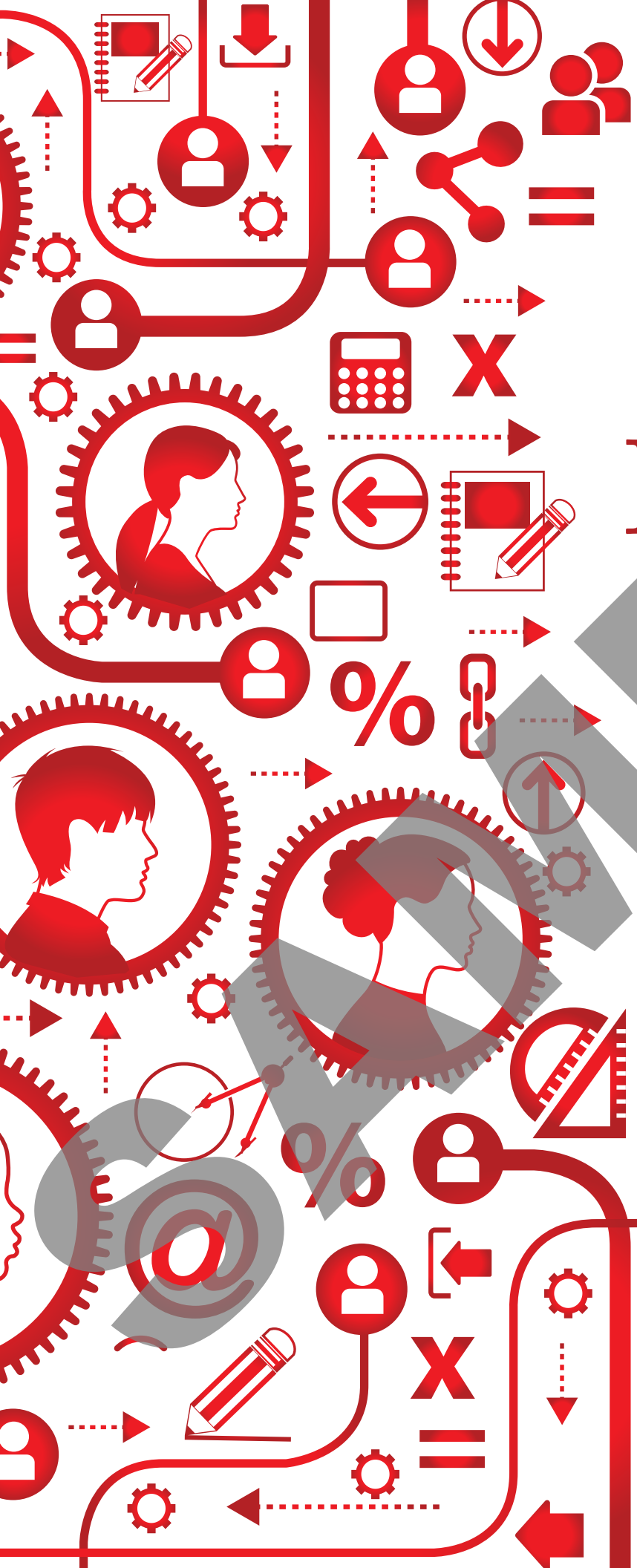

Engaging Mathematics,

Volume I: Grade 6

region4®

Engaging Mathematics, Volume I: Grade 6

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 I: Grade 6*?

1 An instructional resource featuring 81 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 6 mathematics TEKS. *Engaging Mathematics, Volume I* complements *Engaging Mathematics, Volume II*. Both volumes provide—

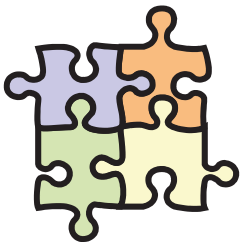
- Rigorous problem-solving tasks;
- Manipulative-based tasks;
- Vocabulary development tasks; and
- Sorting and classifying tasks.

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.

An answer key is included for each activity.

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

Opposites
6(2)(B)

Activity Objective
The student will identify a number and its opposite.

Materials
- **Opposites**
- Colored pencils or crayons–at least 8 different colors

Facilitation Questions
- **What is the relationship between the cards within the shaded set?**
  Possible answer: Descended and ascended are opposites. An airplane can go down (descend) 16 kilometers or go up (ascend) 16 kilometers.
- **What is the opposite of losing 7 pounds?**
  The opposite of losing pounds is gaining pounds.
- **How can you represent gaining 7 pounds of total weight as an integer? Losing 7 pounds of total weight?**
  +7 (gaining weight); –7 (losing weight)

Answers

Shari deposited $10.
+10
Mika withdrew $10.
–10

The temperature was 7° above zero.
+7
The temperature was 7° below zero
–7

The man was standing 3 feet above sea level.
+3
The woman was standing 3 feet below sea level.
–3

The toy car moved forward 16 inches.
+16
The toy car moved backwards 16 inches.
–16

The football team gained 10 yards.
+10
The football team lost 10 yards.
–10

The puppy gained 7 pounds.
+7
The puppy lost 7 pounds.
–7

The stock market rose 3 points.
+3
The stock market dropped 3 points.
–3

me: _____ Date: _____

Opposites

ent each situation with an integer.
atches of two opposite situations. Shade each pair of opposite situations using a
color. One set has been done for you.
tches are incomplete. Use a blank space to create opposite situations to complete
ches.

posited $10. ___	The temperature was 7°F above zero. ___	The football team gained 10 yards. ___	The airplane descended 16 kilometers. –16
man was ing 3 feet sea level. ___	The puppy lost 7 pounds. ___	The airplane ascended 16 kilometers. 16	The woman was standing 3 feet below sea level. ___
thdrew $10. ___		The stock market rose 3 points. ___	The football team lost 10 yards. ___
The stock market dropped 3 points. ___	The toy car moved forward 16 inches. ___		The temperature was 7°F below zero. ___

Communicating about Mathematics
What do you notice about the situations that are best represented by a negative integer?

# Order of Operations, Activity 3
6(7)(A)

Activity Objective
The student will simplify numerical expressions using the order of operations.

Materials
- **Amazing Operations**

Facilitation Questions
- **How do parentheses affect the order in which we perform operations?**
  Expressions in parentheses must be evaluated first.
- **Which operation, multiplication or division would you do next? How do you know?**
  When the expression has multiplication and division, you work from left to right, performing the operation that comes first.

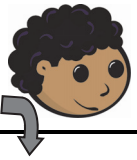
Answers

$3(2)^2 = 12$	$(2\cdot 3)+6 = 12$	$4+2\cdot 8\div 4 = 8$	$3(-4) = -12$	$\frac{(12-6+3)^2}{6} = \frac{27}{2}$
$2(3+6) = 18$	$(4+2)\cdot 8\div 4 = 12$	$\frac{2\cdot 7+10}{5-3} = 12$	$-2+15-6+5 = 12$	$6\cdot 8\div 2\cdot 2 = 48$
$(12\div 6)\cdot(4+2)\cdot 2 = 24$	$2\cdot 7+10\div 5-3 = 13$	$2-15+6-5 = -12$	$6+8-4\div 2 = 12$	$6-18 = -12$
$\frac{4\cdot 6-3}{3} = 7$	$12\div 6\cdot 4+2\cdot 2 = 12$	$3^2-5^2+3 = -13$	$6-(-6) = 12$	$(3-5)^2+3 = 7$
$\frac{1}{4}(16+32) = 12$	$-3(4+6)\div 2 = -15$	$-(-3)(-4) = -12$	$3(-5+3)^2 = 12$	$(-3)(-4) = 12$
				 **Finish: 12**

Student Name: _____ Date: _____

Amazing Operations

Help Alvaro find the cupcake. The correct path to the cupcake only passes through expressions which are equivalent to 12. You can only move horizontally or vertically to the next box. Start in the indicated box and work through the maze shading boxes with expressions equal to 12 as you go.



Start:

$3(2)^2$	$(2\cdot 3)+6$	$4+2\cdot 8\div 4$	$3(-4)$	$\frac{(12-6+3)^2}{6}$
$2(3+6)$	$(4+2)\cdot 8\div 4$	$\frac{2\cdot 7+10}{5-3}$	$-2+15-6+5$	$6\cdot 8\div 2\cdot 2$
$(12\div 6)\cdot(4+2)\cdot 2$	$2\cdot 7+10\div 5-3$	$2-15+6-5$	$6+8-4\div 2$	$6-18$
$\frac{4\cdot 6-3}{3}$	$12\div 6\cdot 4+2\cdot 2$	3^2-5^2+3	$6-(-6)$	$(3-5)^2+3$
$\frac{1}{4}(16+32)$	$-3(4+6)\div 2$	$-(-3)(-4)$	$3(-5+3)^2$	$(-3)(-4)$
				 **Finish: 12**

Communicating about Mathematics
Describe the rules for the order of operations.

# Modeling the Distributive Property
6(7)(D)

Activity Objective
The student will apply the distributive property to represent expressions in multiple ways and generate equivalent expressions using the distributive property.

Materials
- **Models of Groups of Tiles**
- Algebra Tiles

Facilitation Questions
- **What information is given in the key?**
  The key provides information about what the shapes and shading of tiles represent.
- **What similarities do you notice between the pictorial model you created for Expression 1 and the pictorial model you created for Expression 4? How might this information help you complete the verbal description for Expression 4?**
  I notice that the model I created for Expression 4 consists of repeated groups of the model of Expression 1. Since there are 4 equal groups, I can represent the model verbally as: four groups of $-x+2$.

Answers

Pictorial Model	Verbal Description	Algebraic Representation
1. 	*One group of* $-x+2$	$-x+2$
2. 	Two groups of $-x+2$	$-2x+4$
3. 	*Three groups of* $-x+2$	$-3x+6$
4. 	*Four groups of* $-x+2$	$-4x+8$

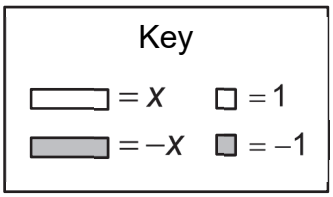
5. *Possible answer: The two expressions are equivalent to each other. One represents the expression before the distributive property is applied. The other represents the simplified expression after the distributive property is applied.*

6. *Possible answer:* $3(x-5)$*: The model represents 3 groups of* $x-5$.
   $3x-15$*: The model is comprised of 3* x*-tiles and 15 negative unit tiles.*

Student Name: _____ Date: _____

Models of Groups of Tiles

Use the tiles and the key to represent each expression three ways: pictorially, verbally, and algebraically.



Pictorial Model	Verbal Description	Algebraic Representation
1.		$-x+2$
2.	Two groups of $-x+2$	
3. 		
4.		$-4x+8$

5. Compare expression 4 with the expression $4(-x+2)$. How are they alike? How are they different?

6. Write two different algebraic expressions to represent the model below. Explain how each expression represents the model.

Communicating about Mathematics
Describe how the distributive property relates to these expressions.