

Engaging Mathematics, Volume I: Grade 4

Engaging Mathematics,
Volume I:
Grade 4

Teacher Edition

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Region 4 Education Service Center supports student achievement by providing educational products and services that focus on excellence in service for children.

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What is *Engaging Mathematics, Volume I: Grade 4*?

1

An instructional resource featuring 77 Texas Essential Knowledge and Skills (TEKS)-based, classroom-ready mathematics activities that each take approximately 10 to 15 minutes to complete. We took the best activities of the original series, refreshing and revising them, and then added new activities where needed to create a complement for *Engaging Mathematics, Volume II*.

2

A TEKS-based resource that addresses the majority of the grade 4 mathematics TEKS. *Engaging Mathematics, Volume I* complements *Engaging Mathematics, Volume II*. Both volumes provide—

- Rigorous problem-solving tasks;
- Manipulative-based tasks;
- Vocabulary development tasks; and
- Sorting and classifying tasks.

3

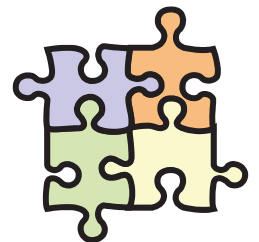
A resource that supports high-quality, research-based practices by providing activities that can be used for various purposes, including—

- Engaging warm-ups and opening tasks that draw students into relevant and challenging mathematics;
- Instructional support for all students to help learners articulate, refine, and retain important mathematical concepts, processes, and skills;
- Short-cycle, formative assessments that provide immediate and ongoing feedback to guide instruction for the teacher and learning for the student; and
- Supplemental tasks to support intervention strategies.

4

A resource that incorporates the mathematical process standards by promoting—

- Reasoning, generalizing, and problem-solving in mathematical and real-world contexts;
- Modeling, using tools, and connecting representations;
- Analysis; and
- Communication.




What is found in an Engaging Mathematics TEKS-based activity?

Each activity addresses a specific student expectation that is reflected in the content objective.

Common classroom materials are used for ease of preparation. Materials are listed 1-per-student unless otherwise noted. Page titles for student handouts are represented with bold font.

Students should have continuous access to STAAR® Reference Materials that will be made available for the assessment.

Facilitation questions are provided for teacher use when supporting student thinking and discourse.



Comparing Fractions, Activity 1
 4(3)(D)

Activity Objective
The student will compare two fractions with different numerators and different denominators using models.









Materials

- Area Model Comparisons
- Fraction circles

Facilitation Questions

- What does the denominator of each fraction tell you?
The denominator of each fraction tells me the number of equal-sized parts into which the whole is partitioned.
- What does the numerator of each fraction tell you?
The numerator of each fraction tells me how many parts of the whole are being counted.
- What do you notice about the size of the pieces of the model partitioned into thirds compared to the size of the pieces of the model partitioned into fourths?
The fractional parts of the model partitioned into thirds are larger than the fractional parts of the model partitioned into fourths.
- How can you compare fractions with different numerators and different denominators using models?
I can compare the size of the shaded portion of each circle model to determine which of the models represents the greater portion.


Answers

Pictorial Representation	Fraction	Symbol	Fraction	Pictorial Representation
	$\frac{1}{4}$	<	$\frac{2}{3}$	
	$\frac{1}{2}$	>	$\frac{3}{8}$	
	$\frac{3}{4}$	>	$\frac{5}{8}$	
	$\frac{1}{3}$	<	$\frac{4}{6}$	

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An answer key is included for each activity.

Each activity includes an opportunity for students to articulate and summarize aspects of their learning.


Date: _____ 

Area Model Comparisons

Use fraction circles to model each fraction. Draw the portion of each model in the space provided. Write each comparison statement using <, >, or = symbol.

Pictorial Representation	Fraction	Symbol	Fraction	Pictorial Representation
	$\frac{1}{4}$		$\frac{2}{3}$	
	$\frac{1}{2}$		$\frac{3}{8}$	
	$\frac{3}{4}$		$\frac{5}{8}$	
	$\frac{1}{3}$		$\frac{4}{6}$	

Communicating about Mathematics
How did the models help you compare fractions with different numerators and different denominators?



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Relating Decimals to Fractions, Activity 1

4(2)(G)

Activity Objective

The student will relate decimals to fractions that name tenths and hundredths.

Materials

- Naming Decimals
- Base-ten blocks

Facilitation Questions

- Which base-ten block corresponds to each place value?
Each flat represents one whole. Each rod represents one-tenth. Each unit cube represents one-hundredth.
- How can you represent $1\frac{5}{10}$ using the base-ten blocks?
I can use the hundreds flat to represent one whole and five tens rods to represent $\frac{5}{10}$.
- How can your pictorial model representation help you complete the place value chart?
I can record a one in the ones place to represent one whole, four in the tenths place to represent four tenths, and three in the hundredths place to represent three hundredths.
- How can using the place value chart help you write the decimal?
The place value chart helps to organize the digits based on place value. I can count the number of each base-ten block to complete the place value chart.



Answers

Fraction $1\frac{5}{10}$	Pictorial Representation 	Place Value Chart <table border="1"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th><th>Tenths</th><th>Hundredths</th></tr></thead><tbody><tr><td></td><td></td><td>1</td><td>5</td><td></td></tr></tbody></table>	Hundreds	Tens	Ones	Tenths	Hundredths			1	5	
		Hundreds	Tens	Ones	Tenths	Hundredths						
		1	5									
Decimal 1.5												

Fraction $\frac{75}{100}$	Pictorial Representation 	Place Value Chart <table border="1"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th><th>Tenths</th><th>Hundredths</th></tr></thead><tbody><tr><td></td><td></td><td>0</td><td>7</td><td>5</td></tr></tbody></table>	Hundreds	Tens	Ones	Tenths	Hundredths			0	7	5
		Hundreds	Tens	Ones	Tenths	Hundredths						
		0	7	5								
Decimal 0.75												

Fraction $1\frac{9}{100}$	Pictorial Representation 	Place Value Chart <table border="1"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th><th>Tenths</th><th>Hundredths</th></tr></thead><tbody><tr><td></td><td></td><td>1</td><td>0</td><td>9</td></tr></tbody></table>	Hundreds	Tens	Ones	Tenths	Hundredths			1	0	9
		Hundreds	Tens	Ones	Tenths	Hundredths						
		1	0	9								
Decimal 1.09												

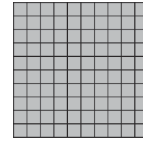
Fraction $1\frac{43}{100}$	Pictorial Representation 	Place Value Chart <table border="1"><thead><tr><th>Hundreds</th><th>Tens</th><th>Ones</th><th>Tenths</th><th>Hundredths</th></tr></thead><tbody><tr><td></td><td></td><td>1</td><td>4</td><td>3</td></tr></tbody></table>	Hundreds	Tens	Ones	Tenths	Hundredths			1	4	3
		Hundreds	Tens	Ones	Tenths	Hundredths						
		1	4	3								
Decimal 1.43												



Naming Decimals

- Use base-ten blocks to represent the given fraction.
- Record a pictorial representation of your model.
- Record the value of the model using the place value chart.
- Record the value of the model using a decimal.

This model is shaded to represent 1 whole.



Fraction $1\frac{5}{10}$	Pictorial Representation <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 5px;"></div> </div>											
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Hundreds	Tens	Ones	Tenths	Hundredths								
			•									

Fraction $\frac{75}{100}$	Pictorial Representation <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 5px;"></div> </div>											
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Hundreds	Tens	Ones	Tenths	Hundredths								
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<p style="text-align: center;">Fraction</p> $1\frac{9}{100}$	<p>Pictorial Representation</p> <div style="display: flex; justify-content: space-around;"><div style="border: 1px solid black; width: 150px; height: 150px; margin: 5px;"></div><div style="border: 1px solid black; width: 150px; height: 150px; margin: 5px;"></div></div>											
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Hundreds	Tens	Ones	Tenths	Hundredths								

Communicating about Mathematics

How does each pictorial representation and fraction relate to the corresponding decimal?





Representing Products, Activity 2

4(4)(C)

Activity Objective

The student will represent the product of two-digit numbers using models.

Materials

- **Multiplication Models**

Facilitation Questions

- What is known in the situation?
The student packed 12 boxes with 24 bars of soap in each box.
- What are you being asked to determine?
I need to determine the total number of bars of soap she packed in the boxes.
- How do you know that each model represents the product of two numbers?
Since the models are area models, I know each side length of the rectangle represents a factor and the area of the rectangle represents the product. Both models show the product of 12×24 even though the factors have been decomposed differently.

Answers

Possible answers:

- 1 *Both models are area models representing the product of 12×24 . The side lengths of both area models represent the factors 12 and 24.*
- 2 *Each student decomposed 24 differently. Brian decomposed the factor of 24 into $10 + 10 + 4$ while Jacob decomposed it by place value into $20 + 4$.*
- 3 *Both models represent the product of 12 and 24 by showing partial products.*



Multiplication Models

A student packed bars of soap into boxes for the local homeless shelter. She packed 12 boxes with 24 bars of soap in each box. How many bars of soap did the student pack?

Mr. Bowman asked two of his students to show how to determine the number of bars of soap the student packed.

Brian				Jacob		
	10	10	4		20	4
10	10 × 10	10 × 10	10 × 4	10	10 × 20	10 × 4
2	2 × 10	2 × 10	2 × 4	2	2 × 20	2 × 4

- 1 How are the two models similar?

- 2 How are the two models different?

- 3 Explain how both of these models can be used to represent the product of 12×24 .

Communicating about Mathematics

What is another model that can be used to determine the number of bars of soap the student packed? Why?