3rd Grade Fractions Unit

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***GSE Addressed:***

Develop understanding of fractions as numbers.

MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼

***Unit Outline:***

1. *Organizing topic and GSE*
   1. Develop understanding of fractions as numbers.

MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼

* 1. Big Ideas that will begin in this 5 day unit (to completely master these big ideas, students need more than 5 days):
     1. Understand fractional parts must be equal-sized
     2. The number of equal parts tells how many make a whole.
     3. As the number of equal pieces in the whole increases, the size of the fractional pieces decreases.
     4. When a whole is cut into equal parts, the denominator represents the number of equal parts.
     5. The numerator of a fraction is the count of the number of equal parts. (3/4 means that there are 3 one-fourths, you can count one fourth, two fourths, three fourths.)
     6. Students express fractions as fair sharing, and parts of a whole. They use various contexts (candy bars, fruit, and cakes) and a variety of models (circles, squares, rectangles, fraction bars, and number lines) to develop a conceptual understanding of fractions and represent fractions.

1. *Culminating activity*- This activity will NOT be part of my 5 day unit. It will be done at the end of the teachers fraction unit and will include standards that are not a focus of my 5 day unit. Performance Task: The Fraction Story Game from the GSE Frameworks Unit 5
2. *Essential questions for unit*
   1. How many different ways can we divide a rectangle into 2 (3, or 4) equal parts?
   2. What are the important features of a unit fraction?
   3. How can I represent fractions of different sizes?
   4. What relationships can I discover about fractions?
3. *Outline of unit with essential questions for each lesson*
   1. Launch activity (December 16, 2015)
      1. The pre-test will be given the Friday before the unit is to be taught (December 18, 2015)
      2. One Brownie to Share- Published in Investigations
         1. Essential Questions for this lesson:
            1. How do we know how many fractional parts make a whole?
            2. When is it appropriate to use fractions?
   2. Lesson 1 (January 5, 2016)
      1. Identify and Write Fractions- Published by Learning Resources in Hands-On Standards
         1. Essential Questions for this lesson:
            1. What is a fraction?
            2. How can I represent fractions of different sizes?
            3. What relationships can I discover about fractions?
   3. Lesson 2 (January 6, 2016)
      1. Pattern Block Fractions- Published by The Math Learning Center in Pattern Block Lessons
         1. Essential Questions for this lesson:
            1. How many halves (thirds, fourths, sixths, eighths) does it take to make a whole?
            2. How can I represent fractions of different sizes?
   4. Lesson 3 (January 7 and 8, 2016)
      1. Exploring Fractions: Make Fraction Strips by Sue Phelps and GSE Framework Unit 5 of the 3rd Grade Frameworks pg. 14
         1. Essential Questions for this lesson:
            1. How do you know you have equal parts?
            2. What does the numerator represent?
            3. What does the denominator represent?
            4. What relationships can I discover about fractions?
   5. Lesson 4 (January 11, 2016)
      1. Finding Fair Shares Activity 5.2 in Teaching Student Centered Mathematics 3rd-5th
         1. Essential Questions for this lesson:
            1. What is the unit fraction?
            2. Is ¼ always the same size? How do you know?
            3. How does the size of the whole affect the size of the fraction?
   6. Lesson 5 (January 12, 2016)
      1. Candy Crush! GSE Framework Unit 5 of the 3rd Grade lesson page 19
         1. Essential Questions for this lesson
            1. What represents the denominator in a set?
            2. What represents the numerator in a set?
4. *Resources used*
   1. 3rd Grade GSE Framework #5
   2. Hands-On Standards by Learning Resources
   3. Pattern Block Lessons by The Math Learning Center
   4. Teaching Student Centered Mathematics 3-5 by Van de Walle, and Lovin

***Culminating Project/Summative Assessment:***

This activity will NOT be part of my 5-day unit. It will be done at the end of the teachers fraction unit and will include standards that are not a focus of my 5-day unit. Performance Task: The Fraction Story Game from the GSE Frameworks Unit 5

**PERFORMANCE TASK: THE FRACTION STORY GAME**

**APPROXIMATE TIME:** 1-2 class periods

Students create a game while reviewing all the different aspects of fractions they have studied.

**CONTENT STANDARDS**

MGSE3.NF.1 Understand a fraction 1𝑏 as the quantity formed by 1 part when a whole is partitioned into *b* equal parts (unit fraction); understand a fraction 𝑎𝑏 as the quantity formed by *a* parts of size 1𝑏. *For example,* 34 *means there are three* 1 4 *parts, so* 34 *=* 14 *+* 14 *+* 14 *.*

MGSE3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction 1𝑏 on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1𝑏. Recognize that a unit fraction 1𝑏 is located 1𝑏 whole unit from 0 on the number line.

b. Represent a non-unit fraction 𝑎𝑏 on a number line diagram by marking off *a* lengths of 1𝑏 (unit fractions) from 0. Recognize that the resulting interval has size 𝑎𝑏 and that its endpoint locates the non-unit fraction 𝑎𝑏 on the number line.

MGSE3.NF.3 Explain equivalence of fractions through reasoning with visual fraction models. Compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

b. Recognize and generate simple equivalent fractions with denominators of 2, 3, 4, 6, and 8, e.g., 12 = 24,4 6 = 23. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 =* 62 *(3 wholes is equal to six halves); recognize that* 31 *= 3; locate* 44 *and 1 at the same point of a number line diagram.*

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

**STANDARDS FORMATHEMATICAL PRACTICE**

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

**BACKGROUND KNOWLEDGE**

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the unit so that students understand what is expected of them.

**COMMON MISCONCEPTIONS**

Students do not understand that when partitioning a whole shape, number line, or a set into unit fractions, the intervals must be equal.

**ESSENTIAL QUESTION**

● How are fractions used in problem-solving situations?

**MATERIALS**

Materials Required Per Group

● “The Fraction Story Game, Directions” student sheet

● “The Fraction Story Game, Game board” student sheet

● Colored pencils or crayons

● Index cards (about 60)

● Common classroom materials - Recycled items for game pieces (about 6)

**GROUPING**

Small Group Task

**TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION**

Students create a game while reviewing all the different aspects of fractions they have studied.

**Comments**

Students may not understand what you mean by “common classroom materials.” While many classrooms have standard dice that can be used, give alternative examples such as a penny can be flipped to determine how many spaces the players get to move (heads = 2 spaces, tails =1 space). For game pieces, extra marker caps, plastic soda lids, manipulatives, or coins can be used.

**Part I (SMP 1, 2, and 6)**

Begin by having students review lessons or activities that have been done during the fraction unit. Record their thoughts on chart paper or the board. You may want to post a list of the elements of the standards covered during the unit and reflect on tasks and activities which addressed each element.

Students will write 20 – 30 word problems that assess the standards covered. You may want the children to work with a partner or in small groups to create enough questions.

This culminating task represents the level of depth, rigor, and complexity expected of all third grade students to demonstrate evidence of learning.

Additional Comments:

● Students should have had multiple opportunities to write story problems by this time in the school year.

● Questions should match a standard.

● Index cards may be used for the problem cards. Insist that the students write legibly. All problem cards should have the solutions on the back

● Solutions should be accompanied by an explanation/illustration.

● Game boards, playing pieces, and cards can be stored in large Ziploc bags or manila folders.

The cards students create for their games can be used in a variety of ways. The problem cards can be used to create a Jeopardy type game which can be played as a review of the unit. Also the problem cards can be reproduced and used as a set of review question before the unit assessment.

**Part II (SMP 1, 2, 3, 4, 5, 6, 7, and 8)**

Students will follow the directions below from “The Fraction Story Game, Directions” student sheet.

Your task is to create a fraction story game using what you learned about fractions. Use the fraction game board on “The Fraction Story Game, Game Board” student sheet to create a game that other students will want to play.

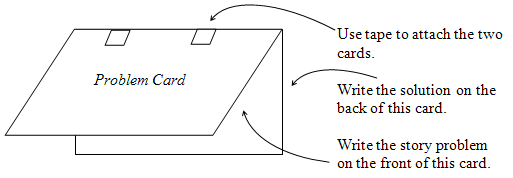
Directions:

● Look at the list of the standard that you studied in class. The problem cards you create must match those standards.

● You will need to make approximately 30 problem cards for your game. Most of the cards should be written in story problem form.

● Be sure you have some problem cards for each of the standards addressed in this unit.

● Each problem card must have the correct answer on the back. Cover each problem card with a blank index card so players cannot see the problems before their turn. See sample below.

****● Write the rules for your game.

**Things to remember:**

• You can only use common classroom materials.

● You may decorate your game board in a way that makes the game interesting and fun to play.

● Be sure to play your game with a partner to be sure it works.

**FORMATIVE ASSESSMENT QUESTIONS**

● What are the skills you learned during this unit?

● What kind of problem can you create for \_\_\_\_ (one of the elements of the standard)?

● How do you know this is the correct solution for your problem?

**DIFFERENTIATION**

**Extension**

● Students can create their own game board format with penalties, rewards, and more complex rules.

**Intervention**

● Allow students to work in a small group so each student will need to make only one card per standard.

● For some of the parts of a standard, give the students the problem and require them to create the solution to the problem.

Fractions Rubric (NF1, NF2, NF3)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Level 1** | **Level 2** | **Level 3** | **Level 4** |
| **SMPs**  **-uses processing skills (estimating, drawings, grid paper, manipulatives) to solve problems involving fractions** | -is not able to solve problems involving fractions using processing skills | -is able to solve some problems involving fractions using processing skills | -solves problem involving fractions using processing skills | -choses effective processing skills according to the demand/context of the problem to solve problems involving fractions |
| **NF1**  **-identifies fractional parts** | -is not able to identify fractional parts | -identifies fractional parts with support or scaffolds | -identifies fractional parts | -identifies fractional parts and explains his/her thinking |
| **NF1**  **-demonstrates understanding of fractions as equal parts of a whole** | -demonstrates no or limited understanding of fractions as equal parts of a whole | -with support demonstrates understanding of fractions as equal parts of a whole | -demonstrates understanding of fractions as equal parts of a whole | -explains to other how fractions are equal parts of a whole |
| **NF1**  **-demonstrates understanding of fractions as equal parts of a set** | -demonstrates no or limited understanding of fractions as equal parts of a set | -with support demonstrates understanding of fractions as equal parts of a set | -demonstrates understanding of fractions as equal parts of a set | -explains to other how fractions are equal parts of a set |
| **NF1**  **-names fractional parts using numerator and denominator** | -does not name fractional parts using numerator and denominator | -with help names fractional parts using numerator and denominator | -names fractional parts using numerator and denominator | -explains numerator and denominator and names fractional parts |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **NF2**  **-demonstrates understanding of fractions as equal parts of a length** | -demonstrates no or limited understanding of fractions as equal parts of a length | -with support demonstrates understanding of fractions as equal parts of a length | -demonstrates understanding of fractions as equal parts of a length | -explains to other how fractions are equal parts of a length |
| **NF2**  **-partitions a number line into equal parts** | -does not partition a number line into equal parts | -with help partitions a number line into equal parts | -partitions a number line into equal parts | -partitions a number line into equal parts and explains how each part represents a unit fraction |
| **NF2**  **-labels a non-unit fraction on a number line (such as ¾)** | -cannot label a non-unit fraction on a number line | -sometimes labels a non-unit fraction on a number line | -labels non-unit fractions on number lines | -labels non-unit fractions on number lines and identifies the unit fractions |
| **NF3**  **-describes how as the number of equal pieces in the whole increases, the size of the fractional pieces decreases** | -cannot describe how the number of equal pieces in the whole increases, the size of the fractional pieces decreases | -with models and supports describes how as the number of equal pieces in the whole increases, the size of the fractional pieces decreases | -describes how as the number of equal pieces in the whole increases, the size of the fractional pieces decreases | -orders fractional pieces from least to greatest |
| **NF3**  **-recognizes fractional equivalence using a visual model** | -cannot recognize fractional equivalence using a visual model | -sometimes recognizes fractional equivalence using a visual model | -recognizes fractional equivalence using a visual model | -recognizes fractional equivalence without the support of a visual model |
| **NF3**  **-compares fractions with the same numerator or with the same denominator** | -cannot compare fractions with the same numerator or with the same denominator | -with scaffolds and support compares fractions with the same numerator or with the same denominator | -compares fractions with the same numerator or with the same denominator | -explains how fractions with the same numerator or with the same denominator are equal, less, or more |

***Lesson Plans:***

Lesson: Launch Activity

Title: One Brownie to Share

|  |
| --- |
| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs:**  **1, 3, 4, 6, 8** |
| Essential Question:   1. How do we know how many fractional parts make a whole? 2. When is it appropriate to use fractions? |
| By the end of the lesson, students will…   * divide a shape into equal parts * describe equal parts as a part of a whole |
| Materials/Manipulatives:  - Rectangles to divide into parts |
| Opening:  PreTest using Plickers  R- Fractions and equal shares  T- “During today’s lesson, you are going to solve some problems about sharing brownies. For this activity, you are going to pretend that these rectangles are brownies. You are going to draw a line on this brownie so that it can be shared equally between two people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?”  Demonstrate how to write the fraction 1/2. |
| During (including differentiation):  Students divide a brownie (paper rectangle) into halves, thirds, fourths, sixths, eighths. They describe how many pieces it takes to make the whole brownie and how much each person gets.  **Differentiation**: According to the data collected with the Plickers, a small group that did not identify the picture that was equally divided into sixths. They will use this link [***http://www2.smarttutor.com/player/swf/STA\_Fraction\_Part\_of\_Whole\_L3\_V1\_T1a.swf***](http://www2.smarttutor.com/player/swf/STA_Fraction_Part_of_Whole_L3_V1_T1a.swf) ***,***to practice identifying shapes divided into equal parts. |
| Closing:  Students will share how they divided their brownie to share equally among the appropriate amount of people. Students who share will be chosen carefully (unequal pieces, equal pieces, unusual divisions, common divisions). The class will answer the following questions about each shared piece of work and show the work using an on-line geoboard at <http://www.mathlearningcenter.org/web-apps/geoboard/>   * How many fractional parts make the whole? * Are the pieces equal? Are they shared fairly and equally? How do you know?   Teacher will discuss and share how to represent the fractional piece in written form. |
| **Formative Assessment:**  TOD: Use the rectangle on your desk and divide it into fourths. On the back, tell how many parts it takes to make the whole and how you know your rectangle is divided into fourths. |
| Technology:  <https://plickers.com/> for the assessment, <http://www.mathlearningcenter.org/web-apps/geoboard/> for the geoboard, and  [***http://www2.smarttutor.com/player/swf/STA\_Fraction\_Part\_of\_Whole\_L3\_V1\_T1a.swf***](http://www2.smarttutor.com/player/swf/STA_Fraction_Part_of_Whole_L3_V1_T1a.swf) |

Pre-Test- **Formative Assessment**

This pre-test was loaded into <https://plickers.com/>, an online testing program that allows the teacher to collect immediate data on what the students know by using a phone or tablet to scan cards as the students hold them up. The feedback to the teacher and to the student is immediate.

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

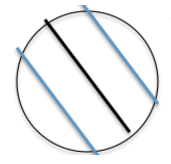
1. If two students in our classroom had a cookie to share, and the teacher cut the cookie like this, how would you describe the cookie?



Missed it:

No one

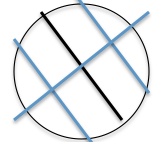
1. parts
2. 2 cookies
3. halves
4. same size pieces
5. After the teacher cut the cookie, how many pieces made up the whole cookie?
6. 1
7. 2
8. 3
9. 4
10. Draw a line on this cookie to show how to cut the cookie into fourths?



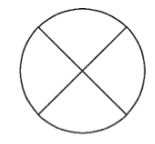
Missed it:

77% of the class!!

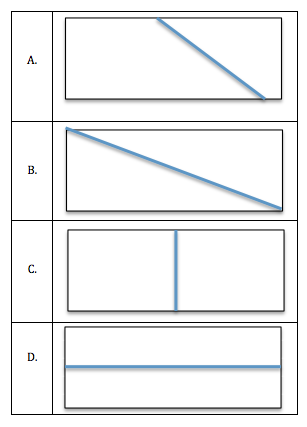
1. True
2. False
3. This is one way to draw a line on a cookie to show how to cut it into fourths?



1. True
2. False
3. This is one way to draw a line on a cookie to show how to cut it into fourths?



1. True
2. False
3. What words could be used to describe the slices of the cookie that you have cut into fourths? Choose the best answer.
4. smaller pieces
5. more cookies
6. same size pieces
7. pieces that make up the whole cookie
8. Sam and his brother wanted to partition the rug in the living room so that they would both have the same amount to play on. Choose the rectangles below that show how you could partition the rug so that they each have the same amount.



1. What math words describe the pieces of rug? Choose the best answer.
2. halves
3. fourths
4. same size pieces
5. different size pieces
6. How many pieces make up the whole rug?
7. 4
8. 3
9. 2
10. 1
11. What part of the rug does Sam have to play on? Choose the best answer.
12. part of it
13. half of it
14. the whole rug
15. none of the rug

Problems with Brownies

Use one whole brownie for each situation:

Use one brownie and draw a line on it to show how it can be shared equally between two people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?

Use another brownie to show how it can be shared between 3 people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?

Use another brownie to show how it can be shared between 4 people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?

Use another brownie to show how it can be shared between 6 people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?

Use another brownie to show how it can be shared between 8 people. What would you call the share of the brownie that one person gets? What fraction of the brownie does each person get?

Brownies

Cut each brownie out on the dotted line.

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Lesson #1

Title: Identify and Write Fractions

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| --- |
| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs:**  **1, 2, 3, 4, 6, 8** |
| Essential Question:   1. What is a fraction? 2. How can I represent fractions of different sizes? 3. What relationships can I discover about fractions? |
| By the end of the lesson, students will…  - show that a fraction is a part of a whole |
| Materials/Manipulatives: fraction pieces (circles and rectangles) |
| Opening:  R- the Launch lesson make connections to today’s learning: divide shapes into equal parts, and describe parts of the whole  Say: We use fractions to show a part or parts of a whole. When you take a whole and divide it into equal parts, you have made a fraction of it.  Work as partners and do a Frayer Model using the word Fraction.  Ask: Do you think it is important that all the parts of a fraction are equal? Why or Why not? How do we write fractions so that people know we are talking about part of a whole and NOT a whole number?  Discuss how to write fractions  Today, we are going to solve problems about what fraction of pizza William and his classmates eat. |
| During (including differentiation):  Students grouped according to information from pre-test  “William’s class had a pizza party on the last day of school. One of the pizzas was divided into 6 pieces. William ate 2 of the pieces. What fraction of the pizza did William eat?”  Students work in partner pairs to show what fraction using their fraction circles.  Solve other problems with other students eating part of the pizza. See handout.  Misconception to be aware of: Students who think they are taking away pieces of the circles.  **Differentiation:** According to the TOD from the last class, students that could not tell how many were in the whole will be pulled and a review lesson using fraction circles to identify the whole and the parts will be done. 2 other students were added because of their pre-test (Students: |
| Closing: Students will share and discuss how much of the pizza William, Kyleigh, and Susan ate. They will use the manipulatives at <http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html> to defend/explain their work. |
| **Formative Assessment:** Checklist  The teacher will keep a checklist documenting the students that show understanding that a fraction is part of a whole. |
| Technology:  Manipulatives at <http://www.glencoe.com/sites/common_assets/mathematics/ebook_assets/vmf/VMF-Interface.html> and extension at [***http://www.sheppardsoftware.com/mathgames/fractions/memory\_fractions1.swf***](http://www.sheppardsoftware.com/mathgames/fractions/memory_fractions1.swf) |

Check List for Lessons 1 and 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Student Name** | **Identify fraction as part of a whole** | **Identify the fractional pieces that make up a whole** | **Names how many pieces it takes to make a whole** | **Writes fraction in written form** | **Comments** |
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Frayer Model Example- This model will be added to/redefined later in the fractions unit.

|  |  |
| --- | --- |
| **Definition in own words:**  A part of a whole  Fraction | **Facts/Characteristics:**   * **Equal pieces** * **Number of parts tells denominator** |
| **Examples:**  **Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-23 at 10.00.13 AM.png** | **Non-Examples:**  **Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 9.44.07 AM.png** |

Class Pizza Party

Work together as a group to answer the following questions. Don’t forget to use your manipulatives to help you.

1. William’s class had a pizza party on the last day of school. One of the pizzas was divided into 6 pieces. William ate 2 of the pieces. What fraction of the pizza did William eat? How do you know? Draw a picture to prove your answer.

2. Sara ate 1 of the pieces. What fraction of the pizza did Sara eat? How do you know? Draw a picture to prove your answer.

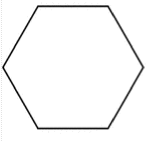
3. Donna ate 3 of the pieces. What fraction of the pizza did Donna eat? How do you know? Draw a picture to prove your answer.

Lesson #2

Title: Pattern Block Fractions

|  |
| --- |
| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs:**  **1, 3, 4, 6, 8** |
| Essential Question:  - How many halves (thirds, fourths, sixths, eighths) does it take to make a whole?  - How can I represent fractions of different sizes? |
| By the end of the lesson, students will…  -Explain how a fraction is part of a whole |
| Materials/Manipulatives: Pattern Blocks |
| Opening: Review that fractions are equal parts of a whole. How many equal parts it takes to make the whole is the denominator. Review how to write fractions. Discuss how today we are using the yellow, hexagon pattern block as our whole. Each group of students will then use the pattern blocks to see what fraction that block is of the whole. For example, the red trapezoid is 1/2. |
| During (including differentiation):  Students will work in groups based off of the teachers checklist from yesterday to solve the following problem:  If the yellow hexagon has the value of one whole what is the value of: - the red trapezoid? - the blue rhombus? - the green triangle? Record your thinking.  **Differentiation** for the Higher level students:  If the red trapezoid has the value of one whole what is the value of: - the yellow hexagon? - the blue rhombus? - the green triangle? Record your thinking.  **Differentiation** for the struggling students:  The teacher will provide scaffolds of drawings for each of the pattern blocks in the shape of the whole. The students will use the scaffold to help them answer the questions.  Extension: Vocabulary practice using <http://www.studystack.com/flashcard-2094121> |
| Closing: The teacher will choose a group or groups to share their thinking with the class and to prove their answers.  Teacher will review how to record written fractions and what they represent. |
| **Formative Assessment:** Checklist  Teacher will keep a checklist/conference notes to track those that can explain fractional pieces as part of a whole, how many it takes to make up the whole, and how to write a fraction. |
| Technology: [***http://www.sheppardsoftware.com/mathgames/fractions/memory\_fractions1.swf***](http://www.sheppardsoftware.com/mathgames/fractions/memory_fractions1.swf) |

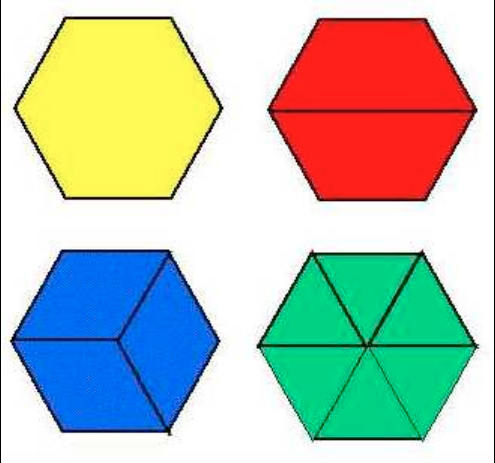
Pattern Block Fractions



=1 (whole)

|  |  |  |  |
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|  | How many make the whole? | What fraction of the whole is this shape? | Use words to explain how you know. |
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| Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2016-01-05 at 2.18.49 PM.png |  |  |  |
| Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2016-01-05 at 2.19.00 PM.png |  |  |  |

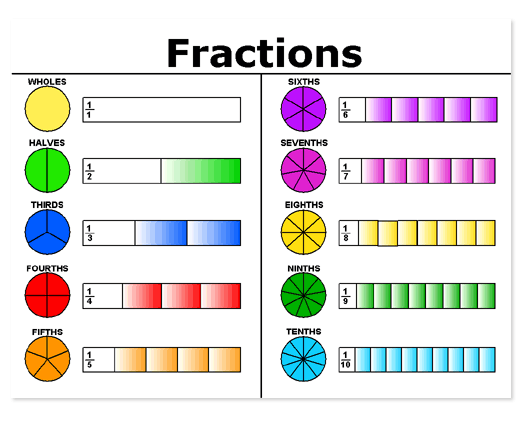
Scaffold for Differentiation:



Lesson #3

Title: Exploring Fractions (**Interdisciplinary Lesson)**

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| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs**  **1, 2, 3, 4, 6, 8** |
| Essential Question:   * How do you know you have equal parts? * What does the numerator represent? * What does the denominator represent? * What relationships can I discover about fractions? |
| By the end of the lesson, students will…  - explain how fractions represent equal parts |
| Materials/Manipulatives: construction paper, fraction strips |
| Opening:  Watch YouTube of Give Me Half by Stuart Murphy  Discuss how the pizza is divided equally (fair share).  <https://www.youtube.com/watch?v=hVaxiJB6Fls> |
| During (including differentiation):  Individual work  To begin the lesson, give students six strips of paper in six different colors. Specify one color and have students hold up one strip of this color. Tell students that this strip will represent the whole. Have students write “one whole” on the fraction strip. The term whole is included in the labeling instead of 1 because it help eliminate confusion between the numeral 1 in fractions such as 1/2. Next, ask students to pick a second strip and fold it into two equal pieces. Have students draw a line on the fold. As students what they think each of these strips should be called (one-half or 1/2). It is important here, for students to understand how fractions are named. Review the names numerator and denominator. Have students label their strips accordingly using both the word and the fractional representation. Label both sides of the strip “1/2 and one-half”. Continue to fold and label the strips of paper for 1/3, 1/4, 1/6, and 1/8.  Group work  Students placed in groups according to teacher observation/checklist from the last 2 day.  Students use their fraction strips and write down observations about the fractions strips. Have each group share some of their comments. Teacher will lead groups to consider questions such as:  How many halves does it take to make a whole strip? How many thirds does it take to equal one whole? How many fourths, sixths, eighths?  Groups should then answer:  What do you think three 1/8 strips might be called? How would you write that fraction?  If you made a 1/9 fraction strip, how many ninths would it take to make a whole?  Pretend you are having a party for 6 people. For refreshments you are serving a 12” sub sandwich. Draw and label a 12” sub. Show how you would equally divide the sandwich for 6 people. Use pictures, words, and number to explain your reasoning.  **Differentiation:** Students who are struggling creating equal parts to make a whole or with writing fractions correctly will be asked to work on the computer [***http://interactivesites.weebly.com/fractions.html***](http://interactivesites.weebly.com/fractions.html)  Students struggling to create fraction strips will be given a set to look at while working.  Extension: Vocabulary practice using <http://www.studystack.com/flashcard-2094121> |
| Closing: Groups will share their thinking to the last question. Groups will be chosen that showed different (uncommon) ways of dividing the sandwich. |
| **Formative Assessment:**  Journal writing: Look at your fraction strip for 1/3 and 1 whole. What observations can you make about these strips. Make sure you draw and label the strips in your journal. |
| Technology: [***http://interactivesites.weebly.com/fractions.html***](http://interactivesites.weebly.com/fractions.html)  And <https://www.youtube.com/watch?v=hVaxiJB6Fls> |

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

**EXPLORING FRACTIONS**

(Adapted from a lesson by Angela Lacey Hester, Floyd County, GA)

1. Using complete sentences and math words, write 3 observations you and your group made about the Fraction Strips.

Use your Fraction Strips to answer the following questions.

2. How many thirds does it take to equal one whole?

3. How many sixths does it take to equal one whole?

4. What do you think three 1/8 strips might be called? How would you write that fraction?

5. If you made a 1/9 fraction strip, how many ninths would it take to make a whole?

Put on your thinking caps…

6. What would a 1/10 Fraction Strip look like? Sketch and label the Fraction Strip in the space below.

7. Pretend you are having a party for 6 people. For refreshments, you are serving a 12” sub sandwich. On the back of this paper, draw and label a 12” sub (just like your Fraction Strips). Show how you would equally divide the sandwich for 6 people. Use pictures, words, and numbers to explain your reasoning.

Lesson #4

Title: Finding Fair Shares

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| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs:**  **1, 2, 3, 6, 7, 8** |
| Essential Question:   * What is the unit fraction? * Is 1/4 always the same size? How do you know? * How does the size of the whole affect the size of the fraction? |
| By the end of the lesson, students will…  - find fractional parts using a model |
| Materials/Manipulatives: pictures of fractional parts and written fractions |
| Opening: Teacher will review fractions as part of a whole, how to write a fraction- numerator and denominator, equal parts.  Discuss how to do a card sort |
| During (including differentiation):  Students work in groups assigned by the teacher (groups arranged according to understandings of fractions as observed through work over the last 4 days). Groups will complete a card sort that uses models and written fractions.  **Differentiation:**  Different groups will have different sorts. Some groups will have only the models we have studied so far (light blue cards), while other groups will be challenged to include sets and number lines (yellow cards), while other groups will have blank cards and will have to fill in the missing pieces of their sort (white cards).  Any student still struggling with how many parts make up a whole, will be assigned [***http://www2.smarttutor.com/player/swf/STA\_Fraction\_Part\_of\_Whole\_L3\_V1\_T1a.swf***](http://www2.smarttutor.com/player/swf/STA_Fraction_Part_of_Whole_L3_V1_T1a.swf)  Extension: Vocabulary practice using <http://www.studystack.com/flashcard-2094121> |
| Closing: The sorts will be displayed on the wall and the students will do a chalk talk and leave observations for other groups. |
| **Formative Assessment:** The teacher will gather data in anecdotal records based off of how the students sort the cards. |
| Technology: [***http://www2.smarttutor.com/player/swf/STA\_Fraction\_Part\_of\_Whole\_L3\_V1\_T1a.swf***](http://www2.smarttutor.com/player/swf/STA_Fraction_Part_of_Whole_L3_V1_T1a.swf) |

Fraction Card Sort for Blue Cards

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| **Fourths** | :::Screen Shot 2015-12-14 at 2.48.29 PM.png | :::Screen Shot 2015-12-14 at 3.03.12 PM.png |
| |  | | --- | |  | |  | |  | | **Thirds** | **Sixths** |
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Fraction Card Sort for Yellow Cards

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| **Fourths** | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.32.06 AM.png | :::Screen Shot 2015-12-14 at 3.03.12 PM.png |
| http://www.homeschoolmath.net/teaching/f/images/3times5balls-answer.gif | **Thirds** | **Sixths** |
| |  |  |  | | --- | --- | --- | |  |  |  | |  |  |  | | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.35.05 AM.png | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.48.18 AM.png |

Fraction Card Sort for White Cards

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| **Thirds** | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.32.06 AM.png | :::Screen Shot 2015-12-14 at 3.03.12 PM.png |
| http://www.homeschoolmath.net/teaching/f/images/3times5balls-answer.gif |  |  |
|  | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.35.05 AM.png | Macintosh HD:Users:kristicaissie:Desktop:Screen Shot 2015-12-15 at 11.48.18 AM.png |

Lesson #5

Title: Candy Crush

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| GSE:  MGSE3.NF.1 Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts (unit fraction); understand a fraction 1/b as the quantity formed by a parts of size 1/b. For example, ¾ means there are three ¼ parts, so ¾ = ¼ + ¼ + ¼  **SMPs:**  **1, 3, 4, 6, 8** |
| Essential Question:   * What represents the denominator in a set? * What represents the numerator in a set? |
| By the end of the lesson, students will…  - identify fraction of a set |
| Materials/Manipulatives: 2-color counters, containers of candy representing the portions stated in the problems. |
| Opening: Review parts of a whole. Discuss how sets of things can be looked at as parts also. Watch YouTube: <https://www.youtube.com/watch?v=DlIf-MuYguY> |
| During (including differentiation): Students work in groups to the Candy Crush problems:  Jar #1 contains 24 pieces of Twizzlers. How many Twizzlers will you get if you can have 1/4 of them?  Jar #2 contains 12 Hershey’s Kisses. How many Hershey’s Kisses can you get if you can have 1/2 of them?  Jar #3 contains 21 Gummie Bears. How many Gummie Bears can you get if you can have 1/3 of them?  Jar #4 contains 16 Skittles. How many Skittles can you get if you can have 1/2 of them?  Does 1/2 always represent the same value? Explain your thinking.  Which candy will you choose? Explain your thinking.  Stanley chose 5 pieces of peppermints. If 5 pieces represents 1/4 of all the peppermints, how many peppermints were there altogether?  **Differentiation:** Struggling students will be given a sheet of paper that is divided into equal groups that is represented by the denominator in their problem. Have them count out the number of counters in the set in their problem and divide them evenly into the groups.  Extension: Vocabulary practice using <http://www.studystack.com/flashcard-2094121> |
| Closing: Groups will be chosen to share their thinking and their strategies for problem solving. |
| **Formative Assessment:**  Conference Notes will be gathered based off of observations made during the work time. |
| Technology: [***http://www.sheppardsoftware.com/mathgames/fractions/fracTut1.swf***](http://www.sheppardsoftware.com/mathgames/fractions/fracTut1.swf)  And <https://www.youtube.com/watch?v=DlIf-MuYguY> |

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

**Candy Crush!**

**Directions: You are being rewarded for your good classroom behavior! Use counters to help you solve and then draw a picture to justify each answer.**

**Jar #1 contains 24 pieces of Twizzlers. How many Twizzlers will you get if you can have ¼ of them?**

**Jar #2 contains 12 Hershey’s Kisses. How many Hershey’s Kisses can you get if you can have ½ of them?**

**Jar #3 contains 21 Gummie Bears. How many Gummie Bears can you get if you can have ⅓ of them?**

**Jar #4 contains 16 Skittles. How many Skittles can you get if you can have ½ of them?**

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

**Candy Crush! - Questions**

**1. Write a number sentence that represents how you solved each problem.**

**Jar #1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Jar #2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Jar #3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Jar #4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**What operation is related to fractions? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**2. Does ½ always represent the same value? Explain your thinking.**

**3. Which candy will you choose? Explain your thinking.**

**4. Stanley chose 5 pieces of peppermints. If 5 pieces represents ¼ of all the peppermints, how many peppermints were there altogether?**