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standards-based math curriculum for grades 6-algebra 1



Math curriculum designed to meet students' needs and empower teachers.

Grade Level Curriculum: student-friendly guided notes, hands-on activities, teaching slides (coming August 2023), and teacher planning resources

Supplemental Digital Components: digital activities, teaching slides, Google Form™ assessments

Student Video Library: professional quality videos aligned to student handouts

#### numbers and operations unit

# 7<sup>th</sup> teks planning guide

A MANEUVERING THE MIDDLE® RESOURCE

#### what is it?

This resource has been designed to model the process presented in the math training, "A Step-by-Step Plan for Unfinished Learning". Please use the information provided to jump start your planning for the school year.

#### how does it work?

A planning guide has been included for each of the key topics in Unit 1: Numbers and Operations. Each guide will help you prepare for formative assessment opportunities, common student misconceptions, instructional strategies you can use to reach your students and suggestions for utilizing activities to best support your students' needs.

PAGE	TOPIC	RESOURCE
5	Adding and Subtracting Integers	Planning Guide
7	Adding and Subtracting Rational Numbers	Planning Guide
9	Multiplying and Dividing Integers	Planning Guide
11	Multiplying and Dividing Rational Numbers	Planning Guide
13	Adding and Subtracting Integers	Cut and Paste Activity
19	Rational Number Operations	Error Analysis Activity

#### learn more about All Access

The hands-on activities included are a brief sample of one element of our All Access membership. All Access is math curriculum designed to meet students' needs and empower teachers. You can find out more by clicking the link below.

#### maneuveringthemiddle.com/math-curriculum

## adding and subtracting integers

	goal Students should be able to ap extend previous understand add and subtract with inte	pply and In previous gra ings to problems in gers. subtracti	or skills ades, students solved volving adding and ng with integers.	related materials
	addin	g integers	subtra	cting integers
formative assessments	20 + student handout 2 -4 + ( student handout 2	(-8) = -7) =	student handout 2 student handout 2	15 - (-8) = -10 - 3 =
common misconceptions	Students may overlook negative multiplication rules to addition and values equals a positive sum (ex $\frac{example 1}{12 + (-3) = 15}$ $-8 + 2 = 10$	signs (ex. 1) or may apply integer nd think that adding two negative . 2). example 2 -9 + (-3) = 12 -1 + (-5) = 6	Students may overlook negati the numbers and add a negati $\underline{\qquad}$ $\underline{\qquad}$ $\underline{\qquad}$ $\underline{\qquad}$ $-15 - 7 = 8$ 20 - (-4) = 16	ve signs (ex. 1) or may simply subtract ve sign to their answer (ex. 2). $\frac{\text{example 2}}{20 - (-7) = -13}$ $-10 - 5 = -5$

#### adding and subtracting integers



# adding and subtracting rational numbers

goal	prior s	skills	related materials
Students should be able to apply and extend previous understandings to add and subtract rational numbers.	In previous grades, problems involvi subtracting positive	, students solved ng adding and rational numbers.	<ul> <li>Unit 1, Student Handout 3</li> <li>Unit 1, Student Handout 4</li> <li>Unit 1, Student Handout 5</li> </ul>
adding and subtracting a	decimals	adding	g and subtracting fractions

formative assessments	-2.5 + 10.7 student handout 3 7.15 - 8.34 student handout 3	=	$-\frac{3}{4} + (-1\frac{3}{4})$ student handout 4 $-\frac{5}{6} - \frac{3}{6}$ student handout 4	=
ceptions (	Students may forget to add/subtr not correctly apply integer rules (e	ract like place values (ex. 1) or may ex. 2).	Students may not find a common correctly apply integer rules (ex. 2 	denominator (ex. 1) or may not ). example 2
common misconc	8.4 + .62 14.6	-3 - 1.5 =1.5 10.2 + (-3.6) = -13.8	$-\frac{2}{3} + (-\frac{3}{4}) = -\frac{5}{7}$	$-\frac{4}{5}-(\frac{2}{5})=-\frac{2}{5}$

#### adding and subtracting rational numbers



\*\*Rational Number Operations Error Analysis is included in this PDF on pages 19-27.

## multiplying and dividing integers

	<b>goal</b> Students should be able to ap extend previous understandi multiply and divide with inte	ply and In prev ngs to proble gers.	vious grades ems involving dividing with	skills , students solved g multiplying and h integers.	• U	related materials nit 1, Student Handout 6
	multiplyi	ng integers			dividing	g integers
s.	In each column below, determir could result in the given solution	ne four different expres n.	ssions that			
men	-30	24			78	÷ (-6) =
Issess	a	a		stude	nt handout 6	
itive c	b c	b c			-85	÷ (-17) –
formc	d	d		stude	nt handout 6	. ( 17) –
	student handout 6					
otions	When the signs are different, students may disregard the negative sign or interpret the negative sign as subtraction (ex. 1). When the signs are the same, students may think two negative values should result in a negative product (ex. 2).		When the signs are di sign (ex. 1). When the negative values shoul	ifferent, stud signs are th d result in a	lents may disregard the negative ne same, students may think two negative quotient (ex. 2).	
ncep	example 1	example 2		example 1		example 2
misco	$-8 \cdot 3 = 24$	-6 · (-3) = -18		<b>-4</b> 2 ÷ 2	2 = 21	-56 ÷ (-8) = -7
common	25(-4) = 21	-12(-2) <b>=</b> -2 <b>4</b>		–108 ÷ 9	9 = 12	-30 ÷ (-3) = -10

#### multiplying and dividing integers

	multiplying integers	dividing integers
	<b>rephrase it</b> : refer to multiplication as "groups of" in order to help students' understanding of integer rules with multiplication; remind students that a negative sign can also represent the "opposite"	<b>model it:</b> use counters as visual examples to help reinforce that when the signs are the same the quotient is positive and when the signs are different the quotient is negative
instructional strategies	8.3 "8 groups of 3" -8.3 "the opposite of 8 groups of 3" 8.(-3) "8 groups of -3" -8.(-3) "the opposite of 8 groups of -3" model it: use counters and number lines as a visual to give concrete experience with multiplying integers and its related rules $2 \cdot (-3) = -6$ $2 \cdot$	$-12 \div 3 = -4 \rightarrow \bigcirc $
extra practice and resources	<ul> <li>Multiplying and Dividing Integers Speed Dating*</li> <li>Consider using the speed dating activity in a traditional class setting experts at multiplying and dividing integers as well as communicatin to use with a small group and have different levels of cards to choos</li> <li>Cards with two values only (labeled with triangular numbering)</li> <li>Cards with three or more values (labeled with circular numberin)</li> </ul>	as an engaging and fun way for students to practice becoming g their learning. Speed dating cards can also provide helpful examples e from as needed: g)

## multiplying and dividing rational numbers

	<b>goal</b> Students should be able to ap extend previous understandin multiply and divide rational nu	ply and ngs to mbers.	prior In previous grades problems involvin dividing positive r	skills , students solved g multiplying and ational numbers.	<ul> <li>related materials</li> <li>Unit 1, Student Handout 7</li> <li>Unit 1, Student Handout 8</li> </ul>
	multiplying and	dividing deci	mals	multiply	ving and dividing fractions
formative assessments	- 15.6(-2) = student handout 7 16.8 ÷ (-4) = homework 7			student	$-\frac{2}{3} \div \frac{1}{2} = \$ handout 7 $-\frac{3}{10} \div (-\frac{4}{5}) = \$ handout 7
common misconceptions	Students may make computation decimal placement (ex. 1) or may incorrectly (ex. 2). example 1 1.5 3 <u>X 0 4</u> 6.1 2	al errors related to operate with neg example 2 -12.1 ÷ (-4) =	o place value and ative values = -3.1	Students may confuse division is the same as correctly apply integer $\frac{e \times ample 1}{-\frac{3}{5} \div \frac{1}{2}} \xrightarrow{-\frac{3}{7}} \cdot \frac{2}{3} \xrightarrow{-\frac{3}{7}}$	multiplication and algorithms, especially that multiplying by a reciprocal (ex. 1) or may not rules (ex. 2). example 2 $-\frac{3}{5} \cdot \frac{1}{2}$ $-\frac{7}{8} \cdot -\frac{2}{3} = -\frac{7}{12}$ $-\frac{4}{7} \cdot \frac{3}{2}$

#### multiplying and dividing rational numbers



\*Multiplying and Dividing Rational Numbers Mazes is included as a part of the 7" Grade All Access Memb \*\*Rational Number Operations Error Analysis is included in this PDF on pages 19-27.

# ADDING & SUBTRACTING INTEGERS CUT AND PASTE

Students will be able to add and subtract integers using a number line model.

![](_page_12_Picture_2.jpeg)

7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.

![](_page_12_Picture_4.jpeg)

7.3A Add, subtract, multiply, and divide rational numbers fluently.

**Ideas for Implementation:** Math is always more fun with a hands-on activity! Students can work individually or in partners to find the matching pieces: problem, number line representation, and solution. Students will be given multiple answers, so some cards will not be used. This activity is perfect for a center, tutoring, or to practice the concept. Glue and scissors are required.

**Directions:** Each student will need a copy of the recording sheet (can be copied double-sided) and a copy of the answers (copy one-sided). Students will read each problem and match the problem, solution, and number line representation.

Name \_\_\_\_\_

Date \_\_\_\_\_

Pd

### INTEGER CUT & PASTE

Match each card with the corresponding solution and number line representation.

PROBLEM	NUMBER LINE	SOLUTION
-9+6		
The water level was -4 feet before rainy season. After rainy season the water level was 4 feet. By how much did the water level change?		
A checking account is overdrawn by \$5, then a \$5 fee is charged. What is the balance on the account?		
-8 – (-3)		
During a football game, the team lost 6 yards and then another 3 yards. How many yards behind the line of scrimmage are they?		

PROBLEM	NUMBER LINE	SOLUTION
-5 + (-2)		
-4 – (-4)		
An elevator traveled up 8 floors and then down to to the second floor. How many floors did the elevator travel down?		
5 + (-7)		
A scuba diver is practicing in a marked pool. He begins 3 feet below the surface of the water and then dives down to the 9 foot marker. How far did he dive?		
write your own		

![](_page_15_Figure_0.jpeg)

Pd

### **INTEGER CUT & PASTE**

Match each card with the corresponding solution and number line representation.

PROBLEM	NUMBER LINE	SOLUTION
-9+6	10 -8 -6 -4 -2 0 2 4 6 8 10	-3
The water level was -4 feet before rainy season. After rainy season the water level was 4 feet. By how much did the water level change?	-10 -8 -6 -4 -2 0 2 4 6 8 10	8
A checking account is overdrawn by \$5, then a \$5 fee is charged. What is the balance on the account?	← ← ← ← −10 -8 -6 -4 -2 0 2 4 6 8 10	-10
-8 – (-3)	-10 -8 -6 -4 -2 0 2 4 6 8 10	-5
During a football game, the team lost 6 yards and then another 3 yards. How many yards behind the line of scrimmage are they?	← ← ← ← −10 -8 -6 -4 -2 0 2 4 6 8 10	-9

PROBLEM	NUMBER LINE	SOLUTION
-5 + (-2)	← ← ++++++++++++++++++++++++++++++++++	-7
-4 – (-4)	$\begin{array}{c} \longrightarrow \\ \leftarrow \\ \leftarrow \\ \leftarrow \\ \leftarrow \\ \leftarrow \\ -10  -8  -6  -4  -2  0  2  4  6  8  10 \end{array}$	0
An elevator traveled up 8 floors and then down to to the second floor. How many floors did the elevator travel down?	-10 -8 -6 -4 -2 0 2 4 6 8 10	6
5 + (-7)	$\leftarrow -10 -8 -6 -4 -2 0 2 4 6 8 10$	-2
A scuba diver is practicing in a marked pool. He begins 3 feet below the surface of the water and then dives down to the 9 foot marker. How far did he dive?	← + + + + + + + + + + + + + + + + + + +	-6
write your own		

# RATIONAL NUMBER OPERATIONS ERROR ANALYSIS

Students will be able to extend their understanding of operations to identify and correct errors in rational operation problems.

![](_page_18_Picture_2.jpeg)

7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

![](_page_18_Picture_4.jpeg)

7.3A Add, subtract, multiply, and divide rational numbers fluently.

7.3B Apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.

#### Directions:

- 1. Print each problem page on card stock and place in a page protector (longer lasting).
- 2. Either give one card to each group of students or print a set of cards for each group and place on a binder ring.
- 3. Print and copy a recording sheet for each student.
- 4. Students may begin at any name and should find and describe the error in the student's work. They should also include the correct solution on their recording sheet.
- 5. Students continue until they have analyzed all cards.

#### Teacher Tips:

- This activity works best in groups of 2-4 so that students can discuss with one another.
- Problems could also be posted around the room if you would like to have students moving and traveling from one card to another.

# ALEXA

 $-\frac{2}{5} + (-\frac{1}{5}) = -\frac{2+1}{5+5} =$ 3 10

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# BERNIE + 15.02 -19.38 -34.40

COHEN <u>6</u> <u>13</u>  $\frac{5}{9} - \left(-\frac{1}{4}\right) = \frac{5}{9} + \frac{1}{4}$ ©Maneuvering the Middle LLC, 2019 009-5.28-9.3-5.28 -9.3 -6.21

# EDDIE

 $-\frac{7}{8} \cdot \left(-\frac{3}{8}\right) = \frac{7(3)}{8} = \frac{21}{8} = 2\frac{5}{8}$ 

![](_page_21_Picture_3.jpeg)

# GARY

# $-\frac{3}{4} \div \frac{1}{8} = -\frac{3}{4} \cdot \frac{1}{8} = -\frac{3}{32}$

HEIDI -3.2 -6 - 19.2 -18 12 -12

Name \_\_\_\_\_

Date \_\_\_\_\_

Pd\_\_\_\_

## RATIONAL NUMBER OPERATIONS

On each card, find the statement that is incorrect. Then, correct and rewrite the statement in the space provided. Show any necessary work.

ALEXA	BERNIE
Describe the error in Alexa's work:	Describe the error in Bernie's work:
What is the correct solution to Alexa's problem?	What is the correct solution to Bernie's problem?
COHEN	DOUG
CONEN	0000
Describe the error in Cohen's work:	Describe the error in Doug's work:

EDDIE	FAYE
Describe the error in Eddie's work:	Describe the error in Faye's work:
What is the correct solution to Eddie's problem?	What is the correct solution to Faye's problem?
GARY	HEIDI
Describe the error in Gary's work:	Describe the error in Heidi's work:
What is the correct solution to Gary's problem?	What is the correct solution to Heidi's problem?

Name \_\_\_\_Answer Key

Date \_\_\_\_\_

Pd\_

### RATIONAL NUMBER OPERATIONS

On each card, find the statement that is incorrect. Then, correct and rewrite the statement in the space provided. Show any necessary work.

ALEXA	BERNIE
Describe the error in Alexa's work:	Describe the error in Bernie's work:
Alexa added both the numerators and the denominators in the fraction. The fractions had a common denominator, so Alexa should have only added the numerators.	Bernie added the two decimals, but since they had different signs, he should have found the difference and kept the sign of the number with the greatest absolute value.
What is the correct solution to Alexa's problem? $-\frac{3}{5}$	What is the correct solution to Bernie's problem? -4.36
COHEN	DOUG
Describe the error in Cohen's work:	Describe the error in Doug's work:
Cohen added the denominators of the fractions when he should have found a common denominator and then added the numerators.	Doug did not line up the decimals in his work correctly.
What is the correct solution to Cohen's problem?	What is the correct solution to Doug's problem?

EDDIE	FAYE
Describe the error in Eddie's work:	Describe the error in Faye's work:
Eddie only multiplied the numerators when he should have multiplied the numerators and the denominators.	Faye did not place her decimal in the correct location of the product.
What is the correct solution to Eddie's problem?	What is the correct solution to Faye's problem? -12.958
GARY	HEIDI
GARY Describe the error in Gary's work:	HEIDI Describe the error in Heidi's work:
Describe the error in Gary's work: Gary changed the division problem to a multiplication problem, but he forgot to change the second fraction to its reciprocal.	HEIDI Describe the error in Heidi's work: Heidi did not apply her integer rules correctly. When the signs are the same in division, the quotient should be positive.
CARY Describe the error in Gary's work: Gary changed the division problem to a multiplication problem, but he forgot to change the second fraction to its reciprocal. What is the correct solution to Gary's problem?	HEIDI Describe the error in Heidi's work: Heidi did not apply her integer rules correctly. When the signs are the same in division, the quotient should be positive. What is the correct solution to Heidi's problem?