Baking Cupcakes!

Fractions

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Grade Level	4th – 5th Grade	**Time Frame**	1-3 class period(s)
Subject	Mathematics	**Duration**	150 minutes
Course	Elementary Mathematics		

Essential Question

How does adding and multiplying fractions relate to real-world problems?

Summary

Students will explore the relationship between fractions using real-world examples. First, students will practice different strategies for converting fractions for a cupcake recipe. This includes adding fractions, converting mixed numbers, and working with improper fractions. Students will extend their understanding by creating their own word problems using real-world examples.

Snapshot

Engage

Students watch a video of kids baking cupcakes as an introduction to discussing fractions.

Explore

Students work through a word problem about baking cupcakes that involves fractions. Students learn to use different strategies to solve the problem.

Explain

Students engage in a Strategy Harvest activity to demonstrate different ways to find ingredient amounts that will be needed for a recipe.

Extend

Students engage in solving a new problem, this time using their own cookie recipes.

Evaluate

Students create their own word problems to show understanding of the essential question.

Standards

Oklahoma Academic Standards for Mathematics (Grade 4)

4.N.2: Represent and compare fractions and decimals in real-world and mathematical situations; use place value to understand how decimals represent quantities.

Oklahoma Academic Standards for Mathematics (Grade 4)

5.N.2: Read, write, represent, and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.
5.N.3: Add and subtract fractions with like and unlike denominators, mixed numbers and decimals to solve real-world and mathematical problems.

Attachments

- Cookie Recipes—Baking Cupcakes.docx
- Cookie Recipes—Baking Cupcakes.pdf
- Cupcake Recipe—Baking Cupcakes.docx
- Cupcake Recipe—Baking Cupcakes.pdf
- Ingredients Table—Baking Cupcakes.docx
- Ingredients Table—Baking Cupcakes.pdf
- Recipe Slides—Baking Cupcakes.pptx
- Sample Student Problems—Baking Cupcakes.docx
- Sample Student Problems—Baking Cupcakes.pdf
- Writing Real-World Problems—Baking Cupcakes.docx
- Writing Real-World Problems—Baking Cupcakes.pdf

Materials

- Recipe Slides (attached)
- Cupcake Recipe (attached; one per student)
- Ingredients Table (attached; one per student)
- Cookie Recipes (attached)
- Writing Real-World Problems (attached; one per student)
- Sample Student Problems (attached)

Engage

To begin, show the class the video segment "Cupcake Mix Meets Fractions," which shows two girls baking cupcakes. As the video plays, ask students to notice and discuss how fractions help the kids with their bake sale goals.

Teacher's Note: Video Description

In this video segment from *Cyberchase*, Bianca helps a friend get ready for a school bake sale. They are making cupcakes, but they realize that the recipe makes only a dozen cupcakes. The girls decide that will not be enough. They want to make double that amount, so they decide to double the recipe, which includes doubling a fraction that results in an improper fraction.

After the video has played, ask students the following questions:

1. What was the problem the girls encountered with the recipe?
2. How did they solve the problem?
3. What strategy did they use to decide how much of the chocolate bar to use?

Sample Student Responses

1. They wanted to sell more cupcakes than the recipe made.
2. They doubled the recipe.
3. They used the chocolate bar to visualize how much 2/3 + 2/3 would be.

Explore

Use the attached **Recipe Slides** for this section of the lesson and pass out a copy of the attached **Cupcake Recipe** to each student.

Display **slide 3.** Introduce the following story problem to the class. Read aloud with plenty of inflection to engage students:

> ***I want to bake cupcakes for a party and need to buy all of the ingredients. There will be 24 people there. If I want to make enough cupcakes for everyone using the following recipe, how much of each ingredient do I need to shop for?***

Have students work with a partner or small group to determine strategies for finding the solution. Students should record their answers on a graphic organizer or scrap paper. Encourage students to find at least two ways to determine the best answer.

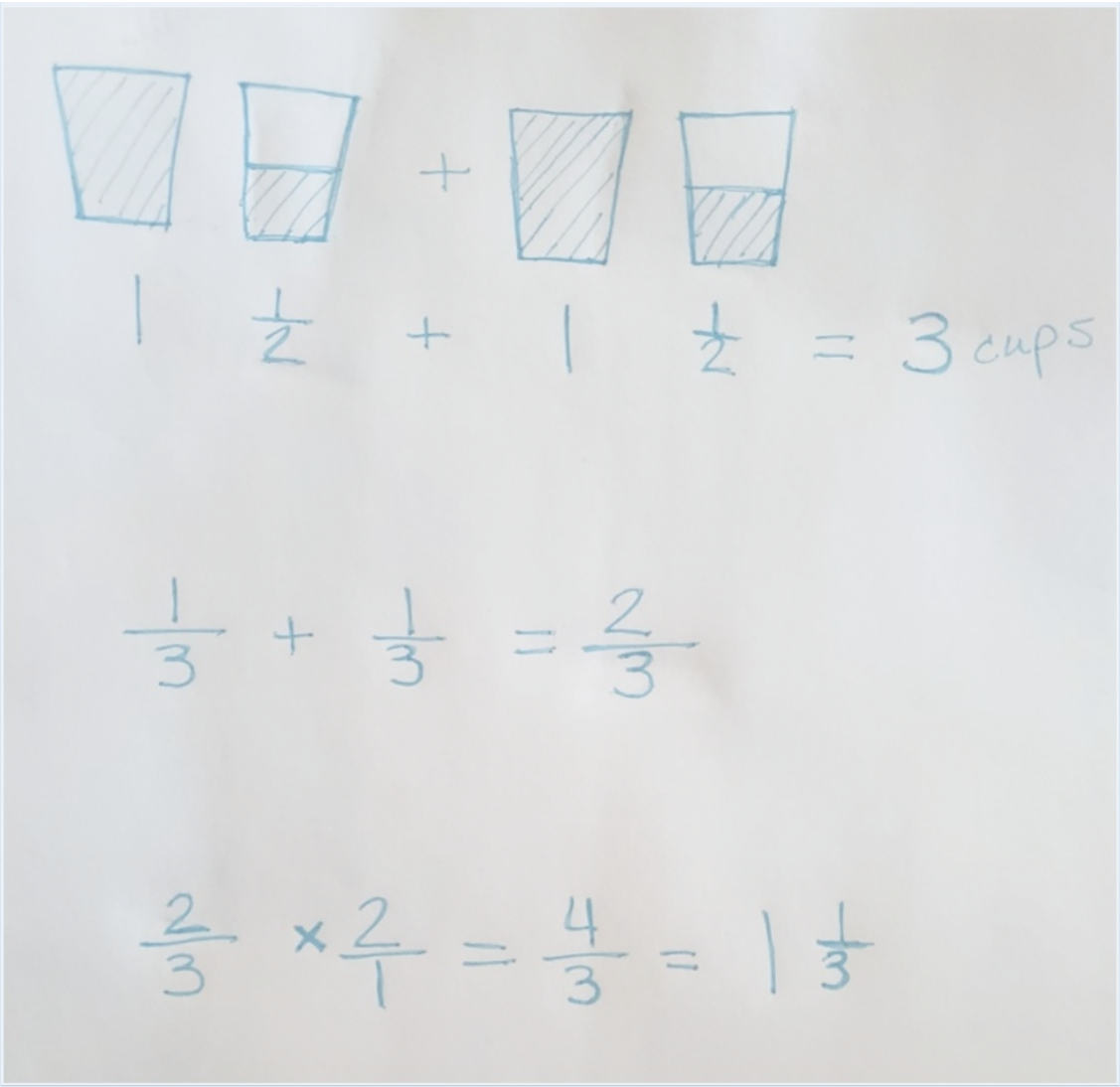
As students are working together, make sure to monitor their progress and collaboration, helping as needed. After students have had enough time to work together, ask the following questions to the whole class:

- Why should we try multiple strategies?
- How can that help us make sure our solution is correct?
- What strategies did you use that you can share?

Examples of Strategies

Some strategies that students may use include drawing pictures, adding fractions, multiplying fractions, and using manipulatives.

The picture below illustrates different ways that students might try to solve the problem. Consider having students come to the board to draw out their different strategies for the whole class to see.


1 1/2 + 1 1/2 = 3 cups
1/3 + 1/3 = 2/3
2/3 × 2/1 = 4/3 = 1 1/3

Explain

After the class has worked through multiple ways to solve the problem, use the Strategy Harvest strategy as a class. Before discussing, display **slide 4**, and pass out a copy of the attached **Ingredients Table** handout to each student. Discuss the strategies that students used to find how much of each ingredient needs to be purchased. Have students complete the middle column as each ingredient is discussed. This gives students a chance to think through different strategies and how the answers were reached.

Now, have students convert the same recipe to make 36 cupcakes. This gives students a chance to practice these strategies on their own. Monitor and observe which strategies students use to find the correct amounts of each ingredient. Are they using only one strategy or trying out a variety of strategies?

Optional: Differentiation Opportunity

Consider using the Jigsaw strategy to help with differentiation and clustering students together by level of understanding.

Extend

Teacher's Note: Activity Prep

For this phase of the lesson, consider asking students to bring their own cookie recipes from home to use. Students will need three different recipes. You can also use the attached **Cookie Recipes** handout instead, which contains recipes for three different cookie types: chocolate chip, sugar, and oatmeal cookies.

During this part of the lesson, pose a new problem to students:

> ***Julie is baking three different types of cookies for a cookie swap. How does she need to change the following recipes to make 36 cookies of each type?***

Pass out three cookie recipes the class has brought from home, or pass out a copy of the attached **Cookie Recipes** handout to each student.

Evaluate

Revisit the essential question: How does adding and multiplying fractions relate to real-world problems? To put it another way: How can we represent real-world numbers as fractions and convert them when needed?

Pass out one equation from the attached **Writing Real-World Problems** handout to each student (one equation per page), or create a similar set of equations with fractions and/or mixed numbers and give one to each student. Introduce students to the Create the Problem strategy. Have the class show that they understand the essential question by asking each student to create a real-world problem (written on the handout or on a piece of notebook paper) based on the equation they were given.

Teacher's Note: Differentiation

When engaging in the Create the Problem strategy, consider the abilities of the students and differentiate by assigning different equations or solutions to different students.

Sample Student Responses

The attached **Sample Student Problems** provides examples of possible student responses.

Resources

- K20 Center. (n.d.). Create the problem. Strategies. https://learn.k20center.ou.edu/strategy/149
- K20 Center. (n.d.). Jigsaw. Strategies. https://learn.k20center.ou.edu/strategy/179
- K20 Center. (n.d.). Strategy harvest. Strategies. https://learn.k20center.ou.edu/strategy/135
- "Shari Spotter and the Cosmic Crumpets | Cupcake Mix Meets Fractions." (2004). *Cyberchase* [Television series]. New York, NY: Thirteen/WNET. https://oeta.pbslearningmedia.org/resource/vtl07.math.number.fra.cupcakemix/cupcake-mix-meets-fractions-cyberchase/