Lesson	Glossary Terms	Check Your Readiness	Standards		
			Building Toward	Addressing	Building On
Unit 5, Lesson 1	• negative number • positive number	• CYR A, Item #1 • CYR A, Item #3 • CYR A, Item #4 • CYR B, Item #1 • CYR B, Item #3 • CYR B, Item #4	7.NS.A.1 7.NS.A.1.b 7.NS.A.1.c 7.NS.A.2.d	7.NS.A.1	6.NS.C
Unit 5, Lesson 2		• CYR A, Item #2 • CYR B, Item #2	7.NS.A.1.b	7.NS.A.1.a 7.NS.A.1.b	
Unit 5, Lesson 3	• opposite		7.NS.A.1.c	7.NS.A.1.a 7.NS.A.1.b 7.NS.A.1.d	
Unit 5, Lesson 4	• deposit • withdrawal	• CYR A, Item #5 • CYR B, Item #5		7.NS.A.1 7.NS.A.1.a	6.NS.C
Unit 5, Lesson 5			7.NS.A.1.c	7.NS.A.1.c	1.OA.B.4
Unit 5, Lesson 6			7.NS.A.1	7.NS.A.1.c 7.NS.A.1.d	6.EE.B
Unit 5, Lesson 7		• CYR A, Item #6 • CYR B, Item #6	7.EE.B.4	7.NS.A.1 7.NS.A.1.c 7.NS.A.3	7.NS.A.1
Unit 5, Lesson 8			7.NS.A.2.a	7.NS.A.2.a 7.RP.A	
Unit 5, Lesson 9			7.NS.A.2.a	7.NS.A.2.a 7.NS.A.2.c	6.RP.A.3.b
Unit 5, Lesson 10			7.EE.B	7.NS.A.2.c 7.NS.A.3	6.EE.A.2.b

Lesson	Glossary Terms	Check Your Readiness	Standards		
			Building Toward	Addressing	Building On
Unit 5, Lesson 11	• solution to an equation		7.EE.B.4.a	7.NS.A.2.b	7.NS.A.2
Unit 5, Lesson 12			7.NS.A.3	7.EE.B.3 7.NS.A.3 7.RP.A	7.RP.A.2
Unit 5, Lesson 13				7.NS.A 7.NS.A.1.d 7.NS.A.2.c	6.EE.A.2.c
Unit 5, Lesson 14			7.EE.B.4.a 7.NS.A.3	7.NS.A.3	6.EE.B.7
Unit 5, Lesson 15			7.EE.B 7.EE.B.4.a	7.EE.B.3 7.EE.B.4 7.NS.A 7.NS.A.3	6.EE.B.5 7.NS.A
Unit 5, Lesson 16			7.EE.B.4.a	7.EE.B.4 7.NS.A.3	7.NS.A 7.NS.A.1
Unit 5, Lesson 17				7.EE.B.3 7.NS.A.3 7.RP.A.3	

Lesson	Instructional Routines	Materials to Gather	Materials to Copy
Unit 5, Lesson 1	• MLR2: Collect and Display • MLR5: Co-Craft Questions • Take Turns		• Rational Numbers Cards (1 copy for every 3 students): Activity 4
Unit 5, Lesson 2	• MLR7: Compare and Connect • MLR8: Discussion Supports • Which Three Go Together?		
Unit 5, Lesson 3	• MLR1: Stronger and Clearer Each Time • MLR2: Collect and Display	• Receipt tape: Activity 4	
Unit 5, Lesson 4	• MLR2: Collect and Display • Notice and Wonder		
Unit 5, Lesson 5	• MLR7: Compare and Connect		
Unit 5, Lesson 6	• 5 Practices • Math Talk • MLR1: Stronger and Clearer Each Time • MLR8: Discussion Supports	• Math Community Chart: Activity 3	
Unit 5, Lesson 7	• MLR7: Compare and Connect • Notice and Wonder		
Unit 5, Lesson 8	• MLR5: Co-Craft Questions • MLR6: Three Reads		

Lesson	Instructional Routines	Materials to Gather	Materials to Copy
Unit 5, Lesson 9	• MLR1: Stronger and Clearer Each Time • MLR2: Collect and Display • MLR8: Discussion Supports		• Rational Numbers Multiplication Grid Handout (1 copy for every 1 students): Activity 4
Unit 5, Lesson 10	• Card Sort • MLR4: Information Gap Cards • MLR8: Discussion Supports • Which Three Go Together?		• Temperature and Art Funds Cards (1 copy for every 4 students): Activity 2 • Matching Expressions Cards (1 copy for every 2 students): Activity 3
Unit 5, Lesson 11	• MLR7: Compare and Connect		
Unit 5, Lesson 12	• MLR6: Three Reads • MLR8: Discussion Supports		
Unit 5, Lesson 13	• Card Sort • Math Talk • MLR2: Collect and Display • MLR8: Discussion Supports • Notice and Wonder • Take Turns	• Math Community Chart: Cool-down	• The Same but Different Cards (1 copy for every 2 students): Activity 2
Unit 5, Lesson 14	• 5 Practices • MLR8: Discussion Supports • Notice and Wonder • Which Three Go Together?		

Lesson	Instructional Routines	Materials to Gather	Materials to Copy
Unit 5, Lesson 15	• Card Sort • Math Talk • MLR2: Collect and Display • MLR7: Compare and Connect • MLR8: Discussion Supports • Take Turns		• Matching Inverses Cards (1 copy for every 2 students): Activity 4
Unit 5, Lesson 16	• Math Talk • MLR3: Critique, Correct, Clarify • MLR7: Compare and Connect • MLR8: Discussion Supports	• Tools for creating a visual display: Activity 4	
Unit 5, Lesson 17	• MLR1: Stronger and Clearer Each Time • MLR6: Three Reads • Notice and Wonder	• Four-function calculators: Activity 2, Activity 3, Activity 4	• Your Own Stock Portfolio Handout (1 copy for every 1 students): Activity 4

Unit 5, Lesson 1

Interpreting Negative Numbers

Goals

- Interpret signed numbers in the contexts of temperature and elevation.
- Order rational numbers, and justify (orally) the comparisons.
- Plot points on a vertical or horizontal number line to represent rational numbers.

Student Facing Learning Goals

Let's review what we know about signed numbers.

Learning Targets

- I can compare rational numbers.
- I can use rational numbers to describe temperature and elevation.

Required Preparation

Activity 4:

Copy each set of cards on a different color of paper so they can easily be sorted for the next class.

Cool Down

Here is a set of signed numbers: 7, -3, $\frac{1}{2}$, -0.8, 0.8, $-\frac{1}{10}$, -2

1. Order the numbers from least to greatest.
2. If these numbers represent temperatures in degrees Celsius, which is the coldest?
3. If these numbers represent elevations in meters, which is the farthest away from sea level?

Responding to Student Thinking

More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Unit 5, Lesson 2

Changing Temperatures

Goals

- Determine the final temperature given the starting temperature and the change in temperature, and explain (orally and using other representations) the solution method.
- Explain (orally) how to create a number line diagram that represents adding signed numbers.
- Write an addition equation to represent a situation involving a temperature increase or decrease.

Student Facing Learning Goals

Let's add signed numbers.

Learning Targets

- I can use a number line to add positive and negative numbers.

Required Preparation

Activity 3:

For the digital version of the activity, acquire devices that can run the applet.

If desired, prepare to display a map showing the locations of:

- Houston, TX.
- Orlando, FL.
- Salt Lake City, UT.
- Minneapolis, MN.
- Fairbanks, AK.

Cool Down

1. Write a story about temperatures that the following expression could represent: $27 + (-11)$
2. Draw a number line diagram and write an expression to represent this situation: "On Tuesday at lunchtime, it was 29°C. By sunset, the temperature had dropped to 16°C."

Responding to Student Thinking

More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Unit 5, Lesson 3

Changing Elevation

Goals

- Comprehend that the term “opposite” (in spoken and written language) refers to numbers with the same magnitude but different signs.
- Create and interpret equations and diagrams that represent adding signed numbers in the context of elevation.
- Generalize (orally) a method for determining the sum of two signed numbers.

Student Facing Learning Goals

Let's solve problems about adding signed numbers.

Learning Targets

- I can add positive and negative numbers.

Required Preparation

Activity 2:

For the digital version of the activity, acquire devices that can run the applet.

Activity 4:

Cut 1 strip of receipt tape for every 2 students. Each strip of receipt tape should be at least 4 feet long. You may want to prepare some strips that are even longer in case groups choose extra long objects.

Cool Down

Find each sum.

1. $56 + (-56)$
2. $-240 + 370$
3. $-5.7 + (-4.2)$

Responding to Student Thinking

Points to Emphasize
If students struggle with adding signed numbers, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the addition expression that represents each transaction in this activity:

Grade 7, Unit 5, Lesson 4, Activity 2 Earning and Spending

Unit 5, Lesson 4

Money and Debts

Goals

- Apply addition of signed numbers to calculate an account balance after a deposit or withdrawal, and explain (orally and using other representations) the solution method.
- Explain (orally and in writing) how signed numbers can be used to represent situations involving money, including deposits or withdrawals and assets or debts.
- Write an equation with an unknown addend to represent a situation where the amount of change is unknown.

Student Facing Learning Goals

Let's apply what we know about signed numbers to money.

Learning Targets

- I understand what positive and negative numbers mean in a situation involving money.

Required Preparation

Activity 3:

If the computation requirements might get in the way of understanding that money can be represented by positive and negative values, consider providing access to calculators.

Cool Down

1. Clare has $150 in her bank account. She buys a bike for $200. What is Clare's account balance now?
2. If Clare earns $75 the next week from delivering newspapers and deposits it in her account, what will her account balance be then?

Responding to Student Thinking

Press Pause
By this point in the unit, there should be some student mastery of adding signed numbers. If students struggle, make time to revisit related work in the lessons referred to here. See the Course Guide for ideas to help students re-engage with earlier work.

Grade 7, Unit 5, Lesson 3 Changing Elevation
Grade 7, Unit 5, Lesson 2 Changing Temperatures

Unit 5, Lesson 5

Representing Subtraction

Goals

- Generalize (orally and in writing) that subtracting a number results in the same value as adding the additive inverse.
- Interpret a number line diagram that represents subtracting signed numbers as adding with an unknown addend.
- Use a number line diagram to find the difference of signed numbers, and explain (orally) the reasoning.

Student Facing Learning Goals

Let's subtract signed numbers.

Learning Targets

- I can explain the relationship between addition and subtraction of rational numbers.
- I can use a number line to subtract positive and negative numbers.

Cool Down

1. Which other expression has the same value as $(-14) - 8$? Explain your reasoning.

   A. $(-14) + 8$

   B. $14 - (-8)$

   C. $14 + (-8)$

   D. $(-14) + (-8)$

2. Which other expression has the same value as $(-14) - (-8)$? Explain your reasoning.

   A. $(-14) + 8$

   B. $14 - (-8)$

   C. $14 + (-8)$

   D. $(-14) + (-8)$

Responding to Student Thinking

More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Unit 5, Lesson 6

Finding Differences

Goals

- Compare and contrast (orally) subtraction expressions that have the same numbers in the opposite order.
- Recognize that the "difference" of two numbers can be positive or negative, depending on the order they are listed, while the "distance" between two numbers is always positive.
- Subtract signed numbers, and explain (orally) the reasoning.

Student Facing Learning Goals

Let's bring addition and subtraction together.

Learning Targets

- I can subtract positive and negative numbers.

Cool Down

Select **all** of the choices that are equal to $(-5) - (-12)$.

A. -7

B. 7

C. The difference between -5 and -12

D. The difference between -12 and -5

E. $(-5) + 12$

F. $(-5) + (-12)$

Responding to Student Thinking

Points to Emphasize
If students struggle with subtracting signed numbers, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the differences they are asked to calculate in these activities:

Grade 7, Unit 5, Lesson 7, Activity 2 Phone Inventory
Grade 7, Unit 5, Lesson 7, Activity 3 Climbing Mount Kilimanjaro

Unit 5, Lesson 7

Adding and Subtracting to Solve Problems

Goals

- Apply addition and subtraction of signed numbers to solve problems in an unfamiliar context, and explain (orally and in writing) the solution method.
- Interpret signed numbers used to represent gains or losses in an unfamiliar context.

Student Facing Learning Goals

Let's apply what we know about signed numbers to different situations.

Learning Targets

- I can solve problems that involve adding and subtracting rational numbers.

Required Preparation

Activity 4:

For the digital version of the activity, acquire devices that can run the applet.

Cool Down

Here is some record keeping from a coffee shop about their paper cups. Cups are delivered 2,000 at a time.

day	change
Monday	+2,000
Tuesday	-125
Wednesday	-127
Thursday	+1,719
Friday	-356
Saturday	-782
Sunday	0

1. Explain what a positive and negative number means in this situation.
2. Assume the starting amount of coffee cups is 0. How many paper cups are left at the end of the week?
3. How many cups do you think were used on Thursday? Explain how you know.

Responding to Student Thinking

Points to Emphasize
If students struggle with adding and subtracting signed numbers, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the addition and subtraction

problems in these activities:

Grade 7, Unit 5, Lesson 13, Activity 2 Card Sort: The Same but Different
Grade 7, Unit 5, Lesson 14, Activity 2 Scoring Margins

Unit 5, Lesson 8

Multiplying Rational Numbers (Part 1)

Goals

- Explain (orally and in writing) how signed numbers can be used to represent positions and speeds in opposite directions.
- Generalize (orally) that the product of a negative number and a positive number is negative.
- Write a multiplication equation to represent a situation involving constant speed with direction.

Student Facing Learning Goals

Let's use signed numbers to represent movement.

Learning Targets

- I can multiply a positive number with a negative number.
- I can use rational numbers to represent speed and direction.

Cool Down

Two runners start at the same point. For each runner, write a multiplication equation that describes their journey.

1. Lin runs for 25 seconds at 8 meters per second. What is her finish point?
2. Diego runs for 30 seconds at -9 meters per second. What is his finish point?

Responding to Student Thinking

More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Unit 5, Lesson 9

Multiplying Rational Numbers (Part 2)

Goals

- Generalize (orally) that the product of two negative numbers is positive.
- Interpret signed numbers used to represent elapsed time before or after a chosen reference point.
- Use patterns to find the product of signed numbers, and explain (orally and using other representations) the reasoning.

Student Facing Learning Goals

Let's multiply signed numbers.

Learning Targets

- I can explain what it means when time is represented with a negative number in a situation about speed and direction.
- I can multiply two negative numbers.

Required Preparation

Activity 3:

For the digital version of the activity, acquire devices that can run the applet.

Activity 4:

For the digital version of the activity, acquire devices that can run the applet.

Cool Down

Decide if each equation is true or false.

1. $7 \cdot 8 = 56$
2. $-7 \cdot 8 = 56$
3. $-7 \cdot -8 = -56$
4. $-7 \cdot -8 = 56$
5. $(3.5) \cdot 12 = 42$
6. $(-3.5) \cdot -12 = -42$
7. $(-3.5) \cdot -12 = 42$
8. $-12 \cdot \frac{7}{2} = 42$

Responding to Student Thinking

Points to Emphasize
If most students struggle with multiplying signed numbers, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the multiplication expressions in these activities:

Grade 7, Unit 5, Lesson 10, Activity 3 Card Sort: Matching Expressions
Grade 7, Unit 5, Lesson 11, Activity 2 Multiplication and Division

Unit 5, Lesson 10

Multiply!

Goals

- Identify multiplication expressions that are equal, and justify (orally) that they are equal.
- Multiply rational numbers, including multiplication expressions with three factors, and explain (orally and in writing) the reasoning.

Student Facing Learning Goals

Let's get more practice multiplying signed numbers.

Learning Targets

- I can solve problems that involve multiplying rational numbers.

Required Preparation

Activity 3:

Copy each set of cards on a different color of paper so they can easily be sorted for the next class.

Cool Down

Noah was doing some homework and answered the following questions. Do you agree with his answers? If you disagree, explain your reasoning.

1. $-5 \cdot 8 =$ 40
2. $(2.7) \cdot (-2.5) =$ -6.75
3. $-\frac{3}{4} \cdot -\frac{5}{7} =$ $-\frac{15}{28}$

Responding to Student Thinking

More Chances

Unit 5, Lesson 11

Dividing Rational Numbers

Goals

- Apply multiplication and division of signed numbers to solve problems involving constant speed with direction, and explain (orally) the reasoning.
- Generalize (orally) a method for determining the quotient of two signed numbers.
- Generate a division equation that represents the same relationship as a given multiplication equation with signed numbers.

Student Facing Learning Goals

Let's divide signed numbers.

Learning Targets

- I can divide rational numbers.

Required Preparation

Activity 3:

For the digital version of the activity, acquire devices that can run the applet.

Cool Down

Match each expression with its value.

1. $15 \div 12$	• -0.8
2. $12 \div (-15)$	• 0.8
3. $12 \div 15$	• -1.25
4. $15 \div (-12)$	• 1.25

Responding to Student Thinking

Press Pause
By this point in the unit, there should be some student mastery of multiplying and dividing rational numbers. If most students struggle, make time to revisit related work in the lessons referred to here. See the Course Guide for ideas to help students re-engage with earlier work.

Grade 7, Unit 5, Lesson 10 Multiply!
Grade 7, Unit 5, Lesson 11 Dividing Rational Numbers

Unit 5, Lesson 12

Negative Rates

Goals

- Apply operations with signed numbers to solve problems involving constant rates, and explain (orally) the solution method.
- Explain (orally and in writing) how signed numbers can be used to represent situations involving constant rates.
- Write an equation of the form $y = -kx$ to represent a situation that involves descending at a constant rate.

Student Facing Learning Goals

Let's apply what we know about signed numbers.

Learning Targets

- I can solve problems that involve multiplying and dividing rational numbers.
- I can solve problems that involve negative rates.

Cool Down

1. A submarine is descending to examine the seafloor 2,100 feet below the surface. It takes the submarine 2 hours to make this descent. Write an equation to represent the relationship between the submarine's elevation and time.
2. Another submarine's descent can be represented as $y = -240x$, where y is the elevation in feet and x is time in hours. How long will it take this submarine to make the descent?

Responding to Student Thinking

Points to Emphasize
If most students struggle with writing and solving equations that involve negatives, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about the multiplication and division equations in these activities:

Grade 7, Unit 5, Lesson 14, Activity 3 Solar Power
Grade 7, Unit 5, Lesson 16, Activity 2 Warmer or Colder than Before?

Unit 5, Lesson 13

Expressions with Rational Numbers

Goals

- Evaluate an expression for given values of the variable, including negative values, and compare (orally) the resulting values of the expression.
- Generalize (orally) about the relationship between additive inverses and about the relationship between multiplicative inverses.
- Identify numerical expressions that are equal, and justify (orally) that they are equal.

Student Facing Learning Goals

Let's develop our signed number sense.

Learning Targets

- I can add, subtract, multiply, and divide rational numbers.
- I can evaluate expressions that involve rational numbers.

Required Preparation

Activity 2:

Copy each set of cards on a different color of paper so they can easily be sorted for the next class.

Activity 4:

For the digital version of the activity, acquire devices that can run the applet.

Cool Down

Complete each equation with an operation to make it true.

1. $24 \_\_\_ \frac{3}{4} = 18$
2. $24 \_\_\_ -\frac{3}{4} = -32$
3. $12 \_\_\_ 15 = -3$
4. $12 \_\_\_ -15 = 27$
5. $-18 \_\_\_ -\frac{3}{4} = 24$

Responding to Student Thinking

More Chances
Students will have more opportunities to understand the mathematical ideas addressed here. There is no need to slow down or add additional work to the next lessons.

Unit 5, Lesson 14

Solving Problems with Rational Numbers

Goals

- Apply operations with rational numbers to solve problems involving repeated gains or losses, and present (orally, in writing, and using other representations) the solution method.

Student Facing Learning Goals

Let's use all four operations with signed numbers to solve problems.

Learning Targets

- I can represent situations with expressions that include rational numbers.
- I can solve problems using the four operations with rational numbers.

Cool Down

Lin's sister has a checking account. If the account balance ever falls below $0, the bank charges her a fee of $5.95 per day. Today, the balance in Lin's sister's account is -$2.67.

1. If she does not make any deposits or withdrawals, what will be the balance in her account after 2 days?
2. In 14 days, Lin's sister will be paid $430 and will deposit it into her checking account. If there are no other transactions besides this deposit and the daily fee, will Lin continue to be charged $5.95 each day after this deposit is made? Explain or show your reasoning.

Responding to Student Thinking

Points to Emphasize
If most students struggle with solving problems that involve negatives, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about what calculations are needed to complete the table in this activity:

Grade 7, Unit 5, Lesson 17, Activity 2 Gains and Losses

Unit 5, Lesson 15

Solving Equations with Rational Numbers

Goals

- Explain (orally and in writing) how to solve an equation of the form $x + p = q$ or $px = q$, where p, q, and x are rational numbers.
- Generalize (orally) the usefulness of additive inverses and multiplicative inverses for solving equations of the form $x + p = q$ or $px = q$.
- Generate an equation of the form $x + p = q$ or $px = q$ to represent a situation involving rational numbers.

Student Facing Learning Goals

Let's solve equations that include negative values.

Learning Targets

- I can solve equations that include rational numbers and have rational solutions.

Required Preparation

Activity 2:

For the digital version of the activity, acquire devices that can run the applet.

Activity 4:

Copy each set of cards on a different color of paper so they can easily be sorted for the next class.

Cool Down

The Hiking Club is taking another trip. The hike leader has a watch that shows that they have gained 296 feet in altitude from their starting position. Their altitude is now 285 feet. The equation $x + 296 = 285$ can be used to represent the situation.

1. Solve for x.
2. What does x mean in the situation?

Responding to Student Thinking

Points to Emphasize
If most students struggle with solving equations that involve negatives, review this concept as opportunities arise over the next several lessons. For example, invite multiple students to share their thinking about finding the solutions to the equations in this activity:

Grade 7, Unit 5, Lesson 16, Activity 2 Warmer or Colder than Before?

Unit 5, Lesson 16

Representing Contexts with Equations

Goals

- Coordinate (orally and in writing) verbal descriptions, equations, and diagrams that represent the same situation involving an unknown amount in the context of temperature or elevation.
- Write equations of the form $x + p = q$ or $px = q$ to represent and solve a problem in an unfamiliar context, and present the solution method (using words and other representations).

Student Facing Learning Goals

Let's write equations that represent situations.

Learning Targets

- I can explain what the solution to an equation means for the situation.
- I can write and solve equations to represent situations that involve rational numbers.

Cool Down

A balloon is floating above a lake, and a sunken canoe is below the surface of the lake. The balloon's vertical position is 12 meters, and the canoe's is -4.8 meters. The equation $12 + d = -4.8$ represents this situation.

1. What does the variable d represent?
2. What value of d makes the equation true? Explain your reasoning.

Responding to Student Thinking

Press Pause
By this point in the unit, there should be some student mastery of interpreting and solving equations that involve negative numbers. If students struggle, make time to revisit related work in the lessons referred to here. See the Course Guide for ideas to help students re-engage with earlier work.

Grade 7, Unit 5, Lesson 15 Solving Equations with Rational Numbers
Grade 7, Unit 5, Lesson 16 Representing Contexts with Equations

Unit 5, Lesson 17

The Stock Market

Goals

- Apply operations with rational numbers to calculate a stock's new value, change in value, or change expressed as a signed percentage of the previous value.
- Compare (orally and in writing) changes in the value of different stocks, including the dollar amount and the percentage of the previous value.
- Interpret (orally) tables that represent the values of different stocks in the stock market.

Student Facing Learning Goals

Let's learn about the stock market.

Learning Targets

- I can solve problems about the stock market using rational numbers and percentages.