

## Lesson 7: Associated Ratios and the Value of a Ratio

### Classwork

#### Example 1

Which of the following correctly models that the number of red gumballs is  $\frac{5}{3}$  the number of white gumballs?

a. Red

White

b. Red

White

c. Red

White

d. Red

White

#### Example 2

The duration of two films are modeled below.

Film A

Film B

a. The ratio of the length of Film A to the length of Film B is \_\_\_\_\_ : \_\_\_\_\_.

b. The length of Film A is  $\frac{\square}{\square}$  of the length of Film B.

c. The length of Film B is  $\frac{\square}{\square}$  of the length of Film A.



**Exercise 2**

A food company that produces peanut butter decides to try out a new version of its peanut butter that is extra crunchy, using twice the number of peanut chunks as normal. The company hosts a sampling of its new product at grocery stores and finds that 5 out of every 9 customers prefer the new extra crunchy version.

- a. Let's make a list of ratios that might be relevant for this situation.
  - i. The ratio of number preferring new extra crunchy to total number surveyed is \_\_\_\_\_.
  - ii. The ratio of number preferring regular crunchy to the total number surveyed is \_\_\_\_\_.
  - iii. The ratio of number preferring regular crunchy to number preferring new extra crunchy is \_\_\_\_\_.
  - iv. The ratio of number preferring new extra crunchy to number preferring regular crunchy is \_\_\_\_\_.
  
- b. Let's use the value of each ratio to make multiplicative comparisons for each of the ratios we described here.
  - i. The number preferring new extra crunchy is \_\_\_\_\_ of the total number surveyed.
  - ii. The number preferring regular crunchy is \_\_\_\_\_ of the total number surveyed.
  - iii. The number preferring regular crunchy is \_\_\_\_\_ of those preferring new extra crunchy.
  - iv. The number preferring new extra crunchy is \_\_\_\_\_ of those preferring regular crunchy.
  
- c. If the company is planning to produce 90,000 containers of crunchy peanut butter, how many of these containers should be the new extra crunchy variety, and how many of these containers should be the regular crunchy peanut butter? What would be helpful in solving this problem? Does one of our comparison statements above help us?

Try these next scenarios:

- d. If the company decides to produce 2,000 containers of regular crunchy peanut butter, how many containers of new extra crunchy peanut butter would it produce?
- e. If the company decides to produce 10,000 containers of new extra crunchy peanut butter, how many containers of regular crunchy peanut butter would it produce?
- f. If the company decides to only produce 3,000 containers of new extra crunchy peanut butter, how many containers of regular crunchy peanut butter would it produce?

### Lesson Summary

For a ratio  $A : B$ , we are often interested in the associated ratio  $B : A$ . Further, if  $A$  and  $B$  can both be measured in the same unit, we are often interested in the associated ratios  $A : (A + B)$  and  $B : (A + B)$ .

For example, if Tom caught 3 fish and Kyle caught 5 fish, we can say:

- The ratio of the number of fish Tom caught to the number of fish Kyle caught is 3 : 5.
- The ratio of the number of fish Kyle caught to the number of fish Tom caught is 5 : 3.
- The ratio of the number of fish Tom caught to the total number of fish the two boys caught is 3 : 8.
- The ratio of the number of fish Kyle caught to the total number of fish the two boys caught is 5 : 8.

For the ratio  $A : B$ , where  $B \neq 0$ , the value of the ratio is the quotient  $\frac{A}{B}$ .

For example: For the ratio 6 : 8, the value of the ratio is  $\frac{6}{8}$  or  $\frac{3}{4}$ .

### Problem Set

1. Maritza is baking cookies to bring to school and share with her friends on her birthday. The recipe requires 3 eggs for every 2 cups of sugar. To have enough cookies for all of her friends, Maritza determined she would need 12 eggs. If her mom bought 6 cups of sugar, does Maritza have enough sugar to make the cookies? Why or why not?
2. Hamza bought 8 gallons of brown paint to paint his kitchen and dining room. Unfortunately, when Hamza started painting, he thought the paint was too dark for his house, so he wanted to make it lighter. The store manager would not let Hamza return the paint but did inform him that if he used  $\frac{1}{4}$  of a gallon of white paint mixed with 2 gallons of brown paint, he would get the shade of brown he desired. If Hamza decided to take this approach, how many gallons of white paint would Hamza have to buy to lighten the 8 gallons of brown paint?