7th Grade Mathematics

Number Sense

Unit 1 Curriculum Map: September 15th - October 31st

ORANGE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

OFFICE OF MATHEMATICS

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Unit Overview

In this unit, students will ….

- Extend the number system to include the rational numbers (positive and negative integers, fractions, and decimals);
- Locate and compare the values of rational numbers using a number line;
- Develop and use algorithms for adding, subtracting, multiplying, and dividing rational numbers;
- Solve problems involving rational numbers.

CMP Pacing Guide

Activity	Common Core Standards	Estimated Time
Unit Readiness Assessment (CMP3)	7.NS.1; 7.NS.2; 7.NS.3	1 Block
Accentuate the Negative (CMP3) Investigation 1	7.NS.A.1; 7.NS.A.1a; 7.NS.A.2; 7.NS.A.3; 7.EE.B.4b	3 Blocks
Assessment: Check Up 1 (CMP3)	7.NS.A.1; 7.NS.A.1a; 7.NS.A.2; 7.NS.A.3; 7.EE.B.4b	½ Block
Accentuate the Negative (CMP3) Investigation 2	7.NS.A.1; 7.NS.A.1b; 7.NS.A.1c; 7.NS.A.2; 7.NS.A.3	3 Blocks
Assessment: Partner Quiz (CMP3)	7.NS.A.1; 7.NS.A.1b; 7.NS.A.1c; 7.NS.A.2; 7.NS.A.3	½ Block
Performance Task 1	7.NS.A.1	1 Block
Accentuate the Negative (CMP3) Investigation 3	7.NS.A.2; 7.NS.A.2a; 7.NS.A.2b; 7.NS.A.2c; 7.NS.A.3	2½ Blocks
Assessment: Check Up 2 (CMP3)	7.NS.A.2; 7.NS.A.2a; 7.NS.A.2b; 7.NS.A.2c; 7.NS.A.3	½ Block
Accentuate the Negative (CMP3) Investigation 4	7.NS.A.1; 7.NS.A.1d; 7.NS.A.2; 7.NS.A.2a; 7.NS.A.2d; 7.NS.A.3	2½ Blocks
Unit 1 Assessment	7.NS.1; 7.NS.2; 7.NS.3	1 Block
Performance Task 2	7.EE.A.1	1 Block
Total Time		**16 ½ Blocks**

Pacing Calendar

SEPTEMBER						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
	1 **Labor Day**	**2** **OPENING DAY** **SUP. FORUM PD DAY**	**3** **PD DAY**	**4** **PD DAY**	**5** **PD DAY**	**6**
7	**8** **PD DAY?**	**9** **1st Day for students**	**10**	**11**	**12**	**13**
14	**15** **Unit 1: Number Sense** ***Readiness Assessment***	**16**	**17**	**18**	**19** ***Assessment: Check Up 1***	**20**
21	**22**	**23**	**24** **12:30 pm Dismissal for students**	**25** ***Assessment: Partner Quiz***	**26** ***Performance Task 1 Due***	**27**
28	**29**	**30**				

OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1 ***Assessment: Check Up 2***	2	3	4
5	6 ***Assessment: Unit 1 Assessment***	7	8 **Unit 1 Complete** ***Performance Task 2 Due***	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23 **12:30 pm Dismissal for students**	24	25
26	27	28	29	30 **12:30 pm Dismissal for students**	31	

Unit 1 Math Background

In this Unit, students use integers to find patterns for adding, subtracting, multiplying, and dividing. Students use the rules they discovered for integers to compute with rational numbers. These rules and patterns work in either case. After becoming familiar with positive rational number operations in Grade 6, students can focus on using operations with negative rational numbers in Grade 7.

Order of operations rules are reinforced in this Unit. The rules have been used in prior grades, but we revisit the Order of Operations with a special focus on negative numbers.

Fact families are used in this Unit to help students understand the relationship between addition and subtraction and between multiplication and division. Fact families were introduced in the number sense units in Grade 6.

Inequalities are introduced in the Grade 6 Unit *Comparing Bits & Pieces*. We use integers as a way to name points to the left of 0 on the number line. Students then use the number line, in this Unit, to compare integers.

PARCC Assessment Evidence Statements

CCSS	Evidence Statement	Clarification	Math Practices	Calculator ?
7.NS.1a	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*	i) Tasks require students to recognize or identify situations of the kind described in standard 7.NA.1a.	5	No
7.NS.1b-1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative.	i) Tasks do not have a context. ii) Tasks are not limited to integers. iii) Tasks involve a number line. iv) Tasks do not require students to show in general that a number and its opposite have a sum of 0: this aspect of standard 7.NS.1b may be assessed on the Grade 7 PBA.	5, 7	No
7.NS.1b-2	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. b. Interpret sums of rational numbers by describing real world contexts.	i) Tasks require students to produce or recognize real world contexts that correspond to given sums of rational numbers. ii) Tasks are not limited to integers. iii) Tasks do not require students to show in general that a number and its opposite have a sum of 0.	2, 3, 5	No

7.NS.1c-1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Apply this principle in real-world contexts.	i) Pool should contain tasks with and without contexts. ii) Contextual tasks might, for example, require students to create or identify a situation described by a specific equation of the general form $p - q = p + (-q)$. such as $3 - 5 = 3 + (-5)$. iii) Non-contextual tasks are not computation tasks but rather require students to demonstrate conceptual understanding, for example by identifying a sum that is equivalent to a given difference. iv) Tasks are not limited to integers.	2, 7, 5	No
7.NS.1d	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. d. Apply properties of operations as strategies to add and subtract rational numbers.	i) Tasks do not have a context. ii) Tasks are not limited to integers. iii) Tasks may involve sums and differences of 2 or 3 rational numbers. iv) Tasks require students to represent addition and subtraction on a horizontal or vertical number line, or compute a sum or difference, or demonstrate conceptual understanding for example by producing or recognizing an expression equivalent to a given sum or difference.	7, 5	No
7.NS.2a-1	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers.	i) Tasks do not have a context. ii) Tasks are not computation tasks but rather require students to demonstrate conceptual understanding, for example by providing students with a numerical expression and requiring students to produce or recognize an equivalent expression using properties of operations, particularly the distributive property.	7	No

7.NS.2a-2	Apply and extend previous understanding of multiplication and division and of fractions to multiply and divide rational numbers. a. Interpret products of rational numbers by describing real world contexts.	None	2, 4	No
7.NS.2b-1	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with nonzero divisor) is a rational number. If *p* and *q* are integers, then $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$.	i) Tasks do not have a context. ii) Tasks are not computation tasks but rather require students to demonstrate conceptual understanding, for example by providing students with a numerical expression and requiring students to produce or recognize an equivalent expression.	7	No
7.NS.2b-2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Interpret quotients of rational numbers by describing real world contexts.	None	2, 4	No
7.NS.2c	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. c. Apply properties of operations as strategies to multiply and divide rational numbers.	i) Tasks do not have a context. ii) Tasks are not limited to integers. iii) Tasks may involve products and quotients of 2 or 3 rational numbers. iv) Tasks require students to compute a product or quotient, or demonstrate conceptual understanding for example by producing or recognizing an expression equivalent to a given expression.	7	No

7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers.	i) Tasks are one-step word problems. ii) Tasks sample equally between addition/subtraction and multiplication/division. iii) Tasks involve at least one negative number. iv) Tasks are not limited to integers.	1, 4	No

Connections to the Mathematical Practices

1	Make sense of problems and persevere in solving them
	- Explain and demonstrate rational number operations by using symbols, visuals, words, and real life contexts - Demonstrate perseverance while using a variety of strategies (number lines, manipulatives, drawings, etc.)
2	Reason abstractly and quantitatively
	- Demonstrate quantitative reasoning by representing and solving real world situations using visuals, numbers, and symbols - Demonstrate abstract reasoning by translating numerical sentences into real world situations - Students reason abstractly and quantitatively when they determine whether the product of two or more rational numbers is positive or negative in Problem 3.2 (Accentuate the Negative) and when they use the Distributive Property to compare and verify multiple solution methods in Problem 4.3(Accentuate the Negative).
3	Construct viable arguments and critique the reasoning of others
	- Discuss rules for operations with rational numbers using appropriate terminology and tools/visuals - Apply properties to support their arguments and constructively critique the reasoning of others while supporting their own position - In Problem 1.1(Accentuate the Negative), students find the difference in points scored for two teams. They may justify their answers by finding each team's point difference from zero and then adding.
4	Model with mathematics
	- Model understanding of rational number operations using tools such as algebra tiles, counters, visual, and number lines and connect these models to solve problems involving real-world situations - Students use multiplication number sentences to model a relay race in Problem 3.1(Accentuate the Negative). They use positive and negative numbers to represent running speeds to the right and to the left. They also use positive and negative numbers to represent times in the future and in the past.
5	Use appropriate tools strategically
	- Demonstrate their ability to select and use the most appropriate tool (paper/pencil, manipulatives, and calculators) while solving problems with rational numbers - In Problem 1.3(Accentuate the Negative), students use number lines to explore sums of positive and negative numbers in the familiar context of temperature changes.
6	Attend to precision
	- Demonstrate precision by using correct terminology and symbols and labeling units correctly - Use precision in calculation by checking the reasonableness of their answers and making adjustments accordingly - Students attend to precision when they work with the Order of Operations in Problem 4.1(Accentuate the Negative). They use parentheses in different places within expressions to make the greatest and least possible values.

7	Look for and make use of structure
	- Look for structure in positive and negative rational numbers when they place them appropriately on the number line - Use structure in calculation when considering the position of numbers on the number line - Recognize the problem solving structures of word problems and use this awareness to aid in solving - In Problem 2.4(Accentuate the Negative), students examine the structure of fact families as they rewrite addition sentences as subtraction sentences and subtraction sentences as addition sentences.
8	Look for and express regularity in repeated reasoning
	- Use manipulatives to explore the patterns of operations with rational numbers - - Use patterns to develop algorithms - Use algorithms to solve problems with a variety of problem solving structures - Students observe patterns in Problem 2.1(Accentuate the Negative) when they categorize groups of addition sentences.

Vocabulary

Term	Definition
Absolute Value	The distance between a number and zero on the number line. The symbol for absolute value is shown in this equation I-8I=8
Additive Inverse	Two numbers whose sum is 0 are additive inverses of one another. Example: ¾ and ¾ are additive inverse of one another because ¾ + (-3/4) = (-3/4) + ¾ = 0
Algorithm	A set of rules for performing a procedure.
Commutative Property	The order of the addition or multiplication of two numbers does not change the result.
Distributive Property	The Distributive Property states that for any three numbers *a*,*b*, and *c*, *a*(*b*+*c*)=*ab*+*ac*.
Integers	A number expressible in the form a or –a for some whole number a. The set of whole numbers and their opposites {…, -3, -2, -1, 0, 1, 2, 3 … }
Long Division	Standard procedure suitable for dividing simple or complex multi-digit numbers. It breaks down a division problem into a series of easier steps.
Multiplicative Inverse	Two numbers whose product is 1 are multiplicative inverses of one another. Example: ¾ and 4/3 are multiplicative inverses of one another because $\left(\frac{3}{4}\right)\left(\frac{4}{3}\right)=\left(\frac{4}{3}\right)\left(\frac{3}{4}\right)=1.$
Natural Numbers	The set of numbers {1, 2, 3, 4, …}. Natural numbers are also called counting numbers
Negative Numbers	The set of numbers less than zero
Number Sentence	A mathematical statement that gives the relationship between two expressions that are composed of numbers and operation signs.
Opposite Numbers	Two different numbers that have the same absolute value. Example: 4 and 4 are opposite numbers because both have an absolute value of 4
Positive Numbers	The set of numbers greater than zero.

Rational Numbers	The set of numbers that can be written in the form a/b where a and b are integers and b ≠ 0.

Potential Student Misconceptions

- When subtracting numbers with positive and negative values, students often subtract the two numbers and use the sign of the larger number in their answer rather than realize they are actually moving up or down the number line depending on the signs of the numbers. They also become very confused when subtracting a negative and often add the numbers and make the answer negative or subtract the numbers and make the answer negative.

- Another common mistake occurs when students attempt to apply the rules for multiplying and dividing numbers to adding and subtracting. For example, if they are subtracting two negative numbers they subtract the numbers and make the answer positive. Similarly, when subtracting a negative and positive value, they subtract the two numbers make the answer negative.

- Students will frequently forget the direction to move when adding on a number line. It is advisable to start with smaller numbers that they are familiar with before giving problems with larger numbers or with fractions, or decimals.

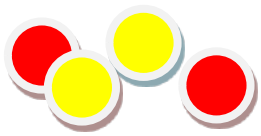
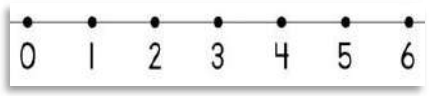
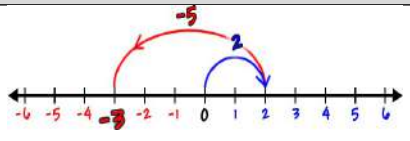
- When interpreting a negative mixed number, the students frequently assume that the whole number part is negative and the fraction part is positive instead of considering the whole mixed number as negative, both the whole number and the fraction part Just as students are taught that 23 means 20 + 3, and that 2 ¾ means 2 + ¾, teachers should explicitly explain what -2 ¾ means. They should lead the students to understand that it means (-2 + -3/4) and not (-2 + ¾).

- Students often make the mistake of assuming that signed numbers mean only integers. They should be exposed to exercises that include signed fractions and decimals to curb this mistake.

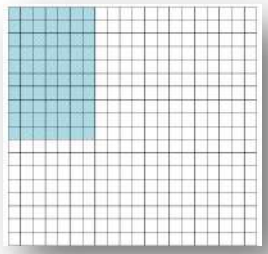
- When dealing with addition and subtraction rules, students often make the mistake of changing the sign of the first number instead of leaving it as it is and then changing the subtraction sign and changing the second number to its additive inverse. Students should spend more time working on addition and subtraction using the number line so that they may have a strong foundation and understanding of the reason that subtraction changes to addition and the second number is changed to its additive inverse

- Students may misread signs of rational numbers. When associated with a rational number, the + sign should be read as “positive.” The – sign should be read as “negative” or “the opposite of.”

Teaching Multiple Representations

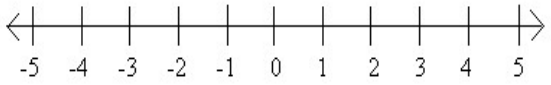
CONCRETE REPRESENTATIONS	
ˇ **2-color coin counters to represent negatives and positives**	
ˇ **Number Lines**	
ˇ **Thermometers and other equally partitioned tools**	
ˇ **Rectangular Strips**	
PICTORIAL REPRESENTATIONS	
ˇ **Number Lines (Horizontal)**	
ˇ **Number Lines (Vertical)**	Figure 3 - Vertical Number Line 

ˬ **Bar/Fraction Models**	

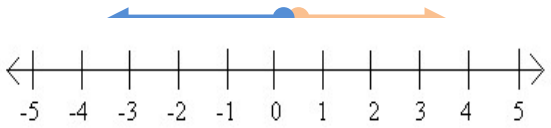
ˬ **100's Grid**	

- **Distance / Vector Model**

Adding Integers
Addition is modeled as putting a second vector's tail at the first vector's head and finding where the second vector's head extends to.
3 + -4 = -1



Subtracting Integers
Subtraction can be thought of as comparing the two vectors p, and q, by putting both tails together (starting each from zero) and asking the question: "How would one extend a vector from the head of p to the head of q?" The length and direction of that vector would be the result of the subtraction.
3 - -4 = 7



ABSTRACT REPRESENTATIONS

- Applying Properties of Numbers; p – q = p + (-q); p - -q = p + q
- Applying Properties of Numbers
- Applying the standard algorithms for addition, subtraction, multiplication, and division
- Symbolic Representations

Assessment Framework

Unit 1 Assessment Framework				
Assessment	**CCSS**	**Estimated Time**	**Format**	**Graded ?**
Unit Readiness Assessment (Beginning of Unit) *CMP3*	7.NS.1; 7.NS.2; 7.NS.3	1 Block	Individual	No
Assessment: Check Up 1 (After Investigation 1) *CMP3*	7.NS.A.1; 7.NS.A.1a; 7.NS.A.2; 7.NS.A.3; 7.EE.B.4b	½ Block	Individual	Yes
Assessment: Partner Quiz (After Investigation 2) *CMP3*	7.NS.A.1; 7.NS.A.1b; 7.NS.A.1c; 7.NS.A.2; 7.NS.A.3	½ Block	Group	Yes
Assessment: Check Up 2 (After Investigation 3) *CMP3*	7.NS.A.2; 7.NS.A.2a; 7.NS.A.2b; 7.NS.A.2c; 7.NS.A.3	½ Block	Individual or Group	Yes
Unit 1 Assessment (Conclusion of Unit) *Model Curriculum*	7.NS.1; 7.NS.2; 7.NS.3	1 Block	Individual	Yes

Unit 1 Performance Assessment Framework				
Assessment	**CCSS**	**Estimated Time**	**Format**	**Graded ?**
Performance Task 1 (Late September) *Comparing Freezing Points and Operations on the Number Line*	7.NS.A.1	1 Block	Group	Yes; Rubric
Performance Task 2 (Early October) *Writing Expressions*	7.EE.A.1	1 Block	Individual w/ Interview Opportunity	Yes: rubric
Assessment Check 1 & 2 (optional)	7.NS.1; 7.NS.2; 7.NS.3	Teacher Discretion	Teacher Discretion	Yes, if administered
Summative Tasks (optional)	7.NS.1; 7.NS.2	Teacher Discretion	Teacher Discretion	Yes, if administered

Performance Tasks

Performance Task 1:

Comparing Freezing Points (7.NS.A.1)

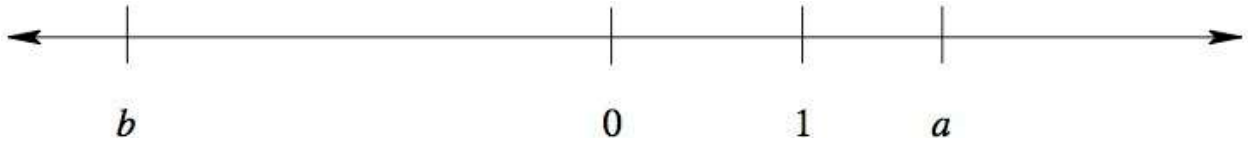
Ocean water freezes at about -2 ½ ˚C. Fresh water freezes at 0 ˚C . Antifreeze, a liquid used in the radiators of cars, freezes at -64 ˚C .

Imagine that the temperature has dropped to the freezing point for ocean water. How many degrees more must the temperature drop for the antifreeze to turn solid?

Explain your reasoning.

Operations on the Number Line (7.NS.A.1)

A number line is shown below. The numbers 0 and 1 are marked on the line, as are two other numbers *a* and *b*.



Which of the following numbers is negative? Choose all that apply. Explain your reasoning.

a. a – 1

b. a − 2

c. –b

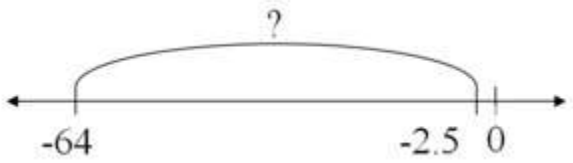
d. a + b

e. a − b

f. ab + 1

Solution: Comparing Freezing Points

We want to find the difference between the freezing point of ocean water and of antifreeze:



The difference between the temperature that ocean water turns to a solid and antifreeze turns to a solid is

$-2.5 - (-64) = 61.5$

So the temperature must drop another 61.5 ˚C after ocean water freezes for the antifreeze to turn to ice.

Solution: Operations on the Number Line

a. a is greater than 1, so a−1 is positive.

b. The distance between a and 1 appears to be less than the distance between 1 and 0, so it looks like a is less than 2. Thus a−2 is negative.

c. b is negative, so −b is positive.

d. The distance between a and 0 appears to be less than the distance between b and 0, so it looks like |a| is less than |b|. Since b is negative and a is positive, a+b is negative.

e. a−b = a+−b. Since b is negative, −b is positive. a is also positive. Thus, a−b is positive.

f. Since |a| and |b| are both greater than 1, |ab| is also greater than 1 (this builds on the intuition students gained in fifth grade as in 5.NF.5). ab is negative since a is positive and b is negative. Thus, ab+1 is negative.

Performance Task Scoring Rubric

3-Point Response	The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.
2-Point Response	The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.
1-Point Response	The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.
0-Point Response	The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.

Performance Task 2:
Writing Expressions (7.EE.A.1)

Write an expression for the sequence of operations.

a. Add 3 to x, subtract the result from 1, then double what you have.

b. Add 3 to x, double what you have, then subtract 1 from the result.

Compare the expressions in a and b. Explain how they are similar and how they are different.

Solution:

a. This problem can be done step-by-step. We first add 3 to x:

$$x+3.$$

Then we subtract the result that we just got from 1:

$$1-(x+3).$$

We then double, meaning we multiply this entire expression by 2:

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

If we choose to simplify this expression, we use the distributive, commutative and associative properties in the following way:

$$\begin{aligned} 2(1-(x+3))&=2(1-x-3) && \text{distribute the -1}\\ &=2(-x-2) && \text{subtracting 3 from 1}\\ &=-2x-4 && \text{distribute the 2} \end{aligned}$$

b. Again, we add 3 to x:

$$x+3$$

This time, next we double, meaning multiplying this expression by 2:

$$2(x+3).$$

Then we subtract 1 from the result and we have:

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

If we choose to simplify this expression, we use the distributive and associative properties in the following way:

$$\begin{aligned} 2(x+3)-1&=(2x+6)-1 && \text{distribute the 2}\\ &=2x+5 && \text{subtracting 1 from 6} \end{aligned}$$

Notice that the final expressions are very different, even though the instructions sounded very similar.

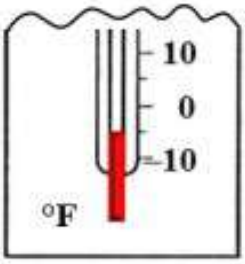
Performance Task Scoring Rubric

3-Point Response	The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.
2-Point Response	The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.
1-Point Response	The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.
0-Point Response	The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.

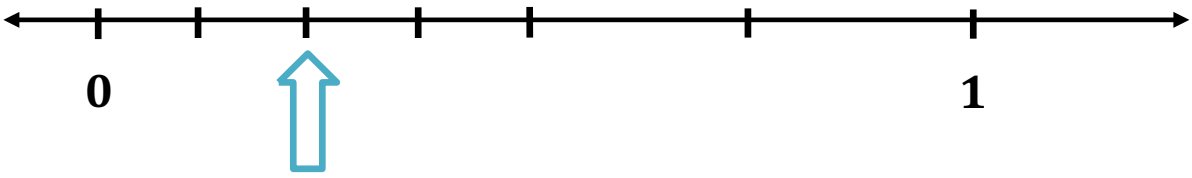
Assessment Checks

Assessment Check 1

1. What temperature would be 15° more than the temperature shown on the thermometer below?



2. Determine the number indicated on the number line below.



3. Jim's cell phone bill is automatically deducting $32 from his bank account every month. How much will the deductions total for the year?

a. -32
b. -44
c. -364
d. -384

4. A submarine was situated 450 feet below sea level. If it descends 300 feet, what is its new position?

5. In the Sahara Desert one day it was 136°F. In the Gobi Desert a temperature of -50°F was recorded. What is the difference between these two temperatures?

6. Mario walked $\frac{3}{4}$ mile to school and he walked back home. Then he walked $\frac{2}{3}$ miles to the store and back home. How far did Mario walk altogether?

Assessment Check 2

1. Let ♦ = -6, find the value of the following expressions:

5 • ♦	-5 • ♦	5 • (-♦)	5 • |♦|

2. When a diver is underwater, he is breathing air at a higher pressure than usual. If he stays too deep for too long, the high pressure of the air causes some of it to dissolve in his blood. Then, if he ascends too quickly, the air will "un-dissolve" and make bubbles in his blood, a very painful experience called "the bends." The US Navy has established time limits for how long a diver can stay at certain depths before he is in danger of the Bends.

To determine the amount of time (in seconds) a diver can safely remain under water, we use the equation:

$$\text{Time} = -6.1 \bullet \text{depth} + 750$$

If a diver is at a depth of 120 feet, how long can he safely remain under water before he is in danger of the Bends?

3. A speedboat can travel at a rate of 40 miles per hour. At this rate, what is the distance that the speedboat will travel in 6 minutes?

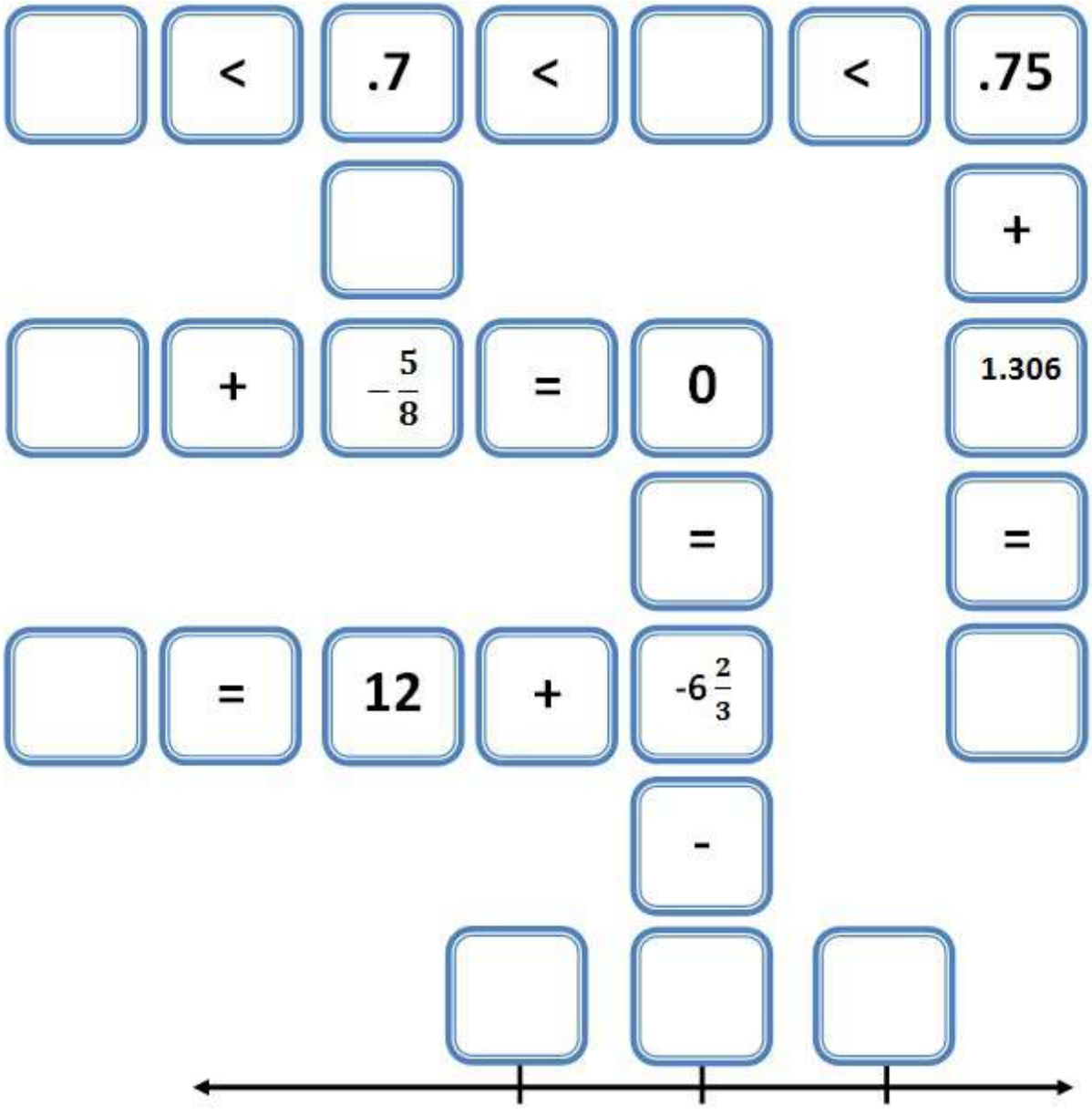
4. A bottle contains 0.375 liters of juice. Which of the following is another way to express 0.375?

   a. 3/75
   b. 3/8
   c. 37/50
   d. 3/4

Summative Tasks

Summative Task 1
7.NS.1

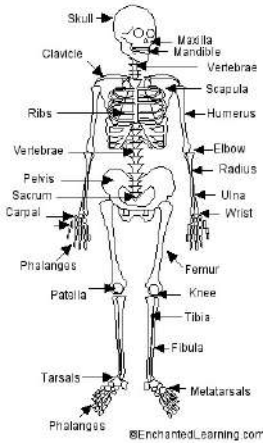
Replace each blank square in the bubble chart with a rational number or symbol that makes each number sentence true.



Summative Task 2
7.NS.2a-b

FORENSIC SCIENCE

When a skeleton is found, a forensic scientist uses the lengths of certain bones to calculate the height of the living person. The bones that are used are the femur (F), the tibia (T), the humerus (H), and the radius (R). When the length of one of these bones is known, one of the following formulas is used to determine the height. All measurements are in inches. Find the approximate height of a female skeleton that has a humerus that measures 12inches.



MALE	**FEMALE**
Height = 2.2•F + 27	Height = 2.3•F + 24
Height = 2.4•T + 32	Height = 2.5•T + 29
Height = 3 •H + 29	Height = 3.1•H + 26
Height = 3.7•R + 32	Height = 3.9•R + 29

TEMPERATURE

To convert between degrees Celsius (C) to degrees Fahrenheit (F), we use the equation

F = 9/5 (C+32). Calculate the temperature in Fahrenheit given C= -7°.

Summative Task 3
7.NS.2c-d

Aiden needs to buy food for his dog Dusty. The Pet Emporium (TPE) has a 30-lb bag of Dusty's favorite brand on sale for $19.95, while Woofs'R'Us (WRU) has a 40-lb bag of Dusty's favorite brand on sale for $24.95.

- Which food package should Aiden buy if he wants to get the better deal on Dusty's favorite brand?

- How much would his savings be if he purchased 3 bags of the less expensive brand?

Extensions

Online Resources

http://dashweb.pearsoncmg.com

http://www.illustrativemathematics.org/standards/k8

- Performance tasks, scoring guides

http://www.ixl.com/math/grade-7

- Interactive, visually appealing fluency practice site that is objective descriptive

https://www.khanacademy.org/math/arithmetic/absolute-value

- Interactive, tracks student points, objective descriptive videos, allows for hints

https://www.khanacademy.org/math/arithmetic

http://www.doe.k12.de.us/assessment/files/Math_Grade_7.pdf

- Common Core aligned assessment questions, including Next Generation Assessment Prototypes