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| **GRADE: 6th** | | |
| **Unit Title:** Division of Fractions  **Lesson Title:** Divide fractions and mixed numbers  **Estimated Duration: 1 Day** | | **Real World Purpose:**  What would you do if you had a portion of a piece of pizza and were required to split it into smaller parts and share it with your closest friends? How would you ensure that each resulting piece was equal in size? Fraction division allows us to do just that. |
| ***I Can:***  **Standard(s): 6.NS.1**: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. | | |
| **Performance Objective: (Evidence of Learning)**  The student will be able to interpret fractions by using models (e.g., number lines, etc.) and compute fractions, solve word problems involving division of fractions with 70% accuracy. Use this link for student’s individual practice;  <https://www.ixl.com/math/level-h/divide-fractions-and-mixed-numbers-word-problems> | | |
| **Prerequisite Skills:**   * Prerequisite Skills: (Fractions and The Number Line) • Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. (3.NF.1) • Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. (3.NF.2b) • Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (3.NF.3) • Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or 1 as a sum of fractions 1/b. (4.NF.3) • Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. [For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people, each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?] (5.NF.3) • Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. (5.NF.4) • Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5.NF.7) | | |
| **Materials/Resources:**  • Fraction tiles • Counters  • Horizontal and vertical number lines  •Bell •Chart paper  •Glue sticks •Post-it notes • Scissors  • Stapler • Word wall  • Card stock/Construction paper • Color-coded sticky dots  • Colored pencils • Color tiles • Fraction circles | | **Key Vocabulary:**   * Fraction * Quotient * Rational number * Complex fraction * Equal sharing * Equivalent * Improper fraction * Mixed number * Inverse * Reciprocal |
| **Elements of Rigor:**   * **Conceptual understanding of key concepts** * **Procedural skill and fluency** * **Rigorous application of mathematics in real-world contexts** | | |
| **Lesson Introduction** | | |
| **How will you introduce the lesson?**  **Student Exploration Activity**  Option 1 ( High- tech)  Pre-Class Preparation: (#1) <https://www.quizizz.com/admin/quiz/593ff56ab89926110096c2bc>, Using this link, the students will play on-line game for the “Key Vocabulary” that will be used in the lesson.  Option 2 ( Low- tech)  Pre-Class Preparation: (#2) Prepare a two small boxes with each of the vocabulary words provided in “Key Vocabulary” section above. Box 1 contains the key vocabulary and box 2 contains the meaning and/or definition. The student must draw one rolled paper from each box and match the vocabulary to its meaning/definition. As students use these words and/or the teacher defines these words throughout the entire unit, the students and/or the teacher will place these words on the Word Wall. | | |
| **Lesson Activities** | | |
| (Objective: To compute and interpret with unit fractions)  **1. Unlocking of dificulties**, students will be involved in an interactive play using this link, (<https://www.quizizz.com/admin/quiz/593ff56ab89926110096c2bc>), for high-tech activity. For a low-tech activity, Prepare a two small boxes with each of the vocabulary words provided in “Key Vocabulary” section above. Box 1 contains the key vocabulary and box 2 contains the meaning and/or definition. The student must draw one rolled paper from each box and match the vocabulary to its meaning/definition. As students use these words and/or the teacher defines these words throughout the entire unit, the students and/or the teacher will place these words on the Word Wall.  **2.Review** (Review unit fractions and other familiar rational numbers) The teacher will begin the lesson by explaining that many geometric shapes can be divided into congruent parts to reveal fractional pieces. Formulas we need to use are a/b × c/d= (ac)/(bd) and a/b ÷c/d = (ad)/(bc). To multiply fractions, multiply the numerators for the numerator of the product, and then multiply denominators for the denominator of the product. If you have mixed numbers, write them as improper fractions before you begin multiplying. In a division problem, multiply the first fraction (the dividend) by the reciprocal of the divisor.  **3. Motivation**: “ Who among you have been to the zoo recently?”  **4.Presentation:**  **a. Reading a word problem** entitled “At The Zoo”. (The elephants at the zoo eat 1 5/6 buckets of bananas each day. The  zookeeper bought 5 1/2 buckets of bananas. For how many days will the bananas last?  **b.Comprehension Questions**. 1. What is the story about? 2. What is asked in the problem? 3. What are the given facts? 4. How do we solve  the problem? 5.What are the steps to follow? These are the questions we need to answer as we go along and solve the word problem.  **5.Discussion:** **Let’s do Math!**  Write mixed numbers as improper fractions. Multiply by the reciprocal of the divisor.ve  Divide the total amount of bananas by the amount eaten each day.  **Steps in Solving the Problem**   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 5 | |  | | --- | | 1 | | 2 | | | ÷ | |  |  |  |  | | --- | --- | --- | --- | | 1 | |  | | --- | | 5 | | 6 | | | | = | | ? | | Write | | | |  |  |  |  | | --- | --- | --- | --- | | 5 | |  | | --- | | 1 | | 2 | | | | as an improper fraction: | | | | | |  | | |  |  |  |  | | --- | --- | --- | --- | | 5 | |  | | --- | | 1 | | 2 | | | = | |  | | --- | | (5 × 2) + 1 | | 2 | | | | | | | = | |  | | --- | | 11 | | 2 | | | Write | | | |  |  |  |  | | --- | --- | --- | --- | | 1 | |  | | --- | | 5 | | 6 | | | | as an improper fraction: | | | | | | | |  |  |  |  | | --- | --- | --- | --- | | 1 | |  | | --- | | 5 | | 6 | | | = | |  | | --- | | (1 × 6) + 5 | | 6 | | | | | | | = | |  | | --- | | 11 | | 6 | |   Turn this from a division problem into a multiplication problem by multiplying by the reciprocal.  MODEL YOUR SOLUTION   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 5 | |  | | --- | | 1 | | 2 | | | ÷ | |  |  |  |  | | --- | --- | --- | --- | | 1 | |  | | --- | | 5 | | 6 | | | = | |  | | --- | | 11 | | 2 | | ÷ | |  | | --- | | 11 | | 6 | | |  |  |  |  |  |  |  | |  |  |  | = | |  | | --- | | 11 | | 2 | | × | |  | | --- | | 6 | | 11 | |   Cancel common factors, then multiply.  3 Day  1 5/6  2nd Day  1 5/6  1st Day  1 5/6   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 11 | | 2 | | × | |  | | --- | | 6 | | 11 | | = | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 1 | | 1 | | × | |  | | --- | | 3 | | 1 | | | |  |  |  |  |  | |  |  |  | = | |  | | --- | | 1 × 3 | | 1 × 1 | | |  |  |  |  |  | |  |  |  | = | |  | | --- | | 3 | | 1 | |     Simplify the answer.  5 ½ buckets of bananas   |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | | 3 | | 1 | | = | 3 |   The zookeeper bought enough bananas to feed the elephants for 3 days  Watch my youtube video | | |
| **Lesson Closure** | | |
| 1. Students will write 3 big ideas that they learned from today’s lesson on one of their light bulbs and share it with a classmate. The classmate must initial beside the light bulb acknowledging the discussion and write one question for the student to consider for homework. The teacher will select several students to share with the class and respond as appropriate.  ***1 of the following problems involves division of fractions. Circle and solve the problems only. Use visual fraction models.***  1. Danny has 7/8 of a cake, and Rob has 1/4. How much more cake does Danny have?  2. Klay wants to make pieces of string that are (1/4) inch and has a string that is (7/8) inches long. How many pieces can he make?  3. Bron has (1/4) of the money and Steph wants (7/8) of his money. How much of the total money does Steph have? | | **Essential Questions:**  • Is division related to “repeated subtraction” as multiplication is related to “repeated addition”?  • Does the order in which you divide two fractions matter? Justify.  • What is the relationship between the term “complex fraction” and “fraction division”?  • When are Fraction Circles a more appropriate tool to use than Fractional Tiles?  • Can Fractional Tiles be used to model all fraction division problems?  • How is dividing whole numbers similar to dividing fractions?  • What is the relationship between division of whole numbers and multiplication of fraction reciprocals?  • How can a whole number be divided by a fraction?  • Why and how can an area model, a number line, or fraction tiles be used to model fraction division?  • What is the relationship between multiplication by a fraction and division?  • How can division of fractions be used to represent and understand real-world and mathematical problems?  • Why must the size of the whole (1) be the same when evaluating the numerator and denominator of a complex fraction?  • How can the proximity of 1 or 0 to a given fraction be used to help make predictions when simplifying complex fractions? |
| **Standards for Mathematical Practice** (select all that apply) | | |
| * Make sense of problems and persevere in solving them. * Reason abstractly and quantitatively. * Construct viable arguments and critique the reasoning of others. * Model with mathematics. * Use appropriate tools strategically. * Attend to precision. * Look for and make use of structure.   * Look for and express regularity in repeated reasoning. | | |
| **Supplemental Activities** | | |
| **Intervention**    ***Attachment # 1 Intervention #1: Naming Fractional Parts*** gives  struggling learners an opportunity to revisit labeling, constructing, and identifying fractional parts.  • http://www.commoncoresheets.com/Fractions.php Allows the teacher to customize worksheets for students that are having difficulty locating fractions on a number line.  • ***Attachment #2 Intervention #2: RWPs Dividing Unit Fractions and Whole Numbers*** gives students extra practice with real world problems (RWPs) that are practical and present a lower degree of difficulty.  [**http://www.commoncoresheets.com/Math/Fractions/Unit%20Fraction%20Word%20Problems/English/2.pdf**](http://www.commoncoresheets.com/Math/Fractions/Unit%20Fraction%20Word%20Problems/English/2.pdf)  [**https://www.ixl.com/math/level-h/divide-fractions-and-mixed-numbers-word-problems**](https://www.ixl.com/math/level-h/divide-fractions-and-mixed-numbers-word-problems) | | **Enrichment**    Have students create their own word problem involving division of fractions and allow  them to present their findings to the class .  • ***Attachment # 3 Enrichment #3: Divide Fractions*** contains 13 problems where advanced students may attempt to solve all the word problems.  <http://www.commoncoresheets.com/Math/Fractions/Unit%20Fraction%20Word%20Problems/English/2.pdf> |
| **Performance Based Assessment Task** | | |
| **Math Task**  *The teacher will work with each student one on one, giving each of them a word problem, and the teacher will observe how the student solve the problem. This is an example of the problem.*  Footsteps Preschool buys paint in bulk, then divides the paint into smaller portions for use in the classrooms. Today, they bought 8 2/3 gallons of purple paint and divided it equally among 6 classrooms. How much purple paint did each classroom get?  *Simplify your answer and write it as a proper fraction or as a whole or mixed number.*  Task Available at  https://www.ixl.com/math/level-h/divide-fractions-and-mixed-numbers-word-problems  *Some students will have to work on their word problems using the following sites.*  *This activity is good for students who needs interventions.*  [*https://www.ixl.com/math/level-h/divide-whole-numbers-by-unit-fractions-using-models*](https://www.ixl.com/math/level-h/divide-whole-numbers-by-unit-fractions-using-models)    *This activity is good for students for mastery of skills purposes.*  [*http://www.commoncoresheets.com/Math/Fractions/Division%20as%20Fraction%20-%20Word/English/2.pdf*](http://www.commoncoresheets.com/Math/Fractions/Division%20as%20Fraction%20-%20Word/English/2.pdf)  *https://www.ixl.com/math/level-h/divide-fractions-and-mixed-numbers-word-problems*    1 1 1 1 | **Rubric/ Plausible Student Response(s)**  . Visual Fraction Model (15 points)  • Number line partitioned correctly (10 points)  • Correct solution (25 points)  • Reasoning (25 points)  • Interpretation of solution (25 points)  *XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX*  Write mixed numbers and whole numbers as improper fractions. Multiply by the reciprocal of the divisor.  Divide the total amount of purple paint by the number of classrooms.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 8 | |  | | --- | | 2 | | 3 | | | | ÷ | | | 6 | | = | | | ? | | Write | | | | | |  | | | |  |  |  |  | | --- | --- | --- | --- | | 8 | |  | | --- | | 2 | | 3 | | | | | as an improper fraction: | | | | | | |  |  |  |  | | --- | --- | --- | --- | | 8 | |  | | --- | | 2 | | 3 | | | | = | | | |  | | --- | | (8 × 3) + 2 | | 3 | | | | | | | | | = | |  | | --- | | 26 | | 3 | | |  | |  | | |  | | | | | | | |  |  | | Write | | | | | | 6 | | as an improper fraction: | | | | | | | | | 6 | = | | |  | | --- | | 6 | | 1 | |   Turn this from a division problem into a multiplication problem by multiplying by the reciprocal.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  |  | | --- | --- | --- | --- | | 8 | |  | | --- | | 2 | | 3 | | | ÷ | 6 | = | |  | | --- | | 26 | | 3 | | ÷ | |  | | --- | | 6 | | 1 | | |  |  |  |  |  |  |  | |  |  |  | = | |  | | --- | | 26 | | 3 | | × | |  | | --- | | 1 | | 6 | |   Cancel common factors, then multiply.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 26 | | 3 | | × | |  | | --- | | 1 | | 6 | | = | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 13 | | 3 | | × | |  | | --- | | 1 | | 3 | | | |  |  |  |  |  | |  |  |  |  |  | |  |  |  | = | |  | | --- | | 13 × 1 | | 3 × 3 | | = | |  | | --- | | 13 | | 9 | | |  |  |  |  |  | |  |  |  |  |  |   Simplify the answer.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | 13 | | 9 | | = | |  |  |  |  | | --- | --- | --- | --- | | 1 | |  | | --- | | 4 | | 9 | | |   Each classroom got 1 4/9 gallons of purple paint.  1 1      Number line generator link.  <http://www.oliverboorman.biz/projects/tools/number_lines.php> | |
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