Title: Fraction Fever

Brief Overview:

Students will find the factors of numbers first with Cuisenaire Rods, and then by using the rules for factorization. They will learn to identify the greatest common factor of two numbers. They will apply these skills by reducing fractions in isolation, and then by reducing the sums and differences of fractions with like denominators.

In Lessons 3 and 4, students will find the multiples of whole numbers in several different ways: using the hundreds chart, multiplication chart, Cuisenaire Rods, and sequenced steps. Students will find the least common multiple of two whole numbers. Students will then apply this concept to fractions. They will find the LCM of the denominators of unlike fractions in order to rename the fractions and add the fractions.

NCTM Content Standard/National Science Education Standard:

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
    - Recognize equivalent representations for the same number and generate them by decomposing and composing numbers.
    - Recognize and generate equivalent forms of commonly used fractions, decimals, and percents.
    - Describe classes of numbers according to characteristics such as the nature of their factors.
    - Compute fluently and make reasonable estimates
    - Develop fluency in adding, subtracting, multiplying, and dividing whole numbers.
    - Develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience.
    - Use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals.
    - Develop fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers;

Grade/Level:

Grades 4-5.

Duration/Length:

This unit contains four 1-hour long lessons.

Student Outcomes

Students will:

- Make a model that shows the factors of a number using Cuisenaire rods.
- Use models and equivalent forms to judge the size of fractions
- List all of the factors of a number.
- Find the common factors of two numbers.
- Find the greatest common factor of two numbers.
- Recognize and generate equivalent forms of fractions.
- Write fractions as a part of a whole, location on a number line, and part of a collection.

Materials and Resources for Lessons 1 and 2

- Student math journals
- Cuisenaire Rods: 1 set for each student or each pair of students
- Overhead Cuisenaire Rods
- Colored pencils or crayons for each student
- Student copies of Student Resource Sheets # 1 - 3
- Teacher Resource Sheet # 1, 2 and 4 made into a transparencies
- Teacher Resource Sheets # 3 and 5
- Chart paper and markers
- Explorer Calculator, if available

Lesson 1

Teacher Preparation:

- Write the essential questions for today's lesson on the board:
  - How can we be sure to identify all of the factors for a number?
  - What rules can help us determine the factors of a number?
- Prepare and distribute baskets of the materials each table will need for today's lesson.

Development/Procedures:

Preassessment

- Put Teacher Resource Sheet #1 "Warm Up," on the overhead for students to complete in their journals: "Using only one color of rod, make a train that is the same length as the orange rod. Sketch the orange rod in your journal, and sketch the train that you made that is the same length as the orange rod. What color rod did you use? If the orange rod represents 10, what number does the rod you chose represent? Write a number sentence that describes the relationship between the orange rod and the rods you used in your train."

- Instruct students to use their Cuisenaire Rods and colored pencils to solve the problem and put their answers in their journals. Observe students as they complete the task. Notice which students complete the task quickly, and which students struggle. Notice how well the students followed directions. Did they use only one color rod? Did they answer all parts of the prompt?

- After 6 minutes, discuss the results with the class. What color rod did they choose? What did that color represent? As the class volunteers colors, use the overhead Cuisenaire Rods to illustrate the models the students made. Put the train of each new color under the previous train. Write their number sentences below the Cuisenaire models. See Teacher Resource Sheet # 2 for an example of a completed model.

Launch

- Call attention to the operation(s) used in the students' number sentences. Did the whole class choose to use the same operation? Why or why not? It is likely that some students used multiplication, and some used addition in their number sentences. If the class did not use both operations, ask how the other operation could be used in this example. Write any new number sentences that are correct under the models. If a student volunteers that two or more unlike rods could be combined to equal the orange, review why these could not be a solution to the problem.

- Refer to the warm-up and ask for the factors of 10. It is likely that the class will list 2 and 5. Write the word, "factors" under the number sentences, and list the factors the class identifies. If they do not include 1 and 10, ask if these also could be factors of 10. If necessary, review the definition of a factor to show that 1 and 10 meet the criteria. Using the overhead Cuisenaire Rods, model how the orange and white rods could be arranged to model 10 and 1 as factors.

Teacher Facilitation

- Draw attention to the objectives written on the board.
    - How can we be sure to identify all of the factors for a number?
    - What rules can help us determine the factors of a number?
- Explain that they already know how to multiply two numbers to obtain a product. You can add visual cues for English Language Learners (ELLs) while explaining this by pointing to the factors and product in the previous multiplication sentences as you explain this.
- Write "16 ÷ 8 =" on the overhead. Ask volunteers for the quotient (2). What would be the other number sentences in this fact family? (16 ÷ 2 = 8, 8 x 2 = 16, and 2 x 8 = 16). What would the 2 and 8 be called in the multiplication sentences? (factors). This shows that the students already know how to find a second factor of a number if they are given one factor of a number. There are times when it is necessary to find all of the factors for a number. Today they will learn how to identify all of the factors of a number.
- Using the overhead Cuisenaire Rods, make a train to represent 18. Explain one way to be sure we find all of the possibilities for something, such as all of the possible factors of a

number, is to make an organized list. We will organize our list of factors by going from least to the greatest. What is the smallest rod that can be used by itself to equal 18? (The white rod, or 1) Make a train of white rods under the first row. Write "18 x 1 = 18" next to the white rod train. Try out the rods for 2, 3, 4, etc. to see which ones go evenly into 18. As each correct factor is discovered, add that train to the model and write the appropriate number sentence next to it. Also, when a factor is discovered (2, for example), identify the other factor (9) that would be needed to produce 18. Add a train for the corresponding factor to the model. Finally, write a list of the factors that were discovered under the model. See Teacher Resource Sheet #2 for an example.

- Demonstrate how the model could be sketched using colored pencils.

Student Application and Embedded Assessment

- Students complete "One Color Rod Trains", (on Teacher Resource Sheet # 1 (to be made into an overhead transparency). Direct students to complete the task in their journals. Observe students as they complete the task. Notice which students complete the task quickly, and which students struggle. Notice if students are using trial and error systematically or randomly.

Teacher Facilitation

- Review results of "One Color Rod Trains" with the class. (Completed models are on Teacher Resource Sheet # 3)
    - How did you know that you had found all of the possible factors? (If they did their work systematically, they checked to see if 2 was a factor, then 3, then 4, etc. When they got to 6 x 2 = 12, they found the factor that matches with 2, and therefore have found all of the factors.) Compare the effectiveness of working systematically or randomly to be sure that all factors were found.
    - Was anyone able to decide if a number was a factor before trying it out with the Cuisenaire Rods? How did they know that number was a factor? Answers may include "I know that 3 x 4 = 12, so I know that 3 and 4 are factors."
- Ask if it is sometimes possible to determine if a number is a factor even when you do not know the multiplication fact that matches it. For example, could 5 be a factor of 95? (Yes). What about 70? 35? 265? What do these numbers have in common? (They all end with either a 0 or 5.) Can we make a rule that tells when a number has 5 for a factor? (Any number with a 0 or 5 in the ones' place will have 5 as a factor.)
- Begin a T-chart with "Factor" on one side, and "Rule" on the other side. Start the first example by writing "5" on the left side, and "The ones' place is 0 or 5" on the right side.
- Lead a similar discussion to uncover additional rules. As each rule is discovered, add it to the chart.
    - 2 The ones' place is even (0, 2, 4, 6, 8)
    - 10 The ones' place is a 0
- It is unlikely that the class will discover the rule for 3 on their own. However, you can introduce it and add it to the list. Likewise, the rules for 4, 6, and 7 can be added if appropriate to the needs of the class:
    - 3 The sum of all digits can be divided by 3.

        - For the number 552, 5 + 5+ 2 = 12. 12 is divisible by 3. If the student was unsure of this, he/she could continue to add digits together until he/she get to a single digit answer: 1 + 2 = 3. If the final sum is 3, 6, or 9, the original number was divisible by 3.
    - 4 The last two digits of the number are divisible by 4.
    - 6 The number is divisible by both 2 and 3.
    - 9 The sum of its digits is divisible by 9.
- Explain that these rules can help us find the factors of a number *without* using the Cuisenaire Rods. Demonstrate this by finding all of the factors of 24. Take a systematic approach, listing 1 and then starting by trying 2, 3, 4, 5, etc.

Student Application

- Students complete Student Resource Sheet #1, "Find the Factors!" in which they practice the factorization rules, apply the rules to find all of the factors of a number, and complete a BCR.

Embedded Assessment

- Monitor students as they complete Student Resource Sheet # 1. Look for the student's ability to use a systematic approach and use the rules for factorization to complete the assignment. Answer Key can be found on Teacher Resource Sheet 4.

Reteaching and Extension

- Explain the game "Taxman - A Game of Strategy and Factors" according to the directions on the web site http://loj.loswego.k12.or.us/wongr/Publish/page2.html. Student Resource Sheet # 2, "Taxman, A Game of Strategy and Factors," summarizes the rules for the game and can be used as a game board for each pair of students.

- While the class is playing "Taxman," work with a small group of students who need extra support with factors.

Lesson 2

Teacher Preparation:

- Write the essential questions for today's lesson on the board:
    - What is a greatest common factor?
    - How can the greatest common factor help us simplify fractions?
- Prepare and distribute baskets of the materials each table will need for today's lesson.

Preassessment – Put Teacher Resource Sheet # 4, "Warm Up," on the overhead for students to complete in their journals. Observe students as they complete the assignment, and provide extra support if needed for some students.

Launch

- Review the results of the warm up with the class. Make separate lists of the factors for 16 and 40 on the overhead:

1, 2, 4, 8, 16
1, 2, 4, 5, 8, 10, 20, 40

- Review how using an organized strategy can help us be sure we have found all of the factors.
- Ask the class for their observations about the two lists. They will probably notice that some factors appear in both lists. What factors are the same in both lists? (1, 2, 4, 8)
- Introduce the word "common." When we have something "in common" with a friend that means that there is something about both of us, such as an interest, that is the same. What does the class think is meant by a "common factor," and then a "greatest common factor?" Identify the common factors, and then the greatest common factor for 16 and 40.
- Use overhead Cuisenaire Rods to make a train for 12 (one orange with one red). Under the 12 train, place 8 white Cuisenaire Rods. Ask, "If the top train represents "1," what fraction is represented by the 8 white Cuisenaire Rods?" (8/12)
- Put "Factors of 12" from the transparency for Teacher Resource Sheet #3 on the overhead. Can we use our model from yesterday to help us find equivalent fractions? What would the equivalent fractions be? (4/6 and 2/3) Point out that the rods representing these fractions are both the same length.
- Write the three equivalent fractions next to each other. When a fraction uses the smallest numbers possible, we call it the simplest form of the fraction. Which fraction would be in the simplest form? (2/3) Circle 2/3 on the board.
- Under the fractions, write the factors of 12: 1, 2, 3, 4, 6, and 12. Then write the factors of 8: 1, 2, 4, and 8. What is the greatest common factor (GCF) of these two numbers? (4) Does anyone notice the relationship between the GCF, the simplest form, and the original fraction 8/12? (8/12 ÷ 4/4 = 2/3) Can we make a rule about how to use the GCF of the numerator & denominator when we want to find the simplest form of a fraction? (Divide both numerator and denominator by the GCF to get the simplest form).
- You have already shown that this is true using the Cuisenaire Rods, but you may want to prove it a second way, such as cross multiplying or using the "simplify" function on the calculator.
- Try the rule out with another fraction that needs to be simplified, such as 15/40.
- Review how to add & subtract fractions with like denominators. Practice addition or subtraction problems in which the answer needs to be simplified, such as 7/8 – 1/8 = 6/8. Simplify the answer.

Student Application and Embedded Assessment

Students complete Student Resource Sheet # 3, "Greatest Common Factors," in which they practice finding the GCF, simplify fractions, and reduce sums or differences to their lowest terms. Answer key is found in Teacher Resource Sheet # 5. Observe students as they complete the task. Notice if students are simplifying fractions to their lowest terms, or just partially reducing them.

Reteaching and Extension

Students who finish early can explore the activities at the following web site:

http://www.visualfractions.com/rename.htm

This web site can also be used to reinforce skills learned in this lesson. Activities include identifying fractions that are shown with pictures or number lines and then reducing them to the lowest terms. The activities extend to using the same concepts with mixed numbers.

Lesson 3

Materials and Resources:

- Student Resource Sheets # 4 - 9 for each child
- Teacher Resource Sheet # 7
- A set of green, yellow, blue and orange markers for each child
- A set of green, yellow, blue, and orange overhead erasable markers for the teacher
- Sentence strip for each child
- A set of Cuisenaire Rods for each child
- Reference book such as Everything You Need to Know About Math Homework by Scholastic Books, ISBN# 0-439-62522-X or a similar book for math definitions
- Timer
- Student Resource Sheet # 5, Overhead Hundreds Chart, made into a transparency
- Overhead projector

Development/Procedures:

Preassessment

Give each child a Student Resource Sheet # 4 Hop About. Read the directions. Set the timer for 3 minutes. After the timer goes off, encourage students to discuss their answers with a partner (2 minutes). Ask volunteers for answers. Pose this question: What strategy did you use to arrive at your answers? Guide the discussion towards skip counting, repetition, sequence, and patterns.

Launch

- Distribute Student Resource Sheet # 5, Hundred Chart. Tell students they will continue to skip count and look for patterns using the Hundreds chart.
- Demonstrate how you want students to highlight the squares. Highlight the inner perimeter of the chart square. If a square ends up with more than one color, add the new color to the inside perimeter of the last color.
- Use the green overhead marker and the overhead copy of the Hundreds Chart to model skip counting by 3's. You will highlight 3, 6, 9, 12, 15, 18, 21, 24, 27….. 99.
- Introduce the term MULTIPLES. Tell them the numbers they just circled are multiples of 3. (Students started with 3 and skip counted by 3).
- Point out the products of 3 on the multiplication chart (Student Resource Sheet 6). Allow students to make connections. Elicit student definition of what they think multiple is. Write a few of these definitions on the board.
- Have a student look up and read the mathematics/official definition for multiple in Everything You Need to Know About Math Homework by Scholastic Books or a similar

math dictionary. Write the official definition on the board. ***Example: Multiple is the product of the number and any whole number.***

- Compare the student and math/official definitions. Show students how close their definition is to the math/official definition.
- Allow students to write the math/official definition for multiple below the hundreds chart in the space #1.
- Students continue to skip count or find multiples/products on the hundreds chart starting with 5 (yellow), 9 (blue), and 10 (orange).

Teacher Facilitation

- Move around the class to make sure students are circling the correct multiples/products. Offer assistance when needed.
- Encourage students to reference the multiplication chart (Student Resource Sheet # 6) after they have circled all the multiples.
- Students again share their observations:
  a. The number circled the most
  b. Multiples in a diagonal pattern
  c. Color patterns on the rows
- With students' help, list the multiples/products of 3 and 5 (colored green and yellow).
- Ask students why numbers such as 15, 30,45,60,75, and 90 are both listed with multiples of 3 and 5 (colored both green and yellow). ***They are shared multiples/products; multiples/products those numbers have in common.***
- Introduce the term common multiples. The smallest shared or common multiple is called the least common multiple.

Student Application

- Solicit student's input to compose a set of steps for finding the LCM of numbers.
- Note the suggested steps below. Guide students to a similar format by asking what they should we do first, second, next. How do you identify the LCM?

<u>Steps for Finding LCM</u>

  - Make a list of multiples for each whole number.
  - Continue your list until at least two multiples are common to all lists.
  - Identify the common multiples.
  - The Least Common Multiple (LCM) is the smallest of these common multiples.
- Students should write these steps in their math journal for further reference.
- Students apply the steps to complete Student Resource Sheet #7 . Give students the numbers referenced on the worksheet.
- Allow students to work with a partner if additional support is needed (example: help with reading or with the concept)

Embedded Assessment

- Student Resource Sheet # 4 Hop About warm up: student identifies patterns/sequence

- Student Resource Sheet # 5 Hundred Chart – finding multiples (completed by students)
- Journal activity- sequential steps to find the LCM
- Cuisenaire Rod/Sentence strip activity- - finding multiples
- Finding LCM- Student Resource Sheet # 7.

Reteaching/Extension

Reteach using a sentence strip number line, Cuisenaire Rod, and Five-By-Twenty Grid.

- Cut out the 5 strips from the Five-By-Twenty Grid (Student Resource Sheet # 8) and glue them end-to-end on a sentence strip.
- Demonstrate with the ***black rod*** (Value of 7). Place the tip of the rod at the beginning or zero point of the number line.
- Trace the outline of the ***black rod***. Count how many blocks were covered - should be 7. Write 7 under the area you traced.
- Continue from where you stopped and cover the next blocks with the black rod. Trace the outline. Count all the blocks covered from the zero or the beginning to the end of the traced section – should be 14. Write 14 under the traced section.
- Have students complete the exercise. They will end up with the multiples of 7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70,77,84, 91,98
- Extension: Students with a clear understanding can work on the Student Resource Sheet #9 Applying the Least Common Multiple. (Answer: in 20 days)

Lesson 4

- Student Resource Sheet # 10 Matching Terms for each student
- Student Resource Sheet # 11 Problem-solving worksheet two double-sided copies per student. Teacher Resource Sheet # 6 is an answer key for Student Resource Sheet # 11.
- Math journal- per student
- Pizza worksheet, Student Resource Sheet # 12
- Student Resource Sheet # 13 Musical Fractions worksheet (for about 1/3 of your class)
- Student Resource Sheet # 14 Fraction/Money worksheet (for about 1/3 of your class)
- Classroom computer with internet assess (about 3 computers; students will work with a partner)
- Computer earphones will be helpful but not necessary
- Bags of coins (place different amounts of two types of coins in each bag)
    - Example: 3 quarters and 3 nickels
    - Example: 5 dimes and 1 quarter
- Set of overhead fraction strips
- Overhead projector
- Overhead copy of the problem solving sheet
- Set of overhead markers
- Explorer calculator – 1 per student or 1 for each pair

Preassessment

- The warm up for this lesson reviews math terms from the three previous lessons.
- Distribute Matching Terms, Student Resource Sheet #10. Set the timer for 3 minutes. Students complete the warm up. Answer Key is on Teacher Resource Sheet # 6.

- Call on volunteers to explain their answers.

Launch –

1. Explain: In the last lesson we learned to find the multiples of whole numbers and to determine the LCM for at least two whole numbers.
2. Offer students the real life example below.
    - Maybe by this time you are wondering why you need to know this concept or how will this be useful to you in the real world.
    - Let us say you are baking cookies for a class celebration. The recipe calls for ¾ cup of butter. However, you need to double the recipe in order to have enough cookies for the whole class.
    - How much butter will you need for a double recipe?

Teacher Facilitation

- Place the overhead copy of Student Resource Sheet #11 Problem-Solving sheet on the overhead projector.
- Ask students how they will go about solving this problem with the butter. Someone might suggest that you have to add the two amounts for the butter. Write ¾ + ¾ = in the Algorithm section of the problem solving sheet.
- Remind students that we keep the denominator the same (common denominator) when we add like fractions.
- Next, solve the problem. Write the common denominator and add the numerator. The answer of 6/4 is an improper fraction and can be simplified to 1 ½. This step can be clarified or readdressed in the Diagram/Model section.
- Estimate section: Use the number line to estimate the answer. Label the number line 0 to 2 since the answer from the Algorithm section was 1 ½ . Ask if ¾ is closer to 0 or 1. Students should answer 1. Mark a point on the number line that is more then 1 but less than 2.
- Draw two bars in the Model/Diagram section of the problem-solving sheet to represent the butter. Ask students to look at the fraction for the butter. How many sections should each bar have? **4 sections.** Show the addition of ¾ + ¾ to equal a full bar and a reminder of 2/4 or ½. You may choose to model or reteach this step using fraction strips. Combine a strip showing ¾ with another strip showing ¾ to see that combined the sum will be 6/4 or 1whole strip plus ½ of the second fraction strip.
- Last step is Calculator Solution. Guide the students to check their answer with the calculator:
    - Turn on the calculator and clear it using the "C" key
    - Press three (3) then the slash (/) key. Next press four (4). This gives you ¾
    - Press the addition (+) key
    - Press three (3), slash (/) and four (4). This gives you the second ¾
    - Press the equal sign (=). The answer will be 6/4
    - Point out that the answer can be simplified because of the N/D-n/d sign in the right corner of the calculator screen.
    - Press the (simp) key and the equal (=) key. This brings you to the final answer1 ½

  See example on Teacher Resource Sheet # 6.

Student Application

- Students will solve a similar problem by applying the same steps.
- Distribute Student Resource Sheet # 12 , Pizza Problem.
- Instruct students to use the problem-solving sheet to solve the Pizza Problem.
- Encourage students to ask someone to their left or right for help if they become puzzled.
- Teacher circulates to offer clarification when needed.

Embedded Assessment

- Teacher observations
- Work steps on Student Resource Sheet# 11, Problem-solving worksheet
- Students answers to teacher directed questions
- Worksheets Student Resource Sheets # 13 (Musical Fractions) & # 14 (Fractions/Money) from the learning styles activities
- Student journal response, Student Resource Sheet# 15

Reteaching/Extension

- Use the embedded assessments above and teacher observation to regroup students into 4 groups. Group 1- Students need more teacher directed help. Sit in a group with these students; use the problem-solving sheet to solve more problems with these students.
- You may choose to show these students another way to find the Least Common Multiple:

    - Find the Greatest Common Factor of the denominators.
    - Multiply the denominators together.
    - Divide the product of the denominators by the Greatest Common Factor.

- When students practice on their own, they can use any of the problems from this lesson to prove this method. They will know it works because they already have the answers for those problems.
- Students in groups 2, 3, and 4 understand the concept. Group them by three learning styles: auditory/music, kinesthetic and visual.
- Students in the auditory/Music group will receive Student Resource Sheet# 13 (Musical Fractions) worksheet. Students will assign fraction values to music notes and add the note values. They can also clap out the beat of each bar. Included is an answer key for students to self check their work.
- Reference site http://www.teachervision.fen.com/page/4851.html
- Kinesthetic students will receive Student Resource Sheet# 14 (Fraction/Money) worksheet and bag of coins. They will assign the fraction value of the coins and add them together.
- Interpersonal/Visual students will work with a partner to solve unlike fraction problems on an interactive web site. Students will use a model to add unlike fractions by first changing them into equivalent fractions. Students receive a feedback and a diagram to further explain the answer. http://www.harcourtschool.com/activity/elab2004/gr4/10.html

- Regroup: Have all the students complete a Journal Prompt as an exit assignment (their ticket out of the room or to end this math class).
    - Assess students' knowledge of the concept with a journal prompt.
        - Prompt: Imagine it is the end of the school year. Your task is to leave helpful notes for students coming into this class next the school year. Your detailed notes will explain with words and numbers the step-by-step process used to add unlike fractions.
    - Students receive a strip titled "Journal Prompt." Allow about 5 minutes for them to respond to the prompt.
    - You can save time by telling students not to recopy the prompt but to leave a space at the top of the page to glue the prompt strip later.
- Teacher circulates during this time to read student's responses and determine if the student understands the concept.

Summative Assessment:

- Students will complete Student Resource Sheet # 16 for the Summative Assessment.

Authors:

Karen Rouhani
Viers Mill Elementary School
Montgomery County Public Schools

Marie Blidi
Bladensburg Elementary School
Prince George's County Public Schools

Warm Up

1. Using only one color rod, make a train that is the same length as an orange rod.

2. Sketch the orange rod in your journal, and sketch the train that you made that is the same length as the orange rod.

3. What color rod did you use?

4. If the orange rod represents 10, what number does the rod you chose represent?

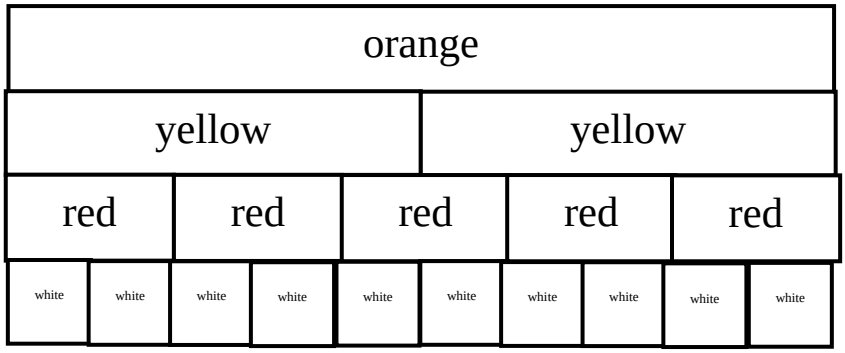
5. Write a number sentence that describes the relationship between the orange rod and the rods you use in your train.

One Color Rod Trains

1. Use your Cuisenaire Rods to find all of the factors for 12. Sketch a model of the trains you used to find the factors of 12. Write all of the factors of 12 under your model.

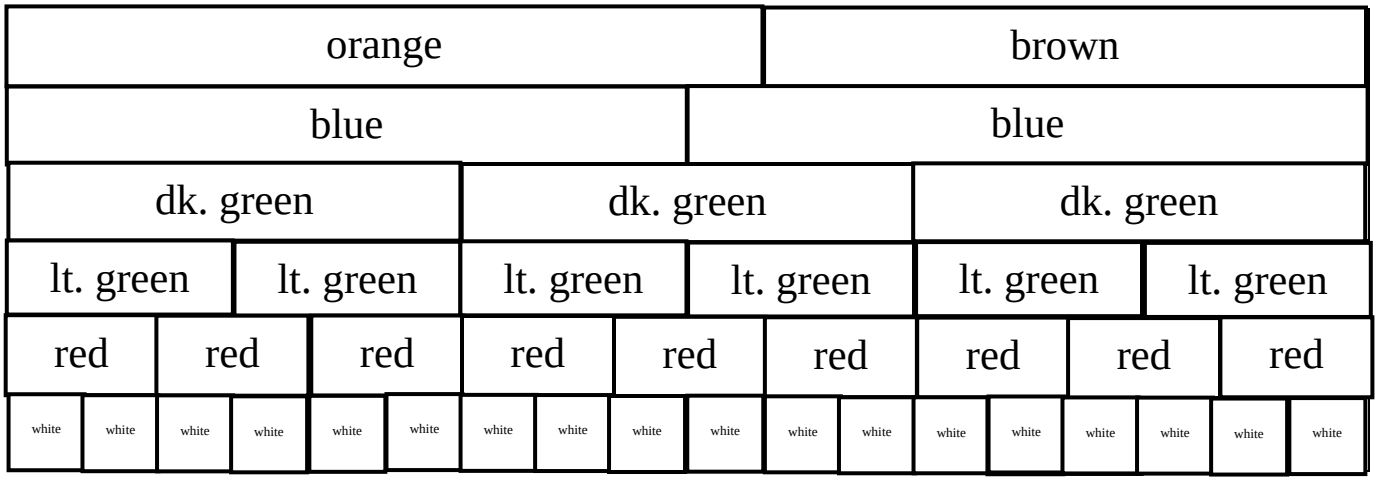
2. Make another Cuisenaire Rod Model to show all of the factors of 15. Sketch your model, and write all of the factors of 15 under your model.

Solution to "Warm Up"



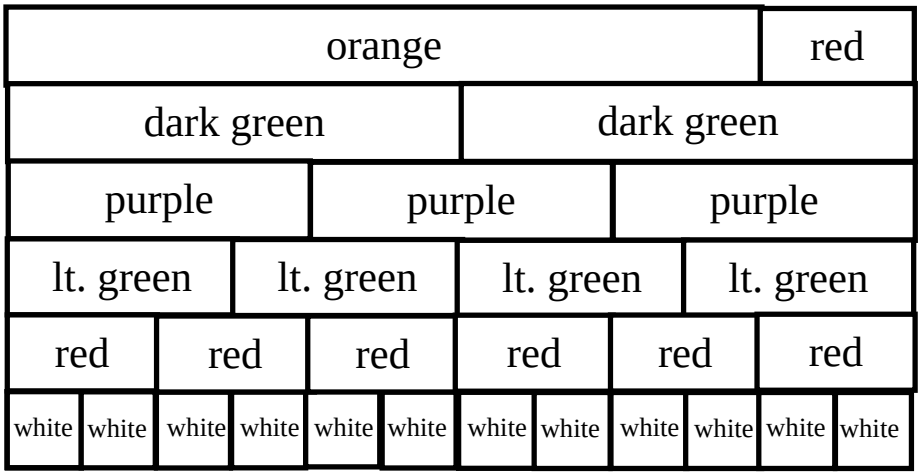
Factors of 10: 10, 5, 2, 1

Example of One Color Rod Train for 18

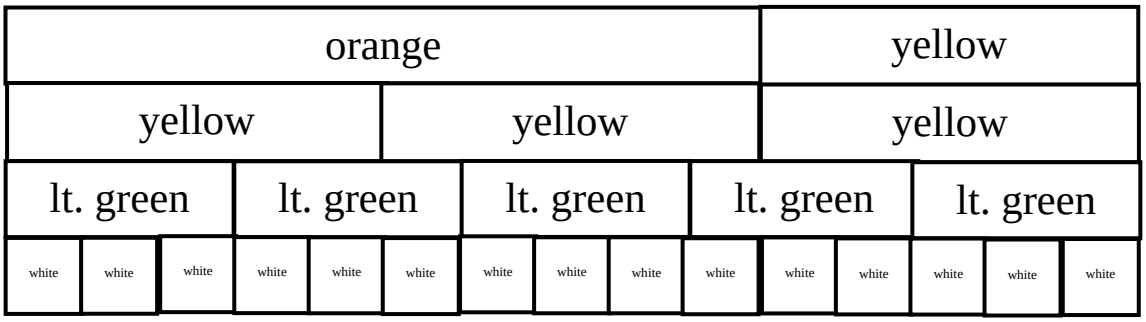


Factors of 18: 18, 9, 6, 3, 2, 1

Solutions to “One-Color Rod Trains”



Factors of 12: 12, 6, 4, 3, 2, 1



Factors of 15: 15, 5, 3, 1

Warm Up

1. List all of the factors of 16.

2. List all of the factors of 40.

3. Write your observations about the two lists.

Name_____ Date _____

Greatest Common Factors

1. Directions: Complete the table to show all of the factors of the given numbers, and then identify the greatest common factor

Numbers	All Factors	Greatest Common Factor
21	1, 3, 7, 21	7
35	1, 5, 7, 35	
30	1, 2, 3, 5, 6, 10, 15, 30	2
32	1, 2, 4, 8, 16, 32	

2. Directions: Write the Greatest Common Factor for the numerator and denominator of each fraction. Simplify each fraction to its lowest terms.

Fraction	Greatest Common Factor	Fraction written in its lowest terms
$\frac{24}{28}$	4	$\frac{6}{7}$
$\frac{15}{45}$	15	$\frac{1}{3}$

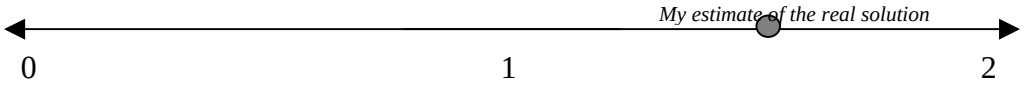
3. Directions: Find the sum or difference. Rewrite the answer in its lowest terms.

$$\begin{array}{r} \underline{24} \\ 28 \\ \underline{12} \\ -\ 28 \\ \hline \underline{12} \\ 28 \end{array} = 3/7$$

$$\begin{array}{r} \underline{3} \\ 24 \\ \underline{7} \\ +24 \\ \hline \underline{10} \\ 24 \end{array} = 5/12$$

Estimate

¾ + ¾ ≈ 1 + 1 = 2



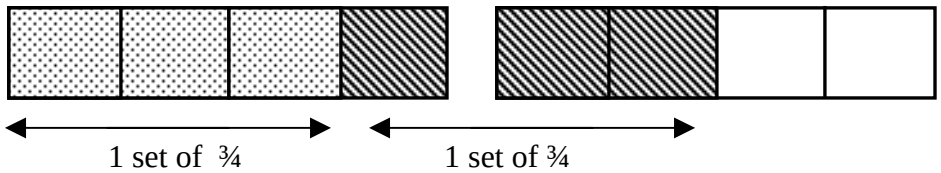
Algorithm

$$\begin{array}{r} \frac{3}{4} \\ + \quad \frac{3}{4} \\ \hline \frac{6}{4} = 1\ \tfrac{1}{2} \end{array}$$

Calculator

¾ + ¾ = **1** ½

Model / Diagram



equals 1 ½

Adapted from a template created by Molly Ketterer HCPSS

Matching Warm Up

Match each term with its definition. Write the letter for the correct term in the blank space before each definition.

Definitions	**Terms**
1. _C -_ The least of the common multiples of two or more whole numbers	**A**. Multiple
2. _B -_ A number that divides into a whole number with a reminder of zero. 5 is a _____ of 20.	**B**. factor
3. _A -_ The product of the number and any whole number	**C**. LCM
4. _D -_ The greatest of the common factors of two or more numbers. The ___ of 24 and 30 is 6.	**D**. GCF

Finding The Least Common Multiple

Summative Assessment
Bake Sale

Directions: Use what you have learned about factors, multiples, and fractions to select the correct answer or answers to the following questions:

1. d
2. b and c
3. b and c
4. a
5. c
6. 2/5, 5/6
7. 1 5/24 and 11/12

BCR:
Part A: yes Molly has enough chocolate for both the cookies and the brownies.
Part B: Molly has to add 3/4 cups of chocolate and 2/3 cups of chocolate. The answer of 1 5/12 cups of chocolate is less than 1 1/2 cups of chocolate, therefore Molly has more than what she needs.

Name_____ Date _____

Find the Factors!

Directions: Use what you know about the rules for finding factors to explain how you know each factor is correct.

Number	Factor	Explanation
45,732	3	I know 3 is a factor of 45,732 because ___ + ___ + ___ + ___ +___ = ____, and
8,540	10	I know 10 is a factor of 8,540 because
34,875	5	I know 5 is a factor of 34,875 because
4,916	2	I know 2 is a factor of 4,916 because

Directions: List all of the factors for each number

Number	Factors
20	
42	
28	

Name_____ Date _____

Brief Constructed Response

Malik is finished with his math homework. He had to list all of the factors of 98. Here is what he has written for the factors of 98:

The factors of 98 are 2, 3, 5, and 10.

Step A

Has Malik found all of the factors of 98?

_____

Step B

Use what you know about factors to explain why your answer is correct. Use words and/or numbers in your explanation.

_____

_____

_____

_____

_____

Taxman-A Game of Strategy and Factors

1 2 3 4 5 6 7 8 9 10

11 12 13 14 15 16 17 18 19 20

Rules:

- To select a number, there has to be at least one factor of that number remaining on the list.
- Player 1 selects a number, crosses it off of the list, and writes it in his column
- Tax collector “collects” all factors of that number that are still on the list by crossing the factors off the list, and writing them in his column.
- The game ends when Player 1 cannot collect any more numbers because any remaining numbers on the list do not have a factor left on the list.
- The tax collector “collects” all of the remaining numbers by crossing them off the list and putting them in his column.
- The winner is the player whose column has the largest sum.

Name_____ Date _____ Student Resource Sheet # 3

Greatest Common Factors

Numbers	All Factors	Greatest Common Factor
21		
35		
30		
32		

1. Directions: Complete the table to show all of the factors of the given numbers, and then identify the greatest common factor

2. Directions: Write the Greatest Common Factor for the numerator and denominator of each fraction. Simplify each fraction to its lowest terms.

Fraction	Greatest Common Factor	Fraction written in its lowest terms
$\frac{24}{28}$		
$\frac{15}{45}$		

3. Directions: Find the sum or difference. Rewrite the answer in its lowest terms.

$$\begin{array}{r} \underline{24} \\ 28 \\ \underline{12} \\ -\ 28 \\ \hline \end{array} \qquad \begin{array}{r} \underline{3} \\ 24 \\ \underline{7} \\ +24 \\ \hline \end{array}$$

Hop About

Identify the pattern/sequence and fill in the blanks.

1. 110, _____120, 125, _____, 135

2. _____, 297, _____, 313, 321, _____

3. Use what you know about patterns, sequence or skip counting to explain how you got your answers.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_

Student Resource Sheet # 5

Name_____ Date _____

Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1.Multiple_____

_____

_____

_____

_____

Multiplication Chart
Student Resource
Sheet 6

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	49	50	60	70	80	90	100

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	49	50	60	70	80	90	100

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	49	50	60	70	80	90	100

Finding Least Common Multiple

Example 1a. **Multiplication**	*Find the multiples of the whole number* ____
Multiples of ___	
Solution	
Example 1b. **Multiplication**	*Find the multiples of the whole number* ____
Multiples of ___	
Solution	
The LCM of ____ and ___ is _____. I know this because _____ _____	

Example 2a. **Multiplication**	*Find the multiples of the whole number* ____
Multiples of ___	
Solution	
Example 2b. **Multiplication**	*Find the multiples of the whole number* ____
Multiples of ___	
Solution	
The LCM of ____ and ___ is _____. I know this because _____ _____	

Five by Twenty Grids

Name _____ **Name_____**

Applying Least Common Multiple in Problem Solving

Use what you know about **Least Common Multiple** to solve the problem below.

During the summer months, Joanna visits her grandmother every 4 days. Her cousin Mira visits her grandmother every 5 days. If they both visit their grandmother today, when is the next time both girls will visit on the same day?

Student Resource Sheet # 10

Matching Warm Up

Match each term with its definition. Write the letter for the correct term in the blank space before each definition.

Definitions	**Terms**
1. _____ The least of the common multiples of two or more whole numbers	**A**. multiple
2. _____ A number that divides into a whole number with a reminder of zero. 5 is a _____ of 20.	**B**. factor
3. _____ The product of a number and any other whole number	**C**. LCM
4. _____ The greatest of the common factors of two or more numbers. The ___ of 24 is 30 is 6.	**D**. GCF

Student Resource Sheet #11

Estimate

Algorithm	Model / Diagram
Calculator	

Adapted from a template created by Molly Ketterer HCPSS

Pizza Problem

The Miller family is having pizza for dinner tonight. Mrs. Miller had just placed the topping on 3/8 of the pizza when the phone rang and she stopped to answer the phone. While she was away, Mr. Miller came in and decided to help his wife complete the pizza. He covered 1/3 of the pizza before she returned. How much of the pizza was covered when Mrs. Miller returned?

Pizza Problem

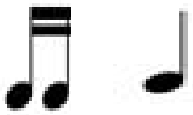
The Miller family is having pizza for dinner tonight. Mrs. Miller had just placed the topping on 3/8 of the pizza when the phone rang and she stopped to answer the phone. While she was away, Mr. Miller came in and decided to help his wife complete the pizza. He covered 1/3 of the pizza before she returned. How much of the pizza was covered when Mrs. Miller returned?

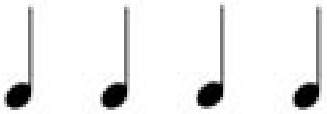
Musical Fractions
Music Note Reference Chart

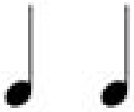
Name	Note	Value	Beat/s
whole note		4/4 or 1	4
Half note		1/2	2
Quarter note		1/4	1
Eighth note		1/8	1/2
Sixteenth note		1/16	1/4

Musical Fractions

Directions: Each musical note has a fractional value. Use the key provided to assign a fractional value to each musical note. Write the musical notes as a fraction sentence. Calculate the sum of each sentence.

1) 

2) 

3) 

4)

5)

Musical Fractions –Answer Key

1. 2/16 +1/4 = 6/16 SIMP. 3/8

2. 1/4 +1/4 +1/4 +1/4 =4/4 SIMP. 1WHOLE

3. 1/4 +1/4 = 2/4 SIMP. 1/2

4. 2/16 +2/16 = 4/16 SIMP. 2/8

5. 2/16 +1/2 =10/16 SIMP. 5/8

Fraction /Money

Directions:

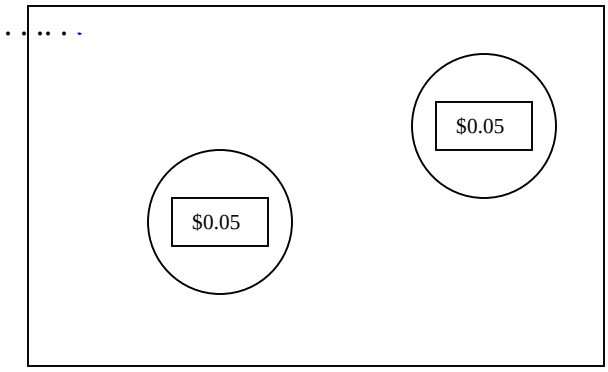
1. Choose a bag of coins
2. Sort the coins in the two boxes by their value. Draw circle and cent value in the boxes to represent the coins.
3. Write the fraction of a dollar that is represented by each type of coin.
4. Add the two fractions. Simplify if needed
5. Choose another bag of coins repeat steps 2-4

Show your work for step 4 in the space below.

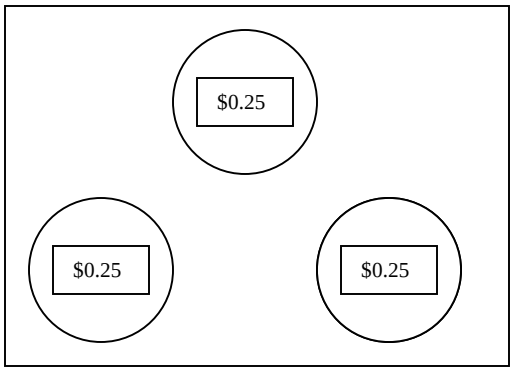
Fraction /Money

Directions:

1. Choose a bag of coins (*example: a bag contains 2 nickels and 3 quarters)*.
2. Sort the coins in the two boxes by their value. Draw circle and cent value in the boxes to represent the coins.
3. Write the fraction of a dollar that is represented by each type of coin (three quarters will be ¾, two nickels will be 2/20).
4. Add the two fractions. Simplify if needed
5. Choose another bag of coins repeat steps 2-4



2/20 or 10/100



3/4 or 75/100

Show your work for step 4 in the space below.

2/20 + 3/4 = 17/20

- Find the LCM (20)
- Get equivalent fractions (2/20 and 15/20)
- Add the equivalent fractions (17/20)

Or: 10/100 + 75/100 = 85/100 simplified to 17/20

Journal Prompt

Imagine it is the end of the school year. Your task is to leave helpful notes for students coming into this class the next school year. Your detailed notes will explain with words and numbers the step-by-step process to add unlike fractions.

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Name_____ Date _____

Summative Assessment
Bake Sale

Directions: Use what you have learned about factors, multiples, and fractions to select the correct answer or answers to the following questions:

1. Sarah made doughnuts for the bake sale. She put all of the doughnuts into bags of 4 doughnuts each. There were no doughnuts left over. How many doughnuts could Sarah have made?
   a. 142
   b. 146
   c. 150
   d. 152

2. The class will have their bake sale at a shopping center. There are 96 cars parked in the parking lot. If an equal number of cars are parked in each row, how many rows of cars might there be?
   a. 5
   b. 4
   c. 3
   d. Not given

3. Ray made brownies for the bake sale. He put the same number of brownies into each bag he prepared for the bake sale. If he bagged all of the 150 brownies with none left over, how many did he put in each bag?
   a. 4
   b. 5
   c. 6
   d. Not given

4. Which statement is true about multiples?
   a. Multiples of 4 are always even numbers
   b. Multiples of 5 are always odd numbers
   c. Multiples of 6 are sometimes odd and sometimes even
   d. Multiples of 7 are always odd

5. Which number is a common factor of 14 and 49?
   a. 49
   b. 14
   c. 7
   d. 3

6. Write in simplest form of each fraction:

   6/15 60/72

7. Directions: Find the sum or difference. Rewrite the answer in its lowest terms.

$$\begin{array}{r} \frac{7}{8} \\ \frac{1}{+\ 3} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{1}{6} \\ \frac{3}{+\ 4} \\ \hline \end{array}$$

Brief Constructed Response

Molly wants to make brownies and also bake some cookies. The brownies will need $\frac{3}{4}$ of a cup of chocolate. The cookies will need 2/3 of a cup of chocolate. Molly has 1-$\frac{1}{2}$ cups of chocolate.

Step A

Does she have enough chocolate to make both recipes?

_____

Step B

Use what you know about fractions to explain why your answer is correct. Use words and/or numbers in your explanation.

_____

_____

_____

_____

_____