DELTA MATH

RtI PROGRAM

8th Grade
Tier 2 Intervention Lessons

Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Readiness for 7.EE.4a: Solve equations with more than one step

Table of Contents

IES Recommendations for Tier 2 and 3 intervention lessons:

2. Instructional materials for students receiving interventions should focus intensely on in-depth treatment of whole numbers in kindergarten through grade 5 and on rational numbers in grades 4 through 8. These materials should be selected by committee.	Low
3. Instruction during the intervention should be explicit and systematic. This includes providing models of proficient problem solving, verbalization of thought processes, guided practice, corrective feedback, and frequent cumulative review.	Strong
4. Interventions should include instruction on solving word problems that is based on common underlying structures.	Strong
5. Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas.	Moderate
6. Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts.	Moderate
7. Monitor the progress of students receiving supplemental instruction and other students who are at risk.	Low
8. Include motivational strategies in tier 2 and tier 3 interventions.	Low

(Institute of Educational Sciences, Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools, 2009, p. 6)
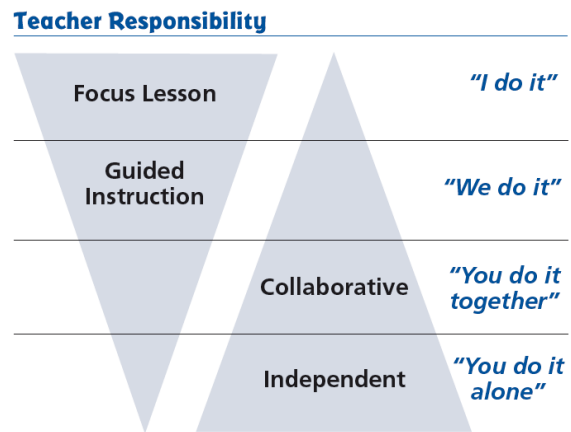
Gradual release of responsibility model

Teacher Responsibility

Focus Lesson		*"I do it"*
Guided Instruction		*"We do it"*
	Collaborative	*"You do it together"*
	Independent	*"You do it alone"*

Figure 1

[(Dr. Douglas Fisher, Effective Use of the Gradual Release of Responsibility Model)](#)

Planning Guide: Session 1

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

	Recommended Actions
Beginning *(15 min.)*	<u>Review</u> the readiness standard with the intervention group using the **Guided Review** o Introduce the learning target and why it is important for future learning o Read each question on the Guided Review and ask students to share what they remember from the previous school year.
Middle *(5 min.)*	➢ Ask students to <u>reflect</u> on their progress towards the learning target o What did I remember about the learning target? o What did I learn today about the learning target? o How confident do I feel about doing the learning target on my own?
End *(10 min.)*	➢ <u>Assess</u> each student's progress using **Quick Check – Form A** ➢ Guide students to self-correct their **Quick Check – Form A** ➢ Guide students to <u>chart their progress</u> by recording the date and Quick Check score in their **Growth Chart** ➢ Collect each student's Quick Check and Growth Chart
After	➢ Create sub-groups to differentiate the middle of sessions 2 through 8 o Group 1 – Include students who <u>did not</u> meet the learning goal o Group 2 – Include students who met or exceeded the learning goal

8ᵗʰ Grade Fall Guided Review

Readiness Standard 4 - 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

1.

Find the equivalent expanded expression:

$$3(x + 2)$$

   ○ $3x + 2$ ○ $3x + 6$ ○ $6x$ ○ $x + 6$

2.

Find the equivalent expanded expression:

$$7(6x + 3)$$

   ○ $42x + 21$ ○ $42x + 3$ ○ $63x$ ○ $6x + 21$

3.

Find the equivalent expanded expression:

$$4(2x + 8) + x$$

   ○ $9x + 8$ ○ $8x + 32$ ○ $41x$ ○ $9x + 32$

Name_____ Date_____

Learning Target: I will expand linear expressions.

1.

Find the equivalent expanded expression:

$$4(x + 6)$$

○ $4x + 24$ ○ $4x + 6$ ○ $24x$ ○ $x + 24$

2.

Find the equivalent expanded expression:

$$8(5x + 2)$$

○ $40x + 2$ ○ $40x + 16$ ○ $56x$ ○ $5x + 16$

3.

Find the equivalent expanded expression:

$$3(4x + 6) + x$$

○ $13x + 6$ ○ $12x + 18$ ○ $31x$ ○ $13x + 18$

8ᵗʰ Grade Spring Guided Review

Readiness Standard 4 - 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

1.

Find the equivalent expanded expression:

$$7(x + 3)$$

○ $7x + 3$ ○ $7x + 21$ ○ $21x$ ○ $x + 21$

2.

Find the equivalent expanded expression:

$$4(6x + 2)$$

○ $6x + 8$ ○ $24x + 2$ ○ $32x$ ○ $24x + 8$

3.

Find the equivalent expanded expression:

$$5(2x + 4) + x$$

○ $10x + 20$ ○ $11x + 20$ ○ $31x$ ○ $11x + 4$

Learning Target: I will expand linear expressions

Briefly discuss student responses

> ➢ What did I remember about expanding algebraic expressions?

> ➢ What did I learn today about expanding algebraic expressions?

> ➢ How confident do I feel about expanding algebraic expressions
> on my own? *(Thumbs up, down, or sideways)*
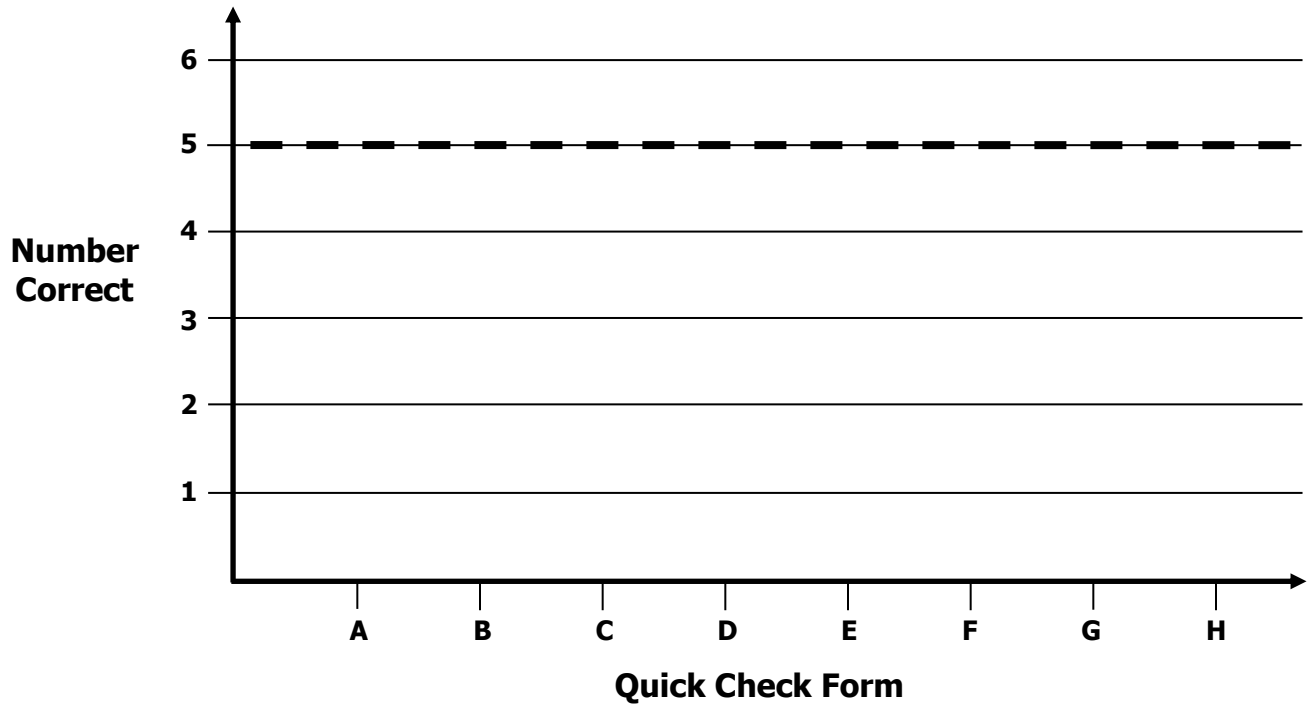
8th Grade – Readiness Standard 4 – 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $9(x + 3)$	**2.** $6(x - 4)$
3. $5(9x + 2)$	**4.** $7(3x - 6)$
5. $8(4x + 7) + x$	**6.** $4(7x + 3) - 6x$

Growth Chart

8th Grade – Readiness Standard 4 – 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

Goal: 5 out of 6 correct

Intervention	Date	Score
Guided Review		

Planning Guide: Sessions 2 Through 8

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

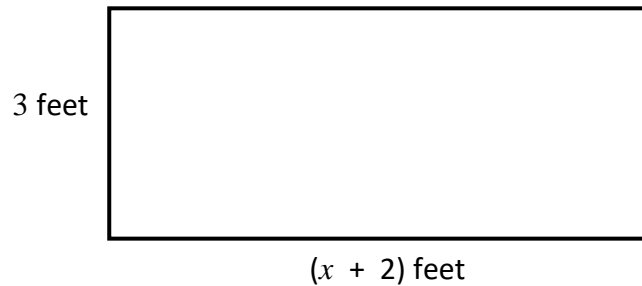| Recommended Actions		
Beginning (5 min.)	➢ Review the learning target with the whole group and ask each student to set a goal.	
Middle (15 min.)	**Group 1:** Students who scored below the learning goal on the previous Quick Check. ➢ Model solving a word problem – "I do" ➢ Guided Practice – "We do" **Session 2:** Expand linear expressions using algebra tiles. **Session 3:** Expand linear expressions using math drawings. **Session 4:** Expand linear expressions by distributing and combining like-terms.	**Group 2:** *(Students who met the learning goal)* ➢ Independent practice – "You do alone" **Activity 1:** *"*Expand Linear Expressions Match-up*"* *(Look for additional activities in 7th grade core instruction resources.)*

End (10 min.)	➢ Bring the students back together.
	➢ Ask students to reflect on their progress towards the learning target
	    o What did I learn today about expanding linear expressions?
	    o How confident do you feel about expanding linear expressions on my own? (Thumbs up, down, or sideways)
	➢ Assess each student's progress using the next **Quick Check** form
	➢ Guide students to self-correct their **Quick Check**
	➢ Guide students to chart their progress in their **Growth Chart**
	    o If not using Delta Math lessons, record the activity in the table
	➢ Collect each student's **Quick Check** and **Growth Chart**	

After	➢ Regroup students to differentiate the middle of sessions 3 through 8
	    o Promote students who met the learning goal to group 2
	    o Exit students who met the learning goal for a third time
	➢ Problem solve with a team to plan additional support for students who did not exit	

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

Blake needs to pave a rectangular shaped sidewalk. The width of the sidewalk is 3 feet and the length is 2 feet longer than an unknown number, x. The area can be calculated by multiplying the algebraic expression: $3(x + 2)$. Find the expanded expression for the area of the sidewalk. Then, find the area of the sidewalk when the unknown, x, is equal to 4 feet.
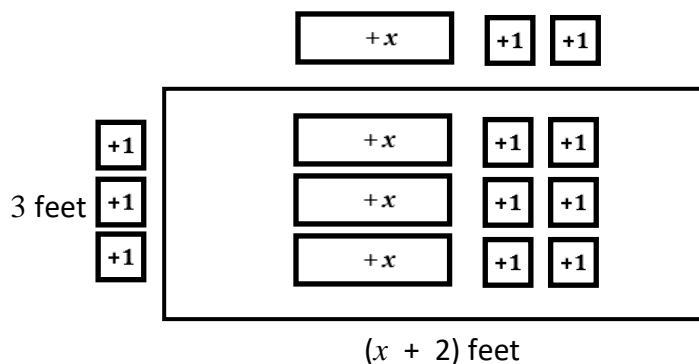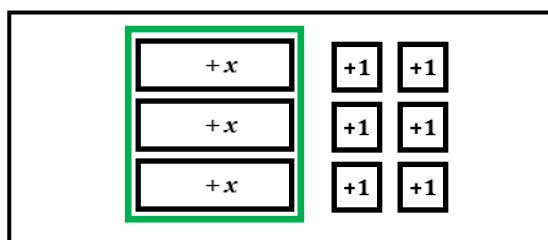
3 feet

$(x + 2)$ feet

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

Blake needs to pave a rectangular shaped sidewalk. The width of the sidewalk is 3 feet and the length is 2 feet longer than an unknown number, x. The area can be calculated by multiplying the algebraic expression: $3(x + 2)$. Find the expanded expression for the area of the sidewalk. Then, find the area of the sidewalk when the unknown, x, is equal to 4 feet.

Area = $3(x + 2)$

= $3x + 6$

When x = 4 feet, the area is 18 square feet

12 + 6

18

Note: Color-coding is provided to help the interventionist make connections between the numbers, symbols and pictures. It may also help students who struggle to make similar connections.

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

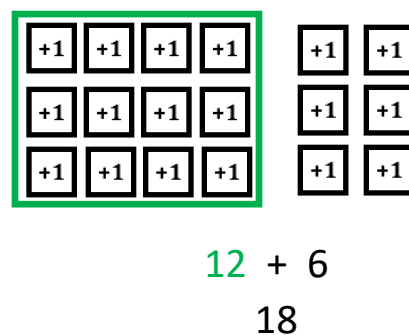**Readiness** for solving equations with more than one step

> Blake needs to pave a rectangular shaped sidewalk. The width of the sidewalk is 3 feet and the length is 2 feet longer than an unknown number, x. The area can be calculated by multiplying the algebraic expression: $3(x + 2)$. Find the expanded expression for the area of the sidewalk. Then, find the area of the sidewalk when the unknown, x, is equal to 4 feet.

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about a sidewalk Blake needs to pave.

Second, I need to determine what I need to find.

I need to find the expanded expression for the area of the sidewalk. Then, the area when the unknown, x, is equal to 4 feet.

**Third, I need to determine what I know.**

I know the shape of the sidewalk is a rectangle and its area can be represented using the algebraic expression 3 times ($x + 2$). (Write "Area = $3(x + 2)$" below the drawing and point to each side length "3" and "$x + 2$".**)**

Fourth, I need to figure out what I can try.

I am going to use algebra tiles to help me model this problem.

I will place 3 positive 1-tiles next to the width and an x-tile and 2 positive 1-tiles above the length.
(Place the algebra tiles next to each side.)
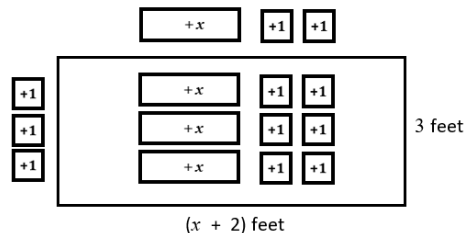
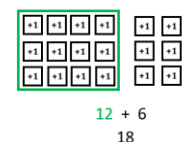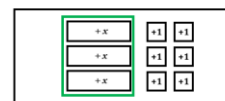**I can model the area with 3 groups of tiles that represent $x + 2$.**
(Place the 3 groups of algebra tiles inside the rectangle.)

There are 3 positive x-tiles and 6 positive 1-tiles.
(Point to the 3 x-tiles and 6 positive 1-tiles and write "= 3x + 6" below "3(x + 2)".)

The expanded expression for the perimeter is 3x + 6.

When x is equal to 4 feet…I am going to replace each positive x-tile with 4 positive 1-tiles.
(Write "When x = 4 feet" and replace the tiles.)

Now I have 4, 8, 12… (Point to the groups of 4 while skip counting… and write "12" below the tiles.)

And 12 plus the 6 is 18 positive 1-tiles. (Point to the group of 6 and write "+6", "18" and "the area is 18 feet")

When x is equal to 4, the area of the sidewalk is 18 square feet.

Last, I need to make sure that my answer makes sense.

This makes sense because I modeled each side length using algebra tiles. Then, I multiplied them by creating equal groups to find the expanded expression. Then, I replaced each x tile with 4 positive 1 tiles to find the actual area.

Learning Target: I will expand linear expressions   8th Grade - RS 4 - 7.EE.1b

Session 2: Guided Practice (We Do)

Materials:

➤ Algebra Tiles (1 set from p. 13 and p. 14: 20 +1-tiles, 20 -1-tiles, 16 +x-tiles and 16 +x-tiles per student)

➤ Multiplication mat (1 per student)

We Do Together: (Teacher Actions)

➤ Say, build and expand each linear expression using multiplication.

1. $4(x + 3)$ 	**2.** $3(x + 5) + 2x$
3. $2(3x - 1)$ 	**4.** $2(\text{-}3x - 1) + 4$

Learning Target: I will expand linear expressions   8th Grade - RS 4 - 7.EE.1b

Session 2: **Guided Practice** (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using multiplication.

5. $3(x + 4)$	**6.** $4(x + 3)$
7. $5(2x + 3) + 1$	**8.** $5(2x - 3)$
9. $3(-x + 2)$	**10.** $3(-2x - 4) - 1$

Learning Target: I will expand linear expressions

8th Grade - RS 4 - 7.EE.1b

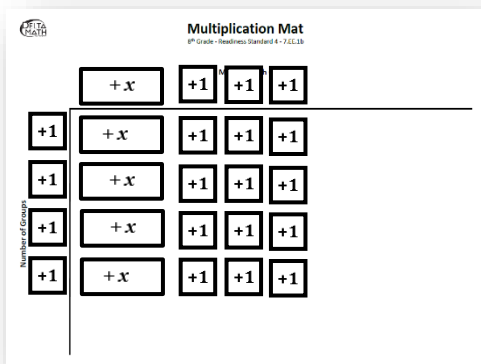# Session 2: Guided Practice (We Do – Teacher Notes)

Materials:

➢ Algebra Tiles (1 set from p. 13 and p. 14: 20 +1-tiles, 20 -1-tiles, 16 +x-tiles and 16 +x-tiles per student)

➢ Multiplication mat (1 per student)

We Do Together: (Teacher Actions)

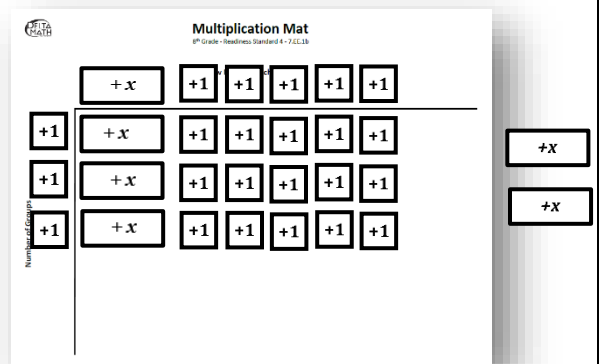➢ Say, build and expand each linear expression using multiplication.
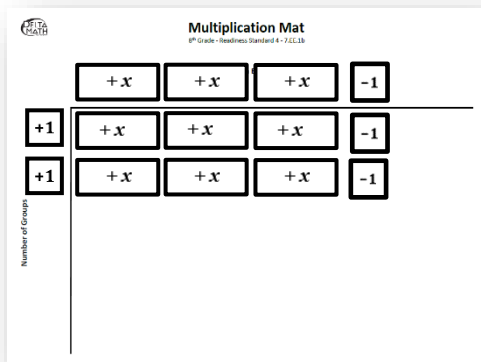
1.

$$4(x + 3) = 4x + 12$$

2.

$$3(x + 5) + 2x = 5x + 15$$
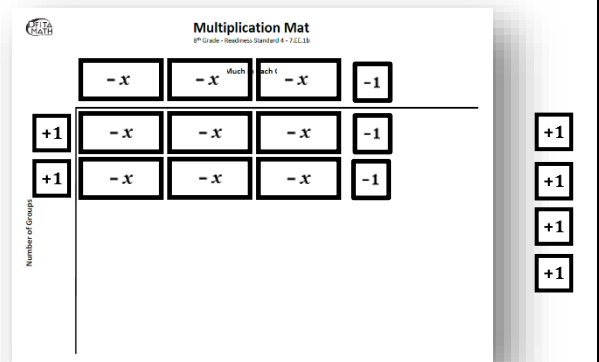

3.

$$2(3x + -1) = 6x + -2$$
$$2(3x - 1)$$

4.

$$2(-3x + -1) + 4 = -6x + 2$$
$$2(-3x - 1) + 4$$

- *Re-write the linear expression using the "add the opposite to subtract" strategy.*
- *Expand by multiplying by creating equal groups*

Algebra Tiles (2 sets of positive tiles)

8th Grade - Readiness Standards 3, 4, 5 and 6 – 7.EE.1a, 7.EE.1b, 7.EE.1c, 7.EE.4

Directions: Provide each student one set of positive and negative tiles.

Note: $+x^2$ tiles and $-x^2$ tiles are included, but will not be used in 7.EE.1a

+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
$+x^2$		$+x^2$		$+x^2$	$+x^2$	$+x^2$		$+x^2$
$+x^2$		$+x^2$		$+x^2$	$+x^2$	$+x^2$		$+x^2$

✂ -

+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
+1	+1	+1	+1	+1	$+x$	$+x$	$+x$	$+x$
$+x^2$		$+x^2$		$+x^2$	$+x^2$	$+x^2$		$+x^2$
$+x^2$		$+x^2$		$+x^2$	$+x^2$	$+x^2$		$+x^2$

Algebra Tiles (2 sets of negative tiles)

8th Grade - Readiness Standards 3, 4, 5 and 6 – 7.EE.1a, 7.EE.1b, 7.EE.1c, 7.EE.4

Directions: Provide each student one set of positive and negative tiles.

-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$

$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$
$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$

✂ -

-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$
-1	-1	-1	-1	-1	$-x$	$-x$	$-x$	$-x$

$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$
$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$	$-x^2$

Modeling & Guided Practice Cards

8th Grade - Readiness Standard 4 - 7.EE.1b

Use for Problem 1	Use for Problem 2
$4(x + 3)$	$2(x + 5) + 2x$
Use for Problem 3	Use for Problem 4
$2(3x − 1)$	$2(\text{-}3x − 1) + 4$
Use for Problem 5	Use for Problem 6
$3(x + 2)$	$2(x + 3)$
Use for Problem 7	Use for Problem 8
$5(2x + 3) + 1$	$5(2x − 3)$
Use for Problem 9	Use for Problem 10
$3(\text{-}x + 2)$	$3(\text{-}2x − 4) − 1$
Use for Modelling	
$3(x + 2)$	

Learning Target: I will expand linear expressions

Briefly discuss student responses

➢ What did I learn today about expanding algebraic expressions?

➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form B

8th Grade – Readiness Standard 4 – 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $8(x + 5)$	**2.** $4(x - 9)$
3. $6(7x + 4)$	**4.** $9(4x - 2)$
5. $5(3x + 8) - x$	**6.** $7(9x + 4) + 5x$

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

Kayla needs to cover a rectangular floor with tiles. The width of the hallway is 4 feet and the length is 5 feet shorter than two times an unknown number, x. The area can be calculated by multiplying the width, 4 feet, times the length, $(2x - 5)$ feet.   This area can be represented by the expression, $4(2x - 5)$. Find the expanded expression for the area of the floor. Then, find the area of the floor when the unknown, x, is equal to 10 feet.

4 feet

(2x – 5) feet

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

Kayla needs to cover a rectangular floor with tiles. The width of the hallway is 4 feet and the length is 5 feet shorter than two times an unknown number, x. The area can be calculated by multiplying the width, 4 feet, times the length, $(2x - 5)$ feet. This area can be represented by the expression, $4(2x - 5)$. Find the expanded expression for the area of the floor. Then, find the area of the floor when the unknown, x, is equal to 10 feet.

	$2x$	+	-5
4 feet	$4 \cdot 2x$ $8x$		$4 \cdot$ -5 -20

$(2x - 5)$ feet

Area = $8x$ + -20

$8(10)$ + -20   When x = 10 feet,

80 + -20   the area is 60 square feet

60

Note: Color-coding is provided to help the interventionist make connections between the numbers, symbols and pictures. It may also help students who struggle to make similar connections.

Session 3: Modeling *(I Do - Teacher Notes)*

DELTA MATH — Rd PROGRAM

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions   **Readiness** for solving equations with more than one step

Kayla needs to cover a rectangular floor with tiles…

I am going to think aloud to model solving this problem.

Your job is to watch, listen, think and ask questions.

First, it is important to know what the problem is about.

The problem is about Kayla covering a floor.

Second, I need to determine what I need to find.

I need to find the expanded expression of its area when the unknown, x, is equal to 10 feet.

Third, I need to determine what I know.

I know the shape of the floor is a rectangle and its area is represented with the algebraic expression $4(2x - 5)$.
(Write "Algebraic Area = $4(2x - 5)$" below the drawing and point to the length "$(2x - 5)$" and width "4".)

Fourth, I need to figure out what I can try.

I will begin by drawing an area model, similar to when we expanded using algebra tiles.
(Draw a rectangle and label the sides with "4 feet" and "$2x - 5$ feet".)

Next, I will separate the area into 2 sections to represent the two types of tiles.
(Draw a vertical line inside the rectangle.)

And, rewrite length as an equivalent addition expression using the "add the opposite to subtract" strategy.
(Point to the subtraction sign in the expression for the length.)

Subtracting 5 is equal to adding negative 5, so I can rewrite the length as $2x$ + -5.
(Rewrite the length above the rectangle.)

To find the total number of x's, I need to multiply 4 times $2x$.
(Write "$4 \cdot 2x$")

4 times $2x$…which is equal to $8x$. *(Write "$8x$")*

To find the total number of ones, I need to multiply 4 times negative 5.
(Write "$4 \cdot$ -5")

Which is equal to negative 20. *(Write "-20")*

It looks like the expanded area is equal to $8x$ + -20.
(Point to the partial products inside each area and write "Area = $8x$ + -20" below the rectangle.)

When x is equal to 10 feet…we can replace the x with the number 10. *(Write an "8(10) + -20".)*

Now I have 8 groups of 10 …and 8 times 10 is 80. *(Write "80 + -20".)*

And, 80 plus negative 20 is equal to 60. *(Write "60" and "When x = 10 feet, the area is 60 square feet".)*

	$2x$	+	-5
4 feet	$4 \cdot 2x$ $8x$		$4 \cdot$ -5 -20

$(2x - 5)$ feet
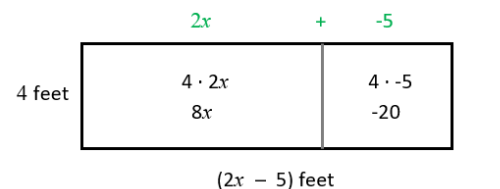
Area $= 8x$ + -20
$8(10)$ + -20
80 + -20
60

When x = 10 feet,
the area is 60 square feet

Last, I need to make sure that my answer makes sense.

This makes sense because I modeled the length and width in a math drawing. Then, I found each partial area to find the expanded expression. Then, I found the area when x = 10 feet by replacing x with 10 feet.
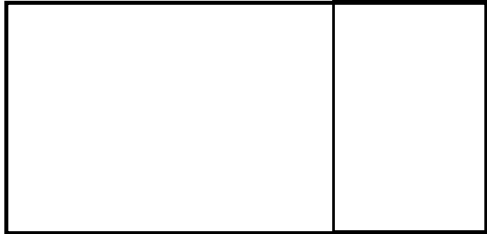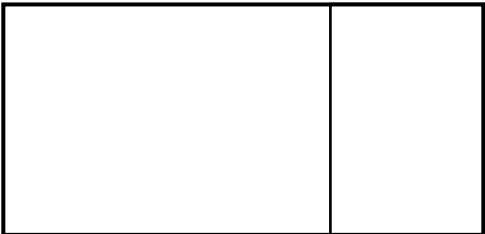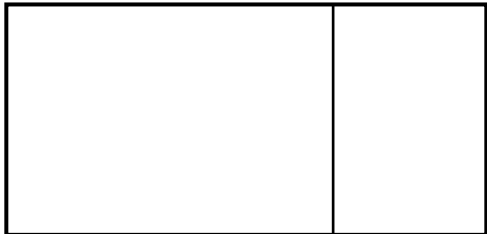
Session 3: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say, draw and expand each linear expression using multiplication.

1. $4(x + 3)$	**2.** $3(x + 5)$
3. $2(3x - 1)$	**4.** $2(-3x - 1)$

Session 3: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using drawings and multiplication.

5. $3(x + 2)$	**6.** $2(x + 3)$
7. $5(2x + 3) + 1$	**8.** $5(2x - 3) + x$
9. $3(\text{-}x + 2)$	**10.** $3(\text{-}2x - 4)$

Learning Target: I will expand linear expressions   8ᵗʰ Grade - RS 4 - 7.EE.1b

Session 3: Guided Practice (We Do – Teacher Notes)

We Do Together: (Teacher Actions)

➢ Say, draw and expand each linear expression using multiplication.

1. $4(x + 3)$ $= 4x + 12$

	x	$+$	3
4	$4 \cdot x$ $4x$		$4 \cdot 3$ 12

2. $3(x + 5) + 2x$

$3x + 15 + 2x$ $= 5x + 15$

	x	$+$	5
3	$3 \cdot x$ $3x$		$3 \cdot 5$ 15

3. $2(3x - 1)$

$2(3x + -1)$ $= 6x + -2$

	$3x$	$+$	-1
2	$2 \cdot 3x$ $6x$		$2 \cdot -1$ -2

4. $2(-3x - 1) + 4$

$2(-3x + -1) + 4$

$-6x + \underline{-2} + \underline{4}$ $= -6x + 2$

	-3x	$+$	-1
2	$2 \cdot -3x$ $-6x$		$2 \cdot -1$ -2

- *Re-write the linear expression using the "add the opposite to subtract" strategy*
- *Expand by multiplying by creating equal groups before combining like terms*
- *Expand by multiplying by creating equal groups*

Session 3: Self-Reflection

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Briefly discuss student responses

> ➢ What did I learn today about expanding algebraic expressions?

> ➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form C

8th Grade – Readiness Standard 4 – 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $7(x + 4)$	**2.** $5(x - 7)$
3. $3(8x + 6)$	**4.** $8(3x - 5)$
5. $6(2x + 9) + x$	**6.** $9(5x + 3) - 2x$

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Matt selected the following answer choice. Is he correct? If not, why do you think he chose his answer?

Find the equivalent expanded expression:

$$4(2x + 8) + x$$

● $9x + 8$ ○ $8x + 32$ ○ $41x$ ○ $9x + 32$

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Matt selected the following answer choice. Is he correct? If not, why do you think he chose his answer?

Find the equivalent expanded expression:

Think: 4 groups of (2x + 8) plus another x ⟶ $4(2x + 8) + x$

4 groups of 2x's and 4 groups of 8 *plus another x* ⟶ $4 \cdot 2x + 4 \cdot 8 + x$

$$8x \ + \ 32 \ + x$$

$$9x \ + \ 32$$

● $9x + 8$　　　○ $8x + 32$　　　○ $41x$　　　○ $9x + 32$

Session 4: Modeling *(I Do - Teacher Notes)*

DELTA MATH — Rd PROGRAM

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Matt selected the following answer choice. Is he correct? If not, why do you think he chose his answer?

First, it is important to know what the problem is about.

This problem is about Matt answering a problem on a Delta Math readiness screener.

Second, I need to determine what I need to find.

I need to find if Matt chose the correct answer. And if he was not correct, I need to consider why he made the choice that he did.

Third, I need to determine what I know.

I know that Matt chose "9x + 8" as the expanded answer and I know that a number in front of a parentheses needs to be distributed to each term inside the parentheses".

Fourth, I need to figure out what I can try.

I am going to try writing equivalent expressions by multiplying the 4 by the 2x + 8 inside the parentheses. *(Point to the 4(2x + 8)*

4 groups of (2x + 8) plus another x is equivalent to 4 groups of 2x's and 4 groups of 8 plus another x … (*Write "4 · 2 x + 4 · 8 + x ".)*

And 4 groups of 2x's is equal to 8x's… (Write "8x".)

4 groups of 8 is equal to 32… (Write "+ 32".)

And this is 1 more x to combine to find the total. (Point to the x on the first line and write " + x " below it.)

8x and x are like terms and can be combined to equal 9x. (Write "9x".)

And the 32 is not a like term, so the final answer is 9x + 32… (Write "+ 32".)

This is not the answer choice that Matt chose…therefore, he must have selected an incorrect answer choice.

I think that Matt chose his answer because he might not have remembered that the 4 must be multiplied by both terms in the parentheses…2x and 8…and that is why the correct answer is 9x + 32 and not 9x + 8.

Find the equivalent expanded expression:

$$4(2x + 8) + x$$
$$4 \cdot 2x + 4 \cdot 8 + x$$
$$8x + 32 + x$$
$$9x + 32$$

● 9x + 8   ○ 8x + 32   ○ 41x   ○ 9x + 32

Last, I need to make sure that my answer makes sense.

I found that Matt was not correct. It makes sense because I thought about the problem as 4 groups of the entire parentheses, 2x + 8 and then combined like terms to find the correct answer…9x + 32.

Session 4: Guided Practice (We Do)

We Do Together: (Teacher Actions)

> ➢ Say the problem with "grouping" language and expand each linear expression using multiplication.

1. $\qquad\qquad 7(x + 3)$	**2.** $\qquad\qquad 8(x + 6) + 3x$
3. $\qquad\qquad 4(9x - 1)$	**4.** $\qquad\qquad 9(\text{-}6x - 7) + 5$

Learning Target: I will expand linear expressions

8th Grade - RS 4 - 7.EE.1b

Session 4: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using multiplication.

5. $6(x + 7)$	**6.** $8(x + 6)$
7. $7(8x + 4) + 1$	**8.** $9(6x - 7) + x$
9. $8(-x + 9) + 3x + 5$	**10.** $7(-8x - 6) + 4x + 2$

Learning Target: I will expand linear expressions

Session 4: Guided Practice (We Do – Teacher Notes)

We Do Together: (Teacher Actions)

➢ Say the problem with "grouping" language and expand each linear expression using multiplication.

1.	$7(x + 3)$ $7x + 21$	**2.**	$8(x + 6) + 3x$ $\underline{8x} + 48 + \underline{3x}$ $11x + 48$
3.	$4(9x - 1)$ $4(9x + \text{-}1)$ $36x + \text{-}4$	**4.**	$9(\text{-}6x - 7) + 5$ $9(\text{-}6x + \text{-}7) + 5$ $\text{-}54x + \underline{\text{-}63} + \underline{5}$ $\text{-}54x + \text{-}58$

- *Re-write the linear expression using the "add the opposite to subtract" strategy*
- *Expand by multiplying by creating equal groups before combining like terms*
- *Expand by multiplying by creating equal groups*

Learning Target: I will expand linear expressions

Briefly discuss student responses

> ➢ What did I learn today about expanding algebraic expressions?

> ➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form D

8th Grade – Readiness Standard 4 – 7.EE.1b

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

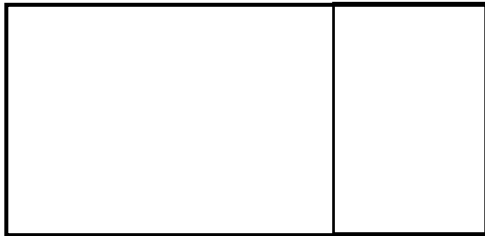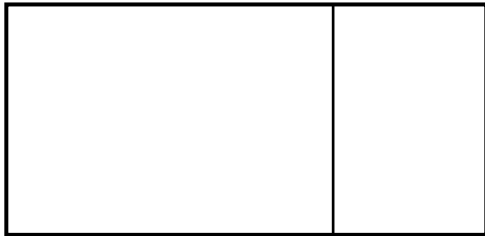|	
1. $6(x + 9)$	**2.** $8(x - 6)$
3. $4(5x + 3)$	**4.** $9(2x - 7)$
5. $3(6x + 8) - x$	**6.** $5(8x + 3) + 4x$

Learning Target: I will expand linear expressions

8th Grade - RS 4 - 7.EE.1b

Session 5: Guided Practice (We Do)

We Do Together: (Teacher Actions)
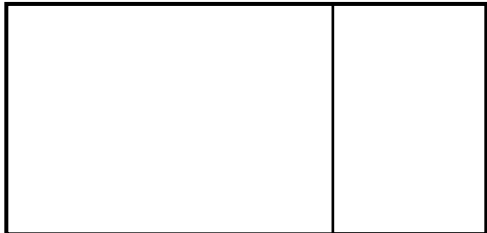
➢ Say, draw and expand each linear expression using multiplication.

1. $7(x + 3)$	**2.** $3(x + 9)$
3. $6(3x - 8)$	**4.** $9(\text{-}4x - 7)$

Session 5: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➤ Students take turns leading to expand each linear expression using drawings and multiplication.

5. $8(x + 7)$	**6.** $7(x + 8)$
7. $6(7x + 9) + 1$	**8.** $7(6x - 9) + x$
9. $7(\text{-}x + 9)$	**10.** $8(\text{-}3x - 6)$

Learning Target: I will expand linear expressions

Briefly discuss student responses

➢ What did I learn today about expanding algebraic expressions?

➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $9(x + 3)$	**2.** $6(x - 4)$
3. $5(9x + 2)$	**4.** $7(3x - 6)$
6. $8(4x + 7) + x$	**6.** $4(7x + 3) - 6x$

Session 6: Guided Practice (We Do)

We Do Together: (Teacher Actions)
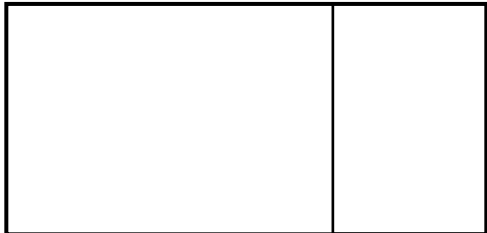
➢ Say, draw and expand each linear expression using multiplication.

1. $4(x + 9)$	**2.** $3(x + 7)$
3. $8(3x - 6)$	**4.** $6(\text{-}3x - 9)$

Learning Target: I will expand linear expressions

Session 6: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using drawings and multiplication.

5. $\quad 9(x + 8)$	**6.** $\quad 8(x + 9)$
7. $\quad 7(4x + 6) + 1$	**8.** $\quad 7(6x - 4) + x$
9. $\quad 8(\text{-}x + 7)$	**10.** $\quad 9(\text{-}7x - 4)$

Learning Target: I will expand linear expressions

Briefly discuss student responses

➢ What did I learn today about expanding algebraic expressions?

➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

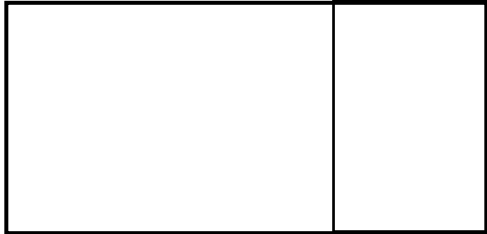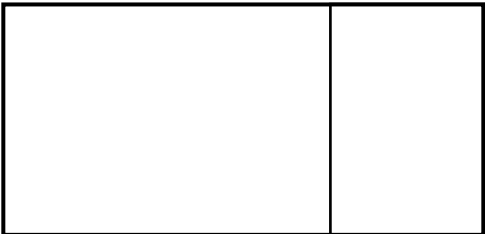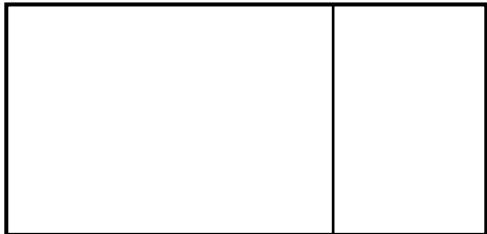|	
1. $8(x + 5)$	**2.** $4(x - 9)$
3. $6(7x + 4)$	**4.** $9(4x - 2)$
5. $5(3x + 8) - x$	**6.** $7(9x + 4) + 5x$

Learning Target: I will expand linear expressions   8th Grade - RS 4 - 7.EE.1b

Session 7: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say the problem with "grouping" language and expand each linear expression using multiplication.

1. $\qquad 7(x + 4)$	**2.** $\qquad 9(x + 6) + 3x$
3. $\qquad 4(8x - 1)$	**4.** $\qquad 8(\text{-}6x - 7) + 5$

Session 7: **Guided Practice** (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using multiplication.

5. $\qquad 9(x + 7)$	**6.** $\qquad 7(x + 6)$
7. $\qquad 6(8x + 4) + 1$	**8.** $\qquad 8(6x - 7) + x$
9. $\qquad 4(-x + 9) + 3x + 5$	**10.** $\qquad 9(-8x - 6) + 4x + 2$

Learning Target: I will expand linear expressions

Briefly discuss student responses

> ➢ What did I learn today about expanding algebraic expressions?

> ➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $7(x + 4)$	**2.** $5(x - 7)$
3. $3(8x + 6)$	**4.** $8(3x - 5)$
5. $6(2x + 9) + x$	**6.** $9(5x + 3) - 2x$

Learning Target: I will expand linear expressions   8th Grade - RS 4 - 7.EE.1b

Session 8: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say the problem with "grouping" language and expand each linear expression using multiplication.

1. $9(x + 3)$	**2.** $7(x + 6) + 3x$
3. $6(7x - 1)$	**4.** $8(\text{-}6x - 7) + 5$

Session 8: Guided Practice (We Do - Continued)

You Do Together: (As a class, or in small groups)

➢ Students take turns leading to expand each linear expression using multiplication.

5. $6(x + 8)$	**6.** $8(x + 9)$
7. $7(9x + 3) + 1$	**8.** $9(8x - 6) + x$
9. $8(\text{-}x + 7) + 3x + 5$	**10.** $9(\text{-}8x - 6) + 5x + 2$

Session 8: Self-Reflection

8th Grade – Readiness Standard 4 – 7.EE.1b

Learning Target: I will expand linear expressions

Briefly discuss student responses

➢ What did I learn today about expanding algebraic expressions?

➢ How confident do I feel about expanding algebraic expressions on my own? *(Thumbs up, down, or sideways)*

DELTA MATH
— RtI PROGRAM —

Name_____ Date_____

Learning Target: I will expand linear expressions.

Directions: Write the equivalent expanded expression. (Work time: 4 minutes)

1. $6(x + 9)$	**2.** $8(x - 6)$
3. $4(5x + 3)$	**4.** $9(2x - 7)$
5. $3(6x + 8) - x$	**6.** $5(8x + 3) + 4x$

Learning Target: I will expand linear expressions

Readiness for solving equations with more than one step

Title of Game: Play "**Expand Linear Expressions Match-up**!"

Number of Players: 2

Objective: To match all of your **"Problem"** cards to the equivalent **"Answer"** linear expression cards.

Materials:

➢ 1 set of **Problem** and **Answer** cards per group

➢ 1 recording sheet per player

Set-up:

➢ Deal all 10 **Problem** cards face down in a row.

➢ Deal 5 **Answer** cards face up to each player.

Directions:

➢ **Player 1** goes first
   o Take a card from the row of face down **Problem** cards and turn it face up
   o Write the problem on the recording sheet
   o And, find the answer in simplest form

➢ If **Player 1** has the **Answer** card, place it face up on top of the **Problem** card, take both cards and say:

"The value being distributed is _____."

➢ If **Player 1** does not have the equivalent **Answer** card, turn the **Problem** card back over.

➢ **Players 1 and 2** alternate turns. The **winner** is the first player to match all 5 of their cards.

Problem Cards (Set A)

Preparation: Copy the **Problem (Set A)** cards and **Answer (Set A)** cards in two different colors.

Sets A$_1$ can be used for one pair of students and Sets A$_2$ can be used for a second pair of students.

Storage: Store 1 set in a bag for each pair of students.

Set A$_1$			
$6(3x + 8)$ Set A	$6(3x - 8)$ Set A	$-6(4x - 8)$ Set A	$6(9x + 7)$ Set A
$6(9x - 7)$ Set A	$-6(9x - 7)$ Set A	$-7(8x - 9)$ Set A	$7(8x + 9)$ Set A
$7(9x - 6)$ Set A	$-7(9x - 6)$ Set A		

Set A$_2$			
$6(3x + 8)$ Set A	$6(3x - 8)$ Set A	$-6(4x - 8)$ Set A	$6(9x + 7)$ Set A
$6(9x - 7)$ Set A	$-6(9x - 7)$ Set A	$-7(8x - 9)$ Set A	$7(8x + 9)$ Set A
$7(9x - 6)$ Set A	$-7(9x - 6)$ Set A		

Answer Cards (Set A)

8th Grade – Readiness Standard 4 – 7.EE.1b

Preparation: Copy the **Problem (Set A)** cards and **Answer (Set A)** cards in two different colors.

Sets A_1 can be used for one pair of students and Sets A_2 can be used for a second pair of students.

Storage: Store 1 set in a bag for each pair of students.

Set A_1

$18x + 48$ Set A	$18x - 48$ Set A	$-24x + 48$ Set A	$54x + 42$ Set A
$54x - 42$ Set A	$-54x + 42$ Set A	$-56x + 63$ Set A	$56x + 63$ Set A
$63x - 42$ Set A	$-63x + 42$ Set A		

Set A_2

$18x + 48$ Set A	$18x - 48$ Set A	$-24x + 48$ Set A	$54x + 42$ Set A
$54x - 42$ Set A	$-54x + 42$ Set A	$-56x + 63$ Set A	$56x + 63$ Set A
$63x - 42$ Set A	$-63x + 42$ Set A		

Problem Cards (Set B)

8th Grade – Readiness Standard 4 – 7.EE.1b

Preparation: Copy the **Problem (Set B)** cards and **Answer (Set B)** cards in two different colors.

Sets B$_1$ can be used for one pair of students and Sets B$_2$ can be used for a second pair of students.

Storage: Store 1 set in a bag for each pair of students.

Set B$_1$ $8(3x + 9)$ Set B	$8(3x − 9)$ Set B	-$8(4x − 9)$ Set B	$8(7x + 6)$ Set B
$8(7x − 6)$ Set B	-$8(7x − 6)$ Set B	-$9(4x − 8)$ Set B	$9(4x + 8)$ Set B
$9(6x − 7)$ Set B	-$9(6x − 7)$ Set B		
Set B$_2$ $8(3x + 9)$ Set B	$8(3x − 9)$ Set B	-$8(4x − 9)$ Set B	$8(7x + 6)$ Set B
$8(7x − 6)$ Set B	-$8(7x − 6)$ Set B	-$9(4x − 8)$ Set B	$9(4x + 8)$ Set B
$9(6x − 7)$ Set B	-$9(6x − 7)$ Set B		

Preparation: Copy the **Problem (Set B)** cards and **Answer (Set B)** cards in two different colors.

Sets B_1 can be used for one pair of students and Sets B_2 can be used for a second pair of students.

Storage: Store 1 set in a bag for each pair of students.

Set B₁

$24x + 72$ Set B	$24x - 72$ Set B	$-32x + 72$ Set B	$56x + 48$ Set B
$56x - 48$ Set B	$-56x + 48$ Set B	$-36x + 72$ Set B	$36x + 72$ Set B
$54x - 63$ Set B	$-54x + 63$ Set B		

Set B₂

$24x + 72$ Set B	$24x - 72$ Set B	$-32x + 72$ Set B	$56x + 48$ Set B
$56x - 48$ Set B	$-56x + 48$ Set B	$-36x + 72$ Set B	$36x + 72$ Set B
$54x - 63$ Set B	$-54x + 63$ Set B		

Q₁

What is the problem about?

Q₂

What do I need to find?

Q₃

What do I know?

Q₄

What can I try?

Q₅

Does my answer make sense?

Steps for Solving Word Problems

Q₁. What is the problem about?

Q₂. What do I need to find?

Q₃. What do I know?

Q₄. What can I try?

Q₅. Does my answer make sense?