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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**

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

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

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- (S) Multiply by 2 (1–5) Pattern Sheet
- (S) Personal white board
- (S) Three's array no fill template
- (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

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)

Important Vocabulary

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

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

Note exemplar pacing in the **Lesson Agenda**

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

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

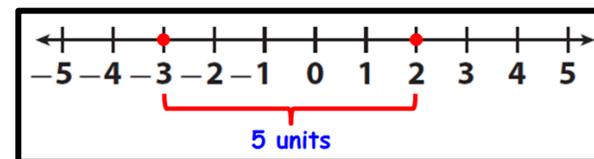
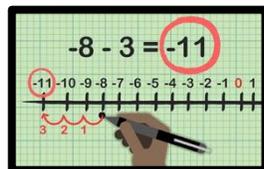
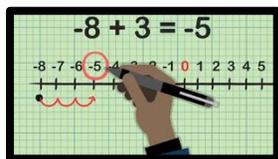
Find recommended lesson modifications, content knowledge boosters, and/or high-leverage instructional moves that may not be in your Teacher Edition located in **Other Notes to Inform Your Planning**

UNIT SYNOPSIS

This unit builds upon the understandings of integers and rational numbers that students began to develop in 6th grade. In this unit, students will formalize rules of operations with integers and fractional rational numbers. Students apply properties of operations as strategies to add and subtract rational numbers. In order for students to be successful in this unit, it is critical that they have a deep conceptual understanding of the processes of addition and subtraction. Avoid teaching students tricks or shortcuts when they are learning the processes for computing with rational numbers. Students use the ideas of distance and direction to add and subtract with all types and forms of rational numbers. Absolute-value as distance and properties of operations will help students make and defend claims about operations with rational numbers. Real-world contexts will help students make sense of computing with positive and negative rational numbers. Number lines and +/- chips present a visual image for students to explore and record addition and subtraction results. Repeated opportunities over time will allow students to compare the results of adding and subtracting pairs of numbers, leading to the generalization of the rules. Fractional rational numbers and whole numbers should be used in computations and explorations. Students should be able to give contextual examples of integer operations, write and solve equations for real-world problems and explain how the properties of operations apply.

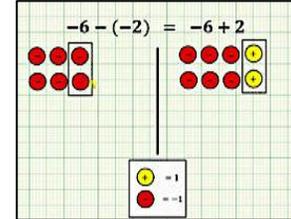
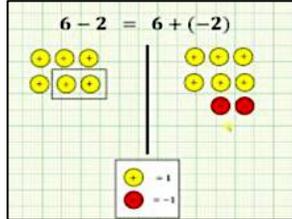
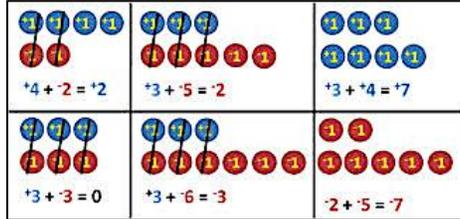
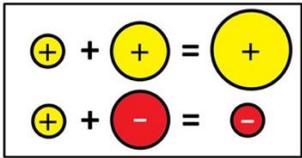
Topic A Overview – *Classifying and Adding/Subtracting Integers*

In topic A, students build a foundation for their understanding of adding and subtracting with rational numbers using the number-line. They should understand that numbers have direction and distance. They will be exposed to a vertical number line as well as a horizontal number line. The number line presents a visual image for students to explore and record addition and subtraction involving positive and negative integers. They build an understanding that moving to the right on a number line means you are increasing in value and moving to the left on the number line means that you are decreasing in value. Students also explore the distance between two values on a number line, which will help build an understanding of sums and differences.



Topic B Overview – Adding/Subtracting Integers and The Commutative Property with Integers

In topic B, students explore and formalize rules for finding the sums and differences of integers. They discover that adding a negative is the same as subtracting and the subtracting a negative is the same as adding, then they use integer chips (when numbers are easy to work with) and t-charts to formalize a procedure for adding and subtracting with negative values. Finally, they apply their new knowledge to answer real-world application problems involving the sums and differences of integers.



LEARNING SUPPORTS BY LESSON

There is a checkmark for the math support if the lesson	Lessons →	L1	L2	L3	L4	L5	L6	L7	L8	L9
	Math Supports									
makes a connection to prior content or from a previous unit or academic year	Access Prior Knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓
uses familiar contexts or experiences to make the learning relevant to students	Real-World Connections	✓	✓	✓	✓	✓	✓	✓	✓	✓
makes use of graphic organizers	Graphic Organizers	✓		✓		✓	✓		✓	✓
includes tools like rulers, protractors, patty paper, algebra tiles, etc.	Tools or Manipulatives				✓			✓		
incorporates tables, reference charts, displays, pictures, or models, or color-coding	Visual Aids	✓	✓	✓	✓			✓		
includes definitions, examples vs. nonexamples, cognates, etc.	Vocabulary Supports	✓	✓	✓	✓	✓	✓	✓	✓	✓
includes strategies that support language development	Language Supports									
asks students to discuss with their partner to prepare for whole class discussion	- Turn and Talk									
teacher facilitates a whole class discussion to debrief key learnings	- Guided Discussion	✓	✓	✓	✓	✓	✓	✓	✓	✓
asks students to think independently, test their idea with a partner, and share whole group	- Think, Pair, Share									
includes sentence stems to support students with explanations	- Sentence Stems		✓	✓	✓					
provides opportunities for students to work with a partner or a group	Peer Collaboration	✓	✓	✓	✓	✓	✓	✓	✓	✓
uses mnemonics such as SohCahToa	Mnemonics									
includes websites or equipment that enhances the lesson	Technological Support									
content can be presented in different forms	Different Modalities									
uses hands-on tools or manipulatives to represent the math	- Concrete				✓					
uses drawings to represent the math	- Pictorial		✓	✓	✓				✓	✓
uses numbers and number sentences to represent the math	- Abstract	✓	✓	✓	✓	✓	✓	✓	✓	✓

CONTENT STANDARDS

Below are the standards addressed in this unit.

Readiness Standards	Supporting Standards
7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.	7.2(A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers 7.3(A) add, subtract, multiply, and divide rational numbers fluently

Focus on Disciplinary Literacy 	Mathematical Process Standard (F) – analyze mathematical relationships to connect and communicate mathematical ideas
	Mathematical Process Standard (G) – display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

ROADMAP

AT A GLANCE: Unit 1 – Sums and Differences of Rational Numbers				
Topic	Day	Date	Lesson	Lesson Title
Topic A: Classifying and Adding/Subtracting Integers	1		1	Classifying Rational Numbers
	2		2	Distances Between Integers and Adding and Subtracting Integers on a Number Line
	3		3	Adding/Subtracting Negatives ($a + (-b)$ or $a - (-b)$)
Topic B: Adding/Subtracting Integers and The Commutative Property with Integers	4		4	Adding/Subtracting Integers using Integer Chips
	5			Topic Quiz AB Review and/or Flex
	6		5	Adding/Subtracting Integers using a +/- T-chart
	7		6	Sums & Differences of Integers Real-World Application
	8		7	The Commutative Property to Rewrite Integer Expressions
	9		8	Adding and Subtracting Rational Numbers
	10		9	Adding and Subtracting Rational Numbers Application
	11			Cumulative Review
	12			End of Unit 1 Assessment

Standard(s)
 ◆ **7.2(A)** extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers

Notes for Intellectual Preparation & Lesson Planning
Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Create an SE Exemplar
- Rehearse INM and Debrief

Lesson Agenda	Time
I. Do Now	5
II. INM	25
III. Student Practice	27
IV. Student Debrief	5
V. Exit Ticket	8

Mathematical Goal of this Lesson
 Numbers can be classified based on their properties. Numbers can belong to sets and subsets, and it is possible for numbers to belong to multiple sets.

Lesson Look Fors
Look for teachers to...

- ❑ Ask probing questions to CFU. “Is this number also an integer? Where would we put it in our Venn Diagram?”

Look for students to...

- ❑ Justify their answers using the definitions of rational numbers

Important Vocabulary

- integer
- rational number
- set
- subset
- whole number

Opportunities to CFU

- ✓ Page 2 of INM (Checklist)
- ✓ Student Practice: Q1, Q3
- ✓ Page 2 of INM Venn diagram

Other Notes to Inform Your Planning

- Do Now is priming students to understand that numbers can be classified into more than one category.
- Parts II, III and IV of the INM are nice to have, but can be cut if needed
- It is important to lay the foundation for using critical thinking and justification during this lesson because these are things they will be required to do throughout the year.

Focus on Disciplinary Literacy

INM: Table at the beginning specifically, **Examples** SP: #1,2

Student Know/Do Chart

- Numbers can be classified based on their properties
- Whole numbers are also integers because they contain no fractional part
- Whole numbers are also rational numbers because it can be written as a ratio of that number to one
- Integers are also rational numbers because they can be written as a ratio of that number to one
- Classify numbers as rational, integer or whole
- Place a number in the correct location on a Venn Diagram based on its subset

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ 7.3(A) add, subtract, multiply, and divide rational numbers fluently</p> <p>◆ 7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ MCR SE and TE ▪ PPT ▪ Create Exemplar SE ▪ Rehearse INM <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Lesson Agenda</th> <th style="text-align: left;">Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>5</td> </tr> <tr> <td>II. INM</td> <td>41</td> </tr> <tr> <td>III. Student Practice</td> <td>15</td> </tr> <tr> <td>IV. Student Debrief</td> <td>4</td> </tr> <tr> <td>V. Exit Ticket</td> <td>5</td> </tr> </tbody> </table> <p>Mathematical Goal of this Lesson</p> <p>Students should discover that to find the distance between two numbers that are on the same side of zero on the number-line, they will subtract, and that to find the distance between two numbers on opposite sides of zero on the number line, you add the absolute values of the two numbers.</p> <p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ INM: Part I Q2 ✓ INM: Part II Q6 ✓ Student Practice: 1, 2 <p>Other Notes to Inform Your Planning</p> <p>The Do Now is intended to activate students' prior knowledge of integers on the number line. This is a foundational lesson to build students' understanding of adding and subtracting with rational numbers. The two application questions at the end of the INM are nice to have but can be cut if you do not have time to complete them. You could also use these as part of your student practice. You will begin working with easy integers, so that students can come to this conclusion themselves and strengthen their critical thinking skills. Students will then take the rules that they discover and apply them to find the distance between harder to work with rational numbers.</p>	Lesson Agenda	Time	I. Do Now	5	II. INM	41	III. Student Practice	15	IV. Student Debrief	4	V. Exit Ticket	5	<p>Look for teachers to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Guide the discussion, ask probing questions, and push student thinking, but NOT define the procedure for students <p>Look for students to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Develop a procedure for finding the distance between any two numbers and use the number-line to explain why this procedure works] <input type="checkbox"/> Explain why you add the absolute value of the numbers that have different signs but subtract the absolute value of the two numbers if they have the same sign
Lesson Agenda	Time													
I. Do Now	5													
II. INM	41													
III. Student Practice	15													
IV. Student Debrief	4													
V. Exit Ticket	5													
<p>Important Vocabulary</p> <ul style="list-style-type: none"> ▪ Absolute Value ▪ Difference ▪ Integer ▪ Sum 	<div style="border: 1px solid black; background-color: #fff9c4; padding: 5px; text-align: center; margin-bottom: 10px;"> <p>Focus on Disciplinary Literacy</p> </div> <div style="display: flex; align-items: center; justify-content: center;">  <div style="text-align: left;"> <p>INM: Table at the beginning specifically, Examples</p> <p>Lesson Debrief: Error Analysis</p> </div> </div>	<p style="background-color: #e1eef6; padding: 2px;">Student Know/Do Chart</p> <p><small>Know</small> Distance measures the space between two things</p> <p><small>Know</small> Distance is always positive</p> <p><small>Do</small> Calculate the distance between two numbers with the same sign by subtracting the absolute value of the numbers.</p> <p><small>Do</small> Calculate the distance between two numbers with opposite signs by adding the absolute value of the numbers.</p> <p><small>Do</small> Find the distance between two objects in a real-world scenario</p>												

Standard(s)

◆ **7.3(A)** add, subtract, multiply, and divide rational numbers fluently

◆ **7.3(B)** apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Create Exemplar SE
- Rehearse INM
- <https://www.mathsisfun.com/positive-negative-integers.html>

Lesson Agenda	Time
I. Do Now	5
II. INM	30
III. Student Practice	22
IV. Student Debrief	5
V. Exit Ticket	8

Mathematical Goal of this Lesson

Students must understand that adding more negatives makes a quantity smaller, so adding a negative is the same as subtracting. $a+(-b) = a - b$. It is also critical that students understand that subtracting negatives means taking away some negatives from your quantity, which means the quantity increases. Therefore, subtracting a negative is the same as adding. $a - (-b) = a + b$.

Opportunities to CFU

- ✓ INM: Table at end of INM
- ✓ Student Practice: Q2, Q4, Q5

Other Notes to Inform Your Planning

- This lesson starts by discussing the meaning of addition and subtraction. When we think of addition, we think of our quantity growing or getting bigger. When we think of subtraction, we think of our quantity decreasing or getting smaller. Equivalent addition and subtraction expressions should contain both integers and variables. For Example: $5 + (-7) = 5 - 7$ and $a - (-b) = a + b$. Expressions are limited to integers. Operations are limited to addition and subtraction.

Focus on Disciplinary Literacy



INM: Reflection and Making Conjectures Student Debrief

Lesson Look Fors

Look for teachers to...

- Emphasize that adding negatives makes you smaller and subtracting negatives makes you bigger.

Look for students to...

- Explain what it means to add negative values and what it means to subtract negative values. (Adding negatives makes you smaller, so adding negatives is the same as subtracting. Subtracting negatives makes you bigger, so subtracting negatives is the same as adding.)

Important Vocabulary

- Sum
- Difference

Student Know/Do Chart

Know Adding a negative is the same as subtracting b/c adding more negatives to a quantity makes it smaller

Know Subtracting a negative is the same as adding because getting rid of negative values makes you bigger

Do Rewrite an expression given in the form of $a + (-b)$ as $a - b$ or rewrite an expression in the form $a - (-b)$ as $a + b$

Do Use a number-line to model an expression in the form of $a + (-b)$ or $a - (-b)$ and find the correct solution

Do Explain why adding a negative is the same as subtracting and why subtracting a negative is the same as adding

Standard(s)

◆ **7.3(A)** add, subtract, multiply, and divide rational numbers fluently
 ◆ **7.3(B)** apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Integer Chips
- Create Exemplar SE
- Rehearse INM

Lesson Agenda	Time
I. Do Now	5
II. INM	40
III. Student Practice	15
IV. Student Debrief	5
V. Exit Ticket	5

Mathematical Goal of this Lesson

Students will understand the concept of a zero pair – that all opposite numbers sum to zero – and utilize that concept to compute while reinforcing that adding a negative is the same as subtracting positives and that subtracting a negative is the same as adding positives.

Opportunities to CFU

- ✓ INM: Q9 - Q12
- ✓ Student Practice: Q1 - Q5

Other Notes to Inform Your Planning

It is critical that students understand that removing a positive integer chip has the same impact as adding a negative integer chip. It is also critical that students understand that removing a negative integer chip has the same impact as adding a positive integer chip. Expressions may be in the form of a + b, a – b, a +(-b) or a – (-b).

Important Vocabulary

- Difference
- Integer
- Sum
- **Zero Pair**

Lesson Look Fors

Look for teachers to...
 Use think aloud strategies as they model with integer chips.
Look for students to...
 Use integer chips to correctly model addition and subtraction expressions.

Student Know/Do Chart

 +1 and -1 are a zero pair b/c they sum to 0 when put together.
 When adding and subtracting w/ integers your answer will be positive if there are more positives and will be negative if there are more negatives.

 Use +/- integer chips to model expressions in the form of a + b, a – b, a +(-b) or a – (-b) and get the correct solution.

 Model a simple real-world scenario using integer chips and get the correct solution.

Focus on Disciplinary Literacy



**INM: #1-8
Student Debrief**

Standard(s)

◆ **7.3(A)** add, subtract, multiply, and divide rational numbers fluently

◆ **7.3(B)** apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Create Exemplar SE
- Rehearse INM

Lesson Agenda	Time
I. Do Now	5
II. INM	25
III. Student Practice	20
IV. Student Debrief	5
V. Exit Ticket	5

Mathematical Goal of this Lesson

Students will discover that when there are numbers in both the positive and negative column, they will subtract the absolute value of the two numbers and take the sign of the column with more. They will also discover that when there are numbers in only one column, they must add the absolute value of the two numbers together and take the sign of the column they are in.

Opportunities to CFU

- ✓ INM: Q6 And Q7
- ✓ INM: Conjecture
- ✓ Student Practice: Q1, Q9, Q11

Other Notes to Inform Your Planning

Students will learn a method for adding and subtracting with negatives when the numbers are far from zero and using a number-line or integer chips is not practical. The t-chart method is important because it takes the integer chip method and makes it less concrete and it allows students to develop a procedure for adding and subtracting with integers. Expressions use very big and very small integers to build the need for the t-chart. Expressions are limited to integers. Operations are limited to addition and subtraction. Numeric expressions may be in the form of $a + b$, $a - b$, $a +(-b)$ or $a - (-b)$

Focus on Disciplinary Literacy



INM: g and Conjecture Student Debrief

Lesson Look Fors

Look for teachers to...

- Guide students to understand the benefits and limitations of a variety of math tools (integer chips and number-lines can only be used with smaller numbers.)

Look for students to...

- Decide which tool will best help them find the solution to integer addition and subtraction problems.

Student Know/Do Chart

 The sum or difference of two rational numbers will have the sign of the number with a greater absolute value, and if the numbers have the same sign, the solution will have that sign as well.

 To find the sum or difference of numbers, you should add the absolute value of the two numbers if they have the same sign, and you should subtract the absolute value of the two numbers if they have opposite signs (positive and negative)

 Use a t-chart to find the correct sum or difference of two integers and can explain whether their answer is positive or negative.

 Explain why you add the absolute value of the numbers to find the sum/difference when both numbers have the same sign and why you subtract the absolute value when the numbers have different signs.

Standard(s)

- ◆ **7.3(A)** add, subtract, multiply, and divide rational numbers fluently
- ◆ **7.3(B)** apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Create Exemplar SE
- Rehearse INM

Lesson Agenda	Time
I. Do Now	5
II. INM	30
III. Student Practice	22
IV. Student Debrief	5
V. Exit Ticket	8

Mathematical Goal of this Lesson
 In this lesson, students will apply their understanding of adding and subtracting integers in order to solve real-world problems.

Important Vocabulary

- Absolute Value
- Difference
- Negative Integer
- Positive Integer
- Sum

Opportunities to CFU

- ✓ INM: QG and QH
- ✓ Student Practice: Q1 and Q4

Other Notes to Inform Your Planning

- Scenarios include situations that can be represented in a variety of forms. ($a + b$, $a - b$, $a + (-b)$ or $a - (-b)$).
- Scenarios are limited to integers. Students should be able to check the reasonableness of their solution in the context of the situation.

Focus on Disciplinary Literacy



INM: 1st Table Student Debrief

Lesson Look Fors

Look for teachers to...

- Continually ask students if their plans and solutions make sense in the context of the problem.

Look for students to...

- Check answers and makes sure solutions are reasonable and make sense.

Student Know/Do Chart

Know When adding and subtracting w/ integers your answer will be positive if there are more positives and will be negative if there are more negatives.

Do Model or represent a real-world situation involving the addition and subtraction of integers using a numeric expression. Use a number-line, integer chips, or t-chart to find the correct solution.

Do Correctly represent the situation by writing their numeric expression in the form of $a + b$, $a - b$, $a + (-b)$ or $a - (-b)$ depending on the situation.

Lesson 7: The Commutative Property to Rewrite Integer Expressions

Date: _____

Standard(s)

- ◆ **7.3(A)** add, subtract, multiply, and divide rational numbers fluently
- ◆ **7.3(B)** apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep

- MCR SE and TE
- Create Exemplar SE
- Rehearse INM

Lesson Agenda	Time
I. Do Now	8
II. INM	30
III. Student Practice	15
IV. Student Debrief	3
V. Exit Ticket	5

Mathematical Goal of this Lesson

In this lesson students explore equivalent numeric expressions, which will be very important as they move into algebraic expressions. To understand this concept, students must understand that in order to maintain equivalence, each number must maintain the same value when it is moved in an addition or subtraction statement.

Lesson Look Fors

Look for teachers to...

- Question students so they can tell the difference between assumptions and logical conjectures.

Look for students to...

- Make and tests conjectures
- Do the heavy cognitive lifting in the inquiry portion of this lesson

Important Vocabulary

- **Commutative Property**
- **Equivalent Expressions**

Opportunities to CFU

- ✓ INM: Q7 – Q10
- ✓ Student Practice: Part III Q1 and Q2

Other Notes to Inform Your Planning

Expressions are limited to integers. Operations are limited to addition and subtraction. Equivalent addition and subtraction expressions should contain both integers and variables. For Example: $5 + (-7) = -7 + 5$ and $a - (-b) = b + a$. Each term in an expression must maintain its sign when the expression is rearranged.

Student Know/Do Chart

 Order of the numbers in the expressions doesn't matter as long as each numbers' sign remains the same.

 Identify equivalent numeric expressions when $a + b$ is rewritten as $b + a$ or $a - b$ is rewritten as $-b + a$

 Rewrite an addition or subtraction expression in the opposite order and get the correct solution.

Focus on Disciplinary Literacy



INM: Questions after Part I, II, and III
SP: IV

Lesson 8: Adding & Subtracting Rational Numbers														
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors												
<p>◆ 7.3(A) add, subtract, multiply, and divide rational numbers fluently</p> <p>◆ 7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ MCR SE and TE ▪ Create Exemplar SE ▪ Rehearse INM <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Lesson Agenda</th> <th style="text-align: left;">Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>5</td> </tr> <tr> <td>II. INM</td> <td>30</td> </tr> <tr> <td>III. Student Practice</td> <td>22</td> </tr> <tr> <td>IV. Student Debrief</td> <td>10</td> </tr> <tr> <td>V. Exit Ticket</td> <td>8</td> </tr> </tbody> </table> <p>Mathematical Goal of this Lesson Students will explore adding and subtracting with positive and negative fractions and decimals and will conclude that the same rules of adding and subtracting integers apply to all rational numbers.</p> <p>Opportunities to CFU ✓ INM: Q2 and Q3(In the table) ✓ Student Practice: Q3, Q4, Q5</p>	Lesson Agenda	Time	I. Do Now	5	II. INM	30	III. Student Practice	22	IV. Student Debrief	10	V. Exit Ticket	8	<p><u>Look for teachers to...</u></p> <ul style="list-style-type: none"> ☐ Use a think-aloud model as they model the concepts of addition and subtraction with rational numbers. <p><u>Look for students to...</u></p> <ul style="list-style-type: none"> ☐ Draw models and complete the standard algorithm to add and subtract rational numbers.
	Lesson Agenda	Time												
I. Do Now	5													
II. INM	30													
III. Student Practice	22													
IV. Student Debrief	10													
V. Exit Ticket	8													
<p>Important Vocabulary</p> <ul style="list-style-type: none"> ▪ Ascend ▪ Descend ▪ Difference ▪ Rational Number ▪ Sum 	<p>Other Notes to Inform Your Planning</p> <ul style="list-style-type: none"> • Both models and the standard algorithm should be used to add and subtract rational numbers. • Expressions are limited to one operation. • Operations limited to addition and subtraction. • Students will likely have varying degrees of comfort with fractions and decimals and teachers should be prepared to provide differentiated support throughout the lesson. • In this lesson, students will combine their understanding of operating with rational numbers (fractions and decimals), built in 4th and 5th grades, with their understanding of operating with integers (6th grade and this unit) to add and subtract with rational numbers. • This lesson builds comfort with fractions and decimals before the next two lessons where students multiply and divide rational numbers. 	<p>Student Know/Do Chart</p> <p> To add or subtract fractions, the terms must have common denominators.</p> <p> When adding or subtracting decimals, place value is important.</p> <p> When adding and subtracting rational numbers, you follow the same process as adding and subtracting integers. Using a T-chart will help you determine whether you should add or subtract the numbers together.</p> <p> Apply properties of adding and subtracting integers to derive rules for adding and subtracting rational numbers.</p>												

Lesson 9: Adding and Subtracting Rational Numbers Application													
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors											
<p>◆ 7.3(A) add, subtract, multiply, and divide rational numbers fluently</p> <p>◆ 7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ MCR SE and TE ▪ Create Exemplar SE ▪ Rehearse INM 	<p>Look for teachers to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Connect the visual models they use to help students understand how to add/subtract rational numbers to the algorithms. <input type="checkbox"/> Connect new learning to what students learned about adding and subtracting integers. <p>Look for students to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use an appropriate method to find sums and differences of rational numbers. 											
	<table border="1"> <thead> <tr> <th>Lesson Agenda</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now</td> <td>7</td> </tr> <tr> <td>II. INM</td> <td>35</td> </tr> <tr> <td>III. Student Practice</td> <td>20</td> </tr> <tr> <td>IV. Student Debrief</td> <td>3</td> </tr> <tr> <td>V. Exit Ticket</td> <td>5</td> </tr> </tbody> </table> <p>Mathematical Goal of this Lesson Students will continue to build procedural fluency with fractions and decimals while also applying this skill to solving real-world application problems.</p>	Lesson Agenda	Time	I. Do Now	7	II. INM	35	III. Student Practice	20	IV. Student Debrief	3	V. Exit Ticket	5
Lesson Agenda	Time												
I. Do Now	7												
II. INM	35												
III. Student Practice	20												
IV. Student Debrief	3												
V. Exit Ticket	5												
<p>Important Vocabulary</p> <ul style="list-style-type: none"> ▪ Ascend ▪ Descend ▪ Rational Number 	<p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ INM: Q2 and Q6 ✓ Student Practice: Q2 and Q3 <p>Other Notes to Inform Your Planning</p> <ul style="list-style-type: none"> • Both models and the standard algorithm should be used. • Expressions include all rational numbers • Students should utilize the UPSC (Understand, Plan, Solve, Check) strategy as they work through each real-world situation. This will help students confidently tackle what may otherwise seem like an intimidating word problem. 												

Recommended Success Day Materials and Resources

7.3A and 7.3B Adding and Subtracting Integers

Adding and Subtracting Rational Numbers Review SE
Adding and Subtracting Rational Numbers Review TE
Rational Numbers Extra Practice SE
Rational Numbers Extra Practice TE

Notes to Inform Your Planning

This resource is 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.

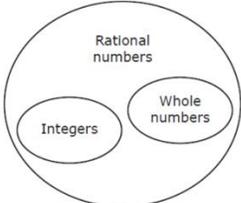
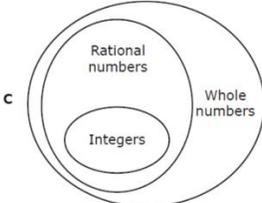
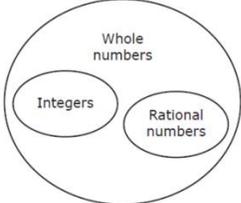
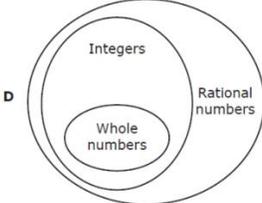
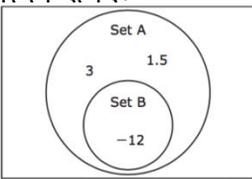
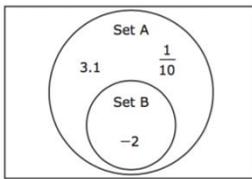
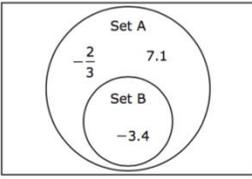
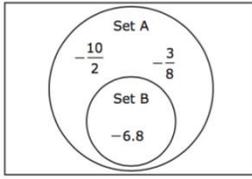
Using exit ticket data can help you prioritize what to review. For example, if you remember that students did poorly on Lesson 2, pull problems from lesson 2, especially if they are problems students did not do before (for example, SP or INM problems you skipped during class). You can also take questions 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.

Standard Breakdown		
Standard	Specificity	STAAR Alignment
<p>7.3(B) apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers</p>	<p>Concepts:</p> <ul style="list-style-type: none"> - Addition & Subtraction of Rational Numbers - Multiplication & Division of Rational Numbers <p>Skills:</p> <ul style="list-style-type: none"> - Apply - Extend - Solve <p>Clarifications Including but Not Limited To:</p> <ul style="list-style-type: none"> - Solve real-world and mathematical problems involving the four operations with rational numbers. - Operations with integers - Operations with positive and negative fractions - Operations with positive and negative decimals - Operations with fractions greater than one - Modeling operations with integers on a number-line - Modeling operations with integers using integer chips. - Equivalent Numeric Expressions - Numeric Expressions with more than one operation <p>Limitations:</p> <ul style="list-style-type: none"> - Exponents and radicals are not included in numeric expressions - Models are limited to whole numbers and integers - Number-line operations include addition, subtraction and multiplication of whole numbers and integers <p>Vertical Alignment:</p> <p>In 6th grade students were limited to integers and positive fractions/decimals</p> <p>In Algebra 1, students will be introduced to operations of exponents and radicals</p>	<p>2019:</p> <p>Q1: Fatima paid for 5 pallets of grass to be delivered.</p> <ul style="list-style-type: none"> • Each pallet of grass cost \$129.95. • Fatima paid \$76.20 for delivery. <p>What is the total amount Fatima paid?</p> <p>Q21 : This week Andres will practice with his band for $1\frac{1}{2}$ hours on Monday, $1\frac{3}{4}$ on Tuesday, and 2 hours on Wednesday. Next week, Andres will practice with his band the same number of hours on Monday, Tuesday and Wednesday. What is the total number of hours Andres will practice with his band over these 6 days?</p> <p>2018:</p> <p>Q17: Maya has 120 caramel apples to sell. Each caramel apple is covered with one topping</p> <ul style="list-style-type: none"> • $\frac{1}{5}$ of the caramel apples are covered with peanuts. • $\frac{1}{3}$ are covered with chocolate chips. • $\frac{3}{10}$ are covered with coconut. • The rest are covered with sprinkles. <p>How many caramel apples are covered with sprinkles?</p> <p>Q35: Marsha gave the cashier \$20 to pay for 3 pairs of socks. The cashier gave her \$5.03 in change. Each pair of socks cost the same amount.</p> <p>What is the cost in dollars and cents of each pair of socks?</p>

Standard	Specificity	STAAR Alignment
<p>7.2(A) extend previous knowledge of <u>sets</u> and <u>subsets</u> using a <u>visual representation</u> to describe relationships between sets of <u>rational numbers</u></p>	<p>Concepts:</p> <ul style="list-style-type: none"> - Sets and Subsets - Visual Representation - Rational Numbers <p>Skills:</p> <ul style="list-style-type: none"> - Extend - Describe <p>Clarifications Including but Not Limited To:</p> <ul style="list-style-type: none"> - Diagrams can include all 3 classifications (rational, integer, whole) or only 2 of the classifications - <p>Limitations:</p> <ul style="list-style-type: none"> - Limited to rational numbers <p>Vertical Alignment:</p> <p>In 6th grade, students classify whole numbers, integers and rational numbers using a visual representation.</p> <p>In Algebra 1, students will extend their understanding to include irrational numbers.</p>	<p>2018:</p> <p>Q37 Which diagram best represents the relationship among integers, rational numbers and whole numbers?</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;"> <p>A</p>  </div> <div style="text-align: center;"> <p>C</p>  </div> <div style="text-align: center;"> <p>B</p>  </div> <div style="text-align: center;"> <p>D</p>  </div> </div> <p>2016</p> <p>Q29 Set A represents rational numbers. Set B represents integers. Which diagram shows the numbers placed in the correct sets?</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;"> <p>A</p>  </div> <div style="text-align: center;"> <p>C</p>  </div> <div style="text-align: center;"> <p>B</p>  </div> <div style="text-align: center;"> <p>D</p>  </div> </div>

Standard	Specificity	STAAR Alignment
<p>7.3(A) add, subtract, multiply, and divide rational numbers fluently</p>	<p>Concepts:</p> <ul style="list-style-type: none"> - Rational numbers <p>Skills:</p> <ul style="list-style-type: none"> - Add - Subtract - Multiply - Divide <p>Clarifications Including but Not Limited To:</p> <ul style="list-style-type: none"> - Operations with integers - Operations with positive and negative fractions - Operations with positive and negative decimals - Operations with fractions greater than one - Modeling operations with integers on a number-line - Modeling operations with integers using integer chips. - Equivalent Numeric Expressions - Numeric Expressions with more than one operation - Real-world application - Real-world situations could include profit/loss, money, weight, sea level, debit/credit, football yardage, etc. <p>Limitations:</p> <ul style="list-style-type: none"> - Numbers limited to rational numbers. <p>Vertical Alignment:</p> <p>In 6th grade, students operate with positive fractions and decimals and with integers. In Algebra 1, students will be expected to continue to operate fluently with rational numbers.</p>	<p>2019:</p> <p>Q24 What is the value of the expression $6\frac{3}{4}(-11.5)$?</p> <p>Q30 What is the value of the expression -9×2.2?</p> <p>2017</p> <p>Q23 Stephanie has $3\frac{3}{4}$ bags of soil to put in her garden. Each bag of soil will cover 125.3 ft^2. How many square feet will Stephanie be able to cover if she uses all of these bags of soil?</p> <p>2016</p> <p>Q25 The diameter of the handle of a softball bat is $1\frac{3}{4}$ inches. What is the length in inches of the diameters of 8 of these bat handles?</p>

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.

5 th Grade	6 th Grade	8 th Grade & Algebra 1
<p>5.3(K) add and subtract positive rational numbers fluently</p> <p>5.4(F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping</p> <p>5.3(E) solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers</p> <p>5.3(G) solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm</p> <p>5.3(L) divide whole numbers by unit fractions and unit fractions by whole numbers</p> <p>5.3(A) estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division</p> <p>5.3(D) represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models</p> <p>5.4(E) describe the meaning of parentheses and brackets in a numeric expression</p> <p>5.3(F) represent quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using objects and pictorial models, including area models</p> <p>5.3(J) represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as $1/3 \div 7$ and $7 \div 1/3$ using objects and pictorial models, including area models</p>	<p>6.3(D) add, subtract, multiply, and divide integers fluently</p> <p>6.3(E) multiply and divide positive rational numbers fluently</p> <p>6.7(A) generate equivalent numerical expressions using order of operations, including whole number exponents, and prime factorization</p> <p>6.2(A) classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers</p> <p>6.2(E) extend representations for division to include fraction notation such as a/b represents the same number as $a \div b$ where $b \neq 0$</p> <p>6.3(A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values</p> <p>6.3(C) represent integer operations with concrete models and connect the actions with the models to standardized algorithms</p>	<p>8.2(A) extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers</p> <p>A.11(B) simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents</p> <p>A.10(A) add and subtract polynomials of degree one and degree two</p> <p>A.10(B) multiply polynomials of degree one and degree two</p> <p>A.10(C) determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend</p> <p>A.10(D) rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property</p>