

Math Menu: Recipe Remix with Ratios

Grade Level: 6

Subject: Mathematics

Focus: Ratios, Rates, and Proportional Reasoning

Materials Needed

- A few favorite simple recipes (from a cookbook or online, e.g., cookies, pancakes, lemonade)
 - Paper or a whiteboard
 - Pencils
 - Calculator (optional, for checking work)
 - Measuring cups and spoons (for a hands-on extension)
 - Access to a grocery store website or flyer (for the "Budget Baker" challenge)
 - (Optional) Ingredients to actually make the scaled recipe after the lesson!
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1. Learning Objectives

By the end of this lesson, the student will be able to:

- **Calculate equivalent ratios** to accurately scale a recipe up (for more people) or down (for fewer people).
 - **Determine the unit rate** (e.g., cost per ounce) to make informed purchasing decisions.
 - **Apply proportional reasoning** to creatively solve a real-world problem (planning food for an event).
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2. Alignment with Standards (Common Core)

- **CCSS.MATH.CONTENT.6.RP.A.1:** Understand the concept of a ratio and use ratio language to describe a relationship between two quantities.
 - **CCSS.MATH.CONTENT.6.RP.A.2:** Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
 - **CCSS.MATH.CONTENT.6.RP.A.3.B & D:** Solve unit rate problems including those involving unit pricing. Use ratio reasoning to convert measurement units.
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3. Instructional Steps and Activities

Part 1: The Hook - The Party Problem (5 minutes)

Start with a fun, relatable scenario:

"Imagine your favorite chocolate chip cookie recipe makes exactly 12 cookies. That's perfect for a small snack, but you want to have 4 friends over this weekend. You'll need a lot more than 12 cookies! How

would you figure out how to make a bigger batch without ruining the recipe? The secret is in a math concept called **ratios**."

Discuss initial ideas. This gets the student thinking about the problem before learning the formal method.

Part 2: What is a Ratio? (10 minutes)

Direct Instruction: Explain ratios in the context of the recipe.

- "A ratio is just a way to compare two or more numbers. In a recipe, the ingredients are in a specific ratio. For example, if a recipe calls for 2 cups of flour and 1 cup of sugar, the ratio of flour to sugar is 2 to 1, or 2:1."
- **Scaling Up:** "To make a double batch (24 cookies), what do you think we should do to our ingredients?" Guide the student to the conclusion that you need to multiply every ingredient by 2.
 - Original: 2 cups flour, 1 cup sugar. (Ratio 2:1)
 - Double Batch: 4 cups flour, 2 cups sugar. (Ratio 4:2, which simplifies to 2:1). The ratio stays the same! This is called a **proportion**.
- **Scaling Down:** "What if you only wanted to make a half-batch (6 cookies)?" Guide them to understand they would divide every ingredient by 2 (or multiply by $1/2$).

Part 3: The Main Activity - Recipe Remix! (20-25 minutes)

This is where the student applies the knowledge creatively.

1. **Choose a Recipe:** The student selects a real, simple recipe they like (e.g., pancakes, brownies, a smoothie).
2. **Set the Challenge:** The student decides on a new goal.
 - **Option A (Scaling Up):** "You're making this for a family gathering of 10 people."
 - **Option B (Scaling Down):** "You're making a single-serving snack just for yourself."
3. **Do the Math:** On paper, the student will create a new ingredient list. They must:
 1. Write down the original ingredients and their amounts.
 2. Determine the "scaling factor" (e.g., if the recipe serves 4 and they need to serve 10, the scaling factor is $10/4$ or 2.5).
 3. Calculate the new amount for each ingredient by multiplying by the scaling factor. This is a great chance to practice multiplying fractions and decimals.

Part 4: The Extension - Budget Baker Challenge (15 minutes)

Let's add another layer of real-world math with **unit rates**.

1. **Introduce Unit Rate:** "When you go to the store, you see a small bag of flour and a big bag of flour. How do you know which is the better deal? You find the **unit price**! That means figuring out the cost for one single unit, like per ounce or per pound."
2. **The Challenge:** Using a grocery store website or flyer, have the student look up 2-3 key ingredients from their scaled-up recipe (e.g., flour, sugar, chocolate chips).
 - Find two different sizes for each item.
 - Calculate the unit price for each size (Total Price \div Number of Ounces/Pounds).
 - Circle the better deal for each ingredient.
 - (Bonus) Calculate the total cost to buy the ingredients for their remixed recipe.

Part 5: Closure and Reflection (5 minutes)

Discuss the experience:

- "What was the most challenging part of scaling your recipe?"
 - "Besides cooking, where else in real life might you need to use ratios?" (Examples: mixing paint, reading a map scale, comparing sports statistics).
 - **Exit Ticket:** Ask the student to explain, in their own words, "Why is it important to multiply every ingredient by the same number when you scale a recipe?"
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4. Differentiation and Inclusivity

- **For Extra Support:**
 - Choose recipes that use simple whole numbers (e.g., 2 cups, not $1\frac{3}{4}$ cups).
 - Provide the "scaling factor" directly instead of having the student calculate it.
 - Work side-by-side through the calculations.
 - **For an Advanced Challenge:**
 - Use a more complex recipe with many fractions.
 - Have the student convert units (e.g., from cups to tablespoons, or ounces to grams) as part of the scaling process.
 - Challenge them to design a full three-course menu for a certain number of guests, calculate all scaled ingredients, and create a complete shopping budget.
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5. Assessment

- **Formative (During the lesson):**
 - Observe the student's thought process and calculations during the "Recipe Remix" activity.
 - Ask guiding questions ("How did you decide to multiply by 3?" "What would happen if we only doubled the flour but not the sugar?").
 - **Summative (End of lesson):**
 - The completed "Recipe Remix" calculation sheet serves as the primary artifact, showing their ability to apply proportional reasoning.
 - The "Budget Baker" list demonstrates their understanding of calculating and comparing unit rates.
 - The student's verbal answer to the "Exit Ticket" question shows their conceptual understanding.
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