DELTA MATH
RtI PROGRAM

8th Grade
Tier 2 Intervention Lessons

Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract 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)
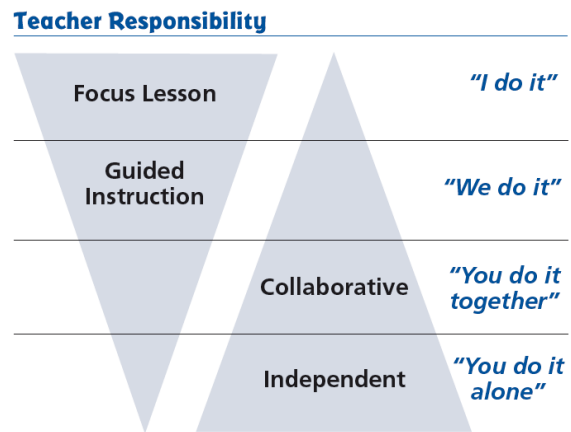
Gradual release of responsibility model

Figure 1

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

Planning Guide: Session 1

8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract 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

Thoughts: Have students graph each expression to see that it forms a linear function
For each x-value, there is a unique (only one) y-value

Graph each un-simplified expression…use the tiles to simplify and then show the simplified expression maps directly onto the un-simplified expression!

Only graph un-simplified expression in session 1…include a few quadratic and cubic to establish the focus on the greatest exponent!

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

1.

Find the simplified equivalent expression.

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

○ $5x + 7$ ○ $4x + 5$ ○ $4x + 7$ ○ $5x + 5$

2.

Find the simplified equivalent expression.

$$(5x + 3) - (2x + 4)$$

○ $3x + 7$ ○ $7x + 7$ ○ $3x - 1$ ○ $7x - 1$

3.

Find the simplified equivalent expression.

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

○ $5x - 1$ ○ $3x + 1$ ○ $5x + 5$ ○ $3x + 5$

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

1.

Find the simplified equivalent expression.

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

○ $3x + 5$ ○ $3x + 8$ ○ $2x + 5$ ○ $2x + 8$

2.

Find the simplified equivalent expression.

$$(6x + 9) - (4x + 6)$$

○ $10x + 15$ ○ $2x + 15$ ○ $10x + 3$ ○ $2x + 3$

3.

Find the simplified equivalent expression.

$$(10x + 2) - (8x - 4)$$

○ $2x - 2$ ○ $2x + 6$ ○ $18x + 6$ ○ $18x - 2$

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

1.

Find the simplified equivalent expression.

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

○ $3x + 7$ ○ $3x + 12$ ○ $2x + 12$ ○ $2x + 7$

2.

Find the simplified equivalent expression.

$$(9x + 6) - (2x + 1)$$

○ $11x + 5$ ○ $7x + 7$ ○ $11x + 7$ ○ $7x + 5$

3.

Find the simplified equivalent expression.

$$(5x + 4) - (2x - 3)$$

○ $7x - 7$ ○ $10x - 12$ ○ $3x + 1$ ○ $3x + 7$

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➢ What did I remember about adding and subtracting algebraic expressions?

> ➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form A

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

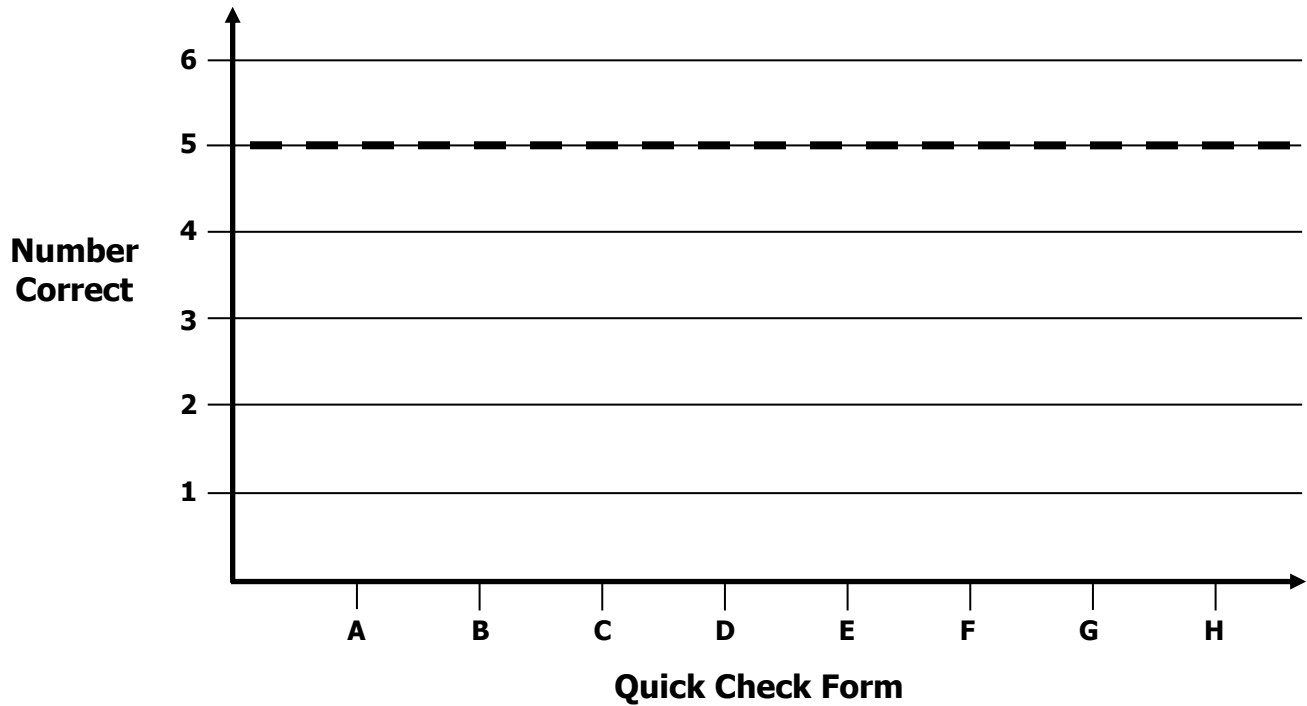|	
1. $(x + 4) + (3x + 9)$	**2.** $(2x - 6) + (4x - 4)$
3. $(6x + 3) + (5x + 2)$	**4.** $(5x - 6) - (x + 2)$
5. $(2x + 4) - (7x - 1)$	**6.** $(4x + 8) - (6x - 9)$

Growth Chart

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Goal: 5 out of 6 correct

Intervention	Date	Score
Guided Review		

Planning Guide: Sessions 2 Through 8

8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

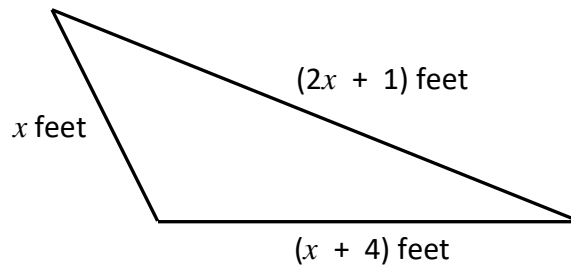| Recommended Actions		
Beginning (5 min.)	➤ Review the learning target with the whole group and ask each student to set a goal.	
Middle (15 min.)	**Group 1:** Students who scored below the learning goal on the previous Quick Check. ➤ Model solving a word problem – "I do" ➤ Guided Practice – "We do" **Session 2:** Add and subtract linear expressions using algebra tiles. **Session 3:** Add and subtract linear expressions using drawings. **Session 4:** Add and subtract linear expressions by identifying and combining like-terms.	**Group 2:** *(Students who met the learning goal)* ➤ Independent practice – "You do alone" **Activity 1:** *"Add and Subtract 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 adding and subtracting linear expressions?
	  o How confident do you feel about adding and subtracting 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 add and subtract linear expressions

Readiness for solving equations with more than one step

Joan needs to build a fence around her triangular shaped garden to keep out the rabbits. The length of one side of the fence is an unknown number of feet (x), the second is one more foot than two times the length of the first side ($2x + 1$), and the third is 4 feet longer than the length of the first side ($x + 4$). The perimeter can be calculated using the algebraic expression: (x) + ($2x + 1$) + ($x + 4$). Find the simplified expression for the perimeter of the fence. Then, find the length of fence that would be needed when the unknown, x, is equal to 3 feet.

$(2x + 1)$ feet

x feet

$(x + 4)$ feet

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

Joan needs to build a fence around her triangular shaped garden to keep out the rabbits. The length of one side of the fence is an unknown number of feet (x), the second is one more foot than two times the length of the first side ($2x + 1$), and the third is 4 feet longer than the length of the first side ($x + 4$). The perimeter can be calculated using the algebraic expression: $(x) + (2x + 1) + (x + 4)$. Find the simplified expression for the perimeter of the fence. Then, find the length of fence that would be needed when the unknown, x, is equal to 3 feet.
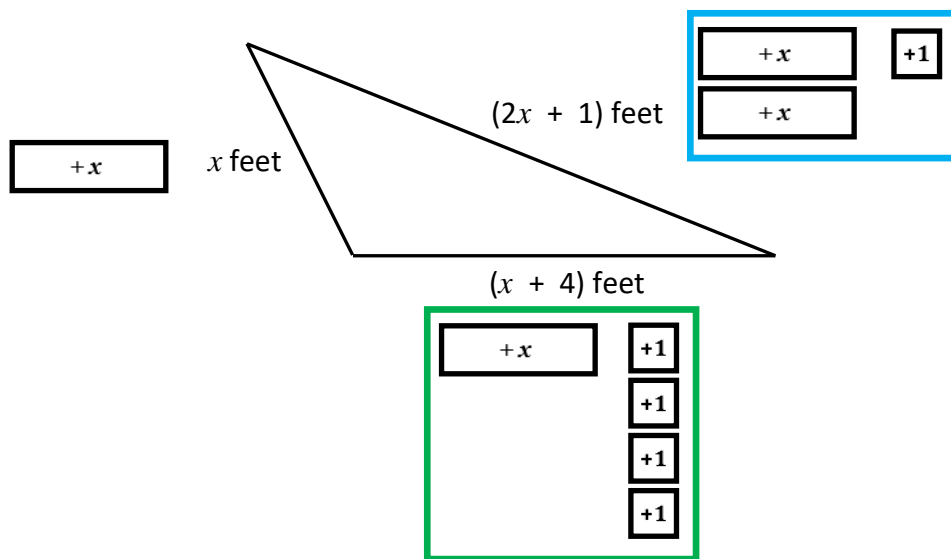

Perimeter $= 4x + 5$

When x = 3 feet, the perimeter is 17 feet

$12 + 5$

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 2: Modeling *(I Do - Teacher Notes)*
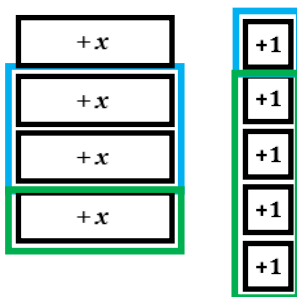
8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract linear expressions

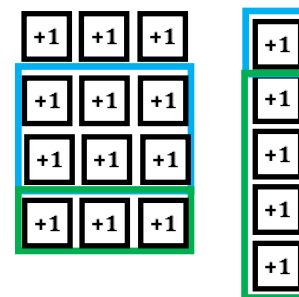**Readiness** for solving equations with more than one step

> Joan needs to build a fence around her triangular shaped garden to keep out the rabbits…
> Find the simplified expression for the perimeter of the fence and then find how much fence would be needed when the unknown, x, is equal to 3 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 fence around Joan's garden.

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

I need to find a simplified expression for the perimeter of Joan's fence and the length of fence that would be needed when the unknown, x, is equal to 3 feet.

Third, I need to determine what I know.

I know the shape of the garden is a triangle and its perimeter can be calculated using the algebraic expression $(x) + (2x + 1) + (x + 4)$.
(Write the word "Perimeter" below the drawing and point to each unknown side length "$(x) + (2x + 1) + (x + 4)$".)

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 a positive x-tile next to the "x" side,
2 positive x-tiles and a positive 1-tile next to the "$2x + 1$" side and a
positive x-tile and 4 positive 1-tiles next to the "$x + 4$" side.**
(Place the algebra tiles next to each side.)

To simplify, I can combine the "like" tiles…there are 4 positive x-tiles.
(Combine the +x-tiles and write "= $4x$" next to the word "Perimeter".)

There are 5 positive 1-tiles.
(Combine the +1-tiles and write "+ 5" next to the "$4x$".)

The simplified expression for the perimeter is $4x + 5$.

When x is equal to 3 feet…I am going to replace each positive x-tile with 3 positive 1-tiles.
(Write "When x = 3 feet" and replace the tiles.)

Now I have 3, 6, 9, 12… (Point to the groups of 3 while skip counting… and write "12" below the tiles.)

And 12 plus the 5 is 17 positive 1-tiles. (Point to the group of 5 and write "+5" and "the perimeter is 17 feet")

Joan needs 17 feet of fence when x is equal to 3 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 combined the like terms to find the simplified expression. Then, I replaced each x tile with 3 positive 1 tiles to find the actual perimeter.
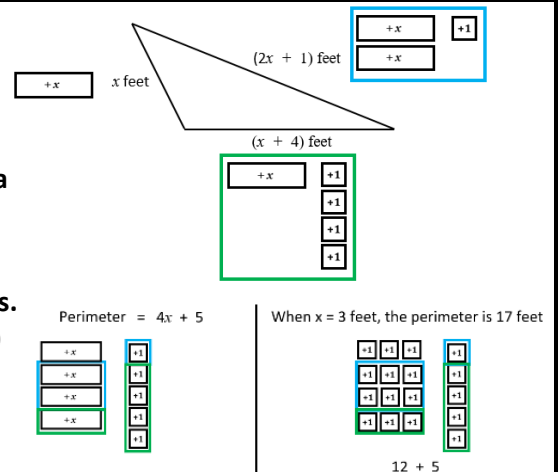
Modeling & Guided Practice Cards

8th Grade - Readiness Standard 3 - 7.EE.1a

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 2: Guided Practice (We Do)

Materials:

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

➤ Expression mat (1 per student)

We Do Together: (Teacher Actions)

➤ Say, build and add or subtract each linear expression.

(Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

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

Learning Target: I will add and subtract linear expressions

Session 2: Guided Practice (We Do - Continued)

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

➢ Students take turns leading to add or subtract each linear expression.

5. $(3x + 2) + (1 + x)$	6. $(2x + 3) - x + (4x + 1)$
7. $(3x - 2) - (1 + x)$	8. $(2x + 3) - x - (4x + 1)$
9. $(2x + 3) + x - (4x + 1)$	10. $(4x + 1) - (5 - 2x) + (2 + x)$
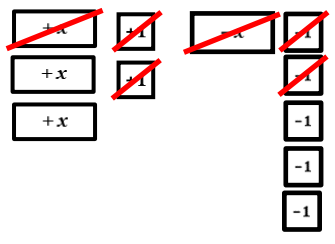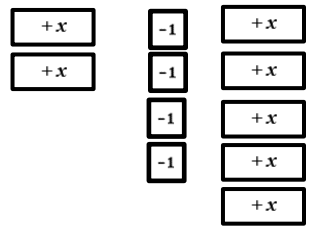
Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

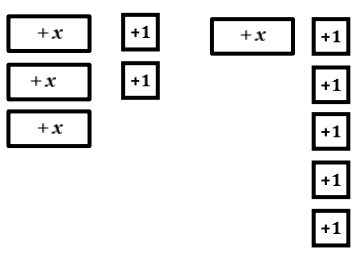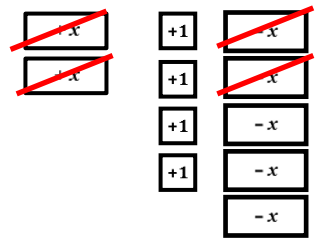# Session 2: Guided Practice (We Do – Teacher Notes)

Materials:

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

➢ Expression mat (1 per student)

We Do Together: (Teacher Actions)

➢ Say, build and add or subtract each linear expression.

(Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

1. $(3x + 2) + (x + 5)$ = 4x + 7	**2.** $2x + (4 - 5x)$ $2x + (4 + -5x)$ = -3x + 5
3. $(3x + 2) - (x + 5)$ $(3x + 2) + (-x + -5)$ = x + -3	**4.** $2x - (4 - 5x)$ $2x - (4 + -5x)$ $2x + (-4 + 5x)$ = 7x + -4

- Re-write the linear expression using the *"add the opposite to subtract" strategy.*
  - *Inside the parentheses*
  - *Outside the parentheses*
- *Combine like terms by adding or taking away zero pairs*

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	$-x$	$-x$	$-x$	$-x$

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

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form B

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Session 3: Modeling (I Do)

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

Tony needs to build a fence around a rectangular pond. The width of the pond is three feet less than two times an unknown number of feet $(2x - 3)$. And, the length of the pond is four feet more than three times the same unknown number of feet $(3x + 4)$. The perimeter can be calculated using the algebraic expression: $(2x - 3) + (3x + 4) + (2x - 3) + (3x + 4)$. Find the simplified expression for the perimeter of the fence. Then, find the length of fence that would be needed when the unknown, x, is equal to 5 feet.

$(2x - 3)$ feet

$(3x + 4)$ feet

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

Tony needs to build a fence around a rectangular pond. The width of the pond is three feet less than two times an unknown number of feet $(2x - 3)$. And, the length of the pond is four feet more than three times the same unknown number of feet $(3x + 4)$. The perimeter can be calculated using the algebraic expression: $(2x - 3) + (3x + 4) + (2x - 3) + (3x + 4)$. Find the simplified expression for the perimeter of the fence. Then, find the length of fence that would be needed when the unknown, x, is equal to 5 feet.
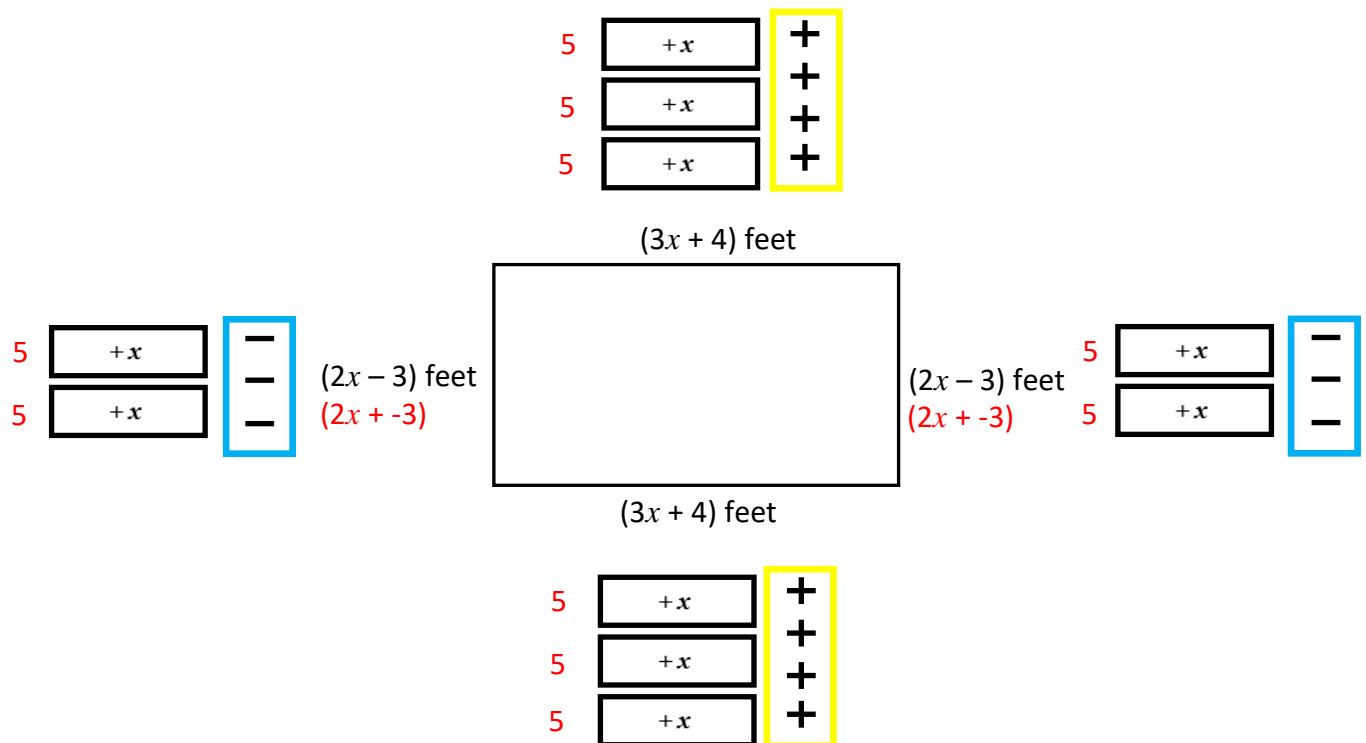

$$\text{Perimeter} = 10x + 8 + -6$$
$$= 10x + 2$$

When x = 5 feet, the perimeter is 32 feet

$$10(5) + 2$$
$$50 + 2$$
$$52$$

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)*

8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract linear expressions
Readiness for solving equations with more than one step

Tony needs to build a fence around a rectangular pond…

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 fence around a rectangular pond.

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

I need to find a simplified expression for the perimeter of the fence and the length of fence that would be needed when the unknown, x, is equal to 5 feet.

Third, I need to determine what I know.

I know the shape of the pond is a rectangle and its perimeter can be calculated using the algebraic expression $(2x - 3) + (3x + 4) + (2x - 3) + (3x + 4)$.
(Write the word "Perimeter" below the drawing and point to the length "$(3x + 4)$" and width "$(2x - 3)$".)

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

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

Before I begin, I need to change my subtraction signs to an equivalent of adding the opposite to help me see the math.
(Point to the subtraction sign in the width.)

Subtracting 3 is equal to adding negative 3, so I need to rewrite each width as 2x + -3. (Rewrite each width.)

Now I will draw 3 positive x-tiles and 4 plus signs next to each length and 2 positive x-tiles and 3 negative signs next to each width.
(Draw the algebra tiles next to each side.)

To simplify, I can combine the "like" tiles…there are 10 positive x-tiles.
(Point to the +x-tiles and write "= 10x" next to the word "Perimeter".)

There are 8 positive and 6 negative signs…
(Point to the positive and negative signs and write "+ 8 + -6" next to the "4x".)

Which gives 6 zero pairs and a value of 2 positives…so the simplified expression for the perimeter is $10x + 2$.
(Write "= $10x + 2$".)

When x is equal to 5 feet…it is like replacing each positive x-tile with 5 plus signs.
(Write "When x = 5 feet" and write "5" next to each positive x-tile.)

Now I have 10 groups of 5 (Write "10(5) + 2".)

Perimeter = $10x$ + 8 + -6
= $10x$ + 2

When x = 5 feet, the perimeter is 32 feet
10(5) + 2
50 + 2
52

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

This makes sense because I changed all subtraction to adding the opposite and then modeled each length and width by drawing algebra tiles. Then, I combined the like terms to find the simplified expression. Then, I replaced each x tile with 5 to find the actual perimeter.
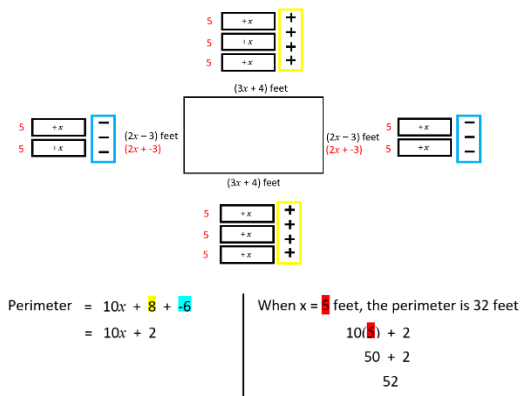
Session 3: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say, draw and add or subtract each linear expression.

(Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

1. $(3x + 2) + (x + 3)$	2. $2x + (5 - 4x)$
3. $(2x + 3) - (x + 4)$	4. $4x - (2 - 6x)$

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 3: Guided Practice (We Do - Continued)

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

➢   Students take turns leading to draw and add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

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

We Do Together: (Teacher Actions)

➢ Say, draw and add or subtract each linear expression.

(Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

1. $(3x + 2) + (x + 3)$ = $4x + 5$ 	**2.** $2x + (5 - 4x)$ $2x + (5 + -4x)$ = $-2x + 5$
3. $(2x + 3) - (x + 4)$ $(2x + 3) + (-x + -4)$ = $x + -1$ 	**4.** $4x - (2 - 6x)$ $4x - (2 + -6x)$ $4x + (-2 + 6x)$ = $10x + -2$

- *Re-write the linear expression using the "add the opposite to subtract" strategy.*
  - *Inside the parentheses*
  - *Outside the parentheses*
- *Combine like terms by adding or taking away zero pairs*

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form C

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Isabelle selected the following answer choice. Is she correct? If not, why do you think she chose her answer?

Find the simplified equivalent expression.

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

    ○ $5x - 1$ ● $3x + 1$ ○ $5x + 5$ ○ $3x + 5$

8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Isabelle selected the following answer choice. Is she correct? If not, why do you think she chose her answer?

Add the opposite to subtract

Find the simplified equivalent expression.

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

$$(4x \ + \ 3) \ - \ (x \ + \ \text{-}2)$$

$$(4x \ + \ 3) \ + \ (\text{-}x \ + \ 2)$$

○ $5x - 1$ ● $3x + 1$ ○ $5x + 5$ ○ $3x + 5$

$$4x \ + \ \text{-}x \ + \ 3 \ + \ 2$$
$$3x \quad + \quad 5$$

- *Re-write the linear expression using the "add the opposite to subtract" strategy.*
  - *Inside the parentheses*
  - *Outside the parentheses*
- *Group like terms*
- *Combine like terms by adding or taking away zero pairs*

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

8th Grade – Readiness Standard 3 – 7.EE.1a

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

On the Delta Math readiness screener, Isabelle selected the following answer choice. Is she correct? If not, why do you think she chose her answer?

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

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

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

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

Third, I need to determine what I know.

I know that Isabelle chose "3x + 1" as the simplified answer and I know that the negative sign in front of a number, variable or parentheses is equal to adding the opposite of the number, variable or what is inside the parentheses". *(Write "Add the opposite to subtract")*

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

I am going to try writing equivalent expressions by adding the opposite to subtract…beginning inside the parentheses.
(Draw an arrow pointing to the subtraction sign inside the parentheses.)

Add the opposite to subtract

Find the simplified equivalent expression.

$$(4x + 3) - (x - 2)$$
$$(4x + 3) - (x + -2)$$
$$\underline{(4x + \underline{3})} + \underline{(\text{-}x + \underline{2})}$$

$4x$ + 3 minus the parentheses does not change…
(Write "$(4x + 3) - ($ ".)

○ $5x - 1$ ● $3x + 1$ ○ $5x + 5$ ○ $3x + 5$

And x minus 2 inside the parentheses has the same value as x plus the opposite of 2, which is x plus negative 2.
(Write "$x + -2$".)

$$4x + \text{-}x + 3 + 2$$
$$3x \quad + \quad 5$$

Next, I will change the subtraction on the outside of the parentheses to adding the opposite of x + -2.
(Write "$(4x + 3) + $".)

And the opposite of x + -2 is negative x plus a positive 2. (Write "+ $(-x + 2)$".)

Now that all terms are being added together… (Point to the addition signs.)

I can regroup the like terms...$4x$ and negative x are like terms as well as 3 and 2. (Write "$4x + -x + 3 + 2$".)

4 positive x's plus a negative x has one zero pair and is equal to 3 positive x's…
(Draw two number bonds and write "$3x$".)

And 3 plus 2 is equal to 5… (Draw two number bonds and write "+ 5".)

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

I think that Isabell chose her answer because she only noticed one of the negative sign and subtracted 3 minus 2 to get 1 instead of adding the opposite…3 plus 2 which is 5.

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

I found that Isabell was not correct. It makes sense because I thought about the problem as rewriting all subtraction signs as adding the opposite and then combined like terms to find the correct answer…$3x$ + 5.

Session 4: **Guided Practice** (We Do)

We Do Together: (Teacher Actions)

➢ Add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 4: Guided Practice (We Do - Continued)

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

➢   Students take turns leading to add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

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

We Do Together: (Teacher Actions)

➢ Add or subtract each linear expression.

1. $(7x + 2) + (x + 5)$ $7x + x + 2 + 5$ $8x + 7$	**2.** $2x + (4 - 8x)$ $2x + 4 + $-$8x$ $2x + $-$8x + 4$ -$6x + 4$
3. $(8x + 2) - (x + 5)$ $(8x + 2) + ($-$x + $-$5)$ $8x + $-$x + 2 + $-$5$ $7x + $-$3$	**4.** $6x - (9 - 5x)$ $6x - (9 + $-$5x)$ $6x + ($-$9 + 5x)$ $6x + 5x + $-$9$ $11x + $-$9$

- *Re-write the linear expression using the "add the opposite to subtract" strategy.*
  - *Inside the parentheses*
  - *Outside the parentheses*
- *Group like terms*
- *Combine like terms by adding or taking away zero pairs*

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form D

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

© OAISD, November 2018   38

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 5: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say, draw and add or subtract each linear expression.

(Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

1. $(4x\ +\ 1)\ +\ (x\ +\ 3)$ 	**2.** $2x\ +\ (5\ -\ 3x)$
3. $(4x\ +\ 1)\ -\ (x\ +\ 4)$ 	**4.** $3x\ -\ (4\ -\ 6x)$

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 5: Guided Practice (We Do - Continued)

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

➢ Students take turns leading to draw and add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form E

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 6: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➢ Say, draw and add or subtract each linear expression.

   (Both partners build the original expression and only one rearranges their tiles to simplify the expression.)

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

Learning Target: I will add and subtract linear expressions

Session 6: Guided Practice (We Do - Continued)

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

➢ Students take turns leading to draw and add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➤ What did I learn today about adding and subtracting algebraic expressions?

> ➤ How confident do I feel about adding and subtracting algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form F

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 7: Guided Practice (We Do)

We Do Together: (Teacher Actions)

> Add or subtract each linear expression.

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

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

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

➢   Students take turns leading to add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➤ What did I learn today about adding and subtracting algebraic expressions?

> ➤ How confident do I feel about adding and subtracting algebraic expressions on my own? *(Thumbs up, down, or sideways)*

Quick Check - Form G

8th Grade – Readiness Standard 3 – 7.EE.1a

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Learning Target: I will add and subtract linear expressions

Session 8: Guided Practice (We Do)

We Do Together: (Teacher Actions)

➤   Add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions   8th Grade - RS 3 - 7.EE.1a

Session 8: **Guided Practice** (We Do - Continued)

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

➢   Students take turns leading to add or subtract each linear expression.

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

Learning Target: I will add and subtract linear expressions

Briefly discuss student responses

> ➢ What did I learn today about adding and subtracting algebraic expressions?

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

Quick Check - Form H

Name_____ Date_____

Learning Target: I will add and subtract linear expressions.

Directions: Write each simplified equivalent expression. (Work time: 4 minutes)

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

Learning Target: I will add and subtract linear expressions

Readiness for solving equations with more than one step

Title of Game: Play "**Add and Subtract Linear Expressions Match-up**!"

Number of Players: 2

Objective: To match all of your **"Problem"** cards to the equivalent **"Answer"** 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 like-terms in the expression are ___."

➢ If **Player 1** does not have the answer to the **Problem** 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)

8th Grade – Readiness Standard 3 – 7.EE.1a

Storage Suggestions: Copy the **Problem (Set A)** cards and **Answer (Set A)** cards in two different colors. Store 1 set of each in a sealable bag for each pair of students.

Set A$_1$

$(3x + 5) + (x + 1)$ Set A	$(3x + 5) + (x - 1)$ Set A	$(3x + 5) - (x + 1)$ Set A	$(3x + 5) - (x - 1)$ Set A
$(5x - 3) + (x - 1)$ Set A	$(5x - 3) - (x + 1)$ Set A	$(5x - 3) + (x + 1)$ Set A	$(5x - 3) - (x - 1)$ Set A
$(x + 5) + (x - 2)$ Set A	$(x + 5) - (x - 1)$ Set A		

Set A$_2$

$(3x + 5) + (x + 1)$ Set A	$(3x + 5) + (x - 1)$ Set A	$(3x + 5) - (x + 1)$ Set A	$(3x + 5) - (x - 1)$ Set A
$(5x - 3) + (x - 1)$ Set A	$(5x - 3) - (x + 1)$ Set A	$(5x - 3) + (x + 1)$ Set A	$(5x - 3) - (x - 1)$ Set A
$(x + 5) + (x - 2)$ Set A	$(x + 5) - (x - 1)$ Set A		

Answer Cards (Set A)

Storage Suggestions: Copy the **Problem (Set A)** cards and **Answer (Set A)** cards in two different colors.
Store 1 set of each in a sealable bag for each pair of students.

Set A₁

$4x + 6$ Set A	$4x + 4$ Set A	$2x + 6$ Set A	$2x + 4$ Set A
$6x - 4$ Set A	$4x - 4$ Set A	$6x - 2$ Set A	$4x - 2$ Set A
$2x + 3$ Set A	6 Set A		

Set A₂

$4x + 6$ Set A	$4x + 4$ Set A	$2x + 6$ Set A	$2x + 4$ Set A
$6x - 4$ Set A	$4x - 4$ Set A	$6x - 2$ Set A	$4x - 2$ Set A
$2x + 3$ Set A	6 Set A		

Problem Cards (Set B)

8th Grade – Readiness Standard 3 – 7.EE.1a

Storage Suggestions: Copy the **Problem (Set B)** cards and **Answer (Set B)** cards in two different colors.
Store 1 set of each in a sealable bag for each pair of students.

Set B₁

$(7x + 9) + (x + 1)$ Set B	$(7x + 9) + (x - 1)$ Set B	$(7x + 9) - (x + 1)$ Set B	$(7x + 9) - (x - 1)$ Set B
$(9x - 7) + (x - 1)$ Set B	$(9x - 7) - (x + 1)$ Set B	$(9x - 7) + (x + 1)$ Set B	$(9x - 7) - (x - 1)$ Set B
$(x + 9) + (x - 7)$ Set B	$(x + 9) - (x - 7)$ Set B		

Set B₂

$(7x + 9) + (x + 1)$ Set B	$(7x + 9) + (x - 1)$ Set B	$(7x + 9) - (x + 1)$ Set B	$(7x + 9) - (x - 1)$ Set B
$(9x - 7) + (x - 1)$ Set B	$(9x - 7) - (x + 1)$ Set B	$(9x - 7) + (x + 1)$ Set B	$(9x - 7) - (x - 1)$ Set B
$(x + 9) + (x - 7)$ Set B	$(x + 9) - (x - 7)$ Set B		

Answer Cards (Set B)

8th Grade – Readiness Standard 3 – 7.EE.1a

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

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

Set B₁

$8x + 10$ Set B	$8x + 8$ Set B	$6x + 10$ Set B	$6x + 8$ Set B
$10x - 8$ Set B	$8x - 8$ Set B	$10x - 6$ Set B	$8x - 6$ Set B
$2x + 2$ Set B	16 Set B		

Set B₂

$8x + 10$ Set B	$8x + 8$ Set B	$6x + 10$ Set B	$6x + 8$ Set B
$10x - 8$ Set B	$8x - 8$ Set B	$10x - 6$ Set B	$8x - 6$ Set B
$2x + 2$ Set B	16 Set B		

Q_1

What is the problem about?

Q_2

What do I need to find?

Q_3

What do I know?

Q_4

What can I try?

Q_5

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?