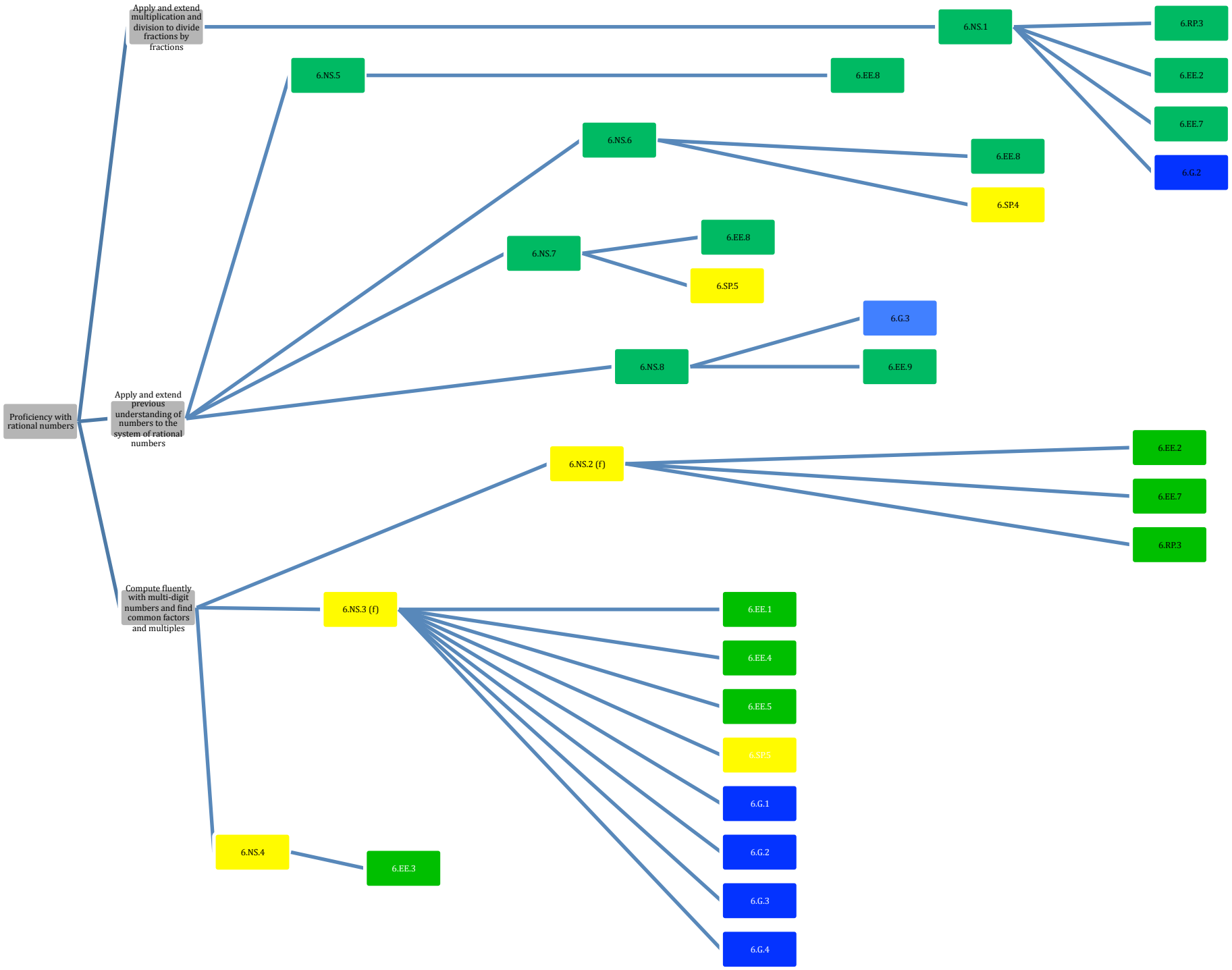
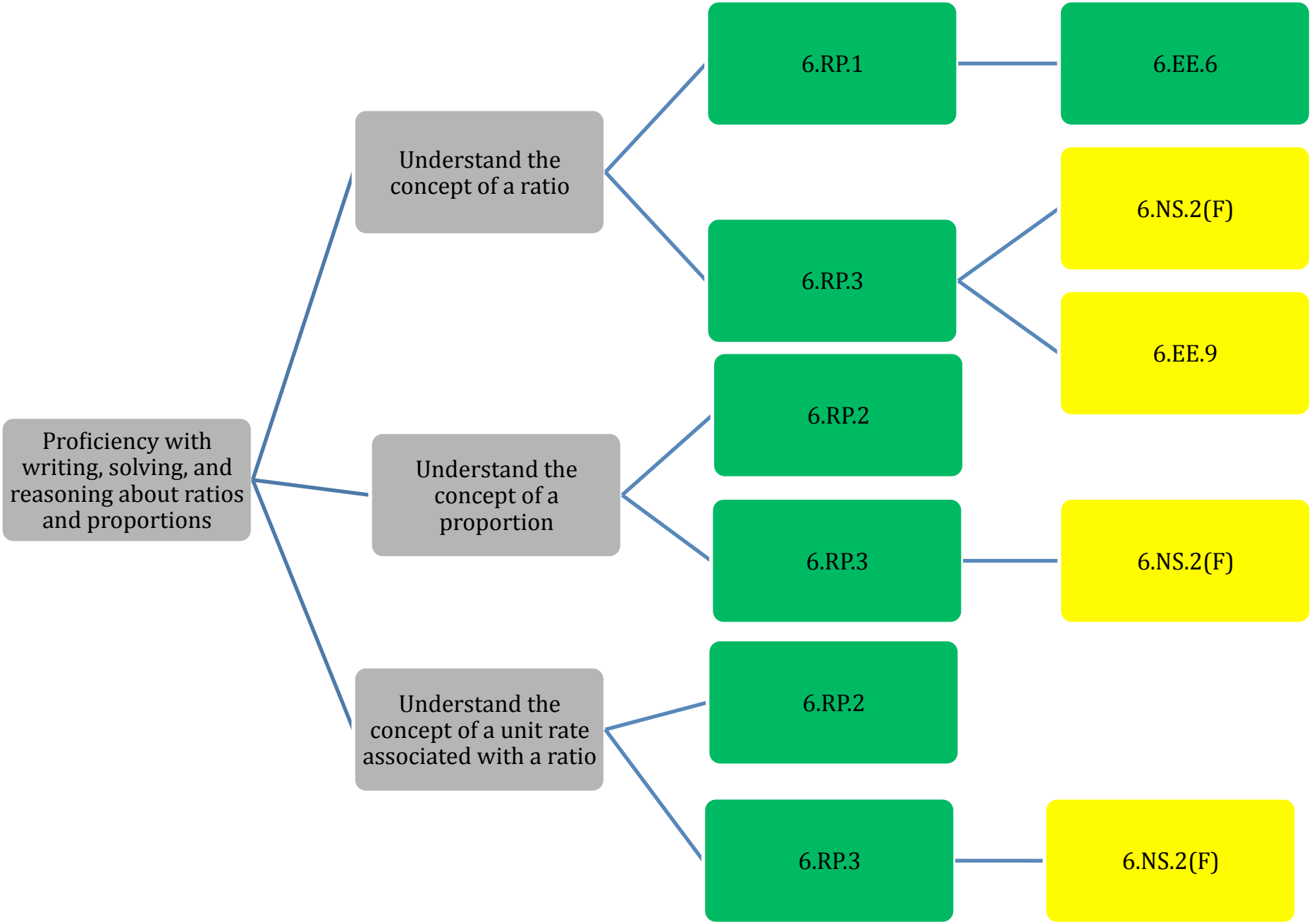
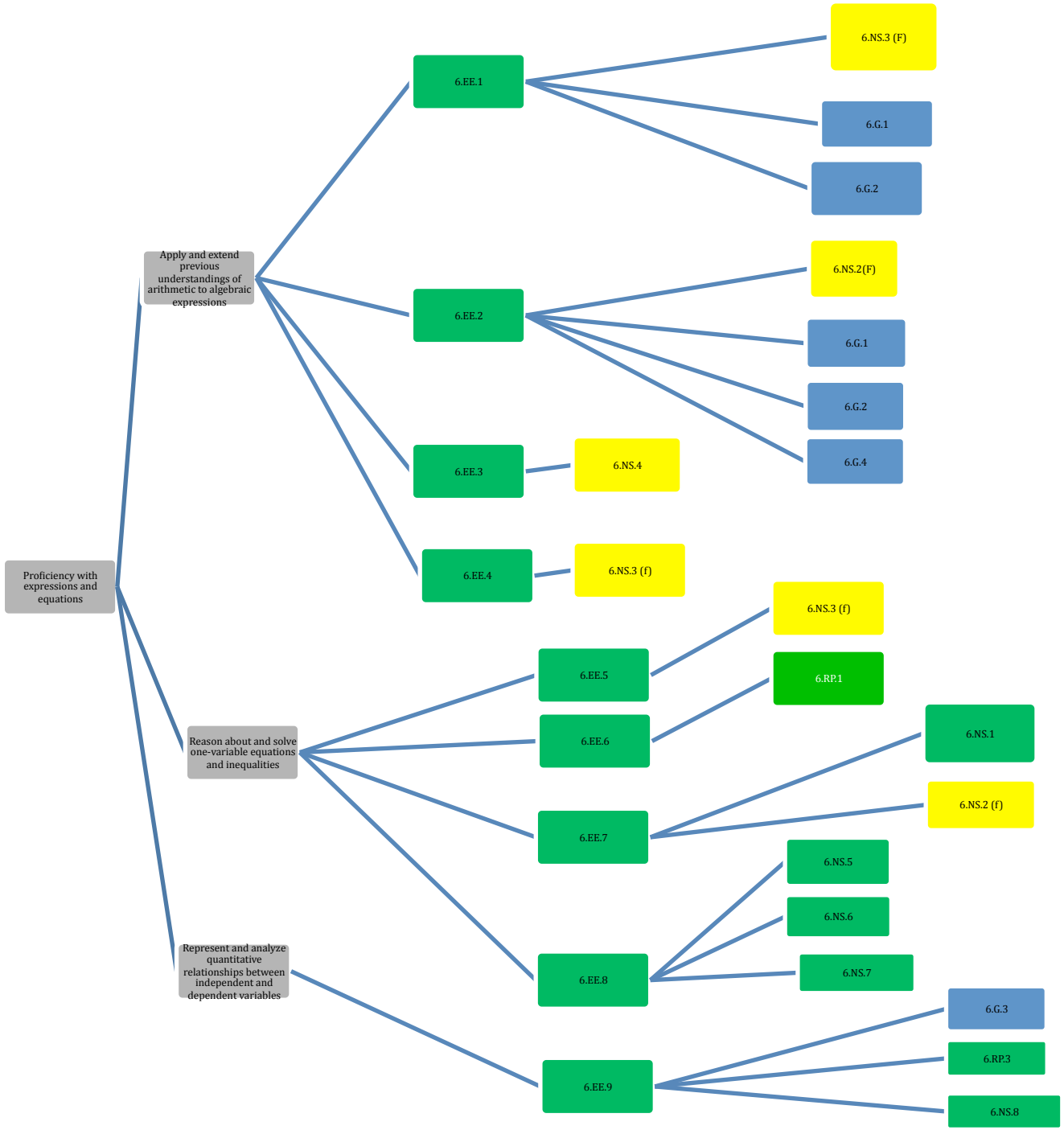
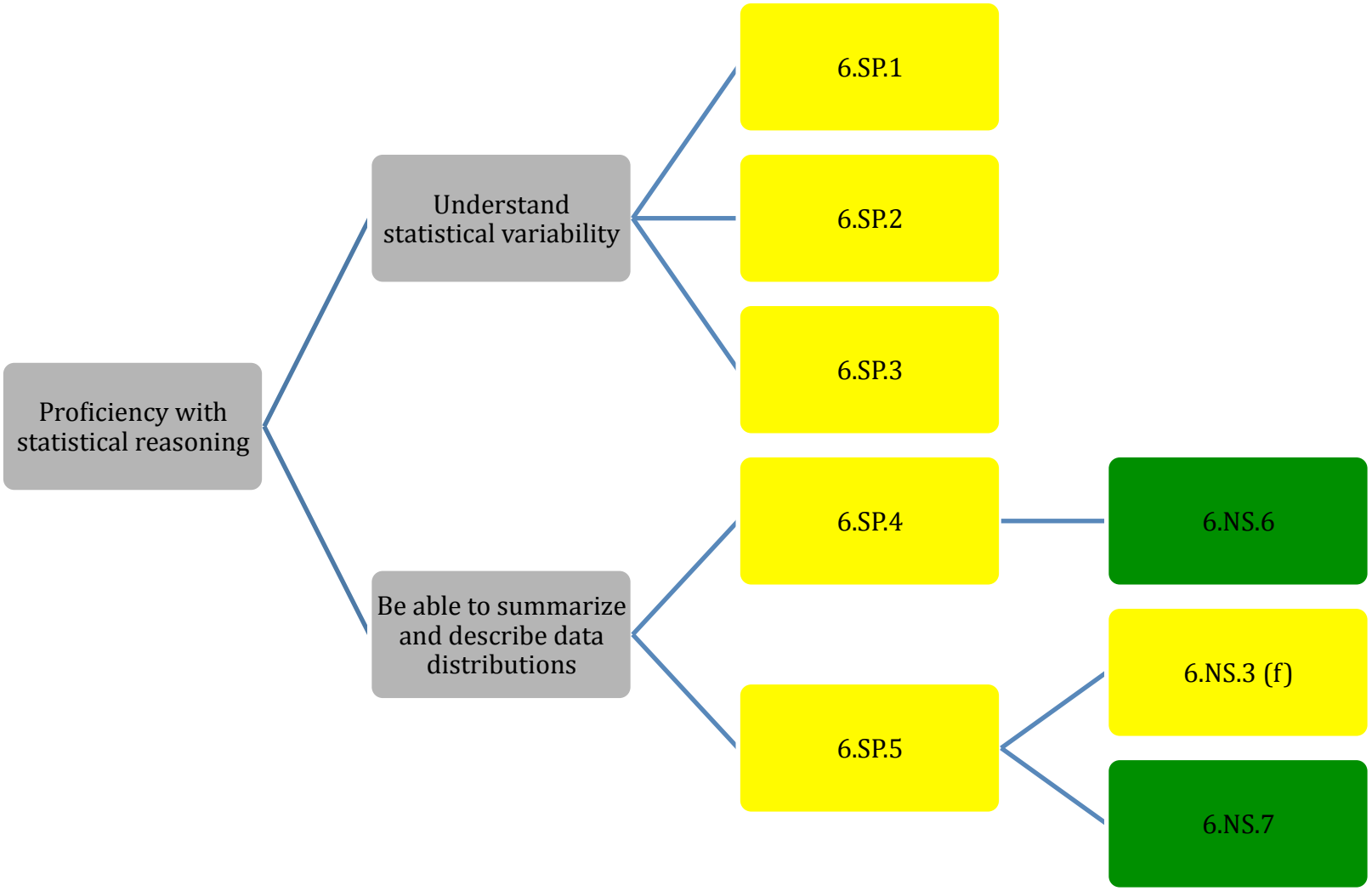
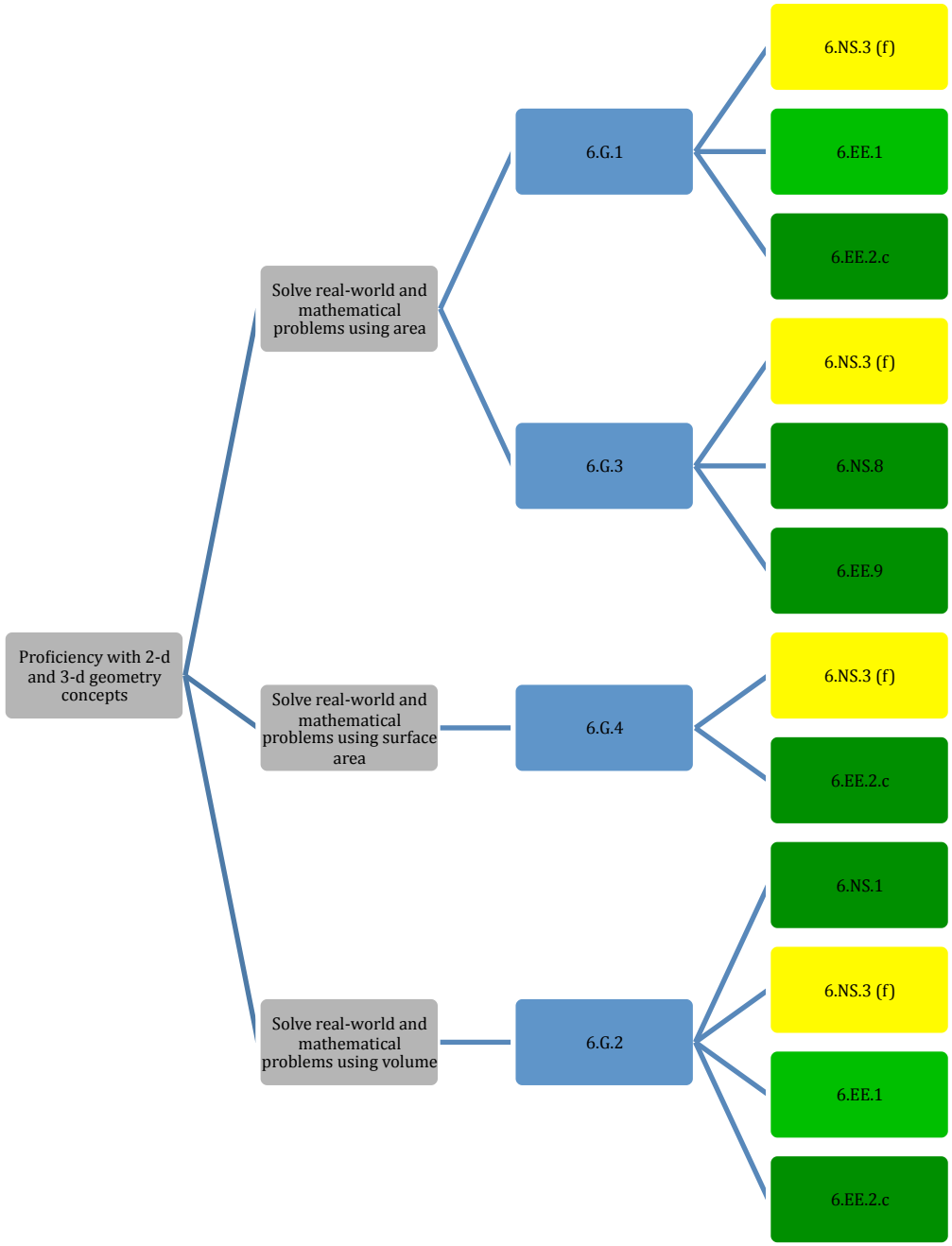

Proficiency with rational numbers
Apply and extend multiplication and division to divide fractions by fractions
6.NS.1
6.RP.3
6.EE.2
6.EE.7
6.G.2
Apply and extend previous understanding of numbers to the system of rational numbers
6.NS.5
6.EE.8
6.NS.6
6.EE.8
6.SP.4
6.NS.7
6.EE.8
6.SP.5
6.NS.8
6.G.3
6.EE.9
Compute fluently with multi-digit numbers and find common factors and multiples
6.NS.2 (f)
6.EE.2
6.EE.7
6.RP.3
6.NS.3 (f)
6.EE.1
6.EE.4
6.EE.5
6.SP.5
6.G.1
6.G.2
6.G.3
6.G.4
6.NS.4
6.EE.3


Proficiency with writing, solving, and reasoning about ratios and proportions
Understand the concept of a ratio
6.RP.1
6.EE.6
6.RP.3
6.NS.2(F)
6.EE.9
Understand the concept of a proportion
6.RP.2
6.RP.3
6.NS.2(F)
Understand the concept of a unit rate associated with a ratio
6.RP.2
6.RP.3
6.NS.2(F)


Proficiency with expressions and equations
Apply and extend previous understandings of arithmetic to algebraic expressions
Reason about and solve one-variable equations and inequalities
Represent and analyze quantitative relationships between independent and dependent variables
6.EE.1
6.NS.3 (F)
6.G.1
6.G.2
6.EE.2
6.NS.2(F)
6.G.1
6.G.2
6.G.4
6.EE.3
6.NS.4
6.EE.4
6.NS.3 (f)
6.EE.5
6.NS.3 (f)
6.EE.6
6.RP.1
6.EE.7
6.NS.1
6.NS.2 (f)
6.EE.8
6.NS.5
6.NS.6
6.NS.7
6.EE.9
6.G.3
6.RP.3
6.NS.8


Proficiency with statistical reasoning
Understand statistical variability
Be able to summarize and describe data distributions
6.SP.1
6.SP.2
6.SP.3
6.SP.4
6.SP.5
6.NS.6
6.NS.3 (f)
6.NS.7


Proficiency with 2-d and 3-d geometry concepts
Solve real-world and mathematical problems using area
Solve real-world and mathematical problems using surface area
Solve real-world and mathematical problems using volume
6.G.1
6.G.3
6.G.4
6.G.2
6.NS.3 (f)
6.EE.1
6.EE.2.c
6.NS.3 (f)
6.NS.8
6.EE.9
6.NS.3 (f)
6.EE.2.c
6.NS.1
6.NS.3 (f)
6.EE.1
6.EE.2.c

Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:37AM

Standard/Module: Mathematical Practices (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%)
- Supporting (20%)
- Additional (10%)

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

Enduring Understandings	Essential Questions

Critical Content

Skills	Vocabulary

Stage 2: Assessment Evidence

Assessments

Stage 3: Learning Plan

Learning Activities	Resources
	http://engageny.org/common-core/

	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

<< Previous Year

Last Updated: Wednesday, August 29, 2012, 1:58PM

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:39AM

Standard/Module: Proficiency with Rational Numbers 6.NS.5 (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.EE.8

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Enduring Understandings	Essential Questions
1. Understand that positive and negative numbers allow us to talk about quantities that have opposite directions or values 2. Understand that a negative integer is less than zero 3. Negative number can be: a. represented on a number line i. moving on a number line ii. on a number line 4. Understand the meaning of zero a. Real world context determines the meaning of zero	1. What does –a mean as a direction? 2. What does –a mean as a value? 3. What is the difference between the positive and negative signs? 4. How does direction effect value?

Critical Content

1. Integers

-concept of zero

2. Real world application of integers

-opposite directions

-values

Skills	Vocabulary
1. Use positive and negative numbers to describe quantities having opposite directions or values 2. Explain the meaning of zero 3. Use positive and negative numbers to represent quantities in real-world contexts: - temperature above and below zero - elevations above/below sea level - credits/debits - positive/negative electric charge	Tier 2: opposite values positive negative zero neutral quantity Tier 3: integer rational

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Joe's football team had a loss of 5 yards on first down. Write an integer to represent the situation.

Problem task
Formative: Performance: Skill Demonstration

Create a situation in which integers have opposite values and explain what zero means in this situation.

Stage 3: Learning Plan

Learning Activities	Resources
Provide multiple examples of types of contexts using positive and negative integers (such as a bank account, hot air balloons, discs to show positive and negative charges, thermometer, number line) and give the students opportunities to make sense of each context. Give students a number and have them write a real-life situation for that number and its opposite that would result in an answer of zero. Explain the meaning of zero in that situation and represent it on the number line. Use a comparison matrix: Negative Zero Positive Definition Example Picture	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/ http://nlvm.usu.edu/en/nav/frames_asid_334_g_2_t_1.html?from=category_g_2_t_1.html

Differentiation Opportunities

Starting with examples of having/owing and above/below zero sets the stage for understanding that there is a

mathematical way to describe opposites. Students should already be familiar with the counting numbers (positive whole numbers and zero), as well as with fractions and decimals (also positive). They are now ready to understand that all numbers have an opposite. These special numbers can be shown on vertical or horizontal number lines, which then can be used to solve simple problems. Demonstration of understanding of positives and negatives involves translating

among words, numbers and models: given the words “7 degrees below zero,” showing it on a thermometer and writing -7; given -4 on a number line, writing a real-life example and mathematically -4. Number lines also give the opportunity to model absolute value as the distance from zero.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:40AM

Standard/Module: Proficiency with Rational Numbers 6.NS.6 (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.EE.8, 6.SP.4

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
- 6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
- 6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
- 6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

Enduring Understandings	Essential Questions
1. Understand the meaning of the term opposite 2. Recognize that the opposite of the opposite of the number is its number itself. ex) –(-3) 3. Any rational number can be found or positioned on a number line 4. An ordered pair is the way of identifying the point on a plane 5. Coordinate plane is divided into 4 quadrants	1. Are there any places on a plane that are not in a quadrant? (Answer: If it is on the axis, it is not in a quadrant) 2. What is the meaning of the term opposite? 3. Why is the opposite of the opposite just the number? 4. How is a double negative in English similar to the opposite of an opposite? 5. When is appropriate to represent a number as a negative integer?

Critical Content

1. Vertical and horizontal number lines

    a. opposites

    b. positive integers

    c. negative integers

    d. whole numbers, integers, fractions,

        decimals, and other rational numbers

2. Coordinate planes (4 quadrants)

    a. point

    b. quadrant

    c. axis (x and y)

    d. coordinates

    e. origin

    f. reflection

    g. ordered pairs

    h. plane

3. Rational number

    a. whole numbers, integers, fractions,

        decimals, and other rational numbers

Skills	**Vocabulary**
1. Extend number line diagrams to include negative numbers 2. Extend coordinate axis to include negative numbers 3. Understand a rational number as a point on the number line (whole numbers, integers, fractions, decimals, and other rational numbers). 4. Recognize and place opposite signs of numbers indicating	Tier 2: Reflections Axes/Axis Point

location on opposite sides of 0 on the number line; coordinate plane; horizontal and vertical number line diagram. 5. Recognize that the opposite of the opposite of a number is the number itself 6. Zero is its own opposite 7. Place ordered pairs in the correct quadrant 8. Recognize two ordered pairs that differs only by signs, are related by reflections across one or both axes.	Quadrant Point Plane Origin Coordinates Signs (positive/negative) Tier 3: Rational number Ordered Pair
Make a number line on the floor. Have a student choose an integer to stand on then call on a student to come stand on the opposite integer. Repeat process asking students to stand on the opposite of an opposite. Have students use appropriate notation to record these integers.	Integers

Stage 2: Assessment Evidence

Assessments

Skill based (6a)
Formative: Performance: Skill Demonstration

Locate 4 and its opposite on a number line.

Problem task (6a)
Formative: Performance: Skill Demonstration

This is a skill-based standard. Therefore, no problem task is offered.

Skill based (6b)
Formative: Performance: Skill Demonstration

If you had a point graphed at (5, -3), what would be one ordered pair that is a reflection of the point? Students may use a coordinate plane to find a solution.

Problem task (6b)
Formative: Performance: Skill Demonstration

A town was laid out using a coordinate plane. On the city plans, the library is at (3, 2). Which of the following locations is a reflection across the *x*-axis of where the library is located? Prove your answer is correct using two different methods.
School (-3, -2) Gas Station (-3, 2) Post Office (3, -2)

Skill based (6c)
Formative: Performance: Skill Demonstration

Plot the following ordered pairs: (3, 2), (-4, 5), (-8, -3), (4, -6), (21/2 , -5), (-9.75, 0) (Note: Approximation is appropriate.)
Create a graph of several points and have students write the ordered pair for each point.

Stage 3: Learning Plan

Learning Activities	Resources
What Integer Am I? Draw a number line on a large sheet of paper. Including: -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, and 10 Step 1 Player 1 places a token on a negative number on the number line. Step 2 Player 2 says, "What is my name?" "What is my opposite?" and "How many units am I away from 0?" Step 3 Player 1 then gives the name of the integer, its opposite, and tells its distance from 0. Step 4 Trade roles and play again. Here's an example: Player 1 places a token on -3. Player 2: "What is my name? What is my opposite? How many units am I away from 0?" Player 1: "Negative 3, positive 3, 3 units from 0."	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/
_____ Have students draw and label a coordinate plane, including quadrants and axes. Make a set of cards with ordered pairs that have a matching card that is a reflection of the point. Have students get in groups and pair the cards that are reflections. Given an ordered pair, have students identify in which quadrant the ordered pair is located.	http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Play coordinate plane battleship as a whole class and then with partners.	http://www.lessonplanspage.com/MathBattleshipPlotCo ordinates79.htm (Note: Modify the lesson plan to include rational numbers within a limited range; for example, halves and fourths between -2 and 2.)

Differentiation Opportunities

Number lines can be used to show numbers and their opposites. Both 3 and -3 are 3 units from zero on the number line. Graphing points and reflecting across zero on a number line extends to graphing and reflecting points across axes on a coordinate grid. The use of both horizontal and vertical number line models facilitates the movement from number lines to coordinate grids.

Interactive Smart board activities and computer practice can provide extra support to students.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:40AM

Standard/Module: Proficiency with Rational Numbers 6.NS.7 (Week 1, 39 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.EE.8, 6.SP.5

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 7. Understand ordering and absolute value of rational numbers.
- 7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
- 7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
- 7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
- 7d. Distinguish comparisons of absolute value from statements about order.

Enduring Understandings	Essential Questions
1. Absolute value is the distance from zero on the number line and is always written as a positive. 2. The further away from zero, the greater the absolute value 3. When ordering rational numbers, numbers are smaller the further left that you go.	1. How does an integers position on a number line effect whether or not if it is <, >, or = to another integer on the number line? 2. What does absolute value represent? 3. How can a rational number that is less than another rational number have a greater absolute value

Critical Content

1. Horizontal and vertical number line

   a. inequality symbols

2. Inequality statements (greater than, less than, equal to)

3. Absolute value is the distance from zero on the number line and is always written as a positive.

4. Rational numbers can be ordered based on magnitude

5. The value on a negative rational number decreases, its absolute value increases.

Skills	Vocabulary
1. Order on a number line 2. Order rational numbers 3. Statements of order using inequalities. a. write b. interpret c. explain 4. Compare rational numbers by using inequalities 5. Write statements of order that represent real word context 6. Interpret absolute value 7. Compare absolute values of rational numbers	Tier 2: diagram magnitude positive negative increase decrease equivalent equal compare order Tier 3: inequality rational numbers absolute value

Stage 2: Assessment Evidence

Assessments

Skill based (7a)
Formative: Performance: Skill Demonstration

Compare rational numbers using symbols of inequality.

Problem task (7a)
Formative: Performance: Skill Demonstration

On Tuesday the temperature was -7°F and on Wednesday the temperature was -5°F. Which day was colder? Write the inequality and show it on a number line. Explain how you know your answer is correct.

Skill based (7b)
Formative: Performance: Skill Demonstration

It is -20 ℉ in Juno, Alaska and -5 ℉ in Salt Lake City, Utah. Which city has the lowest temperature?

Problem task (7b)
Formative: Performance: Skill Demonstration

On Tuesday the temperature was -7°F and on Wednesday the temperature was -5°F. Which day was colder? Write the inequality and show it on a number line. Explain how you know your answer is correct.

Skill based (7c)
Formative: Performance: Skill Demonstration

|-5| = If Billy owes Susie $5, express Billy's debt as an integer.

Problem task (7c)
Formative: Performance: Skill Demonstration

A whale swims 40 ft. below sea level. Express the whale's location as an integer and tell how many feet below the surface the whale is swimming. Explain your answers for both parts of the problem.

Skill based (7d)
Formative: Performance: Skill Demonstration

You are $35 dollars in debt. Write your debt using mathematical symbols. How much do you need to earn to be out of debt?

Problem task (7d)
Formative: Performance: Skill Demonstration

A mother dolphin is 150.25 meters below sea level. Her calf is 45 meters below sea level. Which dolphin is farthest from the surface? A mother whale is at 35 meters below the surface and her calf is at the surface. How far does the calf have to swim to get to its mother? Which statement deals with absolute value? Which statement deals with ordering? Justify your answer.

Stage 3: Learning Plan

Learning Activities	Resources
Vertical number line: Elevator example Horizontal number line: “Jumping Flee” (on illustrative math)	http://engageny.org/common-core/ http://illustrativemathematics.org/
Give students a rational number and have them stand in order from least to greatest on the number line. Make flashcards of rational number and play “war.” Have the students create statements of inequality (e.g., -9 < 1/2) and interpret them by writing out the inequality and its meaning in a sentence or sentences, as in “Negative 9 is less than 1/2 means that negative nine is to the left of 1/2 on the number line. Negative nine is nine and one half positions to the left of 1/2”).	www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html
Have a student write a real-life situation using 2 rational numbers and have another student write an inequality to represent the situation. Then switch tasks.	http://www.korthalsaltes.com/
Have students move on a number line from 0 to 3 and 0 to -3 to show they move the same distance (i.e., walking on a number line on the floor or playground). Have a student choose a place on the number line and have the rest of the class write the absolute value of the number. Develop an original story problem that uses an absolute value. Justify your use of absolute value in that context. Makeintegerplacardsforeachstudent(besureto include 0 in the set). Have students line up from least to greatest as integers and then as absolute	http://mathforum.org/library/drmath/view/57177.html

values.	

Differentiation Opportunities

REVIEW OF INTEGERS

What Integer Am I?
Draw a number line on a large sheet of paper.
Including: -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, and 10

Step 1
Player 1 places a token on a negative number on the number line.

Step 2
Player 2 says, "What is my name?" "What is my opposite?" and "How many units am I away from 0?"

Step 3
Player 1 then gives the name of the integer, its opposite, and tells its distance from 0.

Step 4
Trade roles and play again. Here's an example:
Player 1 places a token on -3. Player 2: "What is my name? What is my opposite? How many units am I away from 0?" Player 1: "Negative 3, positive 3, 3 units from 0."

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:41AM

Standard/Module: Proficiency with Rational Numbers 6.NS.8 (Week 1, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.G.3, 6.EE.9

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Apply and extend previous understandings of numbers to the system of rational numbers.

- 8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Enduring Understandings	Essential Questions
1. Understand that a line segment from one coordinate pair to another represents a distance. 2. Understand that if two coordinates have the same x or y value they are on the same line. 3. Understand that the distance from a point on a coordinate plan to an axis is an absolute value. 4. Understand that the units on a coordinate plane define the unit of distance measure. 5. Understand that the coordinate plane can be used to represent real word contexts.	1. How are maps connected to coordinate planes? 2. How can absolute value help you define the distance between two points on the coordinate plane?

Critical Content

1. Coordinate planes (4 quadrants)

    a. point

    b. quadrant

c. axis (x and y)

d. coordinates

e. origin

f. reflection

g. ordered pairs

h. plane

i. plotting

Skills	Vocabulary
1. Graphing points in all four quadrants of the coordinate plane 2. Find distances between points with the same first coordinate of the same second coordinate 3. Find the distance between two points 4. Find the length of a line segments	Tier 2: plane coordinate distance points length quadrant axis reflection Tier 3: absolute value

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

What is the distance between (-8, 7) and (-8, -2)?

Problem based
Formative: Performance: Skill Demonstration

Bills house is at (-4, 6), the library is at (-4, -2) and the Bakery is at (3, -2). What is the distance between Bill's house and the library? The library and the bakery? Show two different methods to find the difference.

Stage 3: Learning Plan

Learning Activities	Resources
-Find the length of BA and BC of a triangle on a coordinate plane	http://engageny.org/common-core/
Make a coordinate grid on the floor and have students stand on points then find the distance between students. Make sure that the two points have either the same first coordinate or the same second coordinate. Have the students figure out that when you are on the same x or the same y you are on the same line.	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Guided practice with white boards with coordinate planes.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:42AM

Standard/Module: Proficiency with Rational Numbers 6.NS.2 (Week 3, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) 6.EE.2, 6.EE.7, 6.RP.3

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 2. Fluently divide multi-digit numbers using the standard algorithm.

Enduring Understandings	Essential Questions
1. Conceptual understanding of division as: a. repeated subtraction for conceptual understanding of division b. division is breaking a number into equal groups 2. Knowledge of the standard algorithm for division	1. How can you use multiplication to check your division? 2. How can you use estimation to check that your quotient is reasonable? 3. Why is it essential to use the standard algorithm for division quickly and accurately? 4. When would you use the standard algorithm?

Critical Content

1. Basic Facts

a. Mastered addition, subtraction,

multiplication, division

2. Vocabulary

a. Dividend, Divisor, Quotient

3. From various forms (word problem, fraction form, etc.) students can use the standard algorithm to divide

multi-digit whole numbers

4. Use estimation to check their quotient is reasonable.

Skills	**Vocabulary**
1. Subtraction 2. Multiplication 3. Use the standard algorithm with single digit division 4. Understanding of the process of the standard algorithm (guess and check, estimation, basic division and multiplication facts, etc.)	Tier 2: -divide -standard -dividend -division notation (/ , ÷) -divisor -quotient -remainder Tier 3: -algorithm

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

248 divided by 18.

Problem Task
Formative: Performance: Skill Demonstration

I spent $504 on 28 tickets for a rock concert. How much did I spend on each ticket?

Stage 3: Learning Plan

Learning Activities	Resources
<u>Rolling Decimals</u> Materials number cube Step 1 Roll a number cube five times. Write one three-digit number and one two-digit number using the digits you rolled. Use a decimal point in one or both numbers. For example, you might write 23.6 and 0.12. Step 2 Write an addition, subtraction, multiplication, and **division** sentence using the two numbers, such as 23.6 /0.12, 23.6 / 0.12, 23.6 / 0.12, and 23.6 / 0.12. Estimate the answers to each of the problems. For example, you might round 23.6 to 24 and 0.12 to 0.1 and then perform the operations. Use a calculator or paper and pencil to find the value of each problem. Compare the results with your estimations. Step 3 Take turns making up numbers and estimating the results of different operations, play a game together. Choose an estimation goal, such as 100 or 25.5. Challenge your child to write an addition, subtraction, multiplication, or division sentence with two and three-digit decimals that will result in a number as close to the estimate as possible.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html
1. Think Aloud: Do the problem with a partner while explaining and telling what you are thinking and doing. 2. Have students identify in a problem set when they would use mental math and when they would use the standard algorithm. 3. Connect students' existing strategies for division with the standard algorithm. 4. As a starter activity, use division	http://www.korthalsaltes.com/

problems that can reasonably be solved by using mental math (e.g., 105/25), estimation (e.g., 150 ÷ 12, 227 ÷ 30), and reasoning (e.g., when I think of 105 divided by 25, I think of 4 sets of 25 with 5 left over, the 5 left over is 5/25 which is 1/5, so the answer is 4 1/5). Model for the students your thinking as you work through the problem. (Note: This strategy would not apply to complex division problems for which the algorithm is most appropriate [e.g., 4567 ÷ 192]).	http://nlvm.usu.edu/en/nav/frames_asid_197_g_2_t_1.html?open=activities&from=search.html?qt=division

Differentiation Opportunities

Provide the steps of how to divide or provide an example on homework assignments for extra support.

Scaffold problems during lessons and reinforcement activities.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:42AM

Standard/Module: Proficiency with Rational Numbers 6.NS.3 (Week 3, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) 6.EE.1, 6.EE.4, 6.EE.5, 6.SP.5, 6.G.1, 6.G.2, 6.G.3, 6.G.4

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Enduring Understandings	Essential Questions
1. Understand the role of place value of decimals when using with multi-digit operations. 2. Any rational number can be added, subtracted, multiplied, or divided 3. Being able to identify when the standard algorithm is appropriate to use.	1. What is a rational number? 2. Why are rational numbers used? 3. When is it appropriate to use the standard algorithm for addition, subtraction, multiplication, and division?

Critical Content

1. Multi-digit decimals

a. Role of place value when solving problems

2. Standard algorithm for:

a. addition

b. subtraction

c. multiplication

d. division

3. Operations

a. basic facts for addition, subtraction, multiplication, and division

Skills	Vocabulary
1. Fluently use the standard algorithm for addition of decimals. 2. Fluently use the standard algorithm for subtraction of decimals. 3. Fluently use the standard algorithm for multiplication of decimals. 4. Fluently use the standard algorithm for division of decimals.	Tier 2: difference product remainder fluent digits Tier 3: addend sum factor divisor dividend quotient rational number

	algorithm

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

1. 242.134+308.02
2. 38.9–14.334
3. 11.82x2.81
4. 341.8÷1.2

Problem Task
Formative: Performance: Skill Demonstration

The school had a bake sale and raised $75.55. If each cookie cost $0.05, how many cookies were sold? Explain how you got your answer.

Stage 3: Learning Plan

Learning Activities	Resources
Place Value: Write digits from 0 to 9 on pieces of paper, and then put the digits in a container. Draw 3 digits from the container. Have your child write the least decimal from the digits. For example, the least decimal of the digits 9, 1, and 5 is 0.159. Have your child identify the place of each digit in the decimal number (1 is in the tenths place, 5 is in the hundredths, and 9 is in the thousandths). Challenge your child to write a decimal greater than 0.159, using the same 3 digits.	http://illustrativemathematics.org/standards/k8http://engageny.org/common-core/
	http://illustrativemathematics.org/
	www.livebinders.com/play/play/52180
	http://illuminations.nctm.org/
----------	http://www.mathsisfun.com/geometry/polyhedron.html
1-4. Connect students' knowledge of various strategies to the standard	

algorithm. 1-4. Have students look at student work that contains a common misconception and look at errors and discuss how to correct the error.	http://www.korthalsaltes.com/

Differentiation Opportunities

Provide grid paper to help students line up the decimals when adding and subtracting decimals.

Provide examples or the steps on assignments or classwork to give some aid.

Scaffold problems for class activities and homework.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:46AM

Standard/Module: Proficiency with Rational Numbers 6.NS.4 (Week 3, 4 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) 6.EE.3

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Compute fluently with multi-digit numbers and find common factors and multiples.

- 4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.
- Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

Enduring Understandings	Essential Questions
1. A common factor of two whole numbers is a number that can divide both numbers exactly 2. A common multiple of two whole numbers s a number that can be divided by both numbers exactly 3. Understand that GCF and LCM are ways to discuss number relationships and multiplication and division 4. Understand the distributive property using sums and its' use in adding numbers 1-100 with a common factor.	1. What is the difference between LCM and GCF? 2. When would you apply the GCF instead of the LCM? 3. How can GCF and LCM help you use the distributive property when adding?

Critical Content

1. Greatest Common Factor

    a. limited to two whole numbers less than

    or equal to 100

2. Least Common Multiple

a. two whole numbers less than or equal to 12

3. Distributive property

a. to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor

Skills	**Vocabulary**
1. Find the greatest common factor. 2. Find the least common multiple 3. Using the distributive property 4. Computer fluently using the distributive property of multiplication over addition	Tier 2: less than equal multiple Tier 3: Lest Common Multiple Greatest Common Factor Distributive Property Common factor Common multiple

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Find the greatest common factor of 24 and 60. Find the least common multiple of 6 and 10. Use the

distributive property to show 15 + 75.

Problem Task
Formative: Performance: Skill Demonstration

Hot dogs come in packs of 8. Buns come in packs of 12. How many packs of hot dogs and bags of buns would you have to buy to have an equal number of hot dogs and buns?
You need to make gift bags for a party with the same number of balloons and candy in each bag. One package of candy has 24 pieces. One package of balloons has 20 balloons. You need to use all the candy and all the balloons. What is the greatest number of gift bags that you can make containing an equal number of items?

Stage 3: Learning Plan

Learning Activities	Resources
Solve for LCM and/or GCF using factor towers, Venn diagrams, and factor trees. Use a model to show that 4(9 + 2) is four groups of 9 and four groups of 2.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

REVIEW CONCEPT OF FRACTIONS

Finding Fractions in Real World Applications
Identifying fractions at home, school, etc can help your student become comfortable with fraction terms. Use fractions when preparing and serving food, to describe your family, or in other familiar home situations. Encourage your student to answer questions such as these:

- What fraction of eggs is left in the carton?
- What fraction of the pizza is there in two slices? three?
- What fraction of our family is female?
- What fraction of our family is home by 4:00 P.M.?
- What fraction of your allowance did you spend this week? What fraction did you save?
- What fraction of the day did you spend at school? What fraction did you spend sleeping or doing homework?

REVIEW CONCEPT OF FRACTIONS: ADDING/SUBTRACTING

Add Up!
Materials paper and pencil, number cards Step 1 Make a set of number cards with a fraction on each card. Use
fractions with numerators 1 through 5 and denominators 2 through 6.
Step 2 Player 1 turns over two cards and finds the sum of the two fractions shown. Then player 2 turns over two cards and finds the sum of those two fractions. The player whose fractions have the greater sum wins.
Another Way to Play:

- Both players turn over three cards and find the sum of their fractions.
- The player whose fractions have the lesser sum wins.
- After 5 rounds, add each player's sums for each of the rounds. The player with the greater sum wins.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:47AM

Standard/Module: Proficiency with Expressions and Equations 6.EE.2 (Week 7, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.2, 6.G.1, 6.G.2, 6.G.4

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 2. Write, read, and evaluate expressions in which letters stand for numbers.
- 2a. Write expressions that record operations with numbers and with letters standing for numbers.
- 2b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
- 2c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

Enduring Understandings	Essential Questions
1. A variable is a letter representing a number or a variety of numbers. 2. Algebraic expressions may be used to represent real-world problems. 3. Based on what we allow the variable to equal, the value of the expression changes. 4. When evaluating an algebraic operation, continue to use order of operations.	1. Give an example of a real-world situation that can be represented as an algebraic expression. 2. Why does the order of operations apply to letters (variables) as well as numbers?

Critical Content

1. Algebraic expressions

   a) Parts of expressions

1) Variables

2) Terms

3) Coefficient

4) Constant

b) Translate expressions

c) Evaluate expressions

2. Order of operations

3. Formulas (Connects to 6.G.1, 6.G.2, & 6.G.4)

Skills	Vocabulary
1. Read, write and evaluate algebraic expressions in which letters stand for numbers 2. Translate algebraic expressions to verbal expressions, or vice versa 3. Identify parts of the expression using mathematical terms 4. Understand that an expression may be viewed in multiple ways, as a single entity or as a collection of operations. 5. Evaluate an algebraic expression when given the value of the variable. 6. Connects to 6.G.1, 6.G.2, & 6.G.4 (formulas)	Tier 2 expression base power notation factor variable term constant translate evaluate simplify sum difference

	product quotient formula Tier 3 exponent standard form exponential form factor form expanded form coefficient

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Write each word phrase as an algebraic expression.

6 less than 3t

the product of *w* and 8

r divided by 15

Problem Task
Formative: Performance: Authentic Task

Hannah is 3 years younger than Katie. Joey is twice as old as Hannah. Let *k* stand for Katie's age. Write an expression to represent Hannah's age. Using *k*, write an expression for Joey's age.

skill based
Formative: Performance: Skill Demonstration

Provide an expression (e.g., $6x + 4$) for students to identify the parts.

Write an expression that has two terms and a product.

Write an expression that has a coefficient and a sum.

Skill based
Formative: Performance: Skill Demonstration

Complete a table by evaluating the algebraic expression 5x + 8 for the following x values:

x = 0,3,7,12

Problem based
Formative: Performance: Authentic Task

You know that you can find the area of a triangle using the formula $A = \frac{1}{2} bh$. If a triangle has an area of 48 cm2, what can its base and height be? Draw diagrams to justify your thinking.

Stage 3: Learning Plan

Learning Activities	Resources
Writing and evaluating expressions is to write expressions for everyday situations, and then evaluate the expressions for different numbers. Here are some typical situations you	http://engageny.org/common-core/

might use. Food Preparation: What expression can you use to show that I want to divide the pancakes I make between 4 family members? (p ÷ 4, where p is pancakes) How many pancakes does each person get if I make 12 pancakes? (3) 20 pancakes? (5) Chores: What expression can you use to show that it takes 20 minutes to do each chore? (20c or 20 × c, where c is chores) How many minutes will it take to do 3 chores? (60 minutes) 4 chores? (80 minutes) Supplies: What expression can you use to show the total number of juice boxes in the cupboard if the 30 boxes in the cupboard are decreased by some number every day? (30 − b, or 30 − j, or 30 − n) How many juice boxes are there if we use 6? (24) What if we use 15? (15)	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html
1. Within your classroom, have the students find situations where they can role play to compare known and unknown quantities (e.g., Student A (Dory) and Student B (Colleen); Dory says, "I have two sisters." Colleen says, "I have Dory – 1 sisters." Dory says, "You have *d* – 1 sister. You have one sister.") Use all operations.	http://www.korthalsaltes.com/ http://www.mathgoodies.com/lessons/vol7/equations.html
2. Give each pair of students an expression such as *x* + 957. Challenge them to find a way to evaluate each expression for *x* = 35, 825, and 373. Then have the students write a real-life context for each expression.	http://www.cimt.plymouth.ac.uk/projects/mepres/book7/y7s22act.pdf
1. Give an example of an expression, such as 4 *x* + 7 + *x*, and identify the parts. The terms are 4*x*, 7 and *x*. The coefficients are 4 and 1 (since there is one x). The values 4 and *x* are both factors of the product 4*x*. Give additional examples to students to identify parts of expressions in small groups.	http://www.shodor.org/interactivate/activities/SurfaceAreaAndVolume/ http://www.math.niu.edu/~rusin/uses-math/games/krypto/
2. Give the students word problems such as the following and have them find the solutions: The sum of twice a number plus 13 is 75.	http://nlvm.usu.edu/en/nav/category_g_3_t_2.html

Write the equation and find the number. 3. Use the algebra tiles to represent terms in an expression (e.g., 2x requires two x pieces) Game 1: Give students two sets of cards. The first set contains equations and the second set contains the academic vocabulary. Students turn over an equation card. Then students match academic vocabulary to the parts of the equation. Game 2: Start with a small expression, such as 2 *x* - 4. Break the expression into distinct parts. Write on separate cards 2, *x*, -, and 4. 1. Write an expression such as *x* + 6 on the board. Leave space between the symbols and numbers. Give each student an index card with a different number from 0 – 20. Have a volunteer use his or her card to cover the *x*. Have another volunteer give the value for x and evaluate the expression. Summarize by saying, for example, When *x* = 4, then *x* + 6 = 10. Repeat with other students' cards and different expressions involving any of the four operations. Vary the degree of difficulty. 2. In small groups, give students the expression 3 + 4 x 5. This represents the number of people coming to a party. There are three individuals and four families each with five members. List the steps you would use to solve this problem and justify each step. Next, have students write this expression for a variable number of families. Allow students to	Algebra Tiles

reason which number becomes the variable.	

Differentiation Opportunities

Vocabulary needs to be reinforced. Flash cards can be used.

Prompts can be written on homework and class activities like PEMDAS.

Tiered activities and homework questions

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:48AM

Standard/Module: Proficiency with Expressions and Equations 6.EE.1 (Week 7, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.3, 6.G.1, 6.G.2

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 1. Write and evaluate numerical expressions involving whole-number exponents.

Enduring Understandings	Essential Questions
1. Numerical expressions can be simplified to give you one quantitative result in standard form.	1. How can we prove that 5^2 is the same as 25?
2. A number written in standard form may be expressed in exponential or factor form.	2. Within exponential notation, how do you know how many factors you will multiply?
3. Squaring and cubing numbers relates to finding the area and volume of regular figures. (6.G.1, 6.G.2)	3. Based on the exponential notation, how do you know what the factor is?

Critical Content

1. Numerical expressions

2. Whole number exponents

3. Different notations

   a) exponential

b) factor form

c) standard form

d) expanded form

4. Exponents are repeated multiplication

Skills	Vocabulary
1. Write numerical expressions involving whole-number exponents 2. Evaluate numerical expressions involving whole-number exponents	Tier 2 expression base power notation factor Tier 3 exponent standard form exponential form factor form expanded form

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Write five cubed times four as a numerical expression, then evaluate.

Problem Task
Formative: Performance: Authentic Task

Certain biological cells quadruple each hour. Start with one cell at 2:00 and find out how many cells there will be by 5:00. Create a diagram to represent the cell growth. Include an equation using exponential notation.

Stage 3: Learning Plan

Learning Activities	Resources
1. Have the students use manipulatives to show the number 3 after it has been doubled, which would represent 3 2=9 square units. Then have them show 33 = 27 cubic units with the manipulatives.	http://engageny.org/common-core/
2. Play memory games with matching numerical expressions. Example: 2^3 matches with 2 3, which matches with 2 x 2 x 2, which matches with 8.	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180
3. "I Have, Who Has?" game. Example: The first student says: "I have 2^3." The second student says: "I have 8. Who has 4^2?" The third student says: "I have 16. Who has the expression equal to 27?" Etc… Extension: Every positive integer can be expressed as the sum of four or fewer squared numbers (Note: You can use the same integer	http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

more than once.) Examples: 5 = 1 2 + 22 101 = 42 + 62 + 72 170 = 22 + 62 + 72 + 92 Write 83 as the sum of three square numbers.	http://www.wimp.com/makingnoodles

Differentiation Opportunities

The skills of reading, writing and evaluating expressions are essential for future work with expressions and equations, and are a Critical Area of Focus for Grade 6. In earlier grades, students added grouping symbols ( ) to reduce ambiguity when solving equations. Now the focus is on using ( ) to denote terms in an expression or equation. Students should now focus on what terms are to be solved first rather than invoking the PEMDAS rule.

Through modeling, encourage students to use proper mathematical vocabulary when discussing terms, factors, coefficients, etc. Homework can be differentiated by having definitions of some of the terminology written on the homework for students who need extra assistance.

Because this is a foundational year for building the bridge between the concrete concepts of arithmetic and the abstract thinking of algebra, using hands-on materials (such as algebra tiles, counters, unifix cubes, "Hands on Algebra") to help students translate between concrete numerical representations and abstract symbolic representations is critical.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:52AM

Standard/Module: Proficiency with Expressions and Equations 6.EE.3 (Week 7, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.4

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 3. Apply the properties of operations to generate equivalent expressions.

Enduring Understandings	Essential Questions
1. Understand and apply the distributive property. 2. Generate equivalent expressions 3. Understand the limitations of the distributive property in regards to division. 4. When evaluating an algebraic operation, continue to use order of operations. 5. Like terms may be combined to simplify algebraic expressions.	1. How can the distributive property be used to create equivalent expressions? 2. How can like terms be combined to simplify algebraic expressions? 3. Why can only like terms be combined when simplifying an algebraic expression? 4. Why does the order of operations apply to letters (variables) as well as numbers?

Critical Content

1. Distributive property

2. Equivalent expressions

3. Properties of operations

4. Combining like terms

5. **Connects to 6.NS.4 (distributive property)**

Skills	Vocabulary
1. Apply the property of operations 2. Generate equivalent expressions a) Apply the distributive property	Tier 2 expression base power notation factor variable term constant translate evaluate simplify sum difference product quotient formula Tier 3 equivalent expressions exponent standard form exponential form factor form

	expanded form coefficient distributive property like terms

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Generate an equivalent expression for each of the following:

4 (x - 2)

15x - 24y

$x + x + y + y$

5x + 2y

5r + (2s + 2t)

Problem Task
Formative: Performance: Authentic Task

In one packet of nuts, there are two different types of nuts. There are 5 peanuts (p) and 7 cashews (c) in each container. I have 6 packets of nuts; write two expressions that show how many nuts I have all together.

Possible answers: 6 (5 + 7) or (6 x 5) + (6 x 7)

Stage 3: Learning Plan

Learning Activities	Resources
Students must be able to make connections between what they already know about the properties of operations when used with numbers and how those properties apply when used with	

algebraic notation (using variables). Therefore, teachers should first present the topic of equivalent expressions using numbers and then shift to variables. Have students open a package of M&Ms and use the distributive property to write expressions showing how many of each color would be in 5 bags, 10 bags etc. (e.g. There are 10 red, 15 green, and 12 yellow in one bag. That could be represented by the expression 10 r + 15g+ 12y. To represent the number in 5 bags you would obtain the expression 5(10r+ 15g+ 12y). Using the distributive property, the expression is 50r+ 75g+ 60y. So there are 50 red, 75 green, and 60 yellow M&Ms in 5 bags.)	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/ http://www.onlinemathlearning.com/distributive-property-1.html http://www.math.niu.edu/~rusin/uses-math/games/krypto/

Differentiation Opportunities

Provide a variety of expressions and problem situations for students to practice and deepen their skills. Start with simple expressions to evaluate and move to more complex expressions. Likewise start with simple whole numbers and move to fractions and decimal numbers. The use of negatives and positives should mirror the level of introduction in Grade 6 The Number System;

students are developing the concept and not generalizing operation rules.

The use of technology can assist in the exploration of the meaning of expressions. Many calculators will allow you to store a value for a variable and then use the variable in expressions. This enables the student to discover how the calculator deals with expressions like

$x2$, $5x$, xy, and $2(x + 5)$.

<< Previous Year

Last Updated: Saturday, October 6, 2012, 11:49PM

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 11:53AM

Standard/Module: Proficiency with Expressions and Equations 6.EE.4 (Week 7, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.3

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Apply and extend previous understandings of arithmetic to algebraic expressions.

- 4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Enduring Understandings	Essential Questions
1. Recognize when two expressions are equivalent	1. How can you prove two expressions are equivalent? 2. How can two different expressions be equivalent?

Critical Content

1. Equivalent expressions

Skills	Vocabulary
1. Identify when two expressions are equivalent. 2. Prove two expressions are equivalent through substitution and computation.	Tier 2 expression base power notation factor variable

	term constant translate evaluate simplify sum difference product quotient formula Tier 3 equivalent expressions exponent standard form exponential form factor form expanded form coefficient distributive property like terms

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Are the following expressions equivalent?

$x + x + 1 + 1 = 2x + 2$

$5(x + 3) = 5x + 5$

Problem based
Formative: Performance: Authentic Task

Have students generate equivalent expressions for the number 48, using at least two operations and verifying that their notation is correct.

Stage 3: Learning Plan

Learning Activities	Resources
1. Use substitution to verify that both expressions are equivalent (e.g., $3(2 + x) = 6 + x$) is not true. Substitute any number for x; the expressions have different values, therefore they are not equivalent. (Make sure students try more than one number to make sure it works, because 0 will make this statement true.) 2. Present multiple expressions and ask students to determine if they are equivalent using substitution.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/ http://www.mathwire.com/numbersense/

	numbsense.html

Differentiation Opportunities

Area models from elementary can be used to illustrate the distributive property with variables.

Scaffold questions.

Have students work in pairs and before they simplify an expression have one partner explain what the expression means mathematically. This step might help prevent students from misunderstanding what the math symbols truly represent.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:01PM

Standard/Module: Proficiency with Expressions and Equations 6.EE.5 (Week 7, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.3

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Reason about and solve one-variable equations and inequalities.

- 5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

Enduring Understandings	Essential Questions
1. Substitution can be used to determine whether an equation or inequality is true.	1. When is it necessary to actually solve an inequality?
2. Understand the differences between equations and inequalities (equations have a single solution and inequalities have a range of answers)	2. When is it necessary to use substitution?
	3. How do equations and inequalities differ?

Critical Content

1. Equation

2. Inequality

3. Numerical expressions

4. Variable

Skills	Vocabulary

1. Solving one variable equations. 2. Solving inequalities 3. Use substitution to determine if an equation or inequality is true. 4. Understand solving an equation or inequality as a process or answering questions.	Tier 2 expression base power notation factor variable term constant translate evaluate simplify sum difference product quotient formula substitution Tier 3 equivalent expressions exponent standard form exponential form factor form

	expanded form coefficient distributive property like terms inequality equation

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Write an equation or inequality and prove your answer is correct by performing a check.

1.) Joey had 26 papers in his desk. His teacher gave him some more and now he has 100. How many papers did his teacher give him?

2.) If a booklet of stamps cost $11 and each stamp is $.44, how many stamps are in a book of stamps?

3.) Twelve is less than 3 times another number.

Stage 3: Learning Plan

Learning Activities	Resources
How Much Is That (Substitution of a variable) ? Look for ads in newspapers that give prices of groceries, electronics, toys, sporting goods, and other items that are of interest to your student. Use the ads to have your student write an equation. Suppose an ad shows a bicycle on sale for $80. Examples of equations are shown below.	http://engageny.org/common-core/ http://illustrativemathematics.org/

Examples: If you save $5 each week, what equation shows how long it would take to save $80? 5x 5 80, where x represents the number of weeks. If you already have $25, what equation shows how much more you will need to buy the bicycle? y 1 25 5 80, where y represents dollars. Help your child solve each of the equations. (x 5 16 weeks, y 5 $55)	www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Practice translating from words to equations or inequalities. This should be done in two to three different ability levels.

Practice solving tiered equations/inequalities.

Guided white board practice.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:02PM

Standard/Module: Proficiency with Expressions and Equations 6.EE.6 (Week 12, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.RP.1

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Reason about and solve one-variable equations and inequalities.

- 6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Enduring Understandings	Essential Questions
1. Use inequalities and equations to solve real-world and mathematical problems. 2. Recognize the difference in the terminology used within a real-world and mathematical problem between an equation and inequality. 3. Depending on the purpose at hand the variable could result in a specific number or a variety of numbers in a specified set.	1. How do equations and inequalities differ? 2. What allows for multiple solutions to an inequality? 3. Is it possible to have more than one solution for equations? 4. Is it possible to have only one solution for an inequality?

Critical Content

1. Equation

2. Inequality

   a. < , > , =

3. Numerical expressions

4. Variable

Skills	Vocabulary
1. Use variables to represent numbers 2. Use variables to write and solve expressions 3. Understand that a variable can represent an unknown number 4. Understand that a variable can represent any number in an unknown set	Tier 2 expression base power notation factor variable term constant translate evaluate simplify sum difference product quotient formula substitution Tier 3 equivalent expressions exponent standard form exponential form

	factor form expanded form coefficient distributive property like terms inequality equation

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

When answering the following questions be sure to define your variables.

1.) Maria has three more than twice as many crayons as Elizabeth. Write an algebraic expression to represent the number of crayons that Maria has.

2.) An amusement park charges $28 to enter and $0.35 per ticket. Write an algebraic expression to represent the total amount spent.

3.) Andrew has a summer job doing yard work. He is paid $15 per hour and a $20 bonus when he completes the yard. He was paid $85 for completing one yard. Write an equation to represent the amount of money he earned.

4.) Describe a problem situation that can be solved using the equation $2c + 3 = 15$; where *c* represents the cost of an item.

5.) Bill earned $5.00 mowing the lawn on Saturday. He earned more money on Sunday. Write an expression that shows the amount of money Bill has earned.

Stage 3: Learning Plan	
Learning Activities	**Resources**
Traveling About Town Look for opportunities to talk about equations when traveling by car, foot, bus, or train. Some examples of equations are shown below. Examples: Suppose 8 people get off of a bus and 18 are left. What equation can you write to show how many people were on the bus to begin with? b 2 8 5 18, where b represents people on the bus. (b 5 26) Suppose you buy 12 gallons of gas and your car gets 34 miles per gallon. What equation can you write to show how many miles you can drive? d 5 34 3 12, where d represents miles. (d 5 408).	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Connecting writing expressions with story problems and/or drawing pictures will give students a context for this work. It is important for students to read algebraic expressions in a manner that reinforces that the variable represents a number.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:03PM

Standard/Module: Proficiency with Expressions and Equations 6.EE.7 (Week 12, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.1, 6.NS.2

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations
6.EE Reason about and solve one-variable equations and inequalities.

- 7. Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.

Enduring Understandings	Essential Questions
1. Recognize that both sides of an equation are equal.	1. In what way does using inverse operations on both sides of the equal sign keep an equation balanced?
2. When using inverse operations, students must maintain both sides of the equation to be equal.	2. What are the two key steps in solving a one step equation?
	3. How can you prove that your solution is the correct solution for the equation?

Critical Content

1. Equation

2. Inverse operations

3. One step equations

4. Fluency in addition, subtraction, multiplication, and division in all operations of nonnegative rational numbers (whole numbers, decimals, fractions)

Skills	Vocabulary
1. Solve real-world and mathematical problems using equations. 2. Solve one step equations using inverse operations. 3. Fluently solve multiplication, division, addition, subtraction problems for all nonnegative rational numbers (whole numbers, decimals, fractions)	Tier 2 expression factor variable term constant evaluate simplify sum difference product quotient formula substitution balance rational Tier 3 equivalent expressions standard form exponential form factor form expanded form like terms

	inequality equation inverse operation reciprocal nonnegative

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Give students a 10 question quiz. Each question will be a real-world problem involving have to write an equation and solving it.

Example:

Meagan spent $56.58 on three pairs of jeans. If each pair of jeans costs the same amount, write an algebraic equation that represents this situation and solve to determine how much one pair of jeans cost.

Stage 3: Learning Plan

Learning Activities	Resources
How Much Is That? Look for ads in newspapers that give prices of groceries, electronics, toys, sporting goods, and other items that are of interest to your student. Use the ads to have your student write an equation. Suppose an ad shows a bicycle on sale for $80. Examples of equations are shown below. Examples If you save $5 each week, write an equation that shows how long it would take to save $80? If you already have $25, write an equation which shows how much more you will need to buy the bicycle? **Traveling About Town** Look for opportunities to talk about equations when traveling by car, foot, bus, or train. Some examples of equations are shown below.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/

Examples Suppose 8 people get off of a bus and 18 are left. What equation can you write to show how many people were on the bus to begin with?	http://www.mathsisfun.com/geometry/polyhedron.html
Suppose you buy 12 gallons of gas and your car gets 34 miles per gallon. What equation can you write to show how many miles you can drive?	http://www.korthalsaltes.com/

Differentiation Opportunities

Students create and solve equations that are based on real world situations. It may be beneficial for students to draw pictures that illustrate the equation in problem situations. Solving equations using reasoning and prior knowledge should be required of students to allow them to develop effective strategies.

Provide tiered questions with support like providing examples or the steps in solving an equation.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:04PM

Standard/Module: Proficiency with Expressions and Equations 6.EE.8 (Week 12, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.NS.5, 6.NS.6, 6.NS.7

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Reason about and solve one-variable equations and inequalities.

- 8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Enduring Understandings	Essential Questions
1. An inequality might represent a constraint or condition of a real- world or mathematical problem.	1. How can an infinite number of solutions not include all number?
2. Inequalities may have multiple solutions.	2. Write an inequality to show a real-world problem (example: write an inequality to show the rate at which water does not boil).
3. The solutions to an inequality can be graphed on a number line diagram.	

Critical Content

1. Inequality

   a. real world vs. mathematical problem

2. Constraint

3. Condition

4. Solution

5. Number line diagram

Skills	Vocabulary
1. Read, interpret, and write an inequality 2. Represent their solution of an inequality on a number line. 3. Identify the constraint or condition of an inequality in a real-world or mathematical problem	Tier 2 expression factor variable term evaluate simplify sum difference product quotient formula substitution balance rational set constraint condition infinite

	Tier 3 equivalent expressions like terms inequality equation inverse operation reciprocal nonnegative number line diagram

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

1.) Graph $x \leq 4$ on the number line

2.) Jonas spent more than $50 at an amusement park. Write an inequality to represent the amount of money Jonas spent. What are some possible amounts of money Jonas could have spent? Represent the situation on a number line.

3.) Less than $200.00 was spent by the Flores family on groceries last month. Write an inequality to represent this amount and graph this inequality on a number line.

Stage 3: Learning Plan

Learning Activities	Resources
Illustrative mathematics: "6.EE.8" Many real-world situations are represented by inequalities. Students write an inequality and represent solutions on a number line for various contextual situations. For example, the class must raise at least $80 to go on the field trip. If *m* represents money, then the inequality *m* ≥ to $80. Students recognize that possible values	http://engageny.org/common-core/ http://illustrativemathematics.org/

can include too many decimal values to name. Therefore, the values are represented on a number line by shading.	www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Create questions/situations that would effect and/or interest students that would easily illustrate what a constraint is.

Create differentiated activities and assignments based on interest and ability.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:04PM

Standard/Module: Proficiency with Expressions and Equations 6.EE.9 (Week 12, 5 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.G.3, 6.RP.3, 6.NS.8

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Expressions & Equations

6.EE Represent and analyze quantitative relationships between dependent and independent variables.

- 9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

Enduring Understandings	Essential Questions
1. Dependent variables depend on independent variables. 2. A change in the independent variable creates a change in the dependent variable. 3. A change in the dependent variable creates a change in the independent variable.	1. In a linear equation, the independent variable may change, but still produces a straight line. Why is the graph representation a straight line? 2. How does a change in an independent variable impact the dependent variable

Critical Content

1. Variables

   a. independent variables

   b. dependent variables

   c. relationship between independent and

dependent variables

2. Linear

3. Coordinate Plane

a. axes (x, y)

b. ordered pair

c. input/output

4. Real world problem or real word application

5. Equations

6. Tables and graphs

Skills	**Vocabulary**
1. Use variables to represent two quantities in a real-world problem that change in relationship to one another. 2. Write an equation to express a relationship between a dependent variable and independent variable 3. Recognize when quantitative relationships between independent and dependent variables are linear. 4. Create a table graph to represent a variable 5. Identify the independent and dependent variable.	Tier 2 expression factor variable term evaluate simplify sum difference product quotient formula substitution balance rational

	set constraint condition infinite relationship Tier 3 equivalent expressions like terms inequality equation inverse operation reciprocal nonnegative ordered pair independent variable dependent variable table graph

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be asked 3 questions like the sample below:

Susan started with $1 in her savings. She plans to add $4 per week to her savings. Use an equation, table and graph to demonstrate the relationship between the number of weeks that pass and the amount in her savings account.

Stage 3: Learning Plan	
Learning Activities	**Resources**
Students can use many forms to represent relationships between quantities. Multiple representations include describing the relationship using language, a table, an equation, or a graph. Translating between multiple representations helps students understand that each form represents the same relationship and provides a different perspective on the function.	http://engageny.org/common-core/ http://illustrativemathematics.org/
Provide multiple situations for the student to analyze and determine what unknown is dependent on the other components. For example, how far I travel is dependent on the time and rate that I am traveling.	www.livebinders.com/play/play/52180 http://illuminations.nctm.org/
The use of technology, including computer apps, CBLs, and other hand-held technology allows the collection of real-time data or the use of actual data to create tables and charts. It is valuable for students to realize that although real-world data often is not linear, a line sometimes can model the data .	http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Teachers should have students put the problem in their own words. Once they understand the problem they should then write an equation, create a table of values for the equation, and then graph the equation.

There should be much modeling and guided practice with tiered questions.

Students should be given many opportunities to work with another student to help brainstorm strategies to aid them in understanding the question and develop their equation. Creating a table and graph will also be challenging. Teachers need to provide simplistic steps in coming up with a table of values and graphing their equation. A graphing calculator may help students with the graphing of their equations and the interpretation of the problem as well.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:05PM

Standard/Module: Proficiency with Ratios and Proportions 6.RP.1 (Week 17, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Connects to 6.RP.3 and 6.EE.6

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Ratios & Proportional Relationships

6.RP Understand ratio concepts and use ratio reasoning to solve problems.

- 1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Enduring Understandings	Essential Questions
1. Comparison of at least two quantities over division. 2. Real-world and mathematical problems applications. 3. Ratios can be a part of a part, and part of a whole (which is the same as or similar to a fraction). 4. Order of terms in a ratio must match the order of terms in the question.	1. How do ratios and fractions differ? 2. Describe a comparison as both a description (Ex) 4 more girls jumped rope than played soccer) and a ratio (Ex)or every girl who played soccer, 2 girls jumped rope). *See illustrative math for 6.RP.1 "Games at Recess"

Critical Content

1. Ratio
   a. meaning of
   b. a:b, a/b, a to b
2. Quantities
3. Parts of a part
4. Parts or a whole
5. Order to write ratios

Skills	Vocabulary
1. Understand the concept of a ratio 2. Be able to describe a ratio relationship using appropriate ratio language	Tier 2: part whole total first term second term order Tier 3: ratio

Stage 2: Assessment Evidence

Assessments

Skill Based Task
Formative: Performance: Skill Demonstration

Analyze the table below to determine the missing values. Fill in the missing values on the table below.
Problem Task:
Graph the information from the table on the coordinate plane and explain the relationship of swimmers to life guards.

Swimmers	Life Guards
20	2
30	3
40	4
60	6
90	
100	

Stage 3: Learning Plan

Learning Activities	Resources

Illustrative math "Games at Recess"	http://engageny.org/common-core/
Recipe Re-Write Each ingredient in a recipe is added in a certain ratio to the other ingredients. You can write the relationship of two ingredients as a ratio: 2 eggs to 1 cup of flour, for example. Below is a recipe for quesadillas that serves 6 people. Work with your students to find the answers to the questions. Recipe: Quesadillas 2 cups shredded Colby cheese 6 flour tortillas 1 small tomato 1/4 cup chopped green onions 1/8 cup chopped green chilis Spread 1/3 cups of cheese on each tortilla. Mix the other ingredients. Spread over the tortillas. Fold, and bake at 350° for 5 minutes. Serves 6. Questions: What is the ratio of cheese to tomatoes? What is the ratio of tortillas to onions?	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/
Using a variety of situations, describe relationships using ratio, for example: 1. Part to part:Compare the number o fgirls to boys in the classroom using the different symbols for ratio (girls: boys, girls to boys, girls out of boys). Then compare the number of boys to girls in the same way. 2. Part to whole:Compare the number of girls to the whole class. Do the same thing for the boys in the class.	http://www.softschools.com/math/ratios/ratio_coloring_game/

Differentiation Opportunities

Proportional reasoning is a process that requires instruction and practice. It does not develop over time on its own. Grade 6 is the first of several years in which students develop this multiplicative thinking. Examples with ratio and proportion must involve measurements, prices and geometric contexts, as well as rates of miles per hour or portions per person within contexts that are relevant to sixth graders. Experience with proportional and nonproportional relationships, comparing and predicting ratios, and relating unit rates to previously learned unit fractions will facilitate the development of proportional reasoning.

Ratios and rates can be used in ratio tables and graphs to solve problems. Previously, students have used additive reasoning in tables to solve problems. To begin the shift to proportional reasoning, students need to begin using multiplicative reasoning. To aid in the development of proportional reasoning the crossproduct algorithm is ***not*** expected at this level. When working with ratio tables and graphs, whole number measurements are the expectation for this standard.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:06PM

Standard/Module: Proficiency with Ratios and Proportions 6.RP.2 (Week 17, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Links to 6.RP.3 and 6.NS.2

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Ratios & Proportional Relationships

6.RP Understand ratio concepts and use ratio reasoning to solve problems.

- 2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.

Enduring Understandings	Essential Questions
1. A rate is a specific ratio that compares two units of different quantities. 2. A unit rate is a ratio with a second term of 1	1. What is the relationship between ratios, rates, and unit rates? 2. What distinguishes the difference between a rate and unit rate?

Critical Content

1. Unit Rate

2. Determine the difference between rates, ratios, and unit rates.

Skills	Vocabulary
1. Understand how a rate is a special kind of ratio 2. Understand the concept of a unit rate (a ratio with a second term of 1)	Tier 2: part whole

3. Be able to create a unit rate from a given rate. 4. Fluent with division, multiplication, and subtraction	total first term second term order proportion per Tier 3: ratio rate unit rate unit price equivalent ratio

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Identify (given examples) the difference between a ratio and a rate.

Problem Task
Formative: Performance: Skill Demonstration

Is the following example a ratio or rate? [60 heartbeats per minute] Explain your answer.

Stage 3: Learning Plan

Learning Activities	Resources
Best Buy Plan a trip to the grocery store that will take a little extra	

time. Involve your student in the search for the best product or the best size of product to buy. **Give as a homework activity OR bring in examples from the store for unit rate. ** Be sure you have a pad of paper and a pencil. Together, look over all the selections available at the store. If you are shopping for cereal, for instance, you can approach this in two ways: 1.Decide which brand of cereal you want, then ask your student to find the unit rate for the different sizes offered. The smaller the unit rate, the better bargain that size will be. 2.If you know you need a certain size box, ask your student to compare the unit rate for several different brands of cereal. Encourage your student to help you shop on future trips, too. This exercise will encourage your student to become better informed consumers. _____ 1. Show examples of rates: 300 miles on 10 gallons of gas, $15 for 5 ounces, $30 for 6 hours. 2.Connect rates from number 1 with their unit rates:30 miles per gallons, $3 per 1 ounce, $5 per 1 hour. 3.Quick write: Students brainstorm examples of unit rates in the real world (e.g., 4 candy bars per $1, 55 miles per hour, 6 points per touchdown).	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

A rate is a ratio where two measurements are related to each other. When discussing measurement of different units, the word rate is used rather than ratio. Understanding rate, however, is complicated and there is no universally accepted definition. When using the term rate, contextual understanding is critical. Students need many opportunities to use models to demonstrate the relationships between quantities before they are expected to work with rates numerically.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:06PM

Standard/Module: Proficiency with Ratios and Proportions 6.RP.3 (Week 17, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) Links to 6.RP.1, 6.NS.2, 6.EE.9

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Ratios & Proportional Relationships

6.RP Understand ratio concepts and use ratio reasoning to solve problems.

- 3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
- 3a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
- 3b. Solve unit rate problems including those involving unit pricing and constant speed.
- 3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
- 3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Enduring Understandings	Essential Questions
1. Using ratios and proportions we can solve real-world and mathematical problems.	1. What are some real world applications of unit rate?
2. Tools such as tables, tape diagrams, and graphing on coordinate planes support the development of ratio and proportion reasoning.	2. How are equivalent ratios similar and different to equivalent fractions?
3. From a table you can plot points on a coordinate plane.	3. How can you use various tools to display and help understand sets of ratios?
4. Based on the table patterns, you can make predictions to continue plotting points on a coordinate plane.	4. How do you know if ratios truly produce a proportion or not (cross products)?
5. Percent is a rate per 100.	5. Can ratio reasoning be used for any form of conversions? Proof?
6. Percentage based problems compare two units where one of the units is based on 100.	6. Why if you get one problem wrong out of 10 does not equal 99%?
7. You can apply proportional reasoning for any conversion.	
8. Rate is the comparison of two quantities	

9. Unit rate is the comparison of two rates with one quantity of 1.	

Critical Content

1. Ratio

2. Rates

3. Proportions

4. Unit Rate

5. Equivalent ratios

6. Tape diagrams

7. Double number line diagrams

8. Equations

9. Graphing on a coordinate plane

10. Unit Pricing

11. Constant speed

12. Measurement units

13. Multiplying and diving quantities

14. Percent (part/whole = %/100)

15. Conversions

16. Multiplication and division

17. Means and extremes (Cross products)

18. Decimals

Skills	**Vocabulary**
1. Use ratios and rate reasoning to solve real- world and mathematical problems. 2. Apply reasoning to tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. 3. Make tables of equivalent ratios relating quantities with	1. Ratio 2. Rates 3. Proportions

whole-number measurements. 4. Find missing values in a table 5. Plot the x and y values on the coordinate plane 6. Use tales to compare ratios. 7. Solve unit rate problems including unit price and constant speed 8. Find a percent of a quantity as a rate per 100. 9. Find the part or the whole when given a percent. 10. Use ratios and proportions to convert measurement units. 11. Manipulate and transform units appropriately when multiplying and dividing quantities. 12. Fluency in multiply and dividing rational numbers. 14. Fluency in multiplying and dividing decimals.	4. Unit Rate 5. Equivalent ratios 6. Tape diagrams 7. Double number line diagrams 8. Equations 9. Graphing on a coordinate plane 10. Unit Pricing 11. Constant speed 12. Measurement units 13. Multiplying and diving quantities 14. Percent (part/whole = %/100) 15. Conversions 16. Multiplication and division 17. Means and extremes (Cross products) 18. Decimals

Stage 2: Assessment Evidence

Assessments

Skill-Based Taask
Formative: Performance: Skill Demonstration

There are four dogs and three cats. What is the ratio of dogs to cats and cats to dogs?

Problem Task
Formative: Performance: Skill Demonstration

The newspaper reported, "For every vote candidate A received, candidate B received three votes." Describe possible election results using at least three different ratios. Explain your answer.

Formative: Performance: Skill Demonstration

A credit card company charges 17% interest on any charges not paid at the end of the month. Make a ratio table to show how much the interest would be for several amounts. If your bill totals $450 for this month, how much interest would you have to pay if you let the balance carry to the next month? Show the relationship on a graph and use the graph to predict the interest charges for a $300 balance.

Stage 3: Learning Plan

Learning Activities	Resources
Recipe Re-Write Each ingredient in a recipe is added in a certain ratio to the other ingredients. You can write the relationship of two ingredients as a ratio: 2 eggs to 1 cup of flour, for example. Below is a recipe for quesadillas that serves 6 people. Work with your student to find the answers to the questions. Recipe: Quesadillas 2 cups shredded Colby cheese 6 flour tortillas 1 small tomato 1/4 cup chopped green onions 1/8 cup chopped green chilis Spread 1/3 cups of cheese on each tortilla. Mix the other ingredients. Spread over the tortillas. Fold, and bake at 350° for 5 minutes. Serves 6. Questions: a.) How many tomatoes would you need to make enough quesadillas for 24 people? b.) How many cups of chilis would you need to serve 18 people? c.) How many cups of cheese would you need to serve 15	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/ http://www.softschools.com/math/ratios/rati

people? Find another recipe your students might enjoy making. Ask questions similar to the ones above to reinforce your students understanding of ratios and proportions. Percents are often taught in relationship to learning fractions and decimals. This cluster indicates that percents are to be taught as a special type of rate. Provide students with opportunities to find percents in the same ways they would solve rates and proportions. Part-to-part ratios are used to compare two parts. For example, the number of girls in the class (12) compared to the number of boys in the class (16) is the ratio the ratio 12 to 16. This form of ratios is often used to compare the event that can happen to the event that cannot happen. Rates, a relationship between two units of measure, can be written as ratios, such as miles per hour, ounces per gallon and students per bus. For example, 3 cans of pudding cost $2.48 at Store A and 6 cans of the same pudding costs $4.50 at Store B. Which store has the better buy on these cans of pudding? Various strategies could be used to solve this problem: • A student can determine the unit cost of 1 can of pudding at each store and compare. • A student can determine the cost of 6 cans of pudding at Store A by doubling $2.48. • A student can determine the cost of 3 cans of pudding at Store B by taking 1/2 of $4.50. Using ratio tables develops the concept of proportion. By comparing equivalent ratios, the concept of proportional thinking is developed and many problems can be easily solved. Students should also solve real-life problems involving measurement units that need to be converted. Representing these measurement conversions with models such as ratio tables, t-charts or double number line diagrams will help students internalize the size relationships between same system measurements and relate the process of converting to the solution of a ratio. Continued next page Store B 6 cans 3 cans $4.50 $2.50 Store A 3 cans 6 cans $2.48 $4.96 6Multiplicative reasoning is used when finding the missing element in a proportion. For example, use 2 cups of syrup to 5 cups of water to make fruit punch. If 6 cups of syrup are used to make punch, how many cups of water are needed? 2/5= 6/xRecognize that the relationship between 2	o_colorin g_game/

and 6 is 3 times; 2 · 3 = 6
To find x, the relationship between 5 and x must also be 3 times. 3 · 5 = x,
therefore, x = 15 2/5 = 6/15The final proportion.
Other ways to illustrate ratios that will help students see the relationships that follow. Begin written representation of ratios with the words "out of" or "to" before using the symbolic notation of the colon and then the fraction bar; for example, 3 out of 7, 3 to 5, 6:7 and then 4/5. Use skip counting as a technique to determine if ratios are equal. Labeling units helps students organize the quantities when writing proportions.
Using hue/color intensity is a visual way to examine ratios of part-to-part. Students can compare the intensity of the color green and relate that to the ratio of colors used. For example, have students mix green paint into white paint in the following ratios: 1 part green to 5 parts white, 2 parts green to 3 parts white, and 3 parts green to 7 parts white. Compare the green color intensity with their ratios.

Using a variety of situations, describe relationships using ratio, for example:
1. Part to part:Comparethenumberofgirlstoboysinthe classroom using the different symbols for ratio (girls: boys, girls to boys, , girls out of boys). Then compare the number of boys to girls in the same way.
2. Part to whole:Comparethenumberofgirlstothewhole class. Do the same thing for the boys in the class.

Differentiation Opportunities

Concentrating on Units of Measure
Use the list below to make up playing cards from index cards. Write one of these measures on each card, leaving the other side of the card blank. Place the cards in a rectangular array, face down. Later, you can help your child make up other pairs of cards for the next game. Take turns turning over 2 cards at a time. If the cards show equivalent measures (for instance 12 inches and 1 foot), the player gets to keep the cards. If the measures are not equivalent, the cards are turned face down in their place. When all the cards are taken, the player with the most cards wins.

3 ft
36 in.
5,280 ft
1,760 yd
2 gal
8 pt
15 yd
45 ft
3 pt
24 fl oz
32 oz
2 lbs
6,000 mL

6L
2,000 cm
20 m
500 mL
0.5 L
4,000 m
4 km
7,000 g
7 kg
24 oz
1.5 lbs
7 yd
21 ft
72 in.
2 yd
3L
3,000 mL

This is the students' first introduction to percents. Percentages are a rate per 100. Models, such as percent

bars or 10 x 10 grids should be used to model percents. Students use percentages to find the part when given the percent, by recognizing that the whole is being divided into 100 parts and then taking a part of them (the percent). For example, to find 40% of 30, students could use a 10 x 10 grid to represent the whole (or 30). If the 30 is divided into 100 parts, the rate for one block is 0.3. Forty percent would be 40 of the blocks, or 40 x 0.3, which equals 12.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:07PM

Standard/Module: Proficiency with Rational Numbers 6.NS.1 (Week 17, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Major (70%) 6.RP.3, 6.EE.2, 6.EE.7, 6.G.2

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , The Number System

6.NS Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

- 1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Enduring Understandings	Essential Questions
1. Knowing that multiplication and division are inverse operations	1. Why do we use the reciprocal when dividing fractions?
2. Multiplying fractions means taking part of a part	2. Why does multiplying by the reciprocal give you the same answer as dividing by the initial fraction?
3. Dividing fractions is multiplying by the reciprocal	3. Why is there no algorithm of dividing fractions?

Critical Content

- Quotients of fraction
- reciprocal
- Word problems involving division of fractions by fractions
- Fraction models and equations
- Understanding how to set up a problem based on the context of it
- Interpret what the quotient represents
- Understanding that multiplication and division are inverse operations

Skills	Vocabulary

1. Interpret and computer quotients of fractions 2. Solve word problems involving division of fractions by fractions 3. Using visual fractions 4. Represent the problem using visual fraction models and equations 5. Find greatest common factors 6. Determine least common multiple	Tier 2: interpret compute visual extend Tier 3: quotient fraction equation dividend divisor quotient reciprocal multiplicative inverse

Stage 2: Assessment Evidence

Assessments

Skill based
Formative: Performance: Skill Demonstration

Use representations to show that 1/4 divided by 1/2 is 1/2, that 2/3 divided by 2/5 is 5/3, that 2/3 divided by 3/4 is 8/9, and that 11/2 divided by 6/4 is 1.

Problem Task
Formative: Performance: Skill Demonstration

You have 5/8 pound of Skittles. You want to give your friends 1/4 lb. each. How many friends can you give Skittles to? Explain your answer.

You have a 3/4-acre lot. You want to divide it into 3/8-acre lots. How many lots will you have? Draw a diagram to justify your solution.

You have a 3/4-acre lot. You want to divide it into 2 sections. How many acres in each section will you have? Draw a diagram to justify your solution.

How wide is a rectangular strip of land with length 3/4 mi. and area 1/2 square mi.?

Stage 3: Learning Plan

Learning Activities	Resources
Which Operation Did I Use? Materials two sheets of paper, pencil Multiplying and dividing fractions by challenging your students to identify missing operations. Step 1 Without showing your child, multiply and divide two fractions, such as 2/3 and 5/8, on a sheet of paper. Write the product and quotient on the paper. Step 2 On the second sheet of paper write 2/3 ? 5/8 =5/12 and 2/3 ? 5/8 = 1 1/15 Step 3 Challenge your child to tell whether you multiplied or divided. Encourage him or her to look for a relationship pattern. Ask whether multiplying two fractions results in a product that is greater or less than the factors. (less) Ask whether dividing two fractions results in a quotient that is greater or less than the divisor. (greater) Then help him or her work through the two problems to check.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html
Use this problem: How many servings of popcorn are in 41/2 cups if each person receives 3/4 cup of popcorn The teacher provides 41/2 cups of popcorn. Students use a 3/4 cup measuring cup to solve the problem. Record solutions as a group. 1. Think-Pair-Draw-Share: Put students in pairs. Have one solve the problem using a picture/diagram and the other solve using the algorithm. Then they get together and compare. 2. Think-Pair-Share: Students solve the problem on their own, then get together and discuss how their solutions are the same and how they are different. 3. Four Corners: Give students a problem and the quotient. Give each corner in your room a label and have students go to the corner they think would be the correct label for the quotient.	http://www.korthalsaltes.com/ http://nlvm.usu.edu/en/nav/frames_asid_265_g_2_t_1.html?open=activities&from=category_g_2_t_1.html

Differentiation Opportunities

REVIEW CONCEPT OF FRACTIONS

Finding Fractions in Real World Applications
Identifying fractions at home, school, etc can help your student become comfortable with fraction terms. Use fractions when preparing and serving food, to describe your family, or in other familiar home situations. Encourage your student to answer questions such as these:
• What fraction of eggs is left in the carton?
• What fraction of the pizza is there in two slices? three?
• What fraction of our family is female?
• What fraction of our family is home by 4:00 P.M.?
• What fraction of your allowance did you spend this week? What fraction did you save?
• What fraction of the day did you spend at school? What fraction did you spend sleeping or doing homework?

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:10PM

Standard/Module: Proficiency with Geometry Concepts 6.G.1 (Week 25, 7 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Links to 6.NS.3 and 6.EE.1, 6.EE2c

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Geometry

6.G Solve real-world and mathematical problems involving area, surface area, and volume.

- 1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Enduring Understandings	Essential Questions
1. Area of triangle can be found using the formula A=1/2 bh 2. Area of a triangle formula is from deconstructing the formula of a quadrilateral 3. Area is how many square units are within a shape. 4. The area of a polygon can be found by dividing it into smaller shapes and then adding the areas of those shapes. 5. The base is perpendicular to the height. 6. Any side of a triangle can be called the base. 7. The height of the triangle is the perpendicular distance from the opposite vertex to the base. 8. The height of a shape: a. The height is sometimes the actual side of the shape. b. The height is sometimes the symbolic	1. What characteristics are used to classify quadrilaterals? 2. What are the characteristics of a right triangle? 3. What is the relationship between the area of a triangle and quadrilateral, which share the same base, and height? 4. What's the difference from finding the area of a right triangle and any other type of triangle (acute or obtuse)?

dotted line in a shape	

Critical Content

1. Shapes and identification
   a. Triangles (right, and other)
   b. Quadrilaterals (square, rectangles, rhombus, parallelogram, trapezoid, and kite)
   c. Other polygons
2. Formulas for area
   a. base x height
   b. ½ b x h
   c. 1/2h (b1 + b 2)
   d. other needed formulas for area
3. Area is based on the number of square units within a shape.
4. Relationship between base and height of polygons

Skills	**Vocabulary**
1. Find the area of: a. right triangles b. other triangles c. special quadrilaterals d. polygons 2. By composing and decomposing into other shapes 3. Apply these techniques into real word and	Tier 2: Perpendicular Parallel Area Formula Substitute Base

mathematical problems 4. Identify/classify: a. triangles b. quadrilaterals c. polygons 5.Identify the formula for area of triangles, quadrilaterals and other shapes. 6. Identify the relationship of base and heights in shapes	Height Tier 3: Vertex Square Units Commutative Property

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

1.) Find the area of a triangle with a base length of three units and a height of four units.

2.) Find the area a trapezoid using the formulas for rectangles and triangles if the trapezoid has bases measuring 12 ft and 7 ft and has a height of 3 ft. (Draw the trapezoid first)

3.) A rectangle measures 3 inches by 4 inches. If the lengths of each side double, what is the effect on

the area?

4.) The area of the rectangular school garden is 24 square units. The length of the garden is 8 units.

What is the length of the fence needed to enclose the entire garden?

5.) The sixth grade class at Hernandez School is building a giant wooden H for their school. The H will be 10 feet tall and 10 feet wide and the thickness of the block letter will be 2.5 feet.

How large will the H be if measured in square feet?

The truck that will be used to bring the wood from the lumber yard to the school can only hold a piece of wood that is 60 inches by 60 inches. What pieces of wood (how many pieces and what dimensions) are needed to complete the project?

Stage 3: Learning Plan

Learning Activities	**Resources**
Illustrative math tasks: **"6.G.1 Base and Height"** **Scavenger Hunt** You will need a ruler, yardstick, or measuring tape. Find each of the following items around your school. 1.Something square that has a perimeter less than 20 square inches 2.Something rectangular that has an area of more than 75 square inches 3.Something square that has an area of more than 30 square inches 4.Something rectangular that has a perimeter of less than 20 inches 5.Something square that has an area less than 36 square inches	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/

6.Something rectangular that has a perimeter greater than 15 inches Bonus! 7.Find the perimeter and area of a room in your house.	http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Show Me!

Make the playing cards below. Mix the cards well and place them face down on the table. Take turns selecting one card and drawing an example of the figure described on the card.

CARDS:

quadrilateral with only 2 equal sides
quadrilateral with only 2 parallel sides
quadrilateral with no equal sides
quadrilateral with 4 equal sides
quadrilateral with at least 2 right angles
equilateral triangle
equiangular triangle
acute isosceles triangle
obtuse isosceles triangle
right triangle
acute scalene triangle
obtuse scalene triangle

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:10PM

Standard/Module: Proficiency with Geometry Concepts 6.G.2 (Week 25, 7 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Links to 6.NS.1, 6.NS.3, 6,EE.1, 6.EE.2c

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Geometry

6.G Solve real-world and mathematical problems involving area, surface area, and volume.

- 2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Enduring Understandings	Essential Questions
1. Students need to be able to see the relationship between the side lengths of a cube and its volume. 2. Volume of a rectangular prism is made up of how many cubic units fit inside. 3. Rectangular prisms are three dimensional that you calculate the volume by multiplying the length, height, and width to find the volume. 4. The formulas V= lwh and V=Bh repseent the same formula.	1. Can you identify rectangular prisms in the real-world? 2. How can area be used to help find the volume of a rectangular prism (lw = B)? 3. How can the size of fractional units change the numerical value of a rectangular prism?

Critical Content

1. Volume

   a. formula: V= l x w x h OR V= B x h

   b. concept of volume

c. cubic units

2. Fractions

a. Multiplying

b. Dividing

c. mixed numbers

d. improper fractions

e. converting mixed numbers and improper fractions

Skills	Vocabulary
1. Use the formula for volume (V= l x w x h) 2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths. 3. Show that the volume is the same as would be found by multiplying the edge lengths of the prism. 4. Apply the formulas V= l x w x h OR V= B x h 5. Solve real- world problems using the context of volume. 6. Multiplication of whole numbers 7. Multiplication and division of fractions and mixed numbers 8. Converting from mixed number to improper fractions and improper fractions to mixed numbers	Tier 2: cube height length width prism formula Tier 3: volume

Stage 2: Assessment Evidence

Assessments

Formative: Other: Quiz

Students will be given three word problems involving a cube and 2 rectangular prisms with fractional edge lengths, and will be asked to find the volume of each prism.

Stage 3: Learning Plan

Learning Activities	Resources
Find the volume using milk cartons, tissue boxes, etc.	http://engageny.org/common-core/
What's in the Box? Materials ruler or measuring tape With your student, look at some of the boxes and cans in your cupboard or pantry. Ask your student to select four or five rectangular containers that look as though they might have the same volume. Help your student measure the necessary dimensions, then calculate the volume of each container. The containers can be arranged in order of their volumes from least to greatest. If two containers do have the same volume, they can be returned to the shelf. Now have your student look again for other containers that might have the same volume as those previously measured. Measure, calculate, and compare again.	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/
Going Bigger If you don't care to have your food measured, challenge your student to find the volume of a box that could hold something larger: a bed, a chair, a television, or a couch. This will require some imaginative measuring, but your student is capable of performing these tasks.	http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Students need multiple opportunities to measure volume by filling rectangular prisms with blocks

and looking at the relationship between the total volume and the area of the base. Through these

experiences, students derive the volume formula (volume equals the area of the base times the height). Students can explore the connection between filling a box with unit cubes and the volume formula using interactive applets such as the Cubes Tool on NCTM's Illuminations

(See http://illuminations.nctm.org/ActivityDetail.aspx?ID=6).

In addition to filling boxes, students can draw diagrams to represent fractional side lengths, connecting with multiplication of fractions. This process is similar to composing and decomposing two dimensional shapes.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:11PM

Standard/Module: Proficiency with Geometry Concepts 6.G.3 (Week 25, 7 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Links to 6.NS.3, 6.NS.8, 6.EE.9

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Geometry

6.G Solve real-world and mathematical problems involving area, surface area, and volume.

- 3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Enduring Understandings	Essential Questions
1. Polygons can be created on a coordinate plane using coordinates for the vertices. 2. Understand that if two coordinates have the same x or y value they are on the same line. 3. Understand that the distance from a point on a coordinate plan to an axis is an absolute value. 4. Understand that the units on a coordinate plane define the unit of distance measure. 5. Understand that the coordinate plane can be used to represent real word contexts.	1. What real life objects can we create using ordered pairs on a coordinate plane? 2. How are maps connected to coordinate planes?

Critical Content
1. Coordinate planes (4 quadrants) a. point b. quadrant c. axis (x and y) d. coordinates e. origin f. reflection g. ordered pairs h. plane i. plotting 2. Polygons (identify the different types) 3. Area= lw

Skills	Vocabulary
1. Understand that a line segment from one coordinate pair to another represents a distance. 2. Find distances between points with the same first coordinate of the same second coordinate 3. Find the distance between two points 4. Find the length of a line segments 5. Graphing points in all four quadrants of the coordinate plane 6. In conjunction from 6.NS.8 in real world applications 7. Create polygons using coordinates for the vertices. 8. Finding the area of a polygon and using the	Tier 2: plane coordinate distance points length quadrant axis vertex/vertices

correct formula.	polygons origin Tier 3: x-coordinate y-coordinate x-axis y-axis 4 quardrants (I, II, III, IV)

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

1.) Students will be given three of the four points on the coordinate plane that represents a rectangle and they will then have to answer the following:

a.)Find the fourth vertex?

b.) How do you know that is the 4th vertex of the rectangle?

c.) What are the length and width of the rectangle?

d.) Find the area and the perimeter of the rectangle.

2.) On a map, the library is located at (-2, 2), the city hall building is located at (0,2), and the high school is located at (0,0). Represent the locations as points on a coordinate grid with a unit of 1 mile.

a.) What is the distance from the library to the city hall building?

b.) What is the distance from the city hall building to the high school? How do you know?

c.).What shape does connecting the three locations form?

d.) The city council is planning to place a city park in this area. How large is the area of the planned park?

Stage 3: Learning Plan

Learning Activities	Resources
This standard can be taught in conjunction with **6.G.1** to help students develop the formula for the triangle by using the squares of the coordinate grid. Given a triangle, students can make the corresponding square or rectangle and realize the triangle is just doubled.	http://engageny.org/common-core/
White board practice using the coordinate plane side of the white boards would be good practice in finding a missing coordinate as well as finding the area of the polygon.	http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Where Am I?

Materials Two sheets of blank paper, pencil

In this topic, your student will solve equations with more than one operation, use patterns to write rules

and equations to describe the patterns, and then use the rules and equations to extend patterns.
Your student will also graph points and linear equations in a coordinate plane. He or she will learn how to use reasoning and acting out a problem to solve word problems.

You can help your student understand the concept of a coordinate plane by playing the game below.
the signs of the x- and y- coordinates in the quadrant. So, (23, 1) would be located in Quadrant II. Use this sheet as a reference.

Step 2 On a second sheet of paper, draw a coordinate plane, but do not include quadrants and ordered pairs. Use this sheet to play the game.

Step 3 Ask your student to identify and locate the quadrant of an ordered pair, such as (25, 24) answer: Quadrant III. Continue until your student correctly identifies the quadrant, and then switch roles.

Step 4 Vary the game by naming a quadrant and asking your student to locate the quadrant and give a possible ordered pair in that quadrant.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:12PM

Standard/Module: Proficiency with Geometry Concepts 6.G.4 (Week 25, 7 Weeks)

Stage 1: Desired Results

Standards Focus

- Supporting (20%) Links to 6.NS.3, 6.EE.2c, 6.NS.1

6 Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Geometry

6.G Solve real-world and mathematical problems involving area, surface area, and volume.

- 4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Enduring Understandings	Essential Questions
1. The surface area is the sum of the areas of the faces of the three-dimensional figures. 2. Three dimensional figures can be represented using a net.	1. How can using nets be used in real world context? 2. How can three-dimensional shapes be decomposed?

Critical Content

1. Area of rectangles.

2. Area of triangles

3. Area of other two dimensional shapes

4. Area is measured in square units

5. Characteristics of three-dimensional figures.

6. Surfaces of three-dimensional shapes are composed of two-dimensional shapes

7. Surface area of using nets in real-world

Skills	Vocabulary
1. Represent three-dimensional figures using nets made up of rectangles and triangles. 2. Use nets to find the surface area of three-dimensional figures. 3. Apply these techniques solving real-world and mathematical problems. 4. Given specific dimensions, students needs to be able to draw three-dimensional shapes (special reasoning) 5. Use a net to represent a three-dimensional figure.	Tier 2: prism parallel congruent base area formula plane cube two-dimensional three-dimensional Tier 3: polyhedron surface area face net vertex edge square pyramid triangular pyramid rectangular prism triangular prism
Stage 2: Assessment Evidence	

Assessments

Formative: Performance: Skill Demonstration

Students will be given 3 real - life word problems involving finding the surface area of rectangular and triangular prisms or pyramids. They will be given nets to aid them in finding the surface area.

Stage 3: Learning Plan

Learning Activities	Resources
-Give students polyhedron dice and find the surface area of the shape. -Wrapping presents using the minimal wrapping paper. -Use a variety of real world shapes (cereal boxes, tissue boxes, etc.) and deconstruct the object to find the surface area of each. Enrichment: Put the object back together and try to use the actual formula for surface area to see if their answers match.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/ Students can create nets of 3D figures with specified dimensions using the Dynamic Paper Tool on NCTM's Illuminations (

	http://illuminations.nctm.org/ActivityDetail.aspx?ID=205).

Differentiation Opportunities

Tiered levels of activities and assignments.

Incorporate nets and real world shapes in lessons. Differentiate by interest in finding the surface area of a chosen object.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:13PM

Standard/Module: Proficiency with Statistical Reasoning 6.SP.1 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%)

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Statistics & Probability

6.SP Develop understanding of statistical variability.

- 1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

Enduring Understandings	Essential Questions
1. Students need to know that statistical questions anticipate varied answers.	1. When would more than one answer be more useful than one answer? 2. Why do answers to statistical questions vary?

Critical Content

1. Statistical questions- formulate questions and accounts for the answers

2. Variability

Skills	Vocabulary
1. Discern the difference between a statement and a question. 2. Recognize a statistical question as one that	Tier 2: data expectation

generates various answers. Example: “How old am I?” vs. “How old are the students in this school?” 3. Write simple statistical questions that generate various answers.	statistics variability Tier 3:

Stage 2: Assessment Evidence

Assessments

Pre-Test
Formative: Project: Personal

Have students sort questions if they are statistical or not.

Post-Test
Formative: Test: Written

Have students sort questions if they are statistical or not, and if they include varied answers.

Stage 3: Learning Plan

Learning Activities	Resources
Give students a list of questions and have the students decide if the questions are statistical questions or not.	http://engageny.org/common-core/
Have students create their own statistical questions.	http://illustrativemathematics.org/
Students differentiate between statistical questions and those that are not. A statistical question is one that collects information that addresses differences in a population. The question is framed so that the responses will allow for the differences. For example, thequestion, “How tall am I?” is not a statistical	www.livebinders.com/play/play/52180 http://illuminations.nctm.org/

question because there is only one response; however, the question, “How tall are the students in my class?” is a statistical question since the responses anticipates variability by providing a variety of possible anticipated responses that have numerical answers. Questions can result in a narrow or wide range of numerical values. Students might want to know about the fitness of the students at their school. Specifically, they want to know about the exercise habits of the students. So rather than asking "Do you exercise?" they should ask about the amount of exercise the students at their school get per week. A statistical question for this study could be: “How many hours per week on average do students at Jefferson Middle School exercise?” To collect this information, students might design a survey question that anticipates variability by providing a variety of possible anticipated responses that have numerical answers, such as: 3 hours per week, 4 hours per week, and so on. Be sure that students ask questions that have specific numerical answers.	http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Grade 6 is the introduction to the formal study of statistics for students. Students need multiple opportunities to look at data to determine and word statistical questions. Data should be analyzed from many sources, such as organized lists, box-plots, bar graphs and stem-and-leaf plots. This will help students begin to understand that responses to a statistical question will vary, and that this variability is described in terms of spread and overall shape.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:13PM

Standard/Module: Proficiency with Statistical Reasoning 6.SP.2 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%)

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Statistics & Probability

6.SP Develop understanding of statistical variability.

- 2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Enduring Understandings	Essential Questions
1. Statistics summarizes data so that information or decisions can be gathered from the data. 2. Data can be represented visually using dot plots, histograms, and box plots.	1. How can certain pieces of data affect the spread or overall shape of the distribution? 2. What are different ways you can view data distribution?

Critical Content

1. Data distribution:

   a. identify range

   b. identify center

   c. identify shape

   d. identify overall shape

2. Identify the least and greatest values of the data.

3. Read and interpret graphic organizers including a set of data (dot plots, histograms, and box plots)

Skills	Vocabulary
1. Understand that a set of data collected to answer a statistical question has a distribution. 2. Understand that a distribution can be described by its center, spread, and overall shape. 3. Identify the least and greatest values. 4. Identify the range of a set of data. 5. Identify if the data is symmetrical or not.	Tier 2: center spread shape least greatest gaps range cluster data survey Tier 3: symmetrical outlier skewed dot point dot plot histogram box plot

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

Give students 3 sets of data and have students describe the data by its center, spread, and overall shape.

Give students 3 graphs and have students describe the data by its center, spread, and overall shape

Stage 3: Learning Plan

Learning Activities	Resources
Given data and graphs identify range, center, shape, and the overall shape. Find graphs in newspapers and describe the graphs by its center, spread, and overall shape.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Scaffold data so tasks are tiered.

Differentiate activities by interest of surveys/data.

<< Previous Year

Last Updated: Thursday, October 11, 2012, 10:16PM

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:14PM

Standard/Module: Proficiency with Statistical Reasoning 6.SP.3 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%)

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Statistics & Probability

6.SP Develop understanding of statistical variability.

- 3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Enduring Understandings	Essential Questions
1. Understand the difference between the measure of center and a measure of variation. 2. Measurement of center can be used to summarize data distributions, and help you make decisions in real-world problems.	1. How do the three measures of center differ?

Critical Content

1. Measure of center:

   a. Mean (average)

   b. Median

   c. Mode

2. Measure of variation

   a. Range (difference)

Skills	Vocabulary

1. Recognize that a mode is a measure of center that summarizes a data set of a single number. 2. Recognize that a median is a measure of center that summarizes a data set of a single number. 3. Recognize that a mean (average) is a measure of center that summarizes a data set of a single number. 4. Identify a value as a measure of center. 5. Identify a value as a measure of variation. 6. Identify which measurement of center best summarizes the value of the data set.	Tier 2: Mean (average) Median Mode Range (difference) Value Data Set Tier 3: Measure of Center Measure of Variation

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

Students will be given a dot plot graph and will answer the following questions:

a.) How many students are represented in the data set?

b.) What are the mean and median of the data set?

c.) What do these values mean? How do they compare?

d.) What is the range of the data? What does this value mean?

Stage 3: Learning Plan	
Learning Activities	**Resources**
Have students practice creating different graphs and interpreting the center for a numerical data set. Find measures of variation. Be sure students can differentiate the difference between a number that represents the center of numerical data and a number that represents a measure of variation.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities
Differentiate activities with respect to interest level and ability level. Provide prompting/hints on assignments when needed.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:15PM

Standard/Module: Proficiency with Statistical Reasoning 6.SP.4 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) 6.NS.6

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Statistics & Probability

6.SP Summarize and describe distributions.

- 4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Enduring Understandings	Essential Questions
1. Understand that data can be organized in graphs in order to facilitate understanding. 2. Understand that decisions have to be made in order to create a usable data display. 3. Understand when to represent data on a particular graph.	1. How does graphing make data easier to understand? 2. When is a histogram useful in understanding data? 3. When is a dot plot useful in understanding data? 4. When is a box plot useful in understanding data?

Critical Content

1. Graphing:

   a. line plots

   b. dot plots

   c. histograms

   d. box plot

      i. inter quartile range

      ii. median

iii. first quartile and third quartile

iv. range

Skills	Vocabulary
1. Display numerical data in plots on a number line 2. Display numerical data using histograms 3. Display numerical data using box plots 4. Create frequency table to organize data	Tier 2: mean median range interval scale tally Tier 3: inter quartile range quartile line plot dot plot histogram box plot frequency table

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

Give students a survey in class asking them to answer questions they would be interested in. Give the data of one question to each student and have them organize the data, create a histogram, a stem and leaf, and a box and whisker plot. Then have students describe their findings speaking to the center, spread, and overall shape.

Stage 3: Learning Plan

Learning Activities	Resources

Give students opportunities to create the different graphs using data. Try and use data that is relevant to the students. Practice finding different statistical measures using graphs made.	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities

Differentiate by interest and ability level.

Use the TI-nspire calculator to help create the different graphs.

Use a paper strip with numbers equally spaced to help create a box and whisker plot simply by folding the paper. The first fold will represent the median, the second fold will create the 1st and 3rd quartiles.

<< Previous Year

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Unit Map 2012-2013

Monroe #2 - Orleans BOCES (Regional Collaboration)

Collaboration / Math 6* / Grade 6 (Math Regional Curriculum)

Wednesday, October 31, 2012, 12:15PM

Standard/Module: Proficiency with Statistical Reasoning 6.SP.5 (Week 32, 8 Weeks)

Stage 1: Desired Results

Standards Focus

- Additional (10%) 6.NS.3, 6.NS.7

6th Grade CCS Map.pdf

Standards

NYS: CCLS:Mathematics, NYS: 6th Grade , Statistics & Probability

6.SP Summarize and describe distributions.

- 5. Summarize numerical data sets in relation to their context, such as by:
- 5a. Reporting the number of observations.
- 5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- 5c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- 5d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Enduring Understandings	Essential Questions
1. Understand what an observation is when looking at statistical data. 2. Understand that graphs give you a visual representation of the data. 3. Draw conclusions based on the visual representation of the data and measures of center and variability.	1. What is an observation? 2. How can variability of data be described by one number? 3. Why is it important to justify your conclusions about data? 4. How does the shape of data determine the appropriate measure of center? 5. How does the shape of data determine the appropriate measure of variability?

Critical Content

1. Ask a statistical question

2. Collecting data

3. Displaying data in an appropriate graph

4. Interpreting data

a) by finding measures of center

b) by finding measures of variation

c) by describing patterns

d) by describing deviations, both inter-quartile range and mean absolute deviation

5. Draw conclusions from the data and justify conclusions based on reasonableness

Skills	**Vocabulary**
1. Summarize data sets using a) number of observations b) how it was measured c) what units of measurement were used 2. Determine quantitative measures of center a) mean b) median 3. Determine quantitative measures of variability a) interquartile range b) mean absolute deviation **c) Connects to 6.NS.7** 4. Describe any overall pattern and striking deviations from the overall pattern 5. Determine the best measure of center in relation to the shape of the data distribution and the context in which the data were gathered. 6. Determine the best measure of variability in relation to the shape of the data distribution and the context in which the data were gathered.	Tier 2: scale deviation interval gap median mean (average) range attribute characteristic observation data quantitative pattern distribution Tier 3:

	inter-quartile range absolute deviation mean absolute deviation absolute value box plot dot plot histogram frequency table upper quartile lower quartile measure of center measure of variability

Stage 2: Assessment Evidence

Assessments

Formative: Performance: Skill Demonstration

Given a set of data students will do the following:

a.) Report the number of observations.

b.) Give quantitative measures of center (median and/or mean).

c.) Give quantitative measures of variability (interquartile range and/or mean absolute deviation).

d.) Describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

Stage 3: Learning Plan

Learning Activities	Resources
What Does It Say? This activity will give your student practice in reading data from graphs. Collect dot plots, bar graphs, box plots, and histograms from newspapers, magazines, almanacs, the Internet, and other sources. Ask these questions as you show each of the graphs to your student. •What is one fact that the graph shows? •Make a statement about the graph that is true or false. Then ask your child to decide which it is, based on the graph. What Conclusions Can We Draw? Challenge your student to think about the ways in which data are presented in graphs. Ask some of these questions to get him or her thinking about the data. •What does the shape of the data shown in a bar graph tell us about the data? •Based on that data, what conclusions can we draw based on its shape?	http://engageny.org/common-core/ http://illustrativemathematics.org/ www.livebinders.com/play/play/52180 http://illuminations.nctm.org/ http://www.mathsisfun.com/geometry/polyhedron.html http://www.korthalsaltes.com/

Differentiation Opportunities
Differentiate by interest and ability level. The use of mean absolute deviation in 6th grade is mainly exploratory. The intent is to build a deeper understanding of variability. Students would understand the mean distance between the pieces of data and the mean of the data set expresses the spread of the data set. Students can see that the larger the mean distance, the greater the variability. Comparisons can be made between different data sets.

<< Previous Year

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