

Grade 4 *Celebrations* Mathematics Lesson Day 1 “Party Time”

Rationale

- ✚ One of the critical areas for 4th grade, as identified by the Common Core State Standards, is developing an understanding and fluency with multi-digit multiplication. The intent of this lesson is for students to continue developing fluency in this area. This lesson also provides students an opportunity to demonstrate grade-level proficiency of the Standards for Mathematical Practice.

Goal

- ✚ To add, subtract, and multiply multi-digit numbers

Standards

- ✚ **4.NBT.4** Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- ✚ **4.NBT.5** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- ✚ **MP.2** Reason abstractly and quantitatively.
- ✚ **MP.3** Construct viable arguments and critique the reasoning of others.

Objectives

- ✚ Students will be able multiply to calculate costs given the unit cost and the number of units needed.
- ✚ Students will be able to add up a variety of costs and subtract them from a given budget to determine how much money is left over.

Materials

- ✚ *Party Time!* Group Activity
- ✚ *Cupcake Challenge* Individual Activity

Procedure

- ✚ Divide students into groups of 3 or 4.
- ✚ **“Today we will pretend that we are having an end-of-the-summer party, and the students are in charge of planning.”** Tell them they will have \$750 to plan their party, and they must create a proposal of how they will spend that money.
- ✚ Distribute the *Party Time!* Group Activity sheet. Tell the students to use the attached information to calculate what they want for their party. They must use paper and pencil



for all their calculations—no calculator! Students must make a proposal for the teachers showing how they will spend their money and how much money they will have left over.

- ✚ When students have planned the party, distribute the *Cupcake Challenge* Individual Activity sheet. Have students complete it independently, and then review it with the group.

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ This lesson addresses Standard for Mathematical Practice 2. Students must be able to think in terms of how many guests will be at the party and how many supplies and how much food they will need for all of their guests. Students must think about the relationship between the number of guests and the number of items in each unit as they determine how many of each item they should purchase.
- ✚ This lesson also addresses Standard for Mathematical Practice 3. Because there are multiple ways of correctly completing the group activity, students in each group must listen to their group members and decide whether or not the approach is effective and will produce the desired outcome.
- ✚ Teachers should also check students' calculations as they are progressing. Make note of any students who are having particular difficulty with multiplying the unit price and the quantity, and be ready to assist or provide an alternative strategy.

Assessment

- ✚ The students will demonstrate mastery of the concepts by completing the *Cupcake Challenge* activity individually at the end of the lesson.

Party Time!
Group Activity

Your teachers have decided to throw an end-of-the-summer party for everyone who attended camp and they have decided to allow the students to plan the party. They have given you \$750.00 and you must have food, decorations, and goody bags for the guests. There will be 125 students attending this party, to be held in the cafeteria. They want you to show them a shopping list of what items you are going to buy, how many of each item you will need, and how much each will cost in total. Additionally, they want you to tally up the cost of all the items and subtract it from the \$750.00 to see how much money will be leftover. As long as everything has been provided for the party, the leftover money will be donated to the school for supplies. Remember that you do not need to get everything on the list.

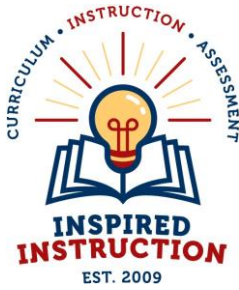
ITEM	UNIT COST	NUMBER YOU WANT	TOTAL COST
Pizza pie (8 slices)	\$12.00		
Bagels with cream cheese (1 dozen)	\$6.00		
Apple Juice (1 bottle = 24 cups)	\$3.00		
Juice Boxes (8 in a package)	\$4.00		
Balloons (1 dozen)	\$6.00		
Cupcakes (serves 8)	\$15.00		
Ice cream sundae (1)	\$2.00		
Cups (pack of 8)	\$3.00		
Plates (pack of 8)	\$3.00		
Napkins (pack of 16)	\$3.00		
Goody Bags (12 filled bags)	\$10.00		
TOTAL COST			
ORIGINAL MONEY			\$750.00
TOTAL COST FOR THE PARTY (SAME AS TOTAL COST)			
TOTAL MONEY LEFTOVER			

Cupcake Challenge
Individual Assessment

- 1) You are a shopper for a new television show called *Cupcake Challenge*. You must buy all the basic supplies the contestants will need, and you have a budget of \$300. Once you have bought the basic supplies, the remainder of the money can be spent on specialty food items for the contestants to use in their cupcakes. Your shopping list of basic supplies is below. How much will it cost to buy these items? How much will you have left to spend on specialty food items?

SHOPPING LIST
27 dozen eggs
8 gallons of milk
16 pounds of butter
12 bags of flour
8 bags of sugar

GROCERIES	UNIT COST	NUMBER NEEDED	TOTAL COST
1 dozen eggs	\$3.00		
1 gallon of milk	\$4.00		
1 pound of butter	\$3.00		
1 bag of flour	\$4.00		
1 bag of sugar	\$5.00		
TOTAL COST			
ORIGINAL MONEY			\$300.00
TOTAL COST OF GROCERIES (SAME AS TOTAL COST)			
TOTAL LEFTOVER FOR SPECIALTY FOOD ITEMS			



Grade 4

Celebrations

Mathematics Lesson Day 2

“Find the Pattern”

Rationale

- ✚ The Common Core State Standards not only require students to identify or create a pattern, but they also require students to identify features of the pattern itself. This requires a particular level of attention to detail, as well as attentiveness to structure.

Goals

- ✚ To use knowledge of patterns and features of patterns to play a party game.

Standards

- ✚ **4.OA.5** Generate a number or shape pattern that follows a given rule. Identify the apparent features of the pattern that were not explicit in the rule itself.
- ✚ **MP.7** Look for and make use of structure.

Objectives

- ✚ Students will be able to create a shape pattern that follows a given rule.
- ✚ Students will be able to identify features of the pattern that will help them win a party game.

Materials

- ✚ A copy of the *Find the Pattern* game board, one for each group (laminated if possible for durability)
- ✚ A copy of the *Find the Pattern* recording sheet, one for each group
- ✚ A set of *Find the Pattern* game cards, one for each group
- ✚ Game pieces for each group (could be different coins, different colored disks)
- ✚ A copy of the attached individual assessment for each student.

Procedure

- ✚ Tell students that with the party they planned yesterday, the only thing missing was a game. Today they will be playing a game using their knowledge of patterns to help them win
- ✚ Divide students into groups of 3 or 4.
- ✚ Distribute the game boards, one to each group. They will follow the directions on the game board sheet, which will lead them to first complete the pattern and then play the game.
- ✚ Upon completion of the game, students will answer the questions at the bottom of the recording sheet to analyze the pattern and identify the features of the pattern.

Teacher & Teacher's Assistant Observations During the Group Activity

- ✚ Circulate the room while the students are completing the pattern. Assure that each group's game board has been filled in correctly before they begin to play.
- ✚ While each group is playing the game, circulate the room to ensure that students are following the rules and playing the game correctly, recording each of their moves in the game.

Assessment

- ✚ The students will demonstrate mastery of the concepts by completing the attached worksheet individually at the end of the lesson.

Find the Pattern


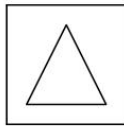
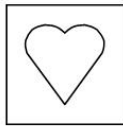
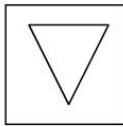

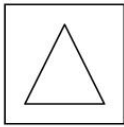

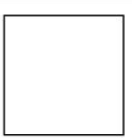


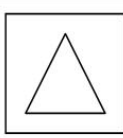
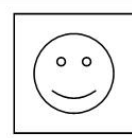


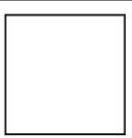





Directions and Game Board

Directions:

- 1) Examine the pattern on the game board below. Determine the pattern and fill in the missing spaces on the board. Once all the spaces are filled in, you are ready to play the game!
- 2) Lay out the 4 game cards face down on the table. Each player picks one card, and the number on the card tells how many moves the player can make with each turn. (For example, if a player chooses the "2" card, that player can move 2 spaces on each turn.)
- 3) Fill in each player's name and number of moves on the recording sheet.
- 4) Begin playing the game. During each player's turn, that player needs to record the object in the space he/she landed on.
- 5) Once the first person has reached the finish, tally up the total number of different objects a player landed on. The player with the highest number is the winner!

Find the Pattern

Recording Sheet

Start						
						
						
						
						
						Finish

Name	Number of Moves Each Turn	Turn 1	Turn 2	Turn 3	Turn 4	Turn 5	Number of Different Objects

After the game, answer the following questions as a group:

- 1) Which players had the highest number of different objects? _____
- 2) What was the number of moves that each winning player could make each turn? _____
- 3) Why do you think these players were able to win the game?

- 4) If the pattern was different (only 3 different objects instead of 4 on the game board), do you think the outcome would be different? Why or why not?

Find the Pattern
Game Cards

1

2

3

4

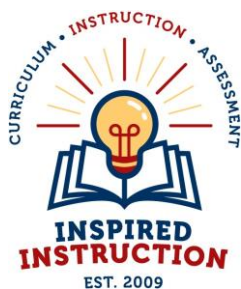
Individual Assessment

Ms. Moore's class recently created a game with patterns. The game board has spaces numbered from 1 to 24. Each player draws a card and follows the rule throughout the game. At the beginning of the game, Julia draws Card 1 and Hailey draws Card 2.

Card 1: Start with 3. Multiply each number by 2 to get the next number in the pattern.

Card 2: Start with 6. Add 3 to that number, and then add 3 to that number, and so on.

- Determine the pattern for both *Card 1* and *Card 2*.
- Which player will reach the finish first and win the game?
- Create a new rule, with a pattern that will cause a third player to win the game.



Grade 4

Celebrations

Mathematics Lesson Day 3

“Redo the Recipe”

Rationale

- ✚ One of the critical areas for 4th grade, as identified by the Common Core State Standards, focuses on fractions, including fraction equivalence.

Goals

- ✚ To model equivalent fractions

Standards

- ✚ **4.NF.1** Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
- ✚ **MP.4** Model with mathematics.

Objectives

- ✚ Students will be able to use visual fraction models to find equivalent fractions.

Materials

- ✚ $\frac{1}{4}$ cup, $\frac{1}{3}$ cup, $\frac{1}{2}$ cup, $\frac{3}{4}$ cup, 1 cup measuring cups
- ✚ $\frac{1}{4}$ teaspoon, $\frac{1}{2}$ teaspoon, $\frac{3}{4}$ teaspoon, and 1 teaspoon measuring spoons
- ✚ Water
- ✚ *Redo the Recipe* worksheet
- ✚ Fraction models (one set per group, copied onto card stock for durability and cut into individual squares)
- ✚ Individual Assessment

Procedure

- ✚ Tell students that as you continue the Celebrations theme, you wanted to make some treats. You searched online for a good recipe, and you found a few great ones! Only one problem...you don't have the right measuring cups! **We will have to work together today to figure out how to convert the amounts of the ingredients in the recipe to match the measuring cups.**
- ✚ To demonstrate, write $\frac{1}{2} = \frac{2}{4}$ on the board. **These two fractions, $\frac{1}{2}$ and $\frac{2}{4}$, equal the same amount. Watch this!** Place a $\frac{1}{2}$ cup measuring cup on the table. Fill a $\frac{1}{4}$ cup measuring cup with water, and then pour it into the $\frac{1}{2}$ cup. Fill the $\frac{1}{4}$ cup measuring cup again, and once again pour it into the $\frac{1}{2}$ cup. **See? Filling up the $\frac{1}{4}$ cup two times, $\frac{2}{4}$, is the same as $\frac{1}{2}$! Now we are going to find other equivalent fractions for this recipe.**

- ✚ Distribute the *Redo the Recipe* to your students. Read the directions together, pointing out that you have $\frac{1}{4}$ cup, $\frac{1}{3}$ cup, $\frac{1}{2}$ cup, $\frac{3}{4}$ cup, 1 cup, $\frac{1}{4}$ teaspoon, $\frac{1}{2}$ teaspoon, $\frac{3}{4}$ teaspoon, and 1 teaspoon.
- ✚ Complete the first fraction equivalent together, showing students how to complete the visual models to find the equivalent. Students will complete the remainder in small groups of 2-3.
- ✚ Review group activity together.
- ✚ Review multiple choice strategies (paper and pencil or mental math approach, eliminating choices). Direct students to complete the multiple choice questions individually. Remind students that they may draw their own fraction models to assist them.
- ✚ Review answers to multiple choice items, being sure to include discussion regarding why the incorrect answers are incorrect.

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ Circulate the room during the group activity, ensuring that students are using the fraction models to assist them in finding equivalent fractions.
- ✚ While students are completing the multiple choice items, reinforce the idea of eliminating choices. Observe which students are using pencil and paper approach and drawing their own fraction models.

Assessment

- ✚ The individually completed multiple choice items may serve as the assessment.

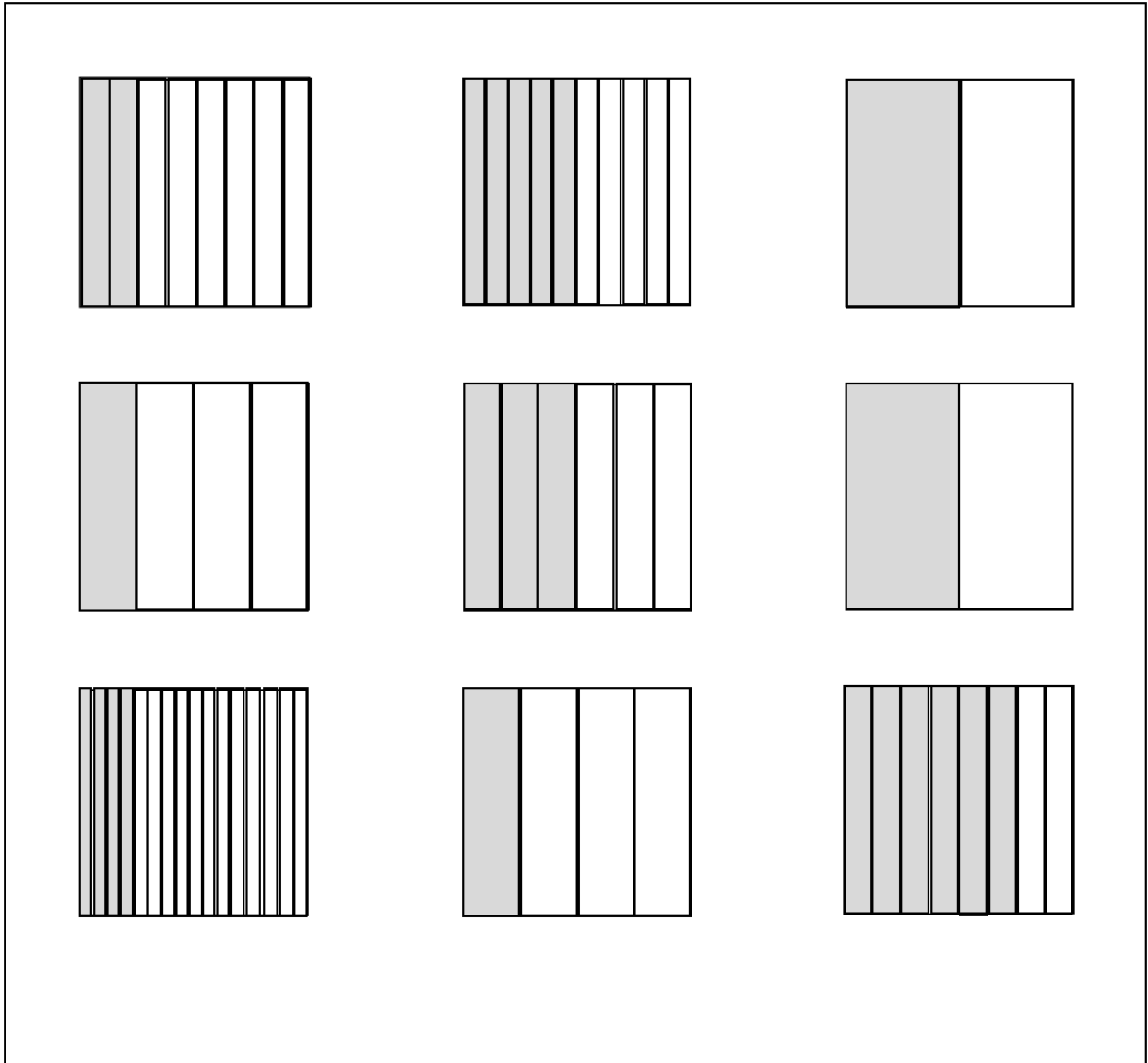
Redo the Recipe

Directions: As part of the celebration this week, we will be making cookies! The following recipe was found online, but we don't have the right measuring cups and spoons. We will have to find equivalent, or equal, fractions so we can make the cookies. Use the visual models to help you find the equivalents. Equivalents must match the measuring cups and spoons we have: $\frac{1}{4}$ cup, $\frac{1}{3}$ cup, $\frac{1}{2}$ cup, $\frac{3}{4}$ cup, 1 cup, $\frac{1}{4}$ teaspoon, $\frac{1}{2}$ teaspoon, $\frac{3}{4}$ teaspoon, and 1 teaspoon.

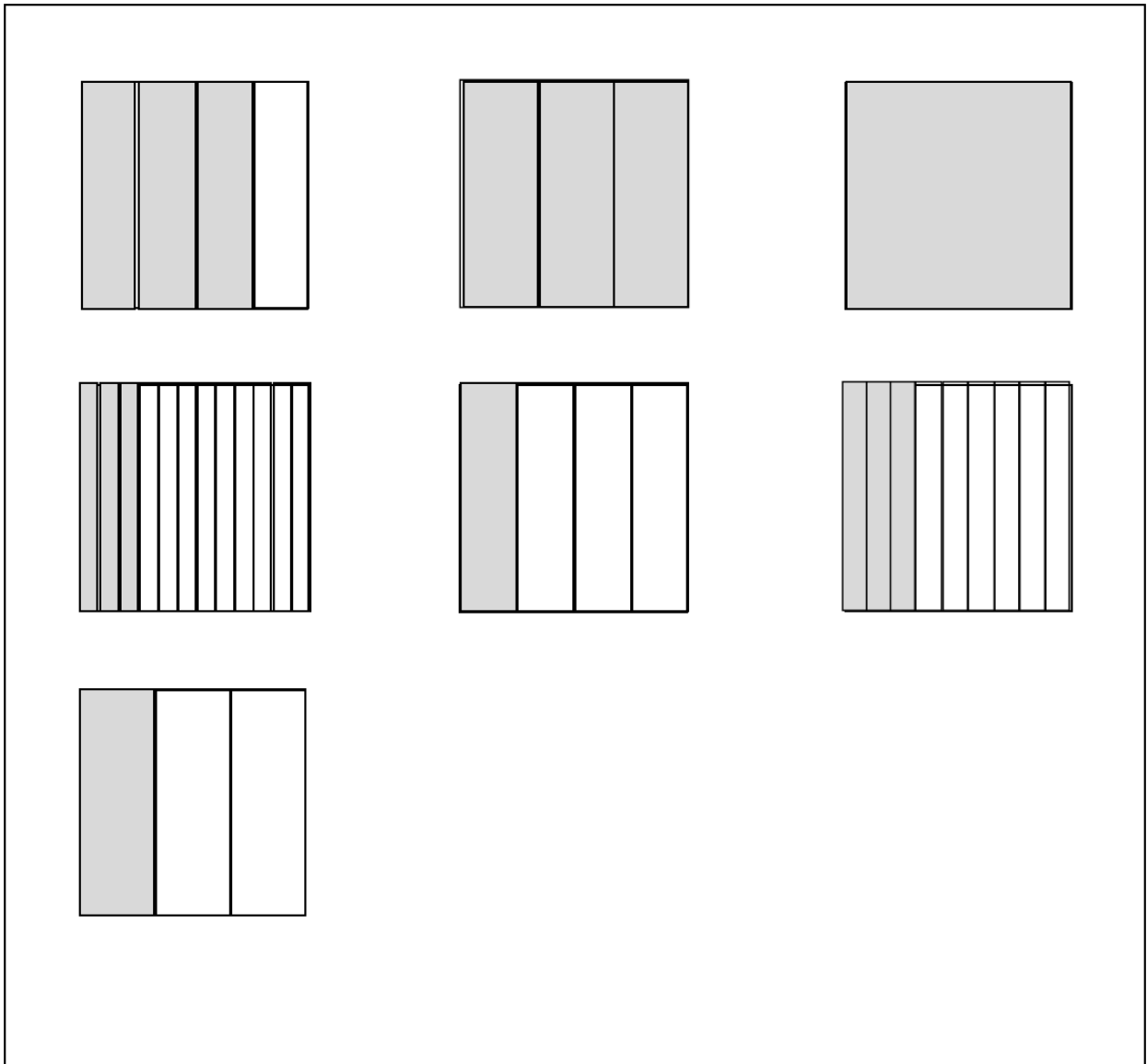
Recipe:

	Original Measurements	Equivalent Measurements
1.	3 $\frac{5}{10}$ cups flour	3 _____ cups flour
2.	1 $\frac{2}{8}$ teaspoon baking soda	1 _____ teaspoon baking soda
3.	$\frac{3}{6}$ teaspoon baking powder	_____ teaspoon baking powder
4.	1 $\frac{4}{16}$ cups butter, softened	1 _____ cups butter, softened
5.	1 $\frac{6}{8}$ cups granulated sugar	1 _____ cups granulated sugar
6.	$\frac{3}{3}$ egg	_____ egg
7.	1 $\frac{3}{12}$ teaspoons vanilla extract	1 _____ teaspoons vanilla extract
8.	$\frac{3}{9}$ cup M&M candies	_____ cup M&M candies

Group Activity
***Redo the Recipe*—Fraction Models Page 1**



Redo the Recipe—Fraction Models Page 2



Individual Assessment

1. Which of the following fractions is equivalent to $\frac{3}{4}$?
 - A. $\frac{2}{8}$
 - B. $\frac{6}{8}$
 - C. $\frac{4}{3}$
 - D. $\frac{12}{4}$
2. Which of the following fractions is equivalent to $\frac{1}{5}$?
 - A. $\frac{2}{5}$
 - B. $\frac{2}{7}$
 - C. $\frac{2}{10}$
 - D. $\frac{5}{10}$
3. Which of the following fractions is equivalent to Figure A?

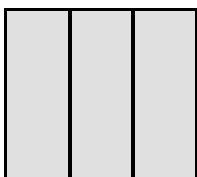
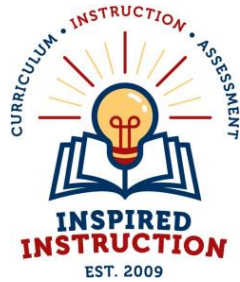


Figure A

- A. $\frac{1}{3}$
 - B. $\frac{2}{6}$
 - C. 1
 - D. 3
4. You are making a recipe which calls for $\frac{2}{6}$ cup of sugar, but you do not have a $\frac{2}{6}$ measuring cup. Which of the following cups could you use instead?
 - A. $\frac{1}{4}$
 - B. $\frac{1}{3}$
 - C. $\frac{2}{3}$
 - D. $\frac{3}{4}$
 5. A recipe for brownies calls for $\frac{1}{2}$ cup of sugar, but you can only find a $\frac{1}{4}$ cup measuring cup. How many $\frac{1}{4}$ cups equal $\frac{1}{2}$ cup?
 - A. 1
 - B. 2
 - C. 3
 - D. 4



Grade 4

Celebrations

Mathematics Lesson Day 4

“Cookies, Cookies, Cookies”

Rationale

- ✚ One of the critical areas for 4th grade, as identified by the Common Core State Standards, focuses on fractions, including using the four operations with fractions.

Goals

- ✚ To recognize units of measurement for cooking and be able to convert them to make twice of a recipe.

Standards

- ✚ **4.NF.4c** 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.

Objectives

- ✚ Students will be able to multiply a fraction by a whole number to double a recipe.
- ✚ Students will apply knowledge of fractions to making a batch of chocolate chip cookies.

Materials

- ✚ Cookie sheets (2 for each group)
- ✚ Non-stick Reynolds wrap or parchment paper (Preparing the cookie sheets with this first makes cleaning up very easy.)
- ✚ Access to an oven (maybe the cafeteria, maybe the teacher’s house) for after class
- ✚ Hand mixer (1 can be shared) or wooden spoons for each group
- ✚ Measuring cups for each group
- ✚ Measuring spoons for each group
- ✚ Paper towels
- ✚ Sink and dish soap for cleaning up
- ✚ 1 large bowl for each group
- ✚ 1 small bowl for each group
- ✚ Hershey’s Milk Chocolate Chips (these are safe for nut-allergic children, but always confirm by reading the package.)
- ✚ The amounts of the ingredients listed are for 4 groups (doubling the recipe, and each group will half the recipe.) If there are more than 4 groups, adjust the amounts accordingly.
- ✚ 1 pound of butter
- ✚ 1 ½ cups of granulated sugar
- ✚ 1 ½ cups of light brown sugar
- ✚ 2 teaspoons vanilla extract
- ✚ 4 eggs

- ✚ 4 ½ cups all-purpose flour
- ✚ 2 teaspoons baking soda
- ✚ 1 teaspoon salt
- ✚ 2 packages of Hershey's milk chocolate chips

Procedure

- ✚ Divide students into groups of 3 or 4.
- ✚ Tell the students they are going to make chocolate chip cookies for their party. Attached is the recipe from the bag of Hershey's chocolate chips.
- ✚ Distribute 1 copy of the recipe to each group, and let them know that they are going to double the recipe.
- ✚ The first thing they need to do is calculate how much of each of the ingredients they are going to need in order to double the recipe.
- ✚ After their calculations have been checked by the teacher, they will join up with another group, ensure their calculations are all the same, and begin making the cookies. When they are finished, they should count the number of chocolate chip cookies they made. Did they make the number they should have for double the recipe? Why or why not?

Teacher & Teachers' Aide Observations During the Group Activity

- ✚ Teachers should observe how students are calculating the amount of each ingredient they need and assist if necessary. Do they know how to multiply each ingredient amount by 2? If not, the teacher should demonstrate.
- ✚ While the students are following the recipe, the teachers should make sure they are following the instructions correctly.

Assessment

- ✚ The students will demonstrate mastery of the concepts by completing the attached worksheet individually at the end of the lesson.

Hershey's Milk Chocolate Cookies

INGREDIENTS (FOR 1 BATCH)	INGREDIENTS (FOR TWO BATCHES)
Makes about 5 dozen cookies	Makes about _____ cookies
1 cup (2 sticks) butter, softened	
$\frac{3}{4}$ cup granulated sugar	
$\frac{3}{4}$ cup packed light brown	
1 teaspoon vanilla extract	
2 eggs	
2 $\frac{1}{4}$ cups all-purpose flour	
1 teaspoon baking soda	
$\frac{1}{2}$ teaspoon salt	
2 cups (11.5 oz pkg.) Hershey's Chocolate Chips	

1. Heat oven to 375°F.
2. Beat butter, granulated sugar, brown sugar and vanilla in large bowl with mixer until creamy. Add eggs; beat well. Stir together flour, baking soda and salt; gradually add to butter mixture, beating until well blended. Stir in chocolate chips.
3. Drop by teaspoons onto ungreased cookie sheets. Bake 8 to 10 minutes or until lightly browned. Cool slightly; remove from cookie sheet to wire rack. Cool completely. Makes about 5 dozen cookies.

Individual Assessment

- 2) You have been asked to bring cookies to school for a large celebration. You decide to make 3 batches of the recipe. Calculate the amount of each of the ingredients you will need to bake 3 batches of cookies.

Hershey's Milk Chocolate Cookies

INGREDIENTS (FOR 1 BATCH)	INGREDIENTS (FOR 3 BATCHES)
Makes about 5 dozen cookies	Makes about _____ cookies
1 cup (2 sticks) butter, softened	
$\frac{3}{4}$ cup granulated sugar	
$\frac{3}{4}$ cup packed light brown	
1 teaspoon vanilla extract	
2 eggs	
2 $\frac{1}{4}$ cups all-purpose flour	
1 teaspoon baking soda	
$\frac{1}{2}$ teaspoon salt	
2 cups (11.5 oz pkg.) Hershey's Chocolate Chips	