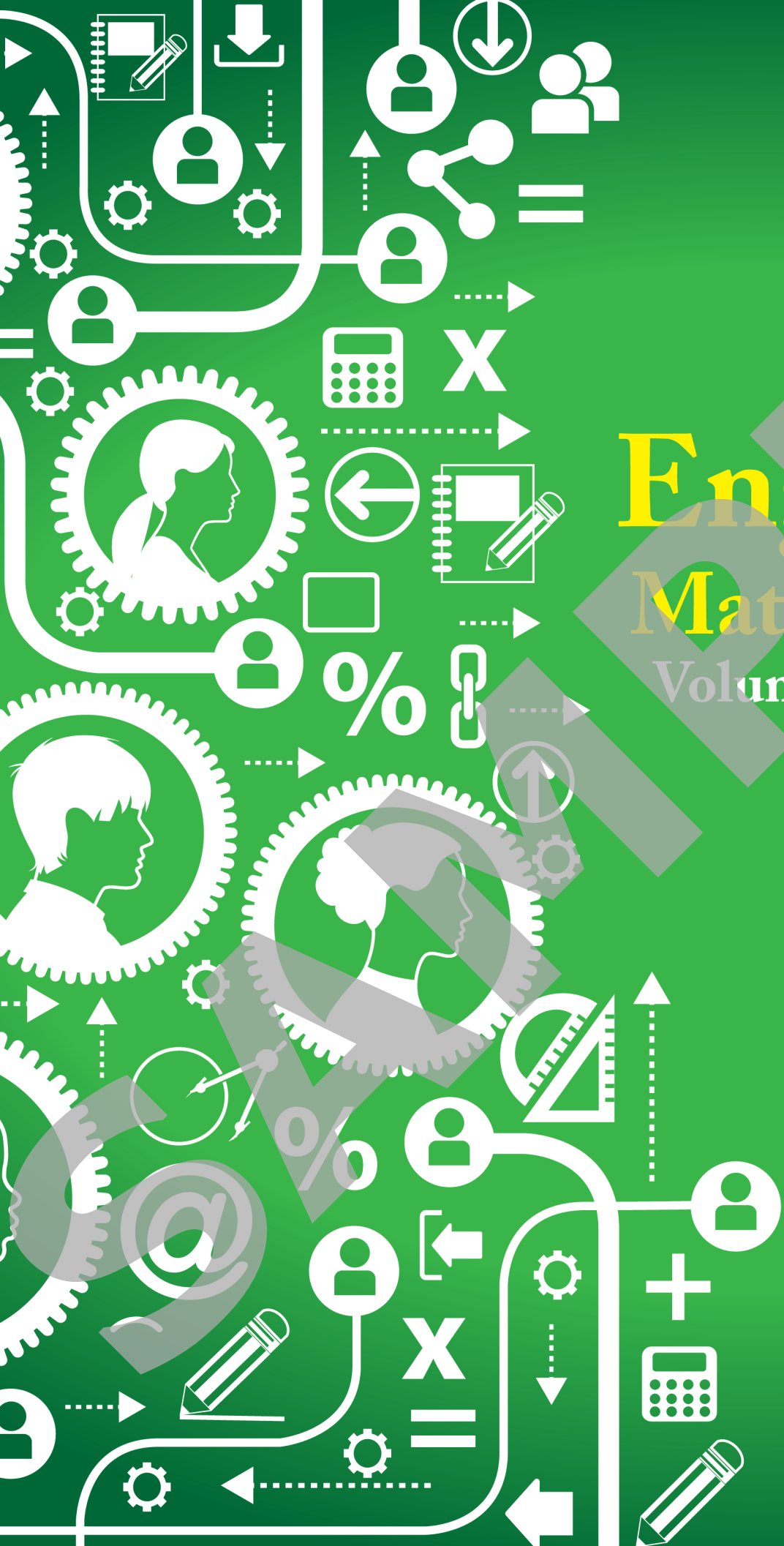

Engaging Mathematics, Volume II: Grade 4

region4®

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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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Table of Contents

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

1 An instructional resource featuring over 90 Texas Essential Knowledge and Skills (TEKS)-based, classroom-ready mathematics activities that each take approximately 10 to 15 minutes to complete.

2 A TEKS-based resource that addresses all Grade 4 mathematics TEKS and provides—

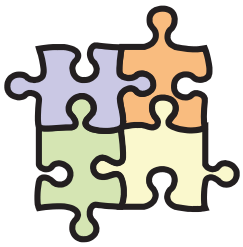
- Rigorous problem-solving tasks
- Manipulative-based tasks
- Vocabulary development tasks
- Sorting and classifying tasks

3 A resource that supports high-quality, research-based instruction 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, from at-risk to gifted and talented, 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
- Supplemental tasks to support intervention strategies

4 A resource that incorporates the mathematics process standards by promoting—

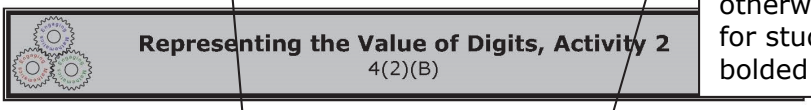
- Reasoning, generalizing, and problem-solving in mathematical and real-world contexts
- Modeling, using tools, and connecting representations
- Analysis
- Communication



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

TEKS have been phrased in student-friendly language so that students may gauge their learning.

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



Representing the Value of Digits, Activity 2
4(2)(B)

Activity Objective

I can represent the value of digits using expanded notation and numerals.

I can use numbers and words to describe the combined values of digits.

Materials

- **What is the Value?**
- **Digit Cards**
- Scissors

Answer Key

Answers will vary.

Possible answer.

862,097,683 = (8 x 100,000,000) + (6 x 10,000,000) + (2 x 1,000,000) + (9 x 10,000) + (7 x 1,000) + (6 x 100) + (8 x 10) + (3 x 1)

ELPS have been included in the form of a student-friendly language objective.

Debriefing questions are included to assist the teacher with facilitating a post-activity student discussion.

Debriefing Questions

- How did you represent the value of the digits in expanded notation?
- How did you determine the value of each digit and the combined value of each number?
- How do you know where to place a comma when writing a multi-digit number?
- How would you represent the numbers in expanded form?

Communicating about Mathematics

Students may respond by talking to a partner and recording a written response in the space provided.

Possible sentence frame:
Expanded notation shows _____.
Expanded form shows _____.

Each activity includes an opportunity for students to articulate and summarize their own learning. A sentence frame is provided for students who may need language support.

Listen For . . .

- *Appropriate use of key vocabulary such as place value, period, millions, hundreds, etc.*
- *Understanding that the value of the digit is based on the place value of the digit.*
- *Understanding that when a place-value position represents a value of zero, the value is not included when writing numbers in expanded form or notation.*
- *Correct usage of place value when saying a number, such as eight hundred sixty-two million, ninety-seven thousand, six hundred eighty-three.*

Listen/Look For . . .

Understanding that expanded notation shows the sum of each digit multiplied by its place-value position.
Understanding that expanded form shows the sum of the value of each digit.

Key learning outcomes from the debriefing discussion are summarized here.

Key learning outcomes from the Communicating about Mathematics section are included here.

Texas Essential Knowledge and Skills (TEKS) Alignment Chart

Relating Decimals to Fractions, Activity 3

4(2)(G)

Activity Objective

I can relate decimals to fractions that name tenths and hundredths.

I can explain my understanding of fractions and decimals.

Materials

- **Fraction and Decimal: Agree or Disagree**

Answer Key

With which student do you agree?
Joe

Explain why you agree with this student, and why you disagree with the other student.

I agree with Joe because $12\frac{2}{10}$ *and 12.2 represent twelve and two-tenths. I disagree with Sam because 12.02 represents twelve and two-hundredths.*

Debriefing Questions

- How did you determine which student was correct?
- What does the 12 represent in the fraction and the decimal notation?
- How might a place-value chart help you determine the correct decimal notation?
- What is the purpose of a zero when using decimal notation?

Listen For . . .

- *Connections between whole number and decimal place value.*
- *Understanding of equivalent fraction and decimal notations for tenths and hundredths.*

Communicating about Mathematics

Students may respond by talking to a partner and draw a picture in the space provided.

Possible sentence frame:
My model/picture justifies my answer because _____.

Listen/Look For . . .

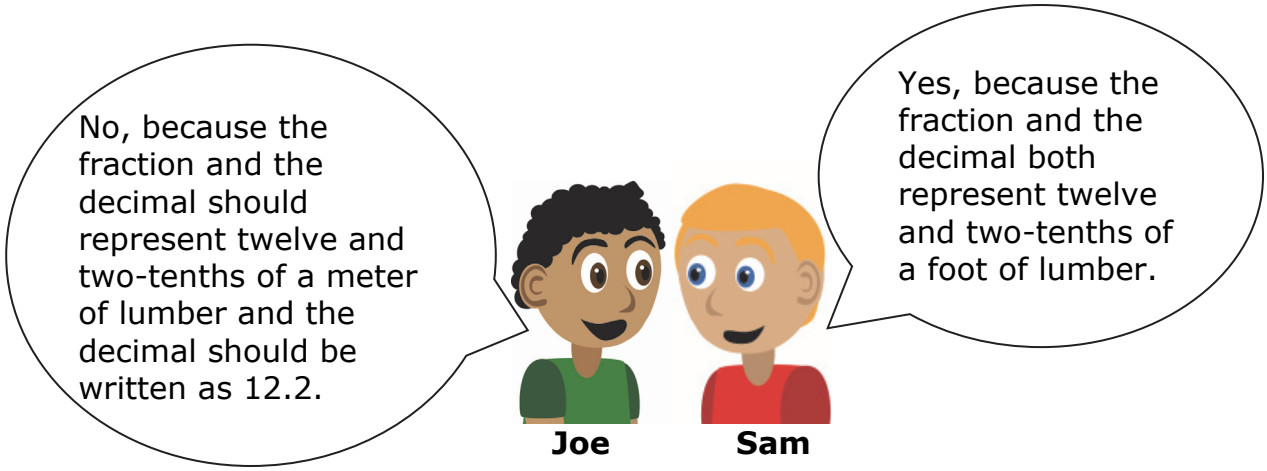
Connections among the model, $\frac{2}{10}$*, 0.02, and 0.2.*

Student Name: _____ Date: _____

Fraction and Decimal: Agree or Disagree

Mr. Thomas wanted to buy a piece of lumber that was $12\frac{2}{10}$ meters. The salesperson gave Mr. Thomas a piece of lumber that was 12.02 meters.

Did the salesperson give Mr. Thomas the correct length?

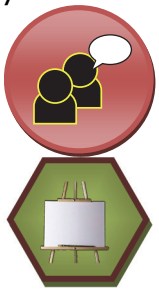


With which student do you agree?

Explain why you agree with this student, and why you disagree with the other student.

Communicating about Mathematics

Sketch a model for $\frac{2}{10}$ and 0.02 using the same model for one whole. How do your sketches justify your answer?



# Multiplying by 10 or 100, Activity 2
4(4)(B)

Activity Objective

I can determine the product of a number and 10 using properties of operations and understandings of place value.

I can explain mathematical ideas related to multiplication.

Materials

- **Multiplying by 10: Who Is Correct?**

Answer Key

Possible answers.

Aubrey is correct. She used an understanding of properties of operations to justify her thinking.

Blaine is also correct. He used an explanation that was based on his understanding of place value.

Debriefing Questions

- Explain in your own words how to multiply any number by 10.
- What pattern do you notice when you multiply any number by 10? By 100?
- How would the process change if you multiplied a number by 100 instead of 10?

Communicating about Mathematics

Students may respond by talking to a partner and recording a written response in the space provided.

Possible sentence frame:
_____'s explanation made the most sense to me mathematically because _____.

Listen For . . .

- *Understandings of the value of each digit based on its place-value position.*
- *Understanding that the value of each digit should be multiplied by 10 or 100 to determine the product.*
- *Understanding of expanded form and its use with properties of operations.*

Listen/Look For . . .

Understanding of properties of operations and place value.

Student Name: _____ Date: _____

Multiplying by 10: Who Is Correct?

Aubrey and Blaine both solved the problem below. They both determined the answer to be $5,460. However, they provided different explanations.

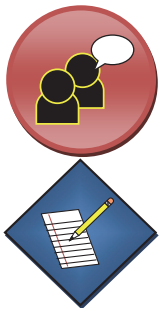
> A local pizza place sold large pizzas for $10 during the month of October. A total of 546 large pizzas was sold during October. What was the total cost of these large pizzas?

Aubrey's Explanation	Blaine's Explanation
To solve the problem I needed to multiply 546 by 10, which means that each value from the expanded form is being multiplied by 10, so $10 \times 546 = 10 \times (500 + 40 + 6)$ $(10 \times 500) + (10 \times 40) + (10 \times 6)$ $5{,}000 + 400 + 60$ $5{,}460$	To solve the problem I needed to multiply 546 by 10. When I multiplied by 10, I knew the product needed to be 10 times larger than the value of each digit; 500, 40, and 6. This means the product is the sum of 5,000 + 400 + 60.

- Is Aubrey correct? Justify your answer.

- Is Blaine correct? Justify your answer.

Communicating about Mathematics
Which explanation makes the most sense to you mathematically? Justify your answer.



_____
_____
_____
_____
_____
_____

Unknown Angle Measures, Activity 2

4(7)(E)

Activity Objective

I can determine the measure of an unknown angle.

I can explain the process used to determine the measure of an unknown angle.

Materials

- **Adjacent Angles: Who Is Correct?**

Answer Key

Paula is correct.

Debriefing Questions

- What do you know about adjacent angles? How did this help you determine who was correct?
- What is another method that you can use to solve this problem? How does it relate to the method used by Paula?

Communicating about Mathematics

Students may respond by talking to a partner and recording a written response in the space provided.

Possible sentence frame:
To determine who was correct, I _____.

Listen For . . .

- *Appropriate use of vocabulary such as adjacent angles, degrees, ray, and vertex.*
- *Appropriate use of angle notation such as m to indicate the angle measure and ∠ for angle.*
- *Connections between the sum of the measures of two non-overlapping adjacent angles and the measure of the angle formed by these two adjacent angles.*

Listen/Look For . . .

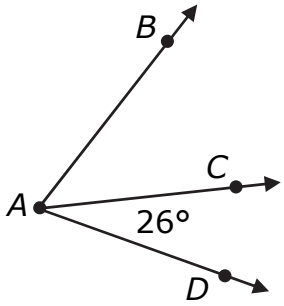
Understanding that when given the sum of the measures of two non-overlapping adjacent angles and the measure of one of the adjacent angles, the unknown angle measure can be determined.

Student Name: _____ Date: _____

Adjacent Angles: Who Is Correct?

Nancy and Paula were asked to solve the following problem:

Angle *BAD* has a measure of 72°. Determine the measure of angle *BAC.*



Nancy and Paula each solved the problem and came up with different answers. Their work is shown below.

Nancy's Work	Paula's Work
x = measure of angle BAC $72° + 26° = x$ $72° + 26° = 98°$ So, $\angle BAC$ measures 98°.	$m\angle BAC = x$ $26° + x = 72°$ $26° + 46° = 72°$ So, $\angle BAC$ measures 46°.
Is Nancy correct? Justify your answer.	Is Paula correct? Justify your answer.

Communicating about Mathematics
Describe the process you used to determine who was correct.

_____
_____
_____
_____
_____
_____