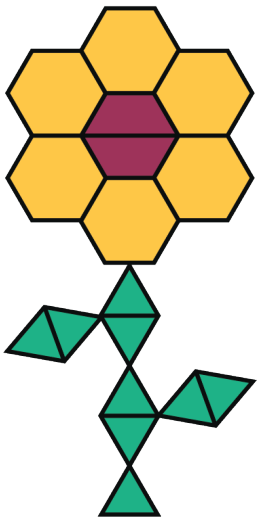
Mixtures

Let's explore what mixing has to do with ratios.

2.1 Flower Pattern

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

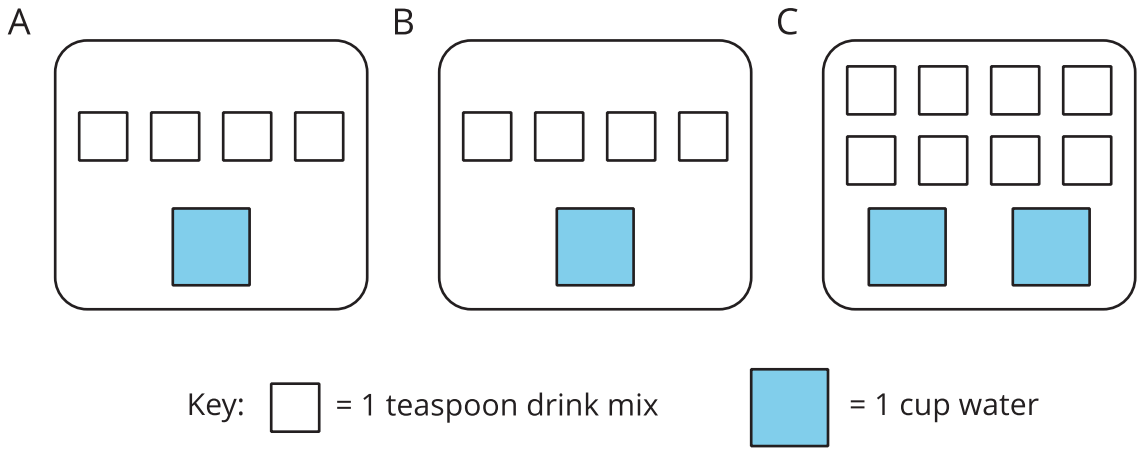


1. Write sentences to describe the ratios of the shapes that make up this pattern.

2. How many of each shape would be in two copies of this flower pattern?

2.2 Powdered Drink Mix

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



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?

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

Nutrition Facts

Serving Size 8 fl oz (240 mL)
Serving Per Container 4

Amount Per Serving
Calories 50

		% Daily Value*
Total Fat	0 g	0%
Sodium	110 mg	5%
Potassium	30 mg	1%
Total Carbohydrate	14 g	5%
Sugars	14 g	
Protein	0 g	

% Daily Value are based on a 2,000 calorie diet.

B

Nutrition Facts

Serving Size 12 fl oz (355 mL)
Serving Per Container about 2.5

Amount Per Serving
Calories 80

		% Daily Value*
Total Fat	0 g	0%
Sodium	150 mg	6%
Potassium	35 mg	1%
Total Carbohydrate	21 g	7%
Sugars	20 g	
Protein	0 g	

% Daily Value are based on a 2,000 calorie diet.

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?

2.3 Batches of Cookies

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? Show 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 say that these ratios are *equivalent*.

   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?

2.4 Perfect Purple Water

The recipe for Perfect Purple Water says, "Mix 8 ml of blue water with 3 ml of red water."

Jada mixes 24 ml of blue water with 9 ml of red water. Andre mixes 16 ml of blue water with 9 ml of red water.

1. Which person will get a color mixture that is the same shade as Perfect Purple Water? Explain or show your reasoning.

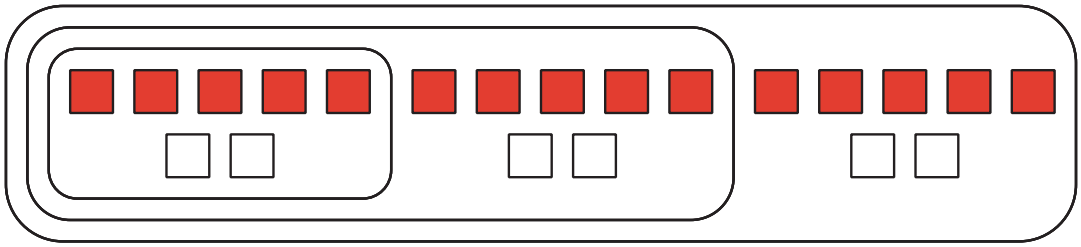
2. Find another combination of blue water and red water that will also result in the same shade as Perfect Purple Water. Explain or show your reasoning.

Lesson 2 Summary

A recipe for fizzy juice says, "Mix 5 cups of cranberry juice with 2 cups of soda water."

To double this recipe, we would use 10 cups of cranberry juice with 4 cups of soda water. To triple this recipe, we would use 15 cups of cranberry juice with 6 cups of soda water.

This diagram shows a single batch of the recipe, a double batch, and a triple batch:



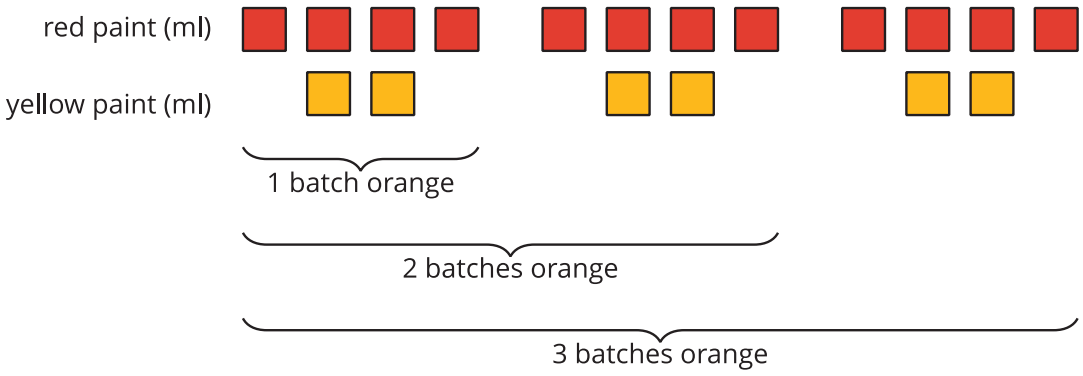
We say that the ratios $5 : 2$, $10 : 4$, and $15 : 6$ are *equivalent*. Even though the amounts of each ingredient within a single, double, or triple batch are not the same, they would make fizzy juice that tastes the same.

When mixing colors, doubling or tripling the amount of each color will create the same shade of the mixed color. In fact, you can always multiply the amount of *each* color by *the same number* to create a different amount of the same mixed color.

For example, a batch of dark orange paint uses 4 ml of red paint and 2 ml of yellow paint.

- To make two batches of dark orange paint, we can mix 8 ml of red paint with 4 ml of yellow paint.
- To make three batches of dark orange paint, we can mix 12 ml of red paint with 6 ml of yellow paint.

Here is a diagram that represents 1, 2, and 3 batches of this recipe.



We say that the ratios $4 : 2$, $8 : 4$, and $12 : 6$ are *equivalent* because they describe the same color mixture in different numbers of batches, and they make the same shade of orange.