

## Waffle Stoichiometry

### Background

The word “stoichiometry” comes from two Greek words and literally means “element measuring.” Today stoichiometry is a branch of chemistry that studies the amounts of reactants used and products made in a chemical reaction. Before solving traditional stoichiometry problems, this worksheet introduces some concepts in a practical application.

**Waffle Recipe**

3 cups waffle mix = Wm  
 2 eggs = Eg  
 1 cup milk = M  
 Makes 12 waffles = W

1. Create a balanced equation for the “reaction” that creates waffles.



2. Assuming you had an infinite supply of waffle mix and milk:
- a. How many waffles could be made with 6 eggs?

36 Waffles

- b. Using the balanced equation from Question 1, show quantitatively (with an equation) how you could calculate that number.

$$6 \text{ eggs} \times \frac{12 \text{ Waffles}}{2 \text{ Eggs}} = \underline{36} \text{ waffles}$$

3. Assuming you had an infinite supply of eggs and milk:
- a. How many cups of waffle mix are needed to make 20 waffles?

5 cups

- b. Using the balanced equation from Question 1, show quantitatively (with an equation) how you could calculate that number. (all you this time!)

$$20 \text{ Waffles} \times \frac{3 \text{ Wm}}{12 \text{ Waffles}} = 5 \text{ cups Waffles Mix}$$

4. Assuming you had an infinite supply of waffle mix exactly how much milk would need to use exactly 5 eggs? (Show your work)

$$5 \text{ eggs} \times \frac{12 \text{ Waffles}}{2 \text{ Eggs}} = 30 \text{ Waffles}$$

5. You have 18 cups of waffle mix, 9 eggs and 5 cups of milk.

a. Which ingredient will run out first?

eggs

b. How much of each remaining ingredient will be left over?

0.5 cups of Milk

4.5 cups of WM

c. How many waffles can you make? (*Show your work*)

$$9 \text{ eggs} \times \frac{12 \text{ Waffles}}{2 \text{ eggs}} = 54 \text{ Waffles}$$

d. Based on your answers above what is the limiting reactant(s)?

Eggs!

e. Based on your answers above what is the limiting reactant(s)?

Waffle Mix  
Milk