons. Students are expected to make sense of problems and work toward solutions, reason using concrete and abstract ideas, and communicate their thinking while providing a critical ear to the thinking of others.

In *Factors and Multiples*, students begin by examining the problem-solving model (6.1B). They will continue to use this model throughout this course. As students continue in this topic, they use precise mathematical language and analyze mathematical relationships to connect and communicate mathematical ideas (6.1F). This topic provides students with formal language for previously learned concepts; this shared language will allow them to communicate more effectively (6.1G). Throughout the topic, students are encouraged to analyze relationships in numbers and shapes. This topic highlights the need for precision in explanations about and computation of fraction division. They will use a variety of strategies to build an understanding of fraction division and determine when each approach is most efficient (6.1C). Students should use reason to consider the relative sizes of numbers and to determine whether their answers make sense. It is important to develop students' disposition early in the course, encouraging them to self-ask, "How is this similar to another concept?" and "Does my answer make sense based on the information given?"

- reciprocal [recíproco]
- multiplicative inverse
- complex fraction [fracción compleja]

How can you use cognates to support EB students?

Cognates are provided for new key terms when applicable. Encourage students to keep a bilingual math journal, recording reflections and background knowledge on new topics, in either written or verbal format, with added visuals for clarity. Incorporate journal excerpts into a shared word wall or digital bilingual glossary, with a focus on highlighting cognates.

NEW SYMBOL

Symbol	Description
·	Multiplication dot

Math Symbols

STRONG FOUNDATIONS
Implementation

Step 2: Know your Destination

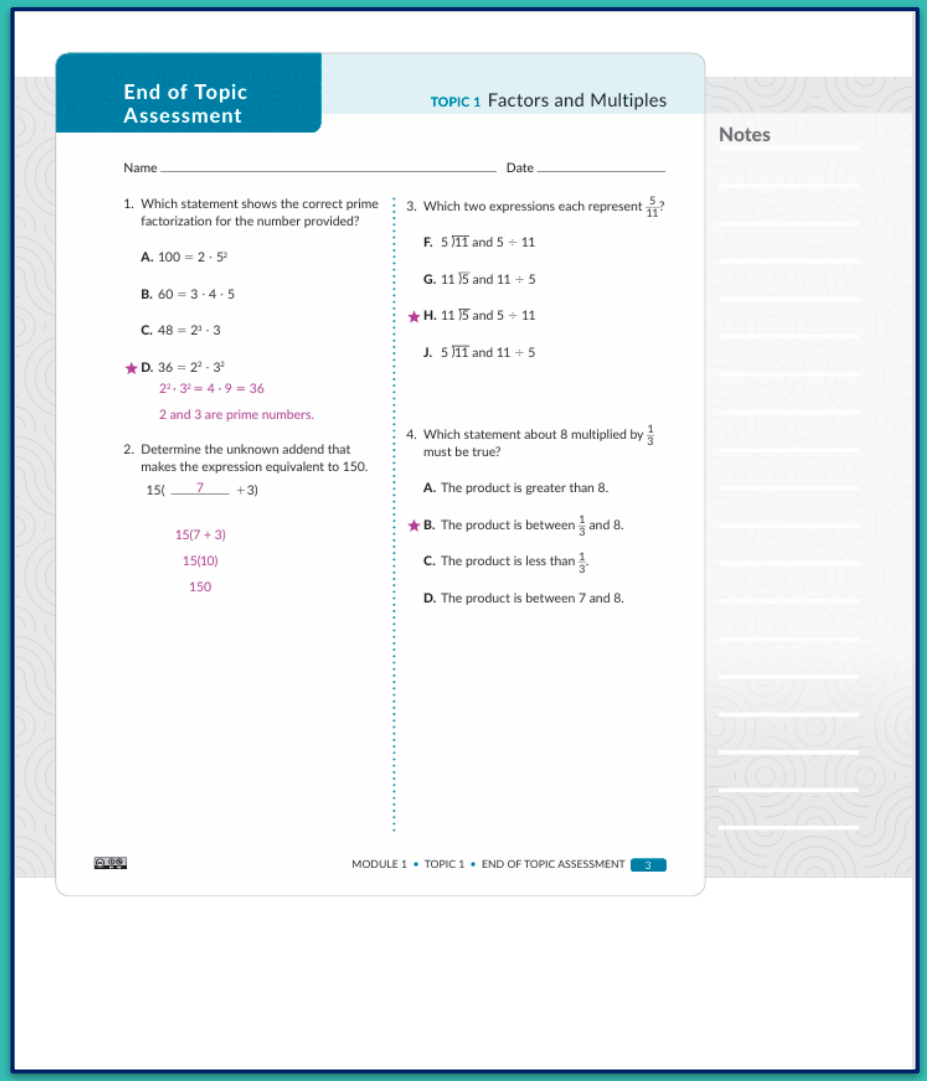
STEP 2 **Know your destination.**

USE THE END OF TOPIC ASSESSMENT AND ANSWER KEYS

Complete the End of Topic Assessment considering exemplar strategies. Note what critical knowledge and skills students should know and be able to do by the end of the topic, including examining the Texas Essential Knowledge and Skills (TEKS) and English Language Proficiency Standards (ELPS).

REFLECT

What models, strategies, or terminology are critical for student success on the assessment?



End of Topic Assessment

TOPIC 1 Factors and Multiples

Name _____ Date _____

1. Which statement shows the correct prime factorization for the number provided?

A. $100 = 2 \cdot 5^2$

B. $60 = 3 \cdot 4 \cdot 5$

C. $48 = 2^3 \cdot 3$

★ D. $36 = 2^2 \cdot 3^2$

$2^2 \cdot 3^2 = 4 \cdot 9 = 36$

2 and 3 are prime numbers.

2. Determine the unknown addend that makes the expression equivalent to 150.

$15(\underline{7} + 3)$

$15(7 + 3)$

$15(10)$

150

3. Which two expressions each represent $\frac{5}{11}$?

F. $5 \overline{)11}$ and $5 \div 11$

G. $11 \overline{)5}$ and $11 \div 5$

★ H. $11 \overline{)5}$ and $5 \div 11$

J. $5 \overline{)11}$ and $11 \div 5$

4. Which statement about 8 multiplied by $\frac{1}{3}$ must be true?

A. The product is greater than 8.

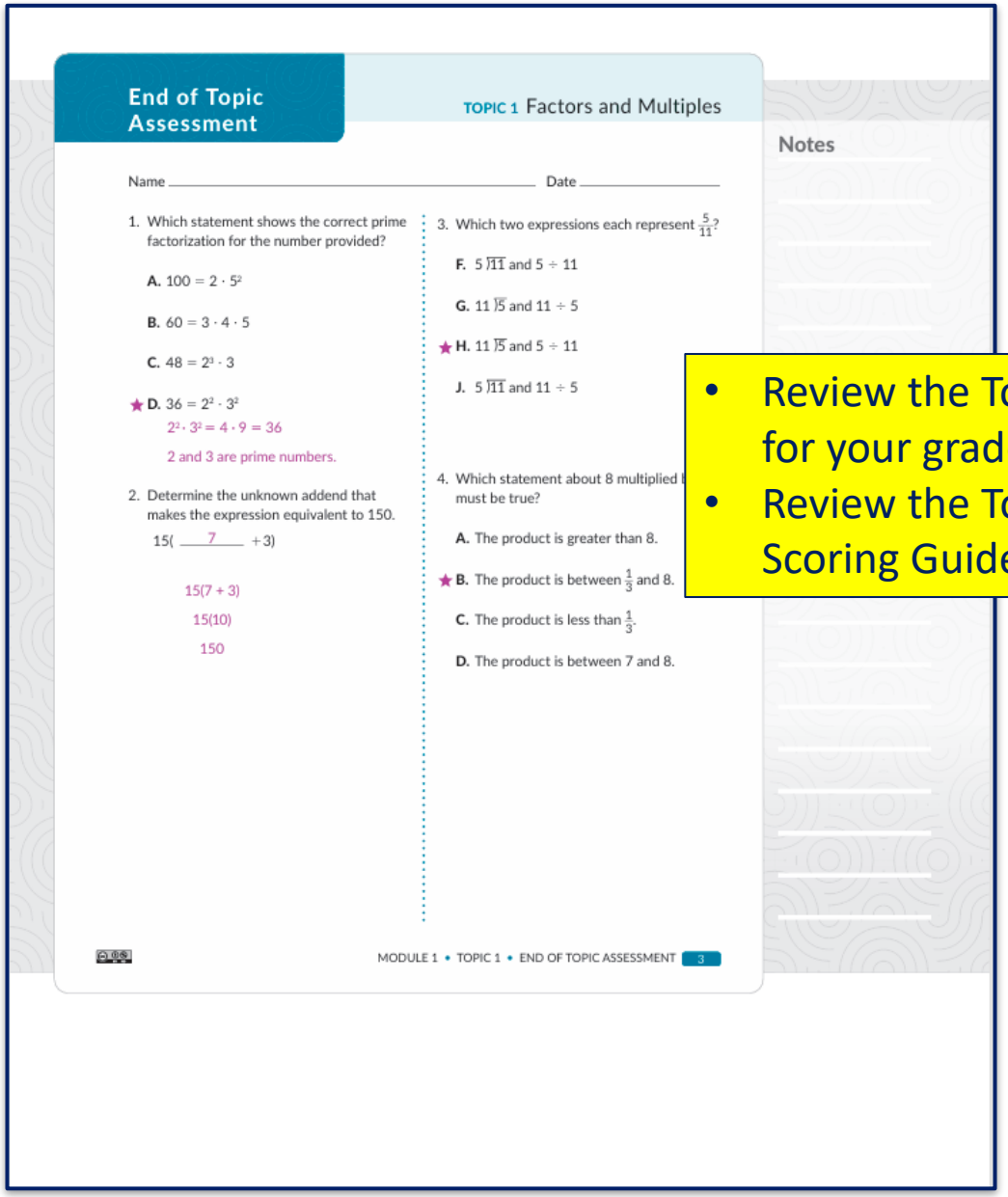
★ B. The product is between $\frac{1}{3}$ and 8.

C. The product is less than $\frac{1}{3}$.

D. The product is between 7 and 8.

MODULE 1 • TOPIC 1 • END OF TOPIC ASSESSMENT 3

Notes



End of Topic Assessment

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4. Which statement about 8 multiplied b must be true?

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C. The product is less than $\frac{1}{3}$.

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MODULE 1 • TOPIC 1 • END OF TOPIC ASSESSMENT 3

Notes

- Review the Topic Assessment for your grade level
- Review the Topic Assessment Scoring Guide

1 Factors and Multiples

Number and Operations

1 DAY PACING = 45-MINUTE SESSION

The student is expected to:

6.2D order a set of rational numbers arising from mathematical and real-world contexts.

6.2E extend representations for division to include fraction notation such as a/b represents the same number as $a \div b$ where $b \neq 0$.

6.3A recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values.

6.3B determine, with and without computation, whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one.

6.3E multiply and divide positive rational numbers fluently.

Proportionality

...ions and percents such as 1%, ...tiples of these values using ...ms, number lines, and numbers.

6.5C use equivalent fractions, decimals, and percents to show equal parts of the same whole.

...ns, and Relationships

...rical expressions using order ...hole number exponents and

6.7D generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.

6.8D determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.

Question Number	TEKS*	Point Value	Scoring Guidance
1	**6.7A**	1	• The student selects the correct answer. (1 point) • The student does not select the correct answer. (0 points)
2	**6.7D**	1	• The student correctly writes the answer on the line. (1 point) • The student incorrectly writes the answer on the line. (0 points)
3	6.2E	1	• The student selects the correct answer. (1 point) • The student does not select the correct answer. (0 points)
4	6.3B	1	• The student selects the correct answer. (1 point) • The student does not select the correct answer. (0 points)
5	6.3A	1	• The student selects the correct answer. (1 point) • The student does not select the correct answer. (0 points)
6	6.5C	2	• The student selects both correct answers. (2 points) • The student selects one correct answer. (1 point) • The student does not select any correct answers. (0 points)

*Bold TEKS = Readiness Standard

STRONG FOUNDATIONS Implementation

TS

Response to Student Performance		
TEKS*	Question(s)	Recommendations
6.2D	8	**To support students:** • Review ordering rational numbers. • Use Skills Practice Set IV.A for additional practice. • Review Lesson 4 Assignment Practice Question 15.
6.2E	3	**To support students:** • Review ordering rational numbers. • Use Skills Practice Set VI.A for additional practice. • Review Lesson 6 Assignment Practice Questions 2 and 3.
6.3A	5	**To support students:** • Review dividing by rational numbers and multiplying by reciprocals • Use Skills Practice Set VI.B for additional practice. • Review Lesson 6 Assignment Practice Question 1.
6.3B	4	**To support students:** • Review what happens to a quantity when multiplied by a fraction. • Use Skills Practice Set V.D for additional practice. • Review Lesson 5 Assignment Practice Questions 1-8.

*Bold TEKS = Readiness Standard

- Utilize the Response to student performance document to select instructional materials for the learning individual days

Response to Student Performance		
TEKS*	Question(s)	Recommendations
6.8D	10	**To support students:** • Review the area of a rectangle. • Use Skills Practice Set I.A for additional practice.
NOTE: Both teachers and administrators should refer to the Assessment Guidance and Analysis section of the Course and Implementation Guide for additional support in analyzing and responding to student data.		

*Bold TEKS = Readiness Standard

Response to Student Performance		
TEKS*	Question(s)	Recommendations
	9	**To support students:** • Review multiplication of positive rational numbers. • Use Skills Practice Sets V.A, V.B, and V.C for additional practice. • Review Lesson 5 Assignment Practice Questions 1-8. **To challenge students:** • Extend student knowledge with the Skills Practice Extension Set V.
	11	**To support students:** • Review division of positive rational numbers. • Use Skills Practice Sets VI.A and VI.C for additional practice. • Review Lesson 6 Assignment Practice Questions 1-3. **To challenge students:** • Extend student knowledge with the Skills Practice Extension Set VI.
6.4F	7	**To support students:** • Review benchmark fractions and percents. • Use Skills Practice Sets III.A and IV.B, IV.C, IV.D, and IV.E for additional practice. • Review Lesson 3 Assignment Practice Questions 1-3 and Lesson 4 Assignment Practice Questions 1-16. **To challenge students:** • Extend student knowledge with the Skills Practice Extension Sets III and IV.
6.5C	6	**To support students:** • Review equivalent fractions, decimals, and percents. • Use Skills Practice Set III.B for additional practice. • Review Lesson 3 Assignment Practice Questions 4-7.
6.7A	1	**To support students:** • Review least common multiple, greatest common factor, and prime factorization. • Use Skills Practice Sets II.A, II.B, II.C, and II.F for additional practice. • Review Lesson 2 Assignment Practice Questions 1-4. **To challenge students:** • Extend student knowledge with the Skills Practice Extension Set II.
6.7D	2	**To support students:** • Review properties of operations. • Use Skills Practice Sets I.A, I.B, I.C, I.D, and II.D for additional practice. • Review Lesson 1 Assignment Practice Questions 1-6. **To challenge students:** • Extend student knowledge with the Skills Practice Extension Set I.

*Bold TEKS = Readiness Standard

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TCMPC

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Grade 7
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Class A
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Grade 8
Class A
A
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TEKS RS Mathematics Grade 8 (0/12)

System Links

- Assessments
- Glossary
- Revision Notes
- Browse All Content

Calendar

25-26 Sample ISD Calendar 25/26

‹ July 2025 ›

SUN	MON	TUE	WED	THU	FRI	SAT
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26

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TCMPC

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Class A

TEKS RS Mathematics Grade 7

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01 02 03 04 05 06 07 08 09 10 11 12

Next

TEKS RS Unit 01: Number and Operations

Course

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TEKS RS Mathematics Grade 7

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Filter Resources

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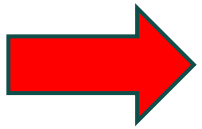

Resource	Added By	Used In
Mathematics Resources: Grade 7	TCMPC	Course
Mathematics Resources: K-HS	TCMPC	Course
Mathematics Resources: Texas Education Agency	TCMPC	Course
Mathematics TEKS RS Grade 7 STAAR Analysis 2015-2024 - Unit 01	TCMPC	Unit / Module 01
Mathematics TEKS RS Grade 7 STAAR Analysis 2015-2024 - Unit 02	TCMPC	Unit / Module 02

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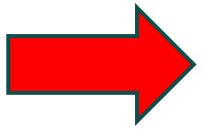
- Mathematics Grade 7 Instructional Considerations to Activate Purposeful Planning (ICAPP) Documents
- Mathematics TEA Grade 7 Supporting Information with TEKS RS Comments
- Mathematics TEKS RS Grade 7 Backward Design Document
- Mathematics TEKS RS Grade 7 Explanation of TEKS RS Unit Sequencing
- Mathematics TEKS RS Grade 7 Overview
- Mathematics TEKS RS Grade 7 STAAR Resources



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STAAR® Test	Grade 7 M	Item #	28	Content SE	7.11B	SE Type	Supporting
Administration	Spring 2024	Reporting Category	3	Process SE	Not Reported	Unit (IFD)	02, 11

28

Determine whether each equation is true or not true when $m = -5$.

Select the correct answer in each row.

Equation	True	Not True
$4m - 6 = 14$	☐	☐
$-2m + 7 = 17$	☐	☐
$4m - 6 = -26$	☐	☐
$-2m + 7 = -3$	☐	☐

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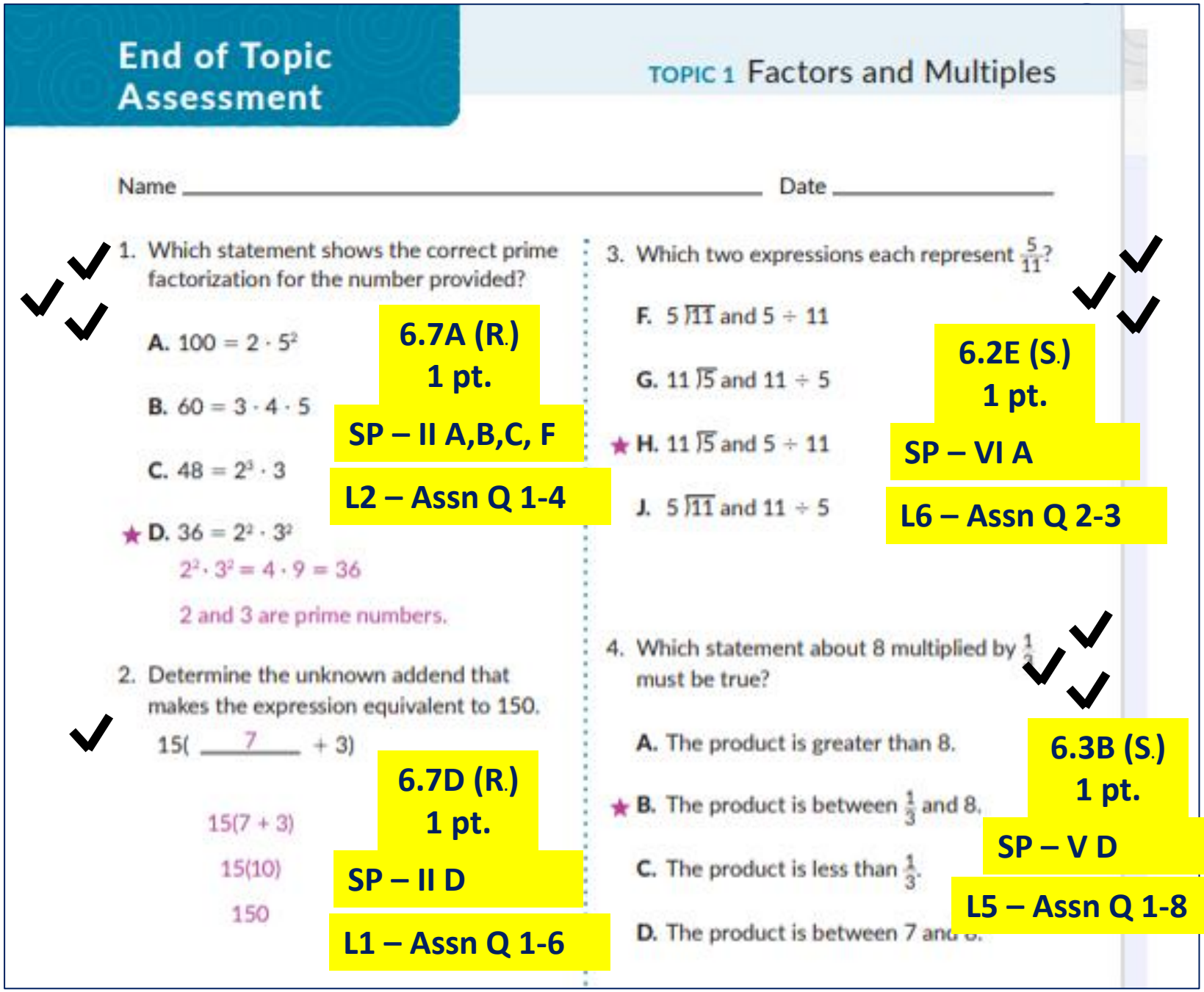
From STAAR Review

SP - Skill Practice

L1 – Lesson 1

Assn Q1 – Assignment Question



End of Topic Assessment

TOPIC 1 Factors and Multiples

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C. $48 = 2^3 \cdot 3$

★ D. $36 = 2^2 \cdot 3^2$

$2^2 \cdot 3^2 = 4 \cdot 9 = 36$

2 and 3 are prime numbers.

6.7A (R.)
1 pt.
SP – II A,B,C, F
L2 – Assn Q 1-4

2. Determine the unknown addend that makes the expression equivalent to 150.

$15(\underline{7} + 3)$

$15(7 + 3)$

$15(10)$

150

6.7D (R.)
1 pt.
SP – II D
L1 – Assn Q 1-6

3. Which two expressions each represent $\frac{5}{11}$?

F. $5 \div 11$ and $5 \div 11$

G. $11 \div 5$ and $11 \div 5$

★ H. $11 \div 5$ and $5 \div 11$

J. $5 \div 11$ and $11 \div 5$

6.2E (S.)
1 pt.
SP – VI A
L6 – Assn Q 2-3

4. Which statement about 8 multiplied by $\frac{1}{3}$ must be true?

A. The product is greater than 8.

★ B. The product is between $\frac{1}{3}$ and 8.

C. The product is less than $\frac{1}{3}$.

D. The product is between 7 and 8.

6.3B (S.)
1 pt.
SP – V D
L5 – Assn Q 1-8

Texas Education Agency

From STAAR Review

SP - Skill Practice

L1 – Lesson 1

Assn Q1 – Assignment Question 1

TOPIC 1 Factors and Multiples

5. Chloe has $\frac{7}{8}$ yard of spirit ribbon to make hair bows for her friends. It takes $\frac{1}{12}$ yard to make each hair bow. Chloe will use the following expression to calculate the number of hair bows that she can make from $\frac{7}{8}$ yard spirit ribbon.

$$\frac{7}{8} \div \frac{1}{12}$$

Which expression can also be used to calculate the number of hair bows that can be made from $\frac{7}{8}$ yard of spirit ribbon?

F. $\frac{8}{7} \cdot \frac{1}{12}$

G. $\frac{8}{7} \cdot \frac{12}{1}$

H. $\frac{7}{8} \cdot \frac{1}{12}$

★ J. $\frac{7}{8} \cdot \frac{12}{1}$

6.3A (S.)
1 pt.

SP – V B

L6 – Assn Q 1

You can divide fractions by multiplying by the reciprocal.

6. Select **TWO** fractions that are equivalent to $\frac{2}{8}$.

★ A. $\frac{7}{28}$

B. $\frac{4}{32}$

C. $\frac{4}{10}$

D. $\frac{6}{12}$

★ E. $\frac{3}{12}$

6.5C (S.)
2 pts.

$\frac{2}{8} = \frac{2 \div 2}{8 \div 2} = \frac{1}{4}$

$\frac{7}{28} = \frac{7 \div 7}{28 \div 7} = \frac{1}{4}$

$\frac{3}{12} = \frac{3 \div 3}{12 \div 3} = \frac{1}{4}$

Texas Education Agency

STRONG FOUNDATIONS
Implementation

From STAAR Review

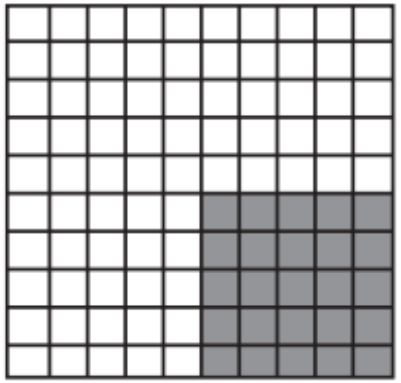
SP - Skill Practice

L1 – Lesson 1

Assn Q1 – Assignment Question 1

6.4F (S.)
2 pt.

7. Which of the models represent the benchmark fraction $\frac{1}{4}$?

Model	$\frac{1}{4}$	A fraction other than $\frac{1}{4}$
	☑ There are 100 boxes and 25 of them are shaded. $\frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}$	☐
	☐	☑ There are 6 boxes and 2 of them are shaded. $\frac{2}{6} = \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$
	☐	☑ The point is on the first of three equal parts between 0 and 1.
	☑ There are 8 boxes and 2 of them are shaded. $\frac{2}{8} = \frac{2 \div 2}{8 \div 2} = \frac{1}{4}$	☐
	☑ The point is on the first of four equal parts between 0 and 1.	☐

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From STAAR Review

SP - Skill Practice

L1 – Lesson 1

Assn Q1 – Assignment Q1

8. Order the numbers from least to greatest.

$\frac{7}{5}, \frac{1}{16}, 1\frac{1}{8}, \frac{7}{12}$

$\frac{1}{16}, \frac{7}{12}, 1\frac{1}{8}, \frac{7}{5}$

6.2D (R.)
1 pt.

SP – IV A

L4 – Assn Q 15

9. Calculate the product. Write your answer in lowest terms.

$\frac{8}{9} \cdot 2\frac{4}{7}$

$\frac{8}{9} \cdot 2\frac{4}{7} = \frac{8}{\cancel{9}_{1}} \cdot \frac{\cancel{18}^{2}}{7} = \frac{16}{7} = 2\frac{2}{7}$

6.3E (R.)
1 pt.

10. Use the diagram to answer the question.

Determine the area of the rectangle in square inches.

$6(4) + 6(12)$

$24 + 72$

96

The area of the entire rectangle is 96 in.^{2}.

6.8D (R.)
2 pts.

SP – I A

11. Mia has 6 teaspoons of salt. She puts $\frac{1}{4}$ teaspoon of salt in each batch of blueberry muffins that she makes. How many batches of muffins can Mia make?

$6 \div \frac{1}{4} = 6 \cdot \frac{4}{1} = 6 \cdot 4 = 24$

Mia can make 24 batches of muffins.

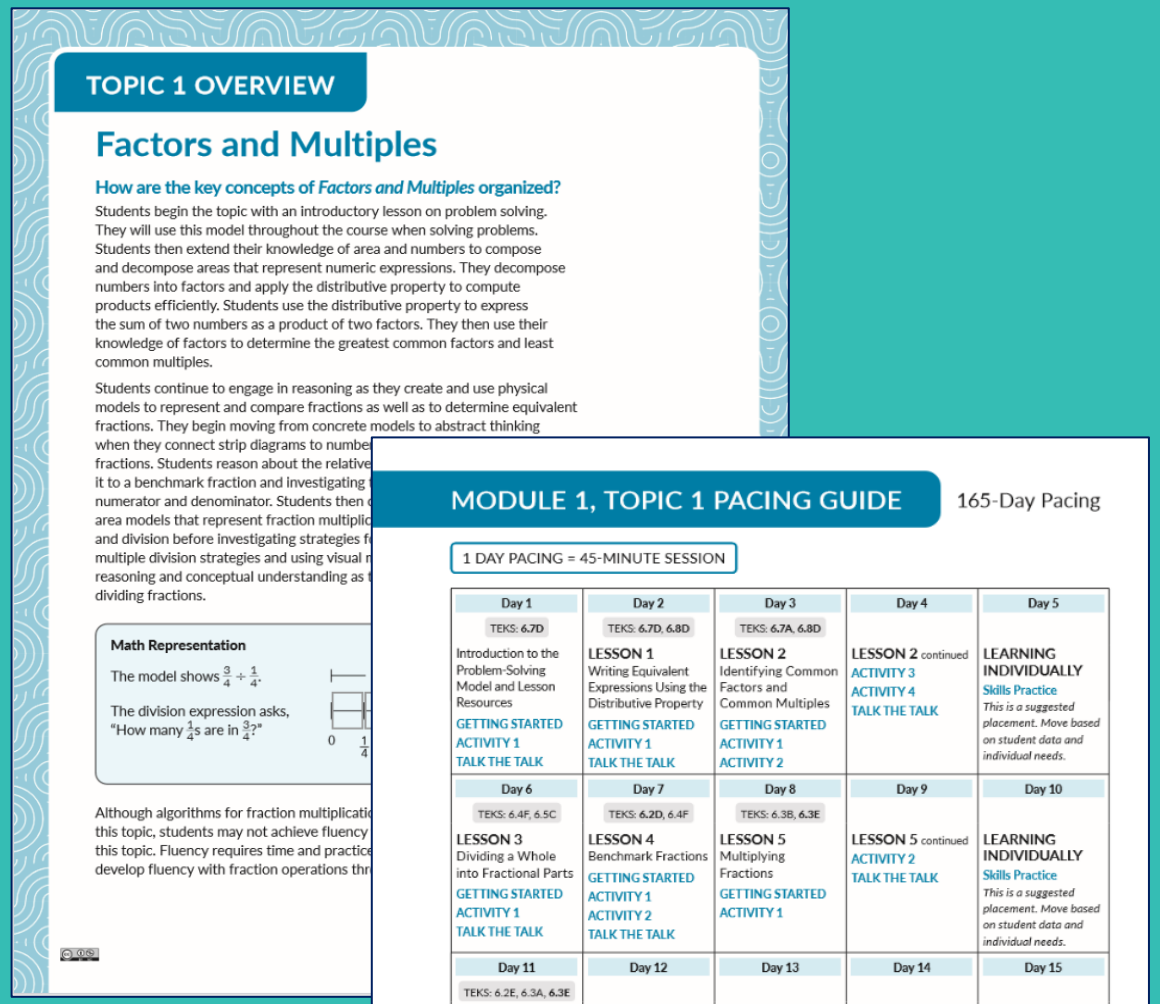
6.3E (R.)
1 pt.

SP – VI A, C

L6 – Assn Q 1-3

STRONG FOUNDATIONS
Implementation

Step 3: Examine the Arc of Learning



TOPIC 1 OVERVIEW

Factors and Multiples

How are the key concepts of *Factors and Multiples* organized?

Students begin the topic with an introductory lesson on problem solving. They will use this model throughout the course when solving problems. Students then extend their knowledge of area and numbers to compose and decompose areas that represent numeric expressions. They decompose numbers into factors and apply the distributive property to compute products efficiently. Students use the distributive property to express the sum of two numbers as a product of two factors. They then use their knowledge of factors to determine the greatest common factors and least common multiples.

Students continue to engage in reasoning as they create and use physical models to represent and compare fractions as well as to determine equivalent fractions. They begin moving from concrete models to abstract thinking when they connect strip diagrams to numbe
fractions. Students reason about the relative
it to a benchmark fraction and investigating
numerator and denominator. Students then
area models that represent fraction multiplic
and division before investigating strategies f
multiple division strategies and using visual
reasoning and conceptual understanding as
dividing fractions.

Math Representation

The model shows $\frac{3}{4} \div \frac{1}{4}$.

The division expression asks, "How many $\frac{1}{4}$s are in $\frac{3}{4}$?"

Although algorithms for fraction multiplicati
this topic, students may not achieve fluency
this topic. Fluency requires time and practice
develop fluency with fraction operations thr

MODULE 1, TOPIC 1 PACING GUIDE — 165-Day Pacing

1 DAY PACING = 45-MINUTE SESSION

Day 1	Day 2	Day 3	Day 4	Day 5
TEKS: **6.7D**	TEKS: **6.7D, 6.8D**	TEKS: **6.7A, 6.8D**		
Introduction to the Problem-Solving Model and Lesson Resources GETTING STARTED ACTIVITY 1 TALK THE TALK	**LESSON 1** Writing Equivalent Expressions Using the Distributive Property GETTING STARTED ACTIVITY 1 TALK THE TALK	**LESSON 2** Identifying Common Factors and Common Multiples GETTING STARTED ACTIVITY 1 ACTIVITY 2	**LESSON 2** continued ACTIVITY 3 ACTIVITY 4 TALK THE TALK	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
TEKS: **6.4F, 6.5C**	TEKS: **6.2D, 6.4F**	TEKS: **6.3B, 6.3E**		
LESSON 3 Dividing a Whole into Fractional Parts GETTING STARTED ACTIVITY 1 TALK THE TALK	**LESSON 4** Benchmark Fractions GETTING STARTED ACTIVITY 1 ACTIVITY 2 TALK THE TALK	**LESSON 5** Multiplying Fractions GETTING STARTED ACTIVITY 1	**LESSON 5** continued ACTIVITY 2 TALK THE TALK	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
TEKS: **6.2E, 6.3A, 6.3E**				
LESSON 6 Fraction by Fraction Division GETTING STARTED TALK THE TALK	**LESSON 6** continued ACTIVITY 2 ACTIVITY 3	**LESSON 6** continued ACTIVITY 4 TALK THE TALK	**LEARNING INDIVIDUALLY** Skills Practice *This is a suggested placement. Move based on student data and individual needs.*	**END OF TOPIC ASSESSMENT**

*Bold TEKS = Readiness Standard

STEP 3 Examine the arc of learning.

USE THE MODULE OVERVIEW, TOPIC OVERVIEW, AND ASSESSMENT
Analyze the big ideas for each lesson to understand how knowledge and skills build over the topic, including any necessary prior knowledge students may need to successfully engage with the mathematics in the topic. Examine and develop familiarity with mathematical strategies required in the topic.

Consider and be ready to share:

How does the math in the arc of learning move from simple to complex?

1 Writing Equivalent Expressions Using the Distributive Property

Setting the Stage

- Communicate the objectives and new key terms to look for.
- Tap into your students' prior learning by reading the narrative statement.
- Provide a sense of direction by reading the Essential Question.

OBJECTIVES

- Write, read, and evaluate equivalent numeric expressions.
- Identify the adjacent side lengths of a rectangle as factors of the area value.
- Identify parts of an expression, such as the product and the factors.
- Write equivalent numeric expressions for the area of a rectangle by decomposing one side length into the sum of two or more numbers.
- Apply the distributive property to rewrite the product of two factors.

NEW KEY TERMS

- numeric expression
- equation
- distributive property

Key vocabulary

You know how to add, subtract, multiply, and divide numbers using different strategies. Taking apart numbers before you perform a mathematical operation can highlight important information or make calculations easier.

How can taking apart numbers help you to express number sentences in different ways?

Sample answer:

There are many ways to rewrite equivalent expressions using properties. The distributive property of multiplication over addition states that for any numbers, a, b, and c, $a(b + c) = ab + ac$.

Model and explain the distributive property

Chunking the Activity

- Read and discuss the situation.
- Have students complete Question 1 individually.
- Check in and share.
- Have students complete Questions 2 and 3 individually.
- Share and summarize.

NOTE: This is the first lesson where TEKS 6.1A is highlighted.

- Read and display TEKS 6.1A and explain that this activity is an example of applying mathematics to everyday life and society.

NOTE: This is the first lesson where TEKS 6.1D is highlighted.

- Read and display TEKS 6.1D and explain that in this activity students are communicating mathematical ideas and reasoning using diagrams and language.

Getting Started

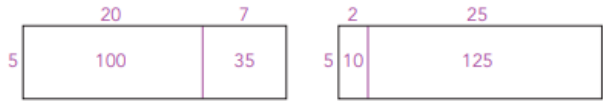
Ask student to read the problem

Ask Yourself . . . How can you use the area of rectangles in everyday life?

Sofia is building a rectangular walkway up to her house. The width of the walkway is 5 feet, and the length is 27 feet. She needs to calculate the area of the walkway to determine the amount of materials needed to build it.

1. Mark and label two different ways you could divide an area model to determine the area of the walkway.

Sample answer:



Ask Yourself . . . How does representing mathematics in multiple ways help to communicate reasoning?

Model one way to develop the area model
Students practice another way & share with their learning partner

3. What is the total area of the walkway?

135 square feet

Share the solution and student check their responses

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STRONG FOUNDATIONS Implementation

ACTIVITY 1.1

Connecting Area Models and the Distributive Property

The numeric expression of 5 · 27 represents the area of the walkway from the Getting Started. A **numeric expression** is a mathematical phrase that contains numbers and operations.

The equation 5 · 27 = 135 shows that the expression 5 · 27 is equal to the expression 135.

An **equation** is a mathematical sentence that uses an equals sign to show that two or more quantities are the same as one another.

1. Reflect on the different ways you can rewrite the product of 5 and 27. Select one of your area models to complete the example.

Sample answers:

How did you split the side length of 27?

$5 \cdot 27 = 5(\underline{25} + \underline{2})$

What are the factors of each smaller region?

$= (5 \cdot \underline{25}) + (5 \cdot \underline{2})$

What is the area of each smaller region?

$= \underline{125} + \underline{10}$

What is the total area?

$= \underline{135}$

What are other ways you could split one of the factors into a correct equation? What would the equation look like if you split one of the factors into more than two regions?

Chunking the Activity

1) Ask student to read about a numeric expression

- Read and discuss the introduction.

2) Ask student to read about an equation

- Read and discuss

3) Turn and talk with a partner to show how they are the same and different

- Check in and share.
- Read and discuss the

4) Model problem #1

to complete Questions 3–5.

- Share and summarize.

STAMP THE LEARNING

The definitions provide an opportunity for explicit instruction. Interact with this information as a class and encourage students to restate or explain the information in their own words.

Optimizing Learning

This activity supports decoding of text, mathematical notation, and symbols.

Question 1 presents an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice rewriting products using the distributive property assign Skills Practice Set A for this lesson.

NOTE: This is the first lesson where TEKS 6.1C is highlighted.

- Read and display TEKS 6.1C and explain that in this activity students select tools including mental math and number sense to solve problems.

5) Sts review the definition & worked example on the distributive property & explain it to their learning partner

6) Teacher clarifies as needed

STAMP THE LEARNING

The definition and Worked Example provide an opportunity for explicit instruction. Interact with this information as a class and encourage students to restate or explain the information in their own words.

Question 3 presents an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice with determining unknown addends, assign Skills Practice Set A for this lesson.

You just used the *distributive property*!

The **distributive property**, when applied for multiplication, states that for any numbers a, b, and c, the equation $a(b + c) = ab + ac$ is true.

2. Explain the distributive property using the area model shown.

Sample explanation:

The area of the whole rectangle is equal to $a(b + c)$, because a is the width and $b + c$ is the length. The area of the smaller rectangle is $a \cdot b$ and the area of the larger rectangle is $a \cdot c$. The sum of those areas, $ab + ac$, is equal to the area of the whole rectangle, $a(b + c)$.

You can also use grouping symbols to show that you need to multiply each set of factors before you add them, $(4 \cdot 2) + (4 \cdot 15)$.

WORKED EXAMPLE

Consider this example of the distributive property.

$4(2 + 15) = 4 \cdot 2 + 4 \cdot 15$

You can read and describe the expression $4(2 + 15)$ in different ways. For example, you can say:

- "four times the quantity of two plus fifteen",
- "four times the sum of two and fifteen", or
- "the product of four and the sum of two and fifteen".

You can describe the expression $4(2 + 15)$ as a product of two factors. The quantity $(2 + 15)$ is both a single factor and a sum of two terms.

3. Fill in the missing addend in each box that makes the equation true.

a. $7(\underline{3} + 10) = 21 + 70$ b. $3(\underline{12} + 15) = 36 + 45$

c. $8(2 + \underline{7}) = 16 + 56$ d. $5(6 + \underline{9}) = 30 + 45$

8 MODULE 1 • TOPIC 1 • LESSON 1

EB STUDENT TIP

For "Advanced" and "Advanced High" proficiency levels

Remind students to refer to the Academic Glossary to review the definition of **describe** and related phrases. Suggest they ask themselves these questions:

- How should I organize my thoughts?
- Did I consider the context of the situation?

EB STUDENT TIP

For "Advanced" and "Advanced High" proficiency levels

Have students differentiate between the terms *expression* and *equation*.

Have students share the similarities and differences between expressions and equations. Then, ask them to provide additional examples of each.

8 MODULE 1 • TOPIC 1 • LESSON 1

4. Rewrite a factor as the sum of two terms in each equation and use the distributive property to verify each product.

a. $4 \cdot 17 = 68$

Sample answer:

$4(10 + 7) = 68$

$40 + 28 = 68$

$68 = 68$

b. $9 \cdot 34 = 306$

Sample answer:

$9 \cdot 34 = 306$

$9(30 + 4) = 306$

$270 + 36 = 306$

$306 = 306$

c. $3 \cdot 29 = 87$

Sample answer:

$3 \cdot 29 = 87$

$3(20 + 9) = 87$

$60 + 27 = 87$

$87 = 87$

5. Identify each statement as true or false. If the statement is false, show how you could rewrite it to make it a true statement.

a. True False $3(2 + 4) = 3 \cdot 2 + 4$

False;

$3(2 + 4) = 3 \cdot 2 + 3 \cdot 4$

b. True False $6(10 + 5) = 6 \cdot 10 + 6 \cdot 5$

True

c. True False $7(20 + 8) = 7 + 20 \cdot 8$

False;

$7(20 + 8) = 7 \cdot 20 + 7 \cdot 8$

d. True False $4(5 + 10) = 20 + 10$

False;

$4(5 + 10) = 20 + 40$

e. True False $2(6 + 11) = 12 + 22$

True

7) Students practice with a partner in completing 4 A,B,C

Ask Yourself . . .
What tools or strategies can you use to solve this problem?

Questions 4 and 5 present an opportunity to assess students' understanding of the essential content of the lesson. Use student responses to determine when to schedule Learning Individually Days. To provide additional practice using the distributive property to decompose expressions, assign Skills Practice Set C. To provide additional practice identifying equivalent expressions, assign Skills Practice Set D.

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STRONG FOUNDATIONS Implementation

Chunking the Activity

- Group students to complete the activity.
- Share and summarize.
- Have students answer the Essential Question on the lesson opener.

Optimizing Learning

This activity optimizes relevance, value, and authenticity.

8) Students complete Exit Ticekt A or Exit Ticket B or both

Talk the Talk

The Floor Is Yours

6th Grade Math
Readiness Standard
Category 1

Exit Ticket A

6.7D # 8Z

Shea wrote the expression $5(y + 2) + 4$ to show the amount of money five friends paid for snacks at a baseball game. Which expression is equivalent to the one Shea wrote?

F $5 + y + 5 + 2 + 4$

G $5 \cdot y \cdot 5 \cdot 2 + 4$

H $5 \cdot y \cdot 4 + 5 \cdot 2 \cdot 4$

J $5 \cdot y + 5 \cdot 2 + 4$

9) Teacher walks around monitoring and assisting students as needed.

Sample answer:

34 + 10) = 50

= 200

= 420

the length of th
ent sizes for each activity.

the area for playing volleyball the largest, 50 feet by
t.

the area for playing dodgeball, 50 feet by 34 feet, close to
the same size as the volleyball area but a bit smaller.

- I made the smallest area of the gym, 50 feet by 10 feet, for playing board games or reading since those are activities that require less movement.

6th Grade Math
Readiness Standard
Category 1

Exit Ticket B

6.7D # 52W

Which two expressions are equivalent?

F $9(6 + x)$
$9 \cdot 6 + 9 \cdot x$

G $x + (8 \cdot 9)$
$(x + 8) \cdot 9$

H $8 \cdot 6 \div x$
$8 \cdot x \div 6$

J $6 \cdot x + 3$
$6 \cdot (x + 3)$

10) Teacher shares solutions and does a formative check. Thumbs up (both correct) , thumb sideways (1 correct) or thumbs down (none correct).

Lesson 1 Assignment

Write

Explain the distributive property in terms of composing and decomposing numbers.

Remember

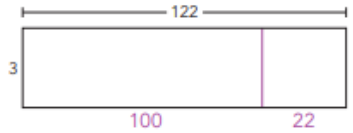
There are many ways to rewrite equivalent expressions using properties. The distributive property of multiplication over addition states that for any numbers a, b, and c, $a(b + c) = ab + ac$.

Practice

Decompose each rectangle into two or three smaller rectangles to demonstrate the distributive property. Then, write each area in the form $a(b + c) = ab + ac$.

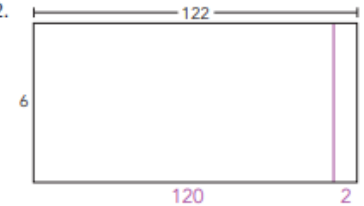
Sample answers:

1.



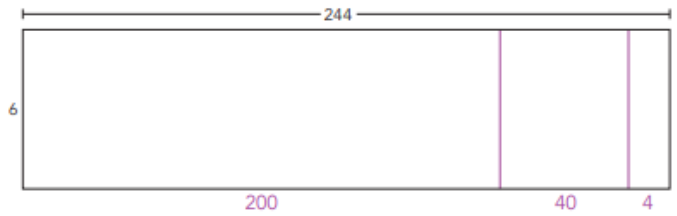
$3(100 + 22) = 300 + 66$

2.



$6(120 + 2) = 720 + 12$

3.



$6(200 + 40 + 4) = 1200 + 240 + 24$

Write

Sample explanation: When you have a rectangle that is composed of two smaller rectangles, the area of the rectangle is equal to the sum of the two smaller rectangles, $a \cdot b + a \cdot c$, where a and b are the dimensions of one rectangle and a and c are the dimensions of the second rectangle. This area is equal to the area of the large rectangle, determined by multiplying the shared side length times the sum of the two other side lengths, or $a(b + c)$.

Lesson 1 Assignment

4. 6(12 + 4)
   = 6 · 12 + 6 · 4
   = 72 + 24
   = 96

5. 10 + 4(2 + 20)
   = 4 · 2 + 4 · 20 + 10
   = 8 + 80 + 10
   = 98

6. 7(4 + 19)
   = 7 · 4 + 7 · 19
   = 28 + 133
   = 161

Prepare

1. In the array of numbers shown, circle the prime numbers, cross out the composite numbers, and use a box to identify any number that is neither prime nor composite.

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STRONG FOUNDATIONS
Implementation

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STRONG FOUNDATIONS
Implementation

Check List for the Internalization Process

1) Read, highlight and annotate the module & topic overviews ✓
2) Review the YAG, pacing guide & annotate any time stamps ✓
3) Review the topic assessment, scoring guide & response to student performance documents ✓
4) On the topic assessment, annotate the TEKS, (R or S), pts, skill practice and lesson assignment ✓
5) Use TCMPC to make the STAAR connection & rank the items level of importance (√), (√√) or (√√√). ✓
6) In the skill practice book, select the exercises and problem sets that student will work on during the learning individually days ✓
7) Review the Talk the Talk Activity or select STAAR exit tickets for students to complete after the lesson. ✓
8) Prep for lesson delivery (Slide decks, gather materials, etc…)

STRONG FOUNDATIONS
Implementation

TEA

Step 4: Organize Your Resources

Consider and be ready to share:

What systems of organization or routines have you used in the past that have increased your instructional time?

A) Prepare your slide deck
B) Gather your materials, resources, books, handouts
C) Rehearse your lesson

STEP 4 **Organize your resources.**

USE THE MATERIALS NEEDED PORTION OF THE TOPIC OVERVIEW

Locate needed resources, supplies, and/or materials. Connect with colleagues, as needed, to support all learners.

ENGLISH

Bluebonnet Learning™

Secondary Mathematics

EDITION 1

To Access the Google Slide Decks/Powerpoints in the OER Portal

1) Go to the Bluebonnet Learning Portal
2) Scroll down and click on view resources
3) Scroll down to Secondary Math
4) Click on your selected slided deck
5) Click download and enable editing