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

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.

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.

6 SESSIONS
5 LEARNING • 1 ASSESSMENT

TOPIC 3 *Decimals*

Learning Together: 4 Sessions

TEKS: 6.2C, **6.2D, 6.3E, 6.8D**

Students plot decimal values on a number line and use this representation to compare two numbers.

- Students reason about decimal point placement and develop the standard algorithm for decimal multiplication.
- Students formalize the long division algorithm for decimals.
- Students solve real-world problems using the standard algorithms for decimal operations.

Learning Individually: 1 Session

Targeted Skills Practice for *Decimals*

- Students plot, order, and compare rational numbers.
- Students use the standard algorithms to calculate sums, differences, products, and quotients of decimals.
- Students represent products of decimals using area models.
- Students determine the area and volume of composite figures and solids with rational side lengths.
- Students write fraction-decimal equivalents.

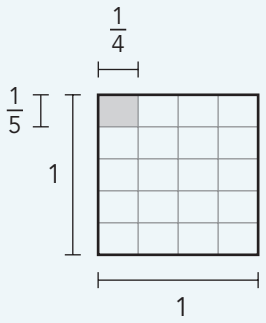
How is *Composing and Decomposing* connected to prior learning?

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

Math Representation

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

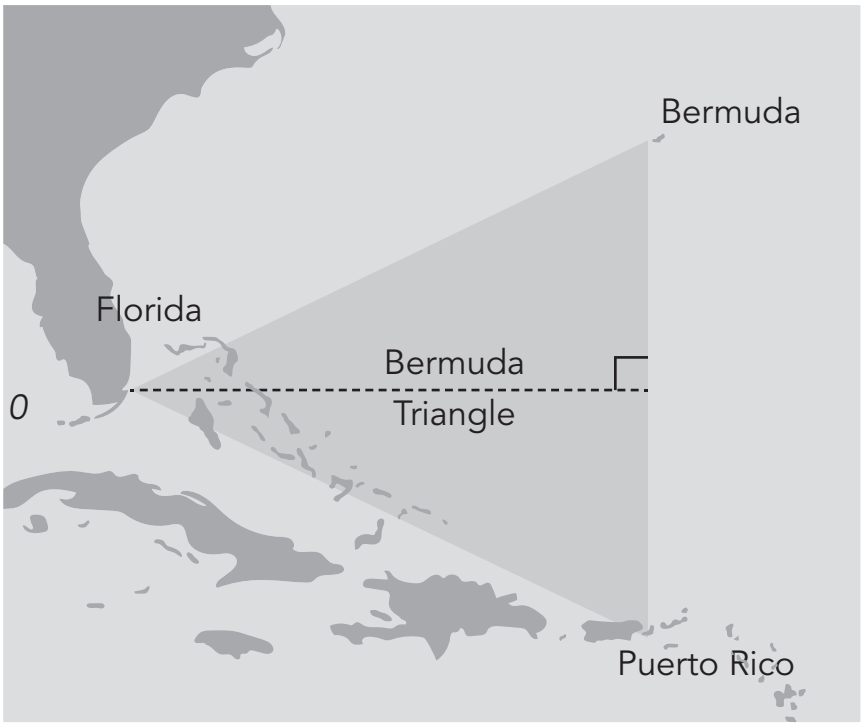


So, the shaded area of the rectangle represents the product $\frac{1}{5} \cdot \frac{1}{4} = \frac{1}{20}$.

When will students use knowledge from *Composing and 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.



The boundaries of the Bermuda Triangle vary according to how sources define the triangle vertices. If we use Miami, Florida, Naguabo, Puerto Rico, and Hamilton, Bermuda to define the Bermuda Triangle, then it covers an area of about 454,000 square miles. The dashed line on the map shows a distance of about 926 miles.

You can use equations to approximate the distance from Bermuda to Puerto Rico.

$A = \frac{1}{2}bh$

$454{,}000 = \frac{1}{2}b(926)$

$454{,}000 = 463b$

$b \approx 980.56$ miles

1 Composing and Decomposing

MODULE 1 Assessment Summary

Topic	Topic Title	Name	Administered	TEKS*
1	Factors and Multiples	End of Topic Assessment	After Topic 1	**6.2D** 6.2E 6.3A 6.3B **6.3E** 6.4F 6.5C **6.7A** **6.7D** **6.8D**
2	Shapes and Solids	End of Topic Assessment	After Topic 2	6.8A 6.8B 6.8C **6.8D**
3	Decimals	End of Topic Assessment	After Topic 3	6.2C **6.2D** **6.3E** **6.8D**

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