|  |
| --- |
| **Synopsis of high-quality task:**You are helping your mother to make cookies for a family reunion, and you will need to make enough for 72 people. You also want to make some cookies for refreshments to serve at a 4th grade family activity at school the following week. You need 140 cookies to have enough for the school function. **Anticipated student time spent on task:** 2 60-minute blocks**Student task structure(s):** Whole group and triad. |
| [**Math Content Standards and Practices:**](http://www.doe.mass.edu/frameworks/math/2017-06.pdf)**4.NF.B.4.a** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a∕b as a multiple of 1∕b. **4.NF.B.4.b** Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)***4.NF.B.4.c** Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. **SMP 1** Make sense of problems and persevere in solving them.**SMP 2** Reason abstractly and quantitatively**SMP 4** Model with mathematics**SMP 5** Use appropriate tools strategically**SMP 8** Look for and express regularity in repeated reasoning. |
| **Prior Knowledge:** **4.OA.A.2** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison**3.OA.A.1** Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.**3.OA.A.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.1**3.NF.A.1** 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*. |
| **Connections to the real-world:**- Cooking- Meal preparation |
| **Mastery Goals:****Learning Objective:**Students will be able to show their understanding of multiplying a whole number by a fraction and mixed numbers.**Language Objective:** Students will explain through discussion and in writing how they solved each part of the task. Students will use math vocabulary in their writing and discussion (multiply, yield) |
| **Teacher instructions****Instructional Tips/Strategies/Suggestions:**-Have a poster ready with the ingredient list. -Go over discussion norms of your class (ex: allow everyone’s voice to be heard, do not interrupt, agree or disagree respectfully, ask questions to each other to clarify if needed…)**DAY ONE*** Have students look at the recipe for making Chocolate Chip cookies.
* Ask students what they notice and what they wonder about the recipe.
* Focus students’ attention to the amounts of each ingredient needed (some are whole numbers, some are fractions, while some are mixed numbers.
* Point out the **yield** for the amount of cookies for this recipe (2 dozen- 24 cookies)
* Ask students what we would have to do if he needed 72 cookies for a large family party? What would we do if he needed 140 cookies for refreshments at a 4th grade family activity?
* Have students work in triads to discuss strategies to create and fill in a table to help to determine what we need to do to the ingredients if we need 72 cookies and then 140 cookies.
* Have a class discussion of what calculation need to be performed (multiply by 3, then by 6). Allow some students to show the tables they created under the document camera.
* Explain that we will need to know how much of each ingredient we will need. Have students go back into their triads to determine the amount of each ingredient needed when making 72 cookies and then 140 cookies.
* Bring students back for class discussion of how much of each ingredient will be needed. Teacher may recreate the ingredient list graphic on a poster and students may come up to add their answer with multiplication sentences in the boxes. Allow students to discuss and verify answers as a class, reminding them of discussion norms of the class.

**DAY TWO*** Begin by referring to ingredient list and student worksheets.
* Have students explain in writing what they would do to measure the flour and the coconut if we do not have the ½-cup measuring cup. (Use the ¼-cup because ¼ x 2= 2/4, which is equivalent to ½)
* When students have successfully verified the amounts of each ingredient and worked to explain how to measure the flour and coconut, have them go back into their groups to investigate how much flour is needed and to determine if they have enough. (We want them to determine that **one bag of flour contains 16 ⅔ cups of flour**. We need 7 ½ cups of flour for 72 cookies and 15 cups of flour for 140 cookies. In total **we need 22 ½ cups of flour, so we will need one more bag of flour** to make all the cookies)
* Circulate as students work to listen to their reasoning and discussions. Ask guiding questions as needed. Look for groups that are having success so they may lead a discussion afterwards.
* Bring students back in whole group so we may hear from teams about how much flour we need. Choose a group to begin as you facilitate discussion and allow students to clarify and explain what they did.
 |
| **Instructional Materials/Resources/Tools:** * Task worksheet with directions
* Rubric
* Teacher created poster of ingredient list for students to fill in (recreate worksheet list)
* Fraction bars available at each team
 |
| **Accessibility and Supports:** **Potential sentence starters:**-In order to yield 72 cookies, we will need to... -In order to yield 140 cookies, we will need to…-To measure the flour and coconut without a ½ c measuring cup, we will…-We will need \_\_\_\_ bags of flour.**Key academic vocabulary:** Fraction, equation, yield, pound = lb.  |

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

**Baking for a Reunion**

You are helping your mother to make cookies for a family reunion, and you will need to make enough for **72 people**. You also want to make some cookies for refreshments to serve at a 4th grade family activity at school the following week. You need **140 cookies** to have enough for the school function.

**CHOCOLATE CHIP COOKIES**

* **2 1/2 cups all-purpose flour**
* **1 teaspoon salt**
* **3/8 teaspoon baking soda**
* **3/4 cup unsalted butter, softened**
* **1 cup granulated sugar**
* **3/4 cup packed brown sugar**
* **2 eggs**
* **5/8 teaspoon vanilla**
* **3 cups semisweet chocolate pieces**
* **1/2 cup flaked coconut (optional)**

**→YIELD- 24 cookies**

 \*You only have a **1 cup** and a **¼ measuring cup** that you can use.

 \*You have one 5 lb. bag of flour. (**3 ⅓ cup of flour make one pound.**)

1. Make a table to determine how many recipes to make to yield 72 cookies and then 140 cookies.
2. Write a multiplication equation to determine how much of each ingredient you will need to make 72 cookies and 140 cookies.
3. Explain how you will measure the flour and the coconut if you do not have a ½ cup measuring cup.
4. Determine how many bags of flour you will need to make **all** the cookies.

**Work Area:**

a.How many batches will you have to make to have 72 cookies? 140 cookies? Make a table to show your thinking. Justify why you will have leftovers from the batch of 140 cookies.

b.Write a multiplication equation to determine the amount of each ingredient needed. (Put the amount of flour into an improper fraction to determine how much flour is needed for the different amounts.)

|  |  |  |
| --- | --- | --- |
| Ingredient | Amount needed for 72 cookies | Amount needed for 140 cookies |
| Flour |  |  |
| Salt |  |  |
| Baking Soda |  |  |
| Unsalted butter |  |  |
| Granulated Sugar |  |  |
| Brown Sugar |  |  |
| Eggs |  |  |
| Vanilla |  |  |
| Chocolate Chips |  |  |
| Coconut |  |  |

c. How will you measure the flour and the coconut if you do not have a ½ cup measuring cup? Use a tape diagram to show your thinking.

d. How many bags of flour will be needed to make **all** of the cookies? (\*Remember: 3 1/3 cups of flour make one pound and you have a 5lb. bag.

|  |
| --- |
| **Sample Student Work:**Student solution for the "Baking for a Reunion Task" |