Hannah Ruebeck

Lehigh Valley Summerbridge

Summer 2013

7th Grade Week 2 Lesson Plans

Core Team 1

**DAY 6: June 24th**

**Topic: Integer Multiplication and Division**

* **Objectives:** 
  + Students will be familiar with the rules of integer multiplication and division.
  + Students will evaluate products and quotients.
* **Materials Used**
  + Chalk and chalkboard
  + Individual whiteboards and markers
  + SMARTboard
  + Review problems (cards)
  + BattleMath cards
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [8 min]
    - I will pass out worksheets for “Math Scramble” and explain the rules. Each pair of students will send one person at a time to pick up a card from the front table. Then they have to answer the question and write it on their answer sheet. Then the other partner has to run and get another card. The team that gets the most correct answers wins!
  + Activity 1: [14 min]
    - I will ask the students what they know about multiplication, and ask what the times tables are. I will explain that along with knowing what numbers multiplied together are, we also have to know how to multiply numbers of different signs. I will ask a student to explain what I mean by numbers of different signs as a review.
    - Then I will introduce the first rule of integer multiplication. I will ask the students what they think happens if we multiply a negative number times a positive number. I will pull up today’s take-home sheet and reveal Rule #1: The product of mixed signs (a positive and a negative number) is always negative. I will ask the students if they can think of a real-world example of this. If they are stuck, I will explain that this is how we would think about owing money to multiple people. I owe $5 to 4 people. I will tape 4 large $5 bills made of cardboard to the chalkboard and ask students how much money I owe. They will add 5+5+5+5 and probably say twenty. However, I will explain that owing means that the $5 is negative, so I owe (-5)(4) = -20 dollars.
    - Next I will introduce the second rule of integer multiplication. I will ask the students what they think happens if we multiply two positive numbers together, and after they have answered, I will ask the students what they think will happen if we multiply two negative numbers together. Since we decided already that the product of two positive numbers is positive, they may expect the product of two negative numbers to be negative. I will explain that the two negative signs cancel each other out and will display the next line of today’s take-home sheet: Rule #2: The product of two integers of the same sign (two positive numbers or two negative numbers) is always positive.
    - I will write several problems on the board that are using the information we have covered so far, and students will do them on their whiteboards. These problems will appear on today’s take-home sheet. The last problem will have three integers being multiplied together.
    - I will ask the students what they think we should do when we have more than two integers. What order do we multiply them in? After the students’ responses, I will reveal the third rule of multiplication from the take-home sheet. Rule #3: Multiplication is associative. This means that it doesn’t matter what order you multiply the integers in. I will ask the students what 2\*3 is, and what 3\*2 is. I will show them the procedure for multiplying more than one integer. Ex: (4)(5)(-8)=(20)(-8)=(4)(-40)= -160. Once the students are convinced that this rule is true, we will do several more whiteboard problems with more than two integers.
  + Activity 2: [10 min]
    - Next we will cover integer division. I will ask if students know the relationship between multiplication and division. Once we have determined that division is just multiplying by a fraction , I will ask the students if they think the division rules will be similar to the multiplication rules (the answer should be yes).
    - I will reveal Division Rule #1 from the take home sheet: The quotient of mixed signs (a positive number and a negative number) is always a negative integer. I will demonstrate with an example on the board : 9/(-3) = -3
    - I will reveal Division Rule #2: The quotient of same signs (two positive numbers or two negative numbers) is always a positive integer. I will demonstrate with two examples: (12)/(4)= 3 and (-16)/(-8)=2.
  + Activity 3: [10 min]
    - I will pass out the “BattleMath” cards: notecards that each have a positive or negative integer on them. Students will pair up. To play, each student pulls out the top card and the first student to multiply them together correctly gets to keep both cards (like the card game ‘war’). After five minutes, we will switch to division.
  + I will then explain the worksheet that they will be filling out for homework, and pass out tonight’s homework and take-home sheet. [3min]
* **Homework:** 
  + Integers Worksheet

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_

**INTEGERS WORKSHEET 3 – Multiplication and Division**

Solve the following equations:

1. |-11|  2 = 6. (9)(-6) =
2. (-30) / (-5) = 7. (-5)(3)(-2)=
3. |-6| / (2) = 8. |(-4)3| =
4. (4)(6)(-3) = 9. (-18) / (9) =
5. (32) / (-4)= 10. |7| (-7) 3

Explain a way that you use any integer operation (addition, subtraction, multiplication, or division) in your everyday life. You may do as many operations as you would like, but your response should be 6-7 sentences.

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**INTEGER MULTIPLICATION AND DIVISION TAKE-HOME SHEET**

**6/19/13**

Multiplication Rules:

1. The product of mixed signs (a positive and a negative number) is always negative.
2. The product of two integers of the same sign (two positive numbers or two negative numbers) is always positive.
3. Multiplication is associative. This means that it doesn’t matter what order you multiply the integers in.

Division Rules:

1. The quotient of mixed signs (a positive and a negative number) is always negative.
2. The quotient of two integers of the same sign (two positive numbers or two negative numbers) is always positive.

Whiteboard Problems:

|-3|  6 = (5)(-8) =

*3* *6= 18 = -40*

(-7) (-4) = (2) (-4)=

*= 28 = -8*

6  2 = |(-4)3| =

*= 12 = |-12|= 12*

(6)(2)(-2) = (-1)49 =

*=(12)(-2)= -24 = (-4)**9= -36*

*=(6)(-4)= -24 = (-1)**36=-36*

(-3)(5)(-2)= 2 (-5) 3

*=(-15)(-2)= 30 = -10 3= -30*

*=(-3)(-10)=30 = 2*  *(-15)= -30*

**7th Grade Syllabus: Week 2**

*Summer 2013 Core Team 1 Hannah Ruebeck*

|  |  |  |  |
| --- | --- | --- | --- |
| DAY | LESSON TOPIC | TAKE-HOME SHEET | TONIGHTS’ HOMEWORK |
| Monday | Integer Multiplication and Division | Operation rules, practice problems | Integer Worksheet 3 |
| Tuesday | Integer Operations | List of websites to practice integer operations | Integer Worksheet 4 |
| Wednesday | Integer Operations Review and Fraction Operations | Fraction operation rules | Integer Worksheet 5 |
| Thursday | Integer Operations in Word Problems | Word problem strategy, whiteboard problems. | Word Problems Worksheet 1 |
| Friday | Cyberchase; Fractions in Real Life |  |  |

**DAY 7: June 25th**

**Topic: Integer Operations**

* **Objectives:** 
  + Students will compute problems with all four integer operations.
  + Students will be familiar with Computer Lab rules and expectations.
  + Students will review integer operations by doing exercises and playing games in the Computer Lab.
* **Materials Used**
  + Chalk and chalkboard
  + SMARTboard
  + Multiplication/Division Math Scramble Cards
  + Individual Whiteboards and markers
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [10 min]
    - Students will pair off and each pair will receive a math scramble worksheet. Students will have 10 minutes to answer as many questions as they can. One student will run and pick up a card from the front table, and they will solve the problem as a team. Then the other student will return the card and get another. The team that answers the most questions wins.
  + Activity 1: [5min]
    - I will explain the rules of the Computer Lab and what we will be doing. I will pass out today’s take-home sheet as it lists all of the URLs we will be using. Rules:
      * Class time is for math activities only. (Pay attention to the math and ignore any distractions that the computer offers).
      * Do not click on any advertisements or pop-up windows.
      * If you have any problems or questions, raise your hand to ask for help or guidance.
  + Activity 2: [25 min] In the Computer Lab
    - Students that were struggling with the review whiteboard problems will be directed towards sites that offer practice with explicit explanation of the topics.
      * Integer Addition: <http://www.aaamath.com/add65_x3.htm>
      * Integer Subtraction: <http://www.aaamath.com/subint1.htm>
      * Integer Multiplication: <http://www.aaamath.com/mul65_x2.htm>
      * Integer Division: <http://www.aaamath.com/div65_x2.htm>
    - Students that are comfortable with the integer operations will be directed towards any one of these sites to practice integer operations with games.
      * The Football Game: reviews number lines, addition and subtraction, and key indication words in word problems. <http://www.mathgoodies.com/games/integer_game/football.html>
      * The Calculator Game: reviews integer multiplication and addition. <http://www.mathplayground.com/calculator_chaos.html>
      * CyberOlympics: reviews comparing numbers, and integer addition. <http://pbskids.org/cyberchase/math-games/cyber-olympics/>
      * Stop that Creature: reviews integer addition, subtraction, multiplication, and division along with pattern recognition. <http://pbskids.org/cyberchase/math-games/stop-creature/>
      * Space Race: reviews integer addition: <http://www.arcademicskillbuilders.com/games/orbit-integers/orbit-integers.html>
      * Space race: reviews integer multiplication: <http://www.arcademicskillbuilders.com/games/integer-warp/integer-warp.html>
      * The Spider Game: reviews integer addition. <http://www.arcademicskillbuilders.com/games/spider-match/spider-match.html>
      * Mathman: reviews integer division. <http://www.sheppardsoftware.com/mathgames/mathman/mathman_division.htm>
      * Mathman: reviews integer subtraction. <http://www.sheppardsoftware.com/mathgames/mathman/mathman_subtraction.htm>
      * Who wants to be a millionaire? : reviews absolute value, integer addition, subtraction, multiplication and division. <http://www.quia.com/rr/41496.html>
    - I will walk around the classroom as students are playing games in order to check their progress and make sure everyone is working on math games only.
  + Activity 4: Wrap Up:
    - I will ask students to name one way that each integer operation can be used in real life. We will continue with this concept tomorrow when we discuss word problems.
* **Homework:** 
  + Integers Worksheet 4

**INTEGER OPERATION REVIEW TAKE-HOME SHEET**

**6/25/13**

Did you enjoy the games we played in class today? Do you want to do some fun review over the weekend or in computer club? Here is the list of links to the games we played this weekend. These websites have many more fun and interesting games, so don’t be afraid to go exploring!

Here are some links to explanations of integer operations, and a practice section if you scroll down the webpage.

* Integer Addition: <http://www.aaamath.com/add65_x3.htm>
* Integer Subtraction: <http://www.aaamath.com/subint1.htm>
* Integer Multiplication: <http://www.aaamath.com/mul65_x2.htm>
* Integer Division: <http://www.aaamath.com/div65_x2.htm>

Here are some links to some games that review integer operations, absolute value, and number lines.

|  |  |  |
| --- | --- | --- |
| Game | Material Reviewed | URL |
| The Football Game | -number lines  -addition and subtraction  -key indication words in word problems | http://www.mathgoodies.com/games/integer\_game/football.html |
| The Calculator Game | -integer multiplication and addition | http://www.mathplayground.com/calculator\_chaos.html |
| CyberOlympics | -integer multiplication and addition | http://pbskids.org/cyberchase/math-games/cyber-olympics/ |
| Stop That Creature | -integer operations  -pattern recognition | http://pbskids.org/cyberchase/math-games/stop-creature/ |
| Space Race | -integer addition or multiplication | http://www.arcademicskillbuilders.com/games/orbit-integers/orbit-integers.html |
| The Spider Game | -integer addition | http://www.arcademicskillbuilders.com/games/spider-match/spider-match.html |
| Mathman | -integer division or subtraction | http://www.sheppardsoftware.com/mathgames/mathman/mathman\_division.htm |
| Who wants to be a millionaire? | -absolute value  -integer operations | http://www.quia.com/rr/41496.html |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INTEGER WORKSHEET 4**

Today we saw how games can be used to review integer operations and to practice solving problems. On the rest of this sheet or another piece of paper, make your own game that can be used to practice ONE of the integer operations: addition, subtraction, multiplication, or division. On the back of your game, please write any rules of the game and how to play.

**DAY 8: June 26th**

**Topic: Integer Operations**

* **Objectives:** 
  + Students will explain their review games.
  + Students will compute problems using all four integer operations.
  + Students will solve problems with fractions and all four integer operations.
* **Materials Used**
  + Chalk and chalkboard
  + SMARTboard
  + Individual Whiteboards and markers
  + Table Races worksheets
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [10 min]
    - Each student will share the game that he or she made for homework last night. They will explain the goals and rules of their game and what operation it reviews.
  + Activity 1: [20 min]
    - We will be playing a game called “Table Races.” Each pod will receive a copy of the worksheet that has integer operations problems on it. When I say go, one person will do the first problem and pass it to the next person. That person can either fix a mistake in the first problem or complete the second problem. Students can only go back one problem to fix it. The team with the most correct answers will win. We will play two rounds, each lasting 7 minutes with 3 minutes to go over the answers and answer any questions that result from the game.
  + Activity 2: [15 min] Fraction Operations
    - I will ask the students if anyone knows how to add fractions. If a student volunteers, I will ask for his or her explanation and then fill in the gaps. We can only add fractions when they have the same denominator. I will ask students what the denominator of a fraction is. (I will ask a student how we get 2 fractions that have different denominators to have the same denominator. I will explain that we do so by finding the Lowest Common Denominator and then converting both fractions into their equivalent fractions with that LCD). Then we add the two numerators together and put them over the original denominator. I will ask students what the numerator of a fraction is. I will demonstrate with several examples and ask for student volunteers.
    - I will ask the students if someone can explain how to subtract fractions based on our explanation of addition. I will fill in the gaps: We can only subtract fractions when they have the same denominator. We subtract the numerator. All of the same rules apply for positive and negative integers. I will ask the students to repeat the rules: positive + positive = ? etc from earlier lessons. I will demonstrate with several examples and ask for student volunteers.
    - I will ask the students if someone can explain fraction multiplication. I will fill in the gaps. In multiplication we multiply the numerators together and that is the new numerator. We multiply the denominators together and that is the new denominator. We put the new numerator over the new denominator and then simplify. I will demonstrate with several examples and ask for student volunteers.
    - I will ask the students if someone can explain fraction division. I will fill in the gaps: Fraction division is the same as multiplying by the inverse of the fraction. HOLD UP. I will explain that the inverse of a fraction is what you get when you flip it over. The denominator goes on top and the numerator goes on the bottom. We will do several examples and I will ask for volunteers.
  + Wrap up: [5 minutes]
    - I will ask the students to name one way that they can incorporate fraction operations into the game that they made last night.
* **Homework:**
  + Integer Worksheet 5

**TABLE RACES 1 6/26/13**

68

\_\_\_\_\_\_\_\_\_\_\_\_\_

12+-7

\_\_\_\_\_\_\_\_\_\_\_\_\_

-14/2

\_\_\_\_\_\_\_\_\_\_\_\_\_

-3-(-6)

\_\_\_\_\_\_\_\_\_\_\_\_\_  
5(3)

\_\_\_\_\_\_\_\_\_\_\_\_\_

32+14

\_\_\_\_\_\_\_\_\_\_\_\_\_

24÷(-3)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-7-4

\_\_\_\_\_\_\_\_\_\_\_\_\_

6-(-17)

\_\_\_\_\_\_\_\_\_\_\_\_\_

32/-8

\_\_\_\_\_\_\_\_\_\_\_\_\_

-4(-11)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-3+(-14)

\_\_\_\_\_\_\_\_\_\_\_\_\_

9-6

\_\_\_\_\_\_\_\_\_\_\_\_\_

12(-6)

\_\_\_\_\_\_\_\_\_\_\_\_\_

**TABLE RACES 2 6/26/13**

7-6

\_\_\_\_\_\_\_\_\_\_\_\_\_

-11+-8

\_\_\_\_\_\_\_\_\_\_\_\_\_

-26/-2

\_\_\_\_\_\_\_\_\_\_\_\_\_

9-(-16)

\_\_\_\_\_\_\_\_\_\_\_\_\_  
15(3)

\_\_\_\_\_\_\_\_\_\_\_\_\_

3+ -14

\_\_\_\_\_\_\_\_\_\_\_\_\_

24÷(-3)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-114

\_\_\_\_\_\_\_\_\_\_\_\_\_

3-(-22)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-36/9

\_\_\_\_\_\_\_\_\_\_\_\_\_

-12(3)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-14+(8)

\_\_\_\_\_\_\_\_\_\_\_\_\_

-67

\_\_\_\_\_\_\_\_\_\_\_\_\_

12(-4)

\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INTEGER WORKSHEET 5**

1. Find the Lowest Common Denominator of the following pairs of fractions:

1. Use your answers from number 1 to solve the following problems:

1. Solve the following problems:

**FRACTION OPERATIONS TAKE-HOME SHEET**

**6/26/13**

Fraction:

Fraction Addition and Subtraction:

To add or subtract two fractions together they must have the same denominator. Then add or subtract the numerators together and put the new numerator over the original denominator.

Fraction Multiplication:

To multiply two fractions together, multiply the numerators together and the denominators together. Put the new numerator over the new denominator and simplify if necessary.

Fraction Division:

Dividing by a fraction is the same as multiplying by its inverse. To get the inverse of a fraction, you flip the numerator and denominator.

**DAY 9: June 27th**

**Topic: Integer Operations and Introduction to Word Problems**

* **Objectives:**
  + Students will create lists in groups of the ways that we can use math in real life.
  + Students will connect integer operations to real life through word problems.
  + Students will create a method for solving word problems.
  + Students will solve word problems.
* **Materials Used**
  + Chalk and chalkboard
  + SMARTboard
  + Individual Whiteboards and markers
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [8 min]
    - I will ask students to create a list of 5-10 ways we can use math in real life in groups at their pods. After 5 minutes, we will come together and I will ask the students to share the things they came up with. We will make a web diagram on the board.
  + Activity 1: [15 min]
    - Next I will introduce the students to word problems. I will project a word problem on the SMARTboard – “A man is at the top of a mountain that is 950 feet tall. If he climbs down 300 feet, what is his new elevation?” We will draw and label a picture on the SMARTboard. We will translate the word problem into math. I will ask the students how we knew what math signs to use, and explain that we inferred certain information from the words. We turned words into math! I will ask the students what other words they can think of that mean something in math. We will make a list on the board.
    - I will ask the students to help me come up with a strategy for attacking word problems. I will ask what we did first – we read the problem. What did we do second? – we drew and labeled a picture. What did we do third? – we decided what information from the problem was important to our question, and looked for key words that translated into math. What did we do fourth? – we created an expression, and then fifthly we solved the expression. This strategy will appear on tonight’s take-home sheet.
  + Activity 2: [15 min]
    - I will project word problems on the SMARTboard and students will work on them at their whiteboards. The problems will appear on tonight’s take-home sheet.
  + Wrap up: I will ask the students to explain the strategy for solving word problems. Each student will explain another step of the process until we have all of the steps.
  + I will then explain the worksheet that they will be filling out for homework, and pass out tonight’s homework and take-home sheet. [3min]
* **Homework:** 
  + Integers Worksheet

**WORD PROBLEMS WITH INTEGERS TAKE-HOME SHEET**

**6/20/13**

READ THE PROBLEM

SOLVE THE EXPRESSION

CREATE A MATHEMATICAL EXPRESSION

FIND KEY WORDS

IDENTIFY IMPORTANT INFORMATION

CAN YOU DRAW A PICTURE?

***YES***

***NO***

DRAW A PICTURE

**WORD PROBLEMS WITH INTEGERS TAKE-HOME SHEET**

**6/20/13**

1. Laura owes the bookstore 20 dollars. Each of her 4 friends will help her pay her debt. How much will each friend pay?

20/4=5. Each friend will pay 5 dollars.

1. A submarine 1,100 feet below sea level rises 450 feet. What is the submarine’s new position?

-1100+450= -650. The submarine is 650 feet below sea level.

1. The empire state building is 1,454 feet tall. The Eiffel Tower is 1,063 feet tall. Which building is taller? How much taller is it?

The empire state building is taller. 1,454-1,063= 391. The empire state building is 391 feet taller than the Eiffel Tower.

1. Joe is selling 5 baby kittens. If he charges 12 dollars for each kitten, how much money will he make?

512=60. Joe will make 60 dollars.

1. It takes 3 hours for Sarah to chop down a tree. How long will it take her to chop down 7 trees? (Whenever we chop down a tree, we should plant two more in its place. How many seeds does Sarah need to plant?)

37=21. It will take Sarah 21 hours to chop down 7 trees.

27=14. Sarah should plant 14 seeds.

1. I have two brothers. If it takes one person 36 hours to clean a house satisfactorily, how long will it take the three of us?

36/3=12. We will each work for 12 hours.

1. If Joseph was born in 45 BC and Sam was born in 37 AD, how long after Joseph was born was Sam born?

Ι-45Ι+Ι37Ι= 82. Sam was born 82 years after Joseph.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_

**WORD PROBLEMS WORKSHEET 1**

1. Zoe bought 12 apples for $36 dollars. How much was each apple?
2. Nemo the clownfish lives 21 kilometers below the surface of the ocean. If he swims up 7 kilometers, what is his new location?
3. At his lemonade stand, Josh made 72 dollars. If he charged 3 dollars for each glass, how many glasses of lemonade did Josh sell?
4. At the top of Mt. Everest, it is -5 degrees Fahrenheit and at the bottom of Mt. Everest it is 20 degrees Fahrenheit. What is the difference between the two?
5. Rebecca bought 3 pairs of jeans for 25 dollars each. She bought 2 shirts for 10 dollars each. How much money did Rebecca spend?
6. The Western Roman Empire began in 27 B.C. and ended in 476 A.D. The Incan Empire began in 1438 A.D. and ended in 1533 A.D. How long did each empire last? How much longer did the Roman Empire last than the Incan Empire?
7. Write and solve your own integer operations word problem and solve it. You may use the back of this sheet if necessary.

**DAY 10: June 28th**

**Topic: Math in Real Life: Fractions and Integers**

* **Objectives:** 
  + Students will solve each other’s word problems from last night’s homework.
  + Students will watch episode 106 of Cyberchase
  + Students will apply fractions and integers to their lives by creating a short story or skit in groups that demonstrates one way they can use something we have covered so far in their everyday lives.
* **Materials Used**
  + Chalk and chalkboard
  + SMARTboard
* **Methodology:**
  + Warm-Up: [5 min]
    - I will ask for any questions about the word problems from last night. I will pair up students and they will exchange the word problems that they wrote last night. Each partner will solve their partner’s word problem and then they will check each other’s work.
  + Activity 1: [25 min]

*Cyberchase is a program designed to reach students 9-11 years old and to explain math to them in a non-formal way. It boasts a diverse audience and claims that children enjoy the show due to its action, humor, suspense, good over bad, and the fact that the children win because they think. Description from http://www.eweek.org/site/News/Eweek/cyberchase.shtml*

* + - I will introduce the episode that I will be playing. I will explain that the three kids and the bird Digit are working against the evil mastermind named “Hacker” to save the math universe. In this episode, the kids are working with the Greek gods. I will ask someone to explain who Zeus is, what Mt. Olympus is, what the Minotaur is, and what Pandora’s box is, and will fill in any gaps. In this episode, Hacker steals Pandora’s box.
    - I will play episode 106 from the PBS show Cyberchase. The episode covers fractions and their applications to every day life. <http://pbskids.org/cyberchase/videos/> Episode 106 “Zeus on the Loose”
      * At 4:06, after Jackie says “whatever that means,” I will pause the video and ask the kids what they think “divide the shares equally means.” I will prompt by asking what we have talked about that has to do with dividing things amongst people. We will come to the conclusion that we will be using fractions.
      * At 7:15, after one of the fates says “Me too, me too,” I will pause the video and ask how Matt, Jackie, and Inez could solve the problem.
      * At 13:09, after Jackie says “how can we split 2 apples among 3 heads” I will pause the video and ask how the students would solve the problem.
      * At 16:34, after Jackie says “hmm” I will pause the video and ask how the students how they would divide the gold evenly.
  + Activity 2: [8 min]
    - The students will be sitting in groups of 4 at their pods. I will ask each pod to write down a story in which they would use fractions in real life. This activity will also be Monday’s warm-up, during which students will finish and then read aloud their stories to the class.
  + Activity 4: Friday Wrap-Up: [3 minutes]
    - I will pass out notecards to the students and ask them each to write one activity or lesson that they liked this week, one activity or lesson that they didn’t like this week, and their favorite thing at Summerbridge so far.
* **Homework:** 
  + None

Hannah Ruebeck

Lehigh Valley Summerbridge

Summer 2013

8th Grade Week 2 Lesson Plans

Core Team 1

**DAY 6: June 24th**

**Topic: PEMDAS and the Order of Operations**

* **Objectives**:
  + Students will recite the order of operations (PEMDAS) and will create their own acronyms.
  + Students will apply PEMDAS while solving multi-step problems.
* **Materials Used**
  + Chalk and chalkboard
  + Individual whiteboards and markers
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Introduction: [5 min]
    - 1 + 53
    - The warm-up problem is on the board. Students will be asked to solve the problem on their own white boards. The correct answer is 16 – if the order of operations is done incorrectly, students will get the answer 20.
    - Ask students to hold up their answers. Ask students to explain how they solved the problem. Discuss the importance of the order in which one solves an equation.
  + Activity 1: [20 min]
  + I will ask the students to give me 4 numbers, which I will write on the board twice.

W X Y Z

W X Y Z

I will ask the students for different operations to fill in with the numbers, different sets for each of the 2 problems. Half of the class will solve one problem and the other half will solve the other. The two groups will compare their answers and talk about why the 2 problems have different answers

I will explain the Order of Operations, PEMDAS, and what it stands for.

*Parentheses Exponent Multiplication/ Addition/*

*Division Subtraction*

It is easier to remember something when you come up with a pneumonic device for it, like PEMDAS. A pneumonic device is any phrase or word that helps you recall something that is hard to remember. I will ask the students if they can think of other pneumonic devices they use. I will give the students the example of “Please Excuse My Dear Aunt Sally” for PEMDAS. Then, each student will come up with a pneumonic device that they want to use for PEMDAS and write them on their whiteboards.

* I will discuss the symbols for the different operations as I introduce the meanings of the different letters. Most importantly, we will discuss using a fraction bar for division instead of ÷ and using  or parentheses instead of and x, because x is now a variable.
* Activity 2: [12 min]
  + We will work on practice problems. The first three problems will be done as a class. The students will do the next on their own with their small whiteboards, and hold it up when they have an answer. If students are struggling with a certain problem we will stop and do it as a class. The problems will appear on today’s take-home sheet.
  + I will then distribute and explain the homework sheet. [2min]
* **Homework:** 
  + Order of Operations Worksheet

**8th Grade Syllabus: Week 2**

*Summer 2013 Core Team 1 Hannah Ruebeck*

|  |  |  |  |
| --- | --- | --- | --- |
| DAY | LESSON TOPIC | TAKE-HOME SHEET | TONIGHTS’ HOMEWORK |
| Monday | PEMDAS and Order of Operations | PEMDAS, whiteboard problems | Order of Operations Worksheet 1 |
| Tuesday | Order of Operations project |  | Work on your project (Homework Hut) |
| Wednesday | Introduction to Equations; 1-step equations | Definitions and Table Races problems | Expression and Equation Worksheet 1 |
| Thursday | 2-step equations, equation practice |  | Equations Worksheet 2 |
| Friday | Equations in Real Life |  |  |

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**ORDER OF OPERATIONS WORKSHEET**

Evaluate the following expressions. Please show all work.

1. =
2. =
3. =




9. On the back of this sheet, explain why the Order of Operations is important. Come up with a real-world example to prove your point.

My example: The grocery store charges a $1 tax. If you are buying 3 apples at 2$ each, you multiply 3(2) before adding the $1 tax to get a total of $7. If you added 3+1=4 and multiplied that by 2, you would be paying 8$ which is too much.

**ORDER OF OPERATIONS TAKE-HOME SHEET**

**6/24/13**

The order of Operations: PEMDAS

*Parentheses Exponent Multiplication/ Addition/*

*Division Subtraction*

Pneumonic Device: Please Excuse My Dear Aunt Sally

Write your own Pneumonic Device here

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Whiteboard Problems:**

5  8 -3  2= 40-6 = 34

3 +10/2 -12= 3 + 5 – 12 = -4

20/(4+1) + (7)(2)= 20/5 +14 = 4+14 = 18

11+2  -4= 11 + -8 = 3

15/-5+3 + (3)(2) -6= -3+3+6-6 = 0

12/2  (1+3)= 64 = 24

7+2  (2)(1)- 15 = 7+22-15 = 7+4-15 = -4

**DAY 7: June 25th**

**Topic: PEMDAS review and project**

* **Objectives**:
  + Students will share real**-**world applications of PEMDAS.
  + Students will work together in groups to create a skit, rap, song, dance, or poem that explains the order of operations and why they are important.
* **Materials Used**
  + Rubric
  + Blank poster-board
  + Markers
* **Methodology:**
  + Warm-Up: [5 min]
    - I will ask for student volunteers to share their real-world examples from last night’s homework. I will collect last night’s homework and will sign the students’ homework logs as we continue the discussion of why the order of operations is important in real life.
  + Activity 1: [30 min]
    - Students will be separated into 3 groups by ability level. They will work to make a skit, song, dance, or rap that explains the order of operations and why they are important.
    - I will pass out the rubric for the project and explain that they will present their skit/song/rap/etc at the beginning of class tomorrow. We will go over the rubric. (If any student knows that they will not be attending Summerbridge the following day, I will ask them to work separately and to write a poem or song that they will hand in when they get back).
    - Students will spend the remainder of class time working on their projects and will be encouraged to continue during Homework Hut as this is their only homework.
  + Wrap-up: Each group will tell the class what kind of performance they will be doing. [3 minutes]
* **Homework:** 
  + Continue to work on project

PEMDAS Group Project **Rubric**

1. You will create a song, dance, skit, or rap about the Order of Operations.
2. Each member of the group must contribute fully to the project.
3. You must represent all of the operations in the correct order.
4. Your project must include at least one example.
5. You must be ready to perform at the beginning of class tomorrow.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

To fill out after your performance:

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Name: \_\_\_\_\_\_\_\_\_\_\_\_

I think every member of my group participated fully

YES \_\_\_\_\_ NO \_\_\_\_\_\_\_\_

If no, how could your group have worked better together?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**DAY 8: June 26th**

**Topic: Introduction to Equations**

* **Objectives**:
  + Students will define new math vocabulary words**.**

[constant, variable, equation, expression, and solution]

* + Students will translate words into mathematical expressions and equations.
  + Students will solve 1-step equations.
* **Materials Used**
  + Chalk and chalkboard
  + Individual whiteboards and markers
  + SMARTboard
  + Table races (handout)
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [10 min]
    - Each group will present their skit/song/rap etc. Students will fill out the participation form.
  + Activity 1: [15 minutes]
    - Stations: I will have cards with the definitions of constant, variable, equation, expression, solution, and blanks for each of those words. They will be multiple-choice questions. Students will travel around the room until they have answered each of the 5 questions. After students have finished we will go over the definitions as a class. [10 minutes]
      * Variable: the part of an equation that changes. A letter that represents an unknown value.
      * Constant: the part of an equation that stays the same. A number that is known.
      * Expression: Numbers, variables, and operators grouped together that show the value of something. There is no equals sign.
      * Equation: Shows that two things are equal and therefore uses an equals sign. An equation is two expressions set equal to one another.
      * Solution: a possible value of a variable in an equation
        + If 4 + x = 6, what is a solution for x?
  + Activity 2: Lecture [ 10 min]
    - I will ask students to look back at the warm up and to tell me what these “mathematical translations” are, now that we have learned a new vocabulary. We will establish that they are expressions and that the letters are variables. I will explain that if the problem said “Sally had 7 more marbles than Betsy did” we would be able to do the same thing. Betsy’s marbles are represented by an unknown value, Sally’s marbles, which we can assign a variable to. I will ask the class how we would express the number of marbles that Betsy has.
    - I will add an equals sign to each of the expressions with variables to make equations. We will go through each one and I will ask students to come up with strategies to solve them.
  + Activity 3: Table Races [10 min]
    - Today’s pods will be seated with mixed ability levels. I will pass out the Table Races handout and explain the rules.
      * Rules: each group has one copy of the same handout. When I say go, the first person does the first problem and then passes it to the next person. The next person can EITHER correct the first problem or do the second problem. Only two problems are in play at any time. The team with the most right will win.
  + I will then explain the worksheet that they will be filling out for homework, and pass out tonight’s homework and take-home sheet.
* **Homework:** 
  + Expressions and Equations Worksheet 1

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_

**EXPRESSIONS AND EQUATIONS WORKSHEET 1**

1. Translate the following into mathematical expressions or equations.

3 more than s 5 times y 11 less than z 4 divided by t

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Mary gave Steve 5 books. Write an expression showing how many books Steve has now.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Sean has five times as many fish as Becca has. Write an expression showing how many fish Sean has.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Solve the following equations:

5 - t = 7 6y = 42 z – 3 = -15

t = \_\_\_\_\_\_\_\_\_ y = \_\_\_\_\_\_\_\_\_ z = \_\_\_\_\_\_\_\_\_

s/4 = -5 v- (-4) = -15 3c = -24

s = \_\_\_\_\_\_\_\_\_ v = \_\_\_\_\_\_\_\_\_ c = \_\_\_\_\_\_\_\_\_

3 – b = 8 r/5 = -9 2m = -9

b = \_\_\_\_\_\_\_\_\_ r = \_\_\_\_\_\_\_\_\_ m = \_\_\_\_\_\_\_\_\_

**TABLE RACES HANDOUT 6/26/13**

**EXPRESSIONS AND EQUATIONS**

1. 4 + y = 5 y= \_\_\_\_\_\_\_\_\_
2. x – 6 = -3 x= \_\_\_\_\_\_\_\_\_
3. 6n = 4 n= \_\_\_\_\_\_\_\_\_
4. v/5 = -7 v= \_\_\_\_\_\_\_\_\_
5. b(-9) = 45 b= \_\_\_\_\_\_\_\_\_
6. 13 + h = -52 h= \_\_\_\_\_\_\_\_\_
7. j – 8 = 37 j= \_\_\_\_\_\_\_\_\_
8. u/ (-4) = 7 u= \_\_\_\_\_\_\_\_\_
9. r + 6 = -8 r= \_\_\_\_\_\_\_\_\_
10. 8t = 48 t= \_\_\_\_\_\_\_\_\_

**EXPRESSIONS AND 1-STEP EQUATIONS TAKE-HOME SHEET**

**6/26/13**

A **variable** is the part of an equation that changes, or a letter that represents an unknown value.

A **constant** is the part of an equation that stays the same, or a number that is known.

An **expression** is a grouping of numbers, variables, and operators that show the value of something. There is no equals sign in an expression.

An **equation** shows that two things are equal and therefore uses an equals sign. An equation is two expressions set equal to one another.

A **solution** is a possible value of a variable in an equation.

Table Races Problems and Solutions:

1. 4 + y = 5 y= 1
2. x – 6 = -3 x= 3
3. 6n = 4 n= 2/3
4. v/5 = -7 v= -35
5. b(-9) = 45 b= -5
6. 13 + h = -52 h= -65
7. j – 8 = 37 j= 45
8. u/ (-4) = 7 u= -28
9. r + 6 = -8 r= -14
10. 8t = -48 t= -6

**DAY 9: June 27th**

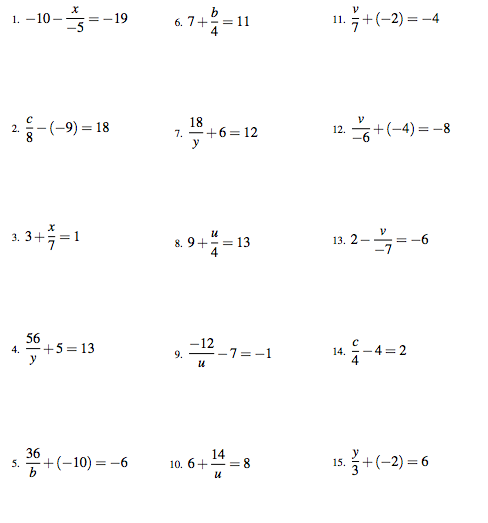
**Topic: 1 and 2-step Equations**

* **Objectives:** 
  + Students will connect the strategies of solving 2-step equations back to the strategies for solving 1-step equations.
  + Students will solve 2-step equations.
* **Materials Used**
  + Chalk and chalkboard
  + Individual whiteboards and markers
  + SMARTboard
  + Basketball hoop and ball
  + Take-home sheet (handout)
  + Homework (handout)
* **Methodology:**
  + Warm-Up: [8 min]
    - I will ask for any questions about the homework, and after any/all have been answered I will collect last night’s homework. There will be a one-step equation on the board [5x=20] and a two-step equation on the board [5x +5 =20]. I will ask students to try to solve both equations on their whiteboards.
    - I will ask students who got the correct answer to explain how they did it to the class.
  + Activity 1: Lecture [10 min]
    - I will go over the strategies for solving two-step equations and highlight the similarities between one and two-step equations. I will do several examples.
  + Activity 2: Practice with 1 and 2-step equations [20 min]
    - I will ask students to come up to the board and solve an equation. If they get it right, they can attempt a free-throw shot at the mini basketball hoop. If they make the shot, they get a point. The person who makes the most points wins. You get a half a point for just solving the equation correctly.
    - **Problems:**
      * **3x-5 = 4 x =3**
      * **x/7 -5 = -6 x = -7**
      * **8-2x = 10 x = 1**
      * **2x+5 = -5 x = -5**
      * **10x-7 = 8 x = 3/2 or 1.5**
      * **-2x+7=19 x = -6**
      * **x/15 -5 = -3 x = 30**
      * **6 = -17-x x = -23**
      * **-9 = 2x-7 x = -1**
      * **2-3x = 10 x = -8/3 or -2 and 2/3 or -2.66**
  + I will then explain the worksheet that they will be filling out for homework, and pass out tonight’s homework and take-home sheet. [3min]
* **Homework:** 
  + Equations Worksheet 2

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EQUATIONS WORKSHEET 2**

Solve the following equations.

****

**DAY 10: June 28th**

**Topic: Equations in Real Life**

* **Objectives:** 
  + Students will connect solving linear equations to their everyday life by solving problems that relate to travel, cell phone payments, temperature conversions, and monetary exchange rates while working in groups at stations.
* **Materials Used**
  + Chalk and chalkboard
  + SMARTboard
  + Station Instructions
* **Methodology:**
  + Warm-Up: [8 min]
    - I will ask for any questions about the homework, and after any/all have been answered I will collect last night’s homework. I will ask each student to suggest one way that they use equations in their everyday lives. If any students suggest temperature conversions, monetary exchange rates, travel, or bill payments I will explain that we will be looking at those further in detail.
  + Activity 1: Stations [30 min]
    - There will be 4 stations set up around the room. Students will rotate around the room in assigned groups (by ability level) to work with each different scenario. They will be playing Robin from their Literature book, Sunrise Over Fallujah as he travels to Iraq, learns how to convert temperatures, exchanges dollars for Iraqi dinars, and purchases an overseas cell phone plan.
      * Station 1: Plane Travel.

See attached worksheet

* Station 2: Temperature Conversions

See attached worksheet

* Station 3: Monetary Exchange Rates

See attached worksheet

Station 4: Cell Phone Plans

See attached worksheet

* + Activity 4: Friday Wrap-Up: [3 minutes]
    - I will pass out notecards to the students and ask them each to write one activity or lesson that they liked this week, one activity or lesson that they didn’t like this week, and their favorite thing at Summerbridge so far.
* **Homework:** 
  + None

**STATION 1: THE PLANE RIDE**

**Robin is flying from JFK airport in New York to Al-Rasheed Airport in Baghdad.**

He has to drive to JFK from his house in Harlem. He has to travel 21 miles and the taxi driver drives at a constant 30 miles an hour. He also waits at stoplights for a total of 17 minutes.

If distance = (rate)(time)+ time waiting, how long will it take for Robin to get to the airport?

After waiting forever in the airport with all of his luggage, Robin finally gets on the plane. The average plane speed is 600 mph, and Robin is on the plane for 10 and a half hours.

If distance = (rate)(time), how many miles are there between New York and Baghdad?

**STATION 2: IT’S SO HOT HERE!**

**Robin has finally arrived in Baghdad. As he is adjusting to his new life, he realizes that it is much hotter in Iraq than it is at home in Harlem. But everywhere he goes, everyone is using degrees Celsius instead of degrees Fahrenheit and he cannot compare the temperature to the temperatures at home.**

Everyone he meets is telling Robin that it is 55 degrees Celsius here in Baghdad. How many degrees Fahrenheit is it in Baghdad? If it is 80 degrees Fahrenheit in New York now, how much hotter is it in Baghdad than New York?

F= C +32

Later that day, Robin realizes that he could have figured out the same problem by converting degrees Fahrenheit into degrees Celsius. So that night, when someone tells him that it is 26 degrees Celsius, he does the problem the other way. If it is 60 degrees Fahrenheit in New York, how many degrees Celsius is it in New York? How much hotter is it in Baghdad than New York?

C = (F-32)

**STATION 3: EXCHANGING MONEY**

**Now that he knows how hot it is, Robin can focus on other things. He realizes that he needs to exchange his American dollars into Iraqi dinars.**

Robin has 750 American dollars to spend this year. If 1 dollar is 1162 dinar, and Robin has to pay a 20-dollar exchanging fee, how many dinars will he have?

Robin’s peer Corporal Eddie Evans gives him a 10,000 dinar note. How many dollars is this?

**STATION 4: CALLING HOME**

**Now that Robin has figured out how much money he has, he can buy a cell phone plan so that he can call home.**

The best cell phone plan offers the following rate: Robin would have to pay 20,000dinar for the plan plus 1,000 dinar per minute that he talks on the phone per month. If Robin talks on the phone for 22 minutes this month, how many dinar will he owe the cell phone company?

The next month, Robin only has 30,000 dinar left. Use the same equation as the previous problem to figure out how many minutes he can talk on the phone for this month.