Unit 2, Lesson 3: Recipes

Lesson Goals

- Use the term “equivalent ratio” to refer to recipes that yield identically-tasting substances.
- Represent multiple batches of a recipe as a discrete diagram with circled groups.
- Understand that “doubling, tripling, or halving the recipe” means “doubling, tripling, or halving each ingredient.”
- Understand that doubling, tripling, or halving a recipe yields something that tastes the same.

Required Materials

- markers
- teaspoon
- water
- paper cups
- empty containers
- drink mix

3.1: Flower Pattern (5 minutes)

Setup: Groups of 2. 2 minutes of quiet work time followed by sharing with a partner and whole-class discussion.
**Student task statement**

This flower is made up of yellow hexagons, red trapezoids, and green triangles.

1. Write sentences to describe the ratios of the shapes that make up this pattern.
2. How many of each shape would be in two copies of this flower pattern?

**Possible responses**

1. Answers vary. Sample responses:
   - For every 2 hexagons there are 3 triangles.
   - There are 3 hexagons for every trapezoid.
   - The ratio of trapezoids to triangles is 2 to 9.
   - The ratio of hexagons to trapezoids to triangles is $6 : 2 : 9$.

2. There would be 12 yellow hexagons, 4 red trapezoids and 18 green triangles.

**Anticipated misconceptions**

Students might get off track by attending to the area each shape covers. Clarify that this task is only concerned with the number of each shape and not the area covered.
3.2: Powdered Drink Mix (15 minutes)

Setup:

Setup for demonstration: three empty containers marked A, B, and C, three small cups for volunteers to taste Mixture A, three small cups for volunteers to taste Mixture B, pre-cut matching cards, teaspoon, extra drink mix, and extra water.
Student task statement

Here are diagrams representing three mixtures of powdered drink mix and water:

A

B

C

Key: [ ] = 1 teaspoon drink mix

= 1 cup water

1. How would the taste of Mixture A compare to the taste of Mixture B?

2. Use the diagrams to complete each statement:

   a. Mixture B uses _____ cups of water and _____ teaspoons of drink mix. The ratio of cups of water to teaspoons of drink mix in Mixture B is ______.

   b. Mixture C uses _____ cups of water and _____ teaspoons of drink mix. The ratio of cups of water to teaspoons of drink mix in Mixture C is ______.

3. How would the taste of Mixture B compare to the taste of Mixture C?

Possible responses

1. They will taste the same.

2.
   a. 1; 4; 1 : 4.
   b. 2; 8; 2 : 8.

3. They will taste the same.

Anticipated misconceptions

Students may not initially realize that Mixtures C and B taste the same. You could ask them to imagine ordering a smoothie from a takeout window. Would a small size smoothie taste the same as a size that is double that amount? If you double the amount of each ingredient, the mixture tastes the same.
Are you ready for more?

Sports drinks use sodium (better known as salt) to help people replenish electrolytes. Here are the nutrition labels of two sports drinks.

A

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size: 8 fl oz (240 mL)</td>
</tr>
<tr>
<td>Serving Per Container: 4</td>
</tr>
<tr>
<td>Amount Per Serving</td>
</tr>
<tr>
<td>Calories: 50</td>
</tr>
<tr>
<td>% Daily Value*</td>
</tr>
<tr>
<td>Total Fat: 0 g</td>
</tr>
<tr>
<td>Sodium: 110 mg</td>
</tr>
<tr>
<td>Potassium: 30 mg</td>
</tr>
<tr>
<td>Total Carbohydrate: 14 g</td>
</tr>
<tr>
<td>Sugars: 14 g</td>
</tr>
<tr>
<td>Protein: 0 g</td>
</tr>
<tr>
<td>% Daily Value are based on a 2,000 calorie diet.</td>
</tr>
</tbody>
</table>

B

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Size: 12 fl oz (355 mL)</td>
</tr>
<tr>
<td>Serving Per Container: about 2.5</td>
</tr>
<tr>
<td>Amount Per Serving</td>
</tr>
<tr>
<td>Calories: 80</td>
</tr>
<tr>
<td>% Daily Value*</td>
</tr>
<tr>
<td>Total Fat: 0 g</td>
</tr>
<tr>
<td>Sodium: 150 mg</td>
</tr>
<tr>
<td>Potassium: 35 mg</td>
</tr>
<tr>
<td>Total Carbohydrate: 21 g</td>
</tr>
<tr>
<td>Sugars: 20 g</td>
</tr>
<tr>
<td>Protein: 0 g</td>
</tr>
<tr>
<td>% Daily Value are based on a 2,000 calorie diet.</td>
</tr>
</tbody>
</table>

1. Which of these drinks is saltier? Explain how you know.

2. If you wanted to make sure a sports drink was less salty than both of the ones given, what ratio of sodium to water would you use?

Possible Responses

1. Drink A. Sample reasoning: Drink A has 110 mg of sodium in an 8 ounce serving. Drink B has 150 mg of sodium in a 12 ounce serving. If we had 24 ounces of each drink, drink A would have 330 mg of sodium and drink B would have 300 mg of sodium. Therefore, drink A is saltier.

2. To be less salty than both drinks, the new drink would have to be less salty than drink B. So, for a 12-ounce serving, you would have to use less than 150 mg of sodium. For example, the ratio of ounces of drink to milligrams of sodium could be 12 to 100.
3.3: Batches of Cookies (15 minutes)

**Setup:** Discuss: “What does it mean to double a recipe?”
Student task statement

A recipe for one batch of cookies calls for 5 cups of flour and 2 teaspoons of vanilla.

1. Draw a diagram that shows the amount of flour and vanilla needed for two batches of cookies.

2. How many batches can you make with 15 cups of flour and 6 teaspoons of vanilla? Indicate the additional batches by adding more ingredients to your diagram.

3. How much flour and vanilla would you need for 5 batches of cookies?

4. Whether the ratio of cups of flour to teaspoons of vanilla is \(5:2\), \(10:4\), or \(15:6\), the recipes would make cookies that taste the same. We call these equivalent ratios.

   a. Find another ratio of cups of flour to teaspoons of vanilla that is equivalent to these ratios.

   b. How many batches can you make using this new ratio of ingredients?

Possible responses

1. See lesson plan for sample responses. Diagrams should clearly show two groups of 5 and 2, representing 10 cups of flour and 4 teaspoons of vanilla.

2. 3 batches

3. 25 cups of flour and 10 teaspoons of vanilla

4. Answers vary. Sample responses:

   a. \(20:8\)

   b. 4 batches

Anticipated misconceptions

For the fourth question, students may not multiply both the amount of flour and the amount of vanilla by the same number. If this happens, refer students to the previous questions in noting that the amount of each ingredient was changed in the same way.
Lesson Synthesis (5 minutes)

What do you do when you want to double or triple a recipe? How does the taste compare to the original recipe?

3.4: A Smaller Batch of Bird Food (Cool-down, 5 minutes)

Setup: None.

Student task statement

Usually when Elena makes bird food, she mixes 9 cups of seeds with 6 tablespoons of maple syrup. However, today she is short on ingredients. Think of a recipe that would yield a smaller batch of bird food but still taste the same. Explain or show your reasoning.

Possible responses

Use 3 cups of seeds and 2 tablespoons of syrup, or 6 cups of seeds and 4 tablespoons of syrup. Explanations and diagrams vary.