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How to Use This Addenda

Make sure you're ready to teach by noting the **Necessary Materials and Pre-Lesson Prep** you will need to gather or complete prior to the lesson

Find high-leverage instructional moves in the **Lesson Look Fors**. This is what leaders should see when observing your instruction

Note how your lesson objective ties to your state **Standards**

Plan purposeful questioning and responses using **Opportunities to CFU**

Use the **Mathematical Goal of the Lesson** to keep you focused on the appropriate student outcome

Note exemplar pacing in the **Lesson Agenda**

Plan to stress **Important Vocabulary** in the lesson. New vocab for the unit is indicated in bold

Plan instruction around what students need to Know & Do to be successful on the Exit Ticket using the identified **Student Criteria for Success**

Find recommended lesson modifications, content knowledge boosters, and/or high-leverage instructional moves that may not be in your Teacher Edition located in **Other Notes to Inform Your Planning**

Lesson 9: Find related multiplication facts by adding and subtracting equal groups in array models   Date: _____

Standard(s)
- ◆ **3.4K** solve one-step ~~and two-step~~ problems involving multiplication ~~and division~~ within 100 using strategies based on objects; pictorial models, including arrays, ~~area models,~~ and equal groups; properties of operations; or recall of facts

Important Vocabulary
- array
- **bracket**
- columns
- rows
- unit(s)

*In this lesson, students are NOT responsible for the vocabulary **distributive property**. Please withhold as it will come up in later lessons.*

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep
- (S) Multiply by 2 (1–5) Pattern Sheet
- (S) Threes array no fill template
- (S) Personal white board
- (S) Blank paper

Lesson Agenda		Time
I.	Do Now (source: fluency #1)	5 min
II.	Fluency*	8 min
III.	Concept Development	25 min
IV.	Student Practice	15 min
V.	Student Debrief	7 min
VI.	Exit Ticket*	5 min

Mathematical Goal of this Lesson
Students learn they can use decomposition to break one larger number into two smaller numbers as a strategy for multiplication. The goal of this lesson is simply for student to understand how to interpret and create an array that demonstrates such decomposition. Students will build on this understanding in subsequent lessons. This lesson also supports the goal of student thinking in terms of counting units, an overarching goal for academy math.

Opportunities to CFU
- ✓ Concept Development, by way of eliciting student responses
- ✓ Problems Set problems: #2, #3

$7 \text{ threes} = 5 \text{ threes} + 2 \text{ threes}$

$7 \times 3 = 5 \times 3 + 2 \times 3$

$21 = 15 + 6$

Other Notes to Inform Your Planning
For **Do Now**: Use the Multiply by 2 (1–5) Pattern Sheet for your Do Now. 3 minutes for completion, 2 minutes whole group classwork check.
For **Fluency**: Complete the Group Counting activity (notice the inclusion of 4s in preparation for upcoming lessons) and Forms of Multiplication activity.
For **Concept Development**: Consider prepping personal whiteboard in advance. Spend no more than 12 minutes for CD Problem 1 and 13 minutes for CD Prob 2.
For **Student Practice**: consider creating an extra set of Qs like 1-3 in case students struggle with entry-level understanding. If they don't, move on to Qs 4 and above.
For **Student Debrief**: consider using the Eureka assigned Exit Ticket for whole group debrief exercise; Suggested strategy – guided discourse.
For **Exit Ticket**: Use **Homework** problems 2 & 3 for this lesson's Exit Ticket.

🔑 Though not formally discussed *yet*, this is a foundation to understanding of distributive property. Students visually see multiplying the sum of two or more addends by a number will give the same result as multiplying each addend individually by the number and then adding the products together.

Lesson Look Fors

Look for teachers to...
- ☐ Have established a signaling routine for choral response or work show during the respective fluency activities
- ☐ Use a think aloud to describe why they shade what portions of the array, or use a different symbol in the array
- ☐ Make the focus of the lesson understanding the visual representations

Look for students to...
- ☐ Explain what they see in the array and how it relates to a given number sentence.

Student Criteria for Success
- Shading, brackets, and/or dotted lines on an array will have mathematical significance
  - brackets can identify parts or wholes
  - dotted lines and shading represent decompositions
- We count units; In an array, counting rows is the same as counting units.
- Addition/subtraction and multiplication math facts (up to 4)
- Interpret an array
  - identify decompositions within an array
  - Relate an annotated or labeled array to one or more number sentences
- Addition/subtraction (+/- up to 4)
- Multiplication (2, 3, and 4)

UNIT SYNOPSIS

In this unit, students apply understandings of rational numbers as they formulate expressions and equations with one variable and use these equations to solve problems. In 6th grade math, students learned to write, model, and solve one-step equations containing whole numbers, integers, and positive fractions/decimals. In pre-algebra, students expand that understanding to write, model and solve two-step equations containing all rational numbers. Student understanding will be grounded in models. Once students understand how they would find a missing value using models they should build an understanding of using inverse operations to isolate a variable and balance the equation. Students should use algebraic reasoning to understand why inverse operations will isolate a variable (subtracting/adding to get the constant to become zero and multiplying or dividing to get the coefficient to become 1). Students will use variables to represent quantities in a real-world or mathematical problem in order to construct and solve simple one- and two-step equations. While acquiring a deeper understanding of solving the one and two-step equations, students' reason about the quantity of their solutions and question the validity of their answers. Students who struggled with computing with rational numbers during unit one will struggle with simplifying expressions, but this is a great opportunity to reteach these skills. Provide students with a graphic organizer that will walk them through the process of each operation with integers, fractions and decimals.

Topic A Overview – Distributive Property and One-Step Equations

In Topic A Lesson 1, students learn to apply distributive property of multiplication to generate equivalent expressions. In Lesson 2 students understand the process of solving one-step equations by using pictorial representations to model. Although students write, model, and solve one-step equations containing whole numbers, integers, positive fractions and decimals, they will build on this understanding using models such as tape diagrams, algebra block and balances. This will deepen their understanding of isolating the variable using the inverse operation. In Lesson 3, students learn how inverse operations are necessary to solve equations by isolating an unknown value represented by a variable. They build on the understanding that for a variable to be isolated, the constant must be zero because $x + 0 = x$ and the coefficient must be one because $1x = x$. Final understandings for this lesson are recognizing that addition/subtraction and multiplication/division are inverse operations, a fraction can be. multiplied by its reciprocal resulting in one whole and recognizing that an equation is solved when the coefficient is one. In Lesson 4, students will use models and equations to solve real world problems represented by one-step equations.

Lesson 1: Distributive Property

① 4(3 + 9)
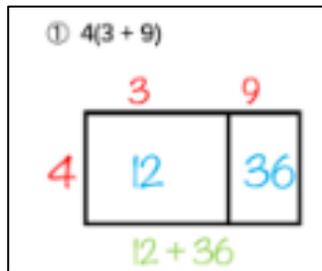
Lesson 2: One-Step Equations (Models)

Lesson 3: One-Step Equations (Algebraically)

Lesson 4: One-Step Equations (Real-World)

1.) Kendal got $\frac{7}{8}$ of the questions on an exam correct. If she got 42 questions correct, how many questions were on the exam?

Equation: $\frac{7}{8}q = 42$

Solution: 48 questions

In Lesson 5 students understand the process of solving two-step equations through modeling then writing an equation from the model just as they did for one-step equations in Lessons 2-4. Through modeling, students continue to build upon the understanding that it is necessary to eliminate the constant first, then eliminate the coefficient using inverse operations to find the value of an unknown quantity. . In Lesson 6, students understand the process of solving two-step equations through models then writing an equation from a model and finding the solution. In this lesson students will check their solutions to an equation by substituting the variable value back into the equation. In Lesson 7, students continue to build on the understanding of solving equations which become more difficult including Integers and Rational Numbers. In Lesson 8, students use what they have learned in lessons 5-8 to solve real world problems represented by two step equations.

Lesson 5: Two-Step Equations w/Models

1.) Write an equation to represent the model, then find the solution.
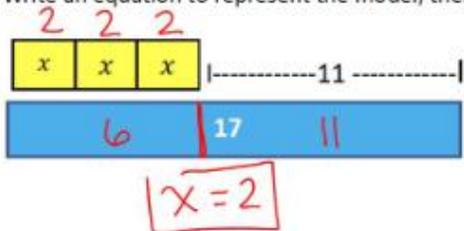
$$x = 2$$

**Lesson 6:** Two-Step Equations w/Integers Algebraically

④ $-8g - 9 = -49$

$+9 \quad +9$

$-8g = -40$

$\dfrac{-8g}{-8} = \dfrac{-40}{-8}$

$g = 5$

Lesson 7: Two-Step Equations w/Integers and Rational Numbers Algebraically

③ $\dfrac{w}{2} - (-1) = 6$

$\dfrac{10}{2} + 1 = 6$ ✓

$\dfrac{w}{2} = 5(2)$

10

Lesson 8: Two-Step Equations Real-World Application

1.) Liz is shipping a present to her friend. The shipping company charges one fee for the box, and another fee depending on the weight of the package. She pays $2 for the shipping box. The package weighs 9 pounds. If Liz paid a total of $38, how much does the company charge per pound?

$2 + 9p = 38$

$-2 \qquad -2$
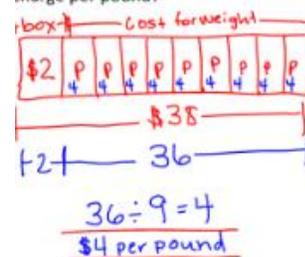
$\dfrac{9p}{9} = \dfrac{36}{9}$

$p = 4$

$4 per pound

$36 \div 9 = 4$

$4 per pound

CONTENT STANDARDS
Below are the standards addressed in this unit.

Readiness Standards	Supporting Standards
7.11(A) model and solve one-variable, two-step equations and inequalities	**6.7(D)** generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties **7.10(A)** write one-variable, two-step equations and inequalities to represent constraints or conditions within problems **7.11(B)** determine if the given value(s) make(s) one-variable, two-step equations and ~~inequalities~~ true

ROADMAP

AT A GLANCE: Unit 5 Algebraic Expression and Equations				
Topic	Day	Date	Lesson	Lesson Title
Topic A Distributive Property and One-Step Equations	1		1	Distributive Property
	2		2	One-Step Equations w/Models
	3		3	One-Step Algebraically
	4		4	One-Step Equations Real-World Application
	5			Success Day | Topic Quiz 5
Topic B Two-Step Equations	6		5	Two-Step Equations w/Models
	7		6	Two-Step Equations w/Integers Algebraically
	8		7	Two-Step Equations w/Integers and Rational Numbers Algebraically
	9		8	Two-Step Equations Real World Application
	10			Review Day
	11			Exam

Lesson 1: The Distributive Property	Date _____

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, ~~two-step equations and inequalities~~ ◆ **6.7(D)** generate equivalent expressions ~~using the properties of operations: inverse, identity, commutative, associative, and distributive properties~~ *This standard will act as a supporting standard for this lesson since it is a review of what students learned 6th grade*	<u>Necessary Materials and Pre-Lesson Prep</u> ▪ Unit 5 Student Workbook ▪ Document Camera ▪ Matching Cards <u>Lesson Agenda</u>　　　　　　　Time <table><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>30 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>25 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> <u>Mathematical Goal of this Lesson</u> The goal of this lesson is for students to apply distributive property of multiplication to generate equivalent expressions. Students will recognize that distributive property of multiplication multiplies the term outside of the parentheses by all terms inside the parentheses. They will then understand that the resulting expression is equivalent to the original expression. <u>Opportunities to CFU</u> ✓ **INM**: Part I: #3, Part II: #1-3, Part III: #3 ✓ **Student Practice:** #5, 6, 12, 14 ✓ **INM***: The Distributive Property with an Area Model: #2, 5, 6,*	<u>Look for teachers to…</u> ❑ Stamp the meaning of $x \cdot x = x^2$ and $5x \cdot x = 5x^2$. ❑ Prompt students to access tools from Unit 1 and 2 on Integer Operations. ❑ Encourage students to justify their solutions ensuring that they have multiplied the term outside of the parentheses by all terms inside the parentheses. <u>Look for students to…</u> ❑ Use what they know about integer operations and the area model to accurately apply distributive property and generate an equivalent expression. ❑ Justify their answers using the appropriate vocabulary for the lesson.

Important Vocabulary	<u>Other Notes to Inform Your Planning</u>	Student Know/Do Chart
▪ Coefficient ▪ Distributive Property of Multiplication ▪ Variable	For **Do Now**: Remind students that area of a rectangle is $A = lw$. Consider projecting the Do Now and having this written in as a clue. Also, record student responses to the guided questions under the document camera so that students can see how their peers responded and understand that the value of the expression should not change. For **INM**: Consider creating an anchor chart with necessary terms and examples for students to reference vocabulary such as coefficient, term, and distributive property. Model examples with students using the document camera. The area model is a great strategy to use in introducing distributive property. It is important to remind students to include negative signs where necessary. You may consider having them highlight negative numbers as a scaffold. **Focus on Disciplinary Literacy** Do Now: #1 INM: Question (1st page of INM)	**Know** Have a strong understanding of adding, subtracting, and multiplying, integers. **Know** Distributive property means that the term outside of the parentheses must be multiplied by all terms inside of the parenthesis. **Do** Use distributive property to simplify expressions. **Do** Use the area model to demonstrate distributive property.

Lesson 2: One-Step Equation w/Models		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, ~~two-step~~ equations ~~and inequalities~~ ◆ **7.10(A)** write one-variable, ~~two-step~~ equations to represent constraint or conditions within problems.	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 5 Student Workbook ▪ Document Camera **Lesson Agenda** Time <table><tr><td>I.</td><td>Do Now</td><td>8 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>38 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>15 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>4 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The goal of this lesson is for students to understand the process of solving one-step equations by using pictorial representations to model. Next, they will write an equation from a model and then find the solution. This lesson is meant to help students understand how to use inverse operations to find the value of an unknown quantity. Models such as tape-diagrams, algebra blocks, and balances will be used to build a deep understanding of the concept of solving one-step equations for students. **Opportunities to CFU** ✓ INM: #1-6 Student Practice: #1-4, #6-8 **Other Notes to Inform Your Planning** **INM**: In the table, **Q1-3** help build an understanding of using variables to represent unknown quantities in real world situations. When modeling, consider scaffolding by color-coding to highlight the use of inverse operations. This will support student's understanding of using inverse operations to find the value of the variable. Students will also define the variable which will build an understanding of how variables are used to represent unknown quantities. This is an important understanding as students will use this throughout the unit, in Algebra and beyond. In **Q5** there is a negative number, some students may struggle. Ask probing questions to support their understanding or encourage them to use the tools learned in Unit 1 to assist them in finding their answer.	**Look for teachers to...** ❑ Use the vocabulary terms throughout the lesson and prompt students to engage in discussion using the lesson vocabulary. ❑ **Model and Stamp for students**: isolate the variable, constant should become zero, and coefficient should become one. ❑ Use the scaffolding questions listed in the lesson when students seem to struggle. **Look for students to...** ❑ Use a t-chart to assist with solving problems with negative integers. ❑ Use the lesson vocabulary consistently in discussion throughout the lesson. ❑ Show the process of isolating the variable and solving.

| | **Focus on Disciplinary Literacy**

INM: #1-3
SP: #1-6 | |

Important Vocabulary		Student Know/Do Chart
▪ Balance ▪ Coefficient ▪ Constant ▪ Equation ▪ Inverse operation ▪ Isolate ▪ Solution ▪ Variable		**Know** When solving an equation, the objective is to isolate the variable on one side of the equal sign. **Know** For an equation to remain true, it must remain balanced. **Know** To isolate the variable, the constant must become zero because zero is the only thing that can be added to a number and not change its value. **Do** Use a pictorial representation or model to write an equation. **Do** Use inverse operations to isolate the variable in an equation then solve.

Pre-Algebra Unit 5 (Updated 8/29/2025)

Lesson 3: Solving One-Step Equations Algebraically		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, ~~two-step~~ equations ~~and inequalities~~	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 5 Student Workbook ▪ Document Camera **Lesson Agenda** Time <table><tr><td>I. Do Now</td><td>5 min</td></tr><tr><td>II. INM/Concept Development</td><td>30 min</td></tr><tr><td>III. Student Practice</td><td>25 min</td></tr><tr><td>IV. Student Debrief</td><td>5 min</td></tr><tr><td>IV. Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The goal of this lesson is for students to learn how inverse operations are necessary to solve equations by isolating an unknown value represented by a variable. Students build an understanding that for a variable to be isolated, the constant must be zero because $x + 0 = x$ and the coefficient must be 1 because $1x = x$. They also recognize that addition/subtraction and multiplication/division are inverse operations. Next, they recognize that a fraction can be multiplied by its reciprocal to result in one whole. Finally, they recognize that an equation is solved when the variable is isolated.	**Look for teachers to…** ❑ Use the vocabulary terms throughout the lesson and prompt students to engage in discussion using the lesson vocabulary. ❑ **Model and Stamp for students**: isolate the variable, constant should become zero, multiply by the reciprocal and coefficient should become one. ❑ Use the scaffolding questions listed in the lesson when students seem to struggle. **Look for students to…** ❑ Use a t-chart to assist with solving problems with negative integers. ❑ Use the lesson vocabulary consistently in discussion throughout the lesson. ❑ Show the process of isolating the variable and solving.

Opportunities to CFU
- ✓ **INM Example** 1-5
- ✓ **INM Table:** #4, 5, 6, 8
- ✓ Student Practice: 2, 3, 5, 6, 7, 8

Important Vocabulary	Other Notes to Inform Your Planning	Student Know/Do Chart
▪ Coefficient ▪ Inverse operations ▪ Isolating the variable ▪ Reciprocal ▪ Variable	**Do Now**: The Do Now offers practice that prepares students for the day's lesson by getting them ready to solve one-step equation making the constant become zero and the coefficient become one. **INM**: Model #1-4 for students under the document camera. Students are building an understanding that to solve for a variable, they must use the inverse operation to get the **constant to become zero** and the **coefficient to become one**. Students who struggle with the lesson should be allowed material to help them access the lesson such as **12 x 12 multiplication chart, number lines or integer chips** if needed. Students should recognize that the steps to solve an equation are the same regardless of which side of the equal sign the variable is located. **Focus on Disciplinary Literacy** INM: Examples 3-5 SP: 2, 4, 8	**Know** A variable is considered isolated when it has a coefficient of one and a constant of zero. **Know** Adding/subtracting and multiplication/division are inverse operations. **Do** Use the appropriate inverse operation to isolate the variable. **Do** Show the process of making the constant become zero and the coefficient become one. **Do** Justify the answer by plugging the value of the variable back into the problem and solving.

Lesson 4: One Step Equations Real World Application		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, ~~two-step~~ equations ~~and inequalities~~	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 5 Student Workbook ▪ Document Camera **Lesson Agenda**	Look for teachers to… ❑ Use the vocabulary terms throughout the lesson and prompt students to engage in discussion using it. ❑ **Model and Stamp for students**: isolate the variable, constant should become zero, multiply by the reciprocal and coefficient should become one when solving. ❑ Model and use scaffolding questions to prompt students to make sense of a word problem. Look for students to… ❑ Show the process to solving the equation. ❑ Use the lesson vocabulary consistently in discussion throughout the lesson. ❑ Model and explain how the model represents a real-world situation.

Lesson Agenda / Time

		Time
I.	Do Now	5 min
II.	INM/Concept Development	30 min
III.	Student Practice	25 min
IV.	Student Debrief	5 min
V.	Exit Ticket	5 min

Mathematical Goal of this Lesson
The goal of this lesson is for students to use models and equations to solve real world problems represented by one-step equations. Using real world situations, students will be able to see how models help them have a better understanding of the problem thus connecting the concrete and abstract aspects of algebra together.

Opportunities to CFU
✓ INM: #1-3, 5, 7
✓ Student Practice: 1-3, 5, 6

Other Notes to Inform Your Planning
Do Now: The Do Now reviews solving one-variable, one-step equations, preparing students to focus on writing and solving in the day's lesson.
INM: Model using a labeled diagram to help to build students' understanding. Also, model the process of the coefficients becoming one and the constants becoming zero when solving. Modeling with a **labeled diagram** helps students to 'make sense' of word problems along with the process of coefficients becoming one and constants becoming zero when solving. This will deepen their understanding and serve as a review of Lesson 5.

Focus on Disciplinary Literacy

INM: #6, 7
Student Debrief

Important Vocabulary
▪ Coefficient ▪ Equation ▪ Inverse operations ▪ Isolating the variable ▪ Reciprocal ▪ Variable

Student Know/Do Chart

Know	One step equations represent the relationship between two quantities which could be additive or multiplicative.
Know	In a real-world situation, variables represent an unknown quantity.
Do	Make sense of a word problem and draw a model and equation to represent the real-world situation.
Do	Use the model and equation to solve and find the solution.

Lesson 5: Two-Step Equations w/Models	Date _____

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, two-step equations and ~~inequalities~~ ◆ **7.10(A)** write one-variable, two-step equations to represent constraint or conditions within problems.	<u>Necessary Materials and Pre-Lesson Prep</u> ▪ Unit 5 Student Workbook ▪ Document Camera <u>Lesson Agenda</u>　　　　　　　　Time <table><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>40 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>19 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>1 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> <u>Mathematical Goal of this Lesson</u> The goal of this lesson is for students to understand the process of solving two-step equations through models and writing an equation from a model, then finding the solution. Through modeling two-step, they should build an understanding that it is necessary to eliminate the constant first, then eliminate the coefficient. This lesson is meant to help students further understand using inverse operations to find the value of an unknown quantity. <u>Opportunities to CFU</u> ✓ INM ## 2, 5, 11 ✓ Student Practice: #5,6	<u>Look for teachers to...</u> ❑ **Model and Stamp for students**: isolate the variable, constant should become zero, and coefficient should become one when solving. ❑ Use the same language that was used in Unit 1; adding a negative is the same as subtracting. ❑ Pay specific attention to problems that involve negatives to catch and address misconceptions. <u>Look for students to...</u> ❑ Use a t-chart to assist with solving problems with negative integers. ❑ Use the lesson vocabulary consistently in discussion throughout the lesson. ❑ Show the process of isolating the variable and solving.
Important Vocabulary ▪ Balance ▪ Coefficient ▪ Constant ▪ Equation ▪ Inverse operation ▪ Isolate ▪ Solution ▪ Variable	<u>Other Notes to Inform Your Planning</u> INM: Q2; students may have misconceptions because instead of adding one, they are adding negative ones <u>since there aren't enough positive ones</u>. It is important to use the same language that was used in Unit 1; adding a negative is the same as subtracting. Continue to watch for misconceptions around this throughout the lesson. Students may also have misconceptions on **Q5** which requires them to eliminate a negative constant by adding positives. This would be a great time to use and model vocabulary (Inverse Operation). Continue to watch for misconceptions around this throughout the lesson. ┌─────────────────────────┐ │ **Focus on Disciplinary** │ │ **Literacy** │ │ Do Now: #2 │ │ INM: #5, 6 │ │ SP: #4, 5 │ └─────────────────────────┘	**Student Know/Do Chart**

Lesson 6: Two-Step Equation w/Integer Algebraically		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, two-step equations and ~~inequalities~~	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 5 Student Workbook ▪ Document Camera **Lesson Agenda** **Time** <table><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>30 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>15 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The goal of this lesson is for students to solve two-step equations algebraically with integers. This lesson is meant to help students further understand using inverse operations to find the value of an unknown quantity. In this lesson students will check their solutions to an equation by substituting the variable value back into the equation. **Opportunities to CFU** ✓ INM: 1st table, 3rd table, (*Let's Practice*) #2-8 ✓ Student Practice: #1, 3, 6, 7, 10, 11	**Look for teachers to…** ❑ <u>Emphasize</u> that the goal of solving an algebraic equation is to isolate the variable, and to do that, students need to make the coefficient one and the constant zero. ❑ Model the process of making the constant zero and the coefficient one. ❑ <u>Stamp</u> that students should rewrite the new equation after eliminating the constant then solve. <u>Look for students to…</u> ❑ Accurately model the process for solving two-step equations and use substitution to check their answers. ❑ Use vocabulary to accurately describe the process of solving two step questions and checking answers.
		Student Know/Do Chart
Important Vocabulary ▪ Coefficient ▪ Constant ▪ Integer ▪ Inverse operations ▪ Isolating the variable ▪ Variable	**Other Notes to Inform Your Planning** **INM:** Ensure that students are writing in the correct words or representations of (variable x) in the guided notes. This is a great tool to reference in the case a student gets 'stuck.' The second table is a great tool for them to reference the process of solving two step equations. As they are working on student practice, consider encouraging students to use the second table as a reference tool to check their steps. Watch for misconceptions around negative numbers and inverse operation especially on problems such as: $37 = -8 + 9r$. There may be several students that get 'stuck' on these types of problems because the sum is to the left of the equal sign. This may afford the teacher an opportunity to bring class whole group to address this misunderstanding. **Focus on Disciplinary Literacy** **Do Now:** I, II, III **INM:** 1st Table w/the equations	**Know** When solving an equation, the goal is to isolate variable on one side of the equal sign. **Know** What happens on one side of the equal sign should happen on the other side. **Know** To isolate the variable, the constant must become zero and the coefficient should become one. **Know** Multiplication/Division and Adding/Subtracting are inverse operations **Do** Solve two step equations using inverse operations; isolating the variable.

Lesson 7: Two-Step Equations w/Integers and Rational Numbers Algebraically		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.11(A)** model and solve one-variable, two-step equations and ~~inequalities~~	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 5 Student Workbook ▪ Document Camera **Lesson Agenda** |	Time
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I. Do Now	5 min
II. INM/Concept Development	35 min
III. Student Practice	20 min
IV. Student Debrief	5 min
V. Exit Ticket	5 min | **Mathematical Goal of this Lesson** The goal of this lesson is for students to solve two step equations algebraically. In this lesson equations become more complex than they were in the previous lesson. Students will continue to build on understandings about solving two-step equations. **Opportunities to CFU** ✓ INM: '*Let's Practice*: #1, 3, 4, 6, 8 ✓ Student Practice: 3, 5, 7-10	**Look for teachers to...** ❑ Emphasize multiplying by the reciprocal if there is a fraction in the coefficient. ❑ Use the vocabulary terms throughout the lesson and prompt students to engage in discussion using it. ❑ Throughout the lesson continue to stamp for students that coefficient that are fractions have a 1 in the numerator (i.e., $\frac{x}{5}$ is the same as $\frac{1}{5}x$). **Look for students to...** ❑ **Explain** the meaning of multiplying by the reciprocal and why it would be necessary when solving equations. ❑ Accurately model the process for solving two-step equations and use substitution to check answers.
Important Vocabulary ▪ Coefficient ▪ **Eliminate** ▪ Integer ▪ Reciprocal ▪ Inverse operations ▪ Isolating the variable ▪ Variable	**Other Notes to Inform Your Planning** **INM**: The first set of problems where students engage in partner work and turn and talk allows the opportunity to assess student understanding of previous lessons such as multiplying fractions and the understanding that the fraction bar represents division; preparing them for the rest of the lesson. Next, students determine the constant and coefficient of each given equation. This helps them to know what order to eliminate numbers in once they begin to isolate the variable and can serve as a reference tool for students that may get 'stuck' on the student practice. Then, the 'two-step equations table' focuses on the steps students will take to solve a two-step equation and can also be used as a reference tool. **Focus on Disciplinary Literacy** INM: 1st Table w/the equations SP: #1, 6, 8	**Student Know/Do Chart**
		Know When solving an equation, the goal is to isolate variable on one side of the equal sign. Know What happens on one side of the equal sign should happen on the other side. Know To isolate the variable, the constant must become zero and the coefficient should become one. Know Multiplication/Division and Adding/Subtracting are inverse operations Do Solve two step equations using inverse operations; isolating the variable.

Lesson 8: Two-Step Equations Real World Application		Date _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors

Standard(s)

◆ **7.11(A)** model and solve one-variable, two-step equations and ~~inequalities.~~

Important Vocabulary

- Coefficient
- Constant
- **Eliminate**
- Equation
- Inverse operation
- Solution
- Variable

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep
- Unit 5 Student Workbook
- Document Camera

Lesson Agenda   Time

		Time
I.	Do Now	5 min
II.	INM/Concept Development	30 min
III.	Student Practice	25 min
IV.	Student Debrief	5 min
V.	Exit Ticket	5 min

Mathematical Goal of this Lesson
The goal of this lesson is to solve real world problems represented by two step equations. Students will bring together what they learned about modeling two step equations and solving two step equations algebraically. Using real world situations, students will be able to see how models help them to make sense of a problem. This lesson ties the concrete and abstract aspects of algebra together and sheds light on both using real world application.

Opportunities to CFU
✓ INM: #1-8
✓ Student Practice: #1, 3, 4, 5, 6

Other Notes to Inform Your Planning
INM: In the first example ensure that students are writing down on their handout exactly what the teacher is modeling to avoid misconceptions later. Students should know the process. It is important to include their voice in solving this problem; prompting them to use the same vocabulary as the last two lessons to reinforce understanding and show that the concept does not change. **Q3** will require more direct questioning as students will struggle to understand the problem. Also, teachers should read and model how to make sense of the problem (i.e., **Read:** Megan divides the deck of cards evenly among 4 people; 'Teacher draws a tape diagram and divides into four players.' **Then read:** Megan puts 3 cards in the middle of the deck and now has 5, 'Teacher models this step on the tape diagram.'). As teacher is modeling, include student voice to engage them in labeling the important pieces of information on the tape diagram. This helps students see more clearly what's happening in the problem which will assist them on the exit ticket.

> **Focus on Disciplinary Literacy**
>
> INM: #1-3
> Student Debrief:

Lesson Look Fors

Look for teachers to...
❑ Model how to makes sense of a problem by reading to understand or having a student to read and then creating the tape diagram, labeling it with each piece of pertinent information **during** the reading.
❑ Ask probing questions to guide student thinking.

Look for students to...
❑ Use a diagram to model and solve two-step equations represent real-world situations.
❑ Accurately model the process for solving two-step equations and use substitution to check answers.

Student Know/Do Chart

Know   Two-step equations, have both additive and multiplicative components.

Know   In a real-world situation, variables represent an unknown quantity.

Know   Once an equation is constructed from a real-world scenario, inverse operations are used to solve the equation.

Know   To isolate the variable in a two-step equation, the constant must first be made equal to zero and then the coefficient must be made equal to one.

Do   Make sense of a word problem and draw a model and equation to represent the real-world situation.

Do   Use the model and equation to solve and find the solution.

Recommended Success Day Materials and Resources

7.10A and 7.11A
Modeling Equations Part I
Modeling Equations Part II
Equations Practice
Extra Practice Teacher Edition (TE)
Extra Practice Student Edition (SE)

Notes to Inform Your Planning
These resources are relatively brief and can be used for either small-group or whole-group reteach.

If student data indicates a pause point is not necessary, you can opt to move forward and reserve a Success Day to use at a later date.

Using exit ticket data can help you prioritize what to review. For example, if you remember that students did poorly on Lesson 7, pull problems from lesson 7 especially if they are problems students did not do before (for example, SP, EP or INM problems you skipped during class). You can also take questions from the resources linked above.

All unit exams should be given online to prepare students for STAAR online.

UNPACKED STANDARDS

Focus standards for this unit.

<table>
<tr><td colspan="3" style="background:#2e6da4;color:white">Standards Clarification</td></tr>
<tr><td>Standards</td><td>Specificity</td><td>Notes/Explanations/Examples</td></tr>
<tr>
<td>

7.11(A) model and solve one-variable, two-step equations and ~~inequalities~~.

</td>
<td>

Concepts:
• one-variable, two-step equations

Skills:
• Model
• Solve

Clarifications Including but Not Limited To:
• Equations contain positive and negative rational numbers as constants and coefficients.
• Equations that have a positive or negative rational number as the solution.
• Diagrams/models used to represent equations
• Real-world situations that can be represented using two-step, one-variable equation.
• Equations written in various forms (not always ax + b = c)

Limitations:
Equations limited to one-variable
Equations limited to two-steps

Vertical Alignment:

Grade 6:
• Students introduced to solving and modeling one-step, one-variable equations, and inequalities.
• Students introduced to the terms constant and coefficient.
• Students introduced to using inverse operations to make the constant 0 and the coefficient 1, then balancing the equation.
• Students introduced to graphing solutions to inequalities on a number-line.

Algebra 1:
• Students will solve and model multi-step one-variable equations/inequalities. This means students may need to CLT or distribute before solving.
• Students will solve one-variable equations/inequalities with variables on both sides of the equal sign.
• Students will solve two-variable systems of equations and inequalities.

</td>
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⚠ 2025 – Q33

What is the solution to $3x + 2x + 20 = 50$?

Ⓐ $x = 6$

Ⓑ $x = 14$

Ⓒ $x = 5$

Ⓓ $x = 25$

*Correct Answer (A)

⚠ 2024 – Q34

What is the solution to the equation $4 + \frac{1}{2}x - 8 = 12$?

Ⓐ $x = 4$

Ⓑ $x = 8$

Ⓒ $x = 16$

Ⓓ $x = 32$

*Correct Answer (D)

</td>
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</table>

Standards Clarification

Standards	Specificity	Notes/Explanations/Examples
		2024 – Q34 What is the solution to the equation $4 + \frac{1}{2}x - 8 = 12$? Ⓐ $x = 4$ Ⓑ $x = 8$ Ⓒ $x = 16$ Ⓓ $x = 32$ *Correct Answer (D)
7.11(B) determine if the given value(s) make(s) <u>one-variable, two-step equations</u> and ~~inequalities~~ true	<u>Concepts:</u> One-Variable two-step equations <u>Skills:</u> Determine <u>Clarifications Including but Not Limited To:</u> • Equations contain positive and negative rational numbers as constants and coefficients. • Equations that have a positive or negative rational number as the solution. • Diagrams/models used to represent equations • Equations written in various forms. (not always ax + b = c) <u>Limitations:</u> Equations limited to one-variable <u>Vertical Alignment:</u>	2024 – Q28 Determine whether each equation is true or not true when $m = -5$. Select the correct answer in each row. | Equation	True	Not True
$4m - 6 = 14$	☐	☐
$-2m + 7 = 17$	☐	☐
$4m - 6 = -26$	☐	☐
$-2m + 7 = -3$	☐	☐ | *Correct Answer (Not True; True; True; Not True)

Standards Clarification

Standards	Specificity	Notes/Explanations/Examples
	Grade 6: • Students introduced to solving and modeling one-step, one-variable equations and inequalities. • Students introduced to the term's constant and coefficient. • Students introduced to using inverse operations to make the constant 0 and the coefficient 1, then balancing the equation. • Students introduced to graphing solutions to inequalities on a number-line. Algebra 1: • Students will solve and model multi-step one-variable equations/inequalities. This means students may need to CLT or distribute before solving. • Students will solve one-variable equations/inequalities with variables on both sides of the equal sign. • Students will solve two-variable systems of equations and inequalities.	

VERTICAL STANDARDS

This section details the **progression** of key student expectations/standards** in the courses **before** and **after** this course. This will help you understand what **prior knowledge skills to build upon** and guide you in knowing what **skills you are preparing your students** for in the subsequent course.

5th Grade	6th Grade	8th Grade & Algebra 1
5.3(K) add and subtract positive rational numbers fluently 5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping 5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping	6.3(D) add, subtract, multiply, and divide integers fluently 6.3(A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values 6.7(D) generate equivalent expressions using the properties of operations: inverse, identity, commutative & distributive properties 6.10(A) model & solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts 6.7(B) distinguish between expressions and equations verbally, numerically, and algebraically 6.7(C) determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations 6.9(A) write one-variable, one-step equations and inequalities to represent constraints or conditions within problems 6.9(B) represent solutions for one-variable, one-step equations and inequalities on # lines 6.9(C) write corresponding real-world problems given one-variable, one-step equations or inequalities 6.10(B) determine if the given value(s) make(s) one-variable, one-step equations or inequalities true 6.7(A) generate equivalent numerical expressions using order of operations, including whole number exponents, and prime factorization	8.8(C) model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants A.5(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides A.5(C) solve systems of two linear equations with two variables for mathematical and real-world problems A.10(E) factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two 8.8(A) write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants 8.8(B) write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants A.12(E) solve mathematic and scientific formulas, and other literal equations, for a specified variable