

Name:

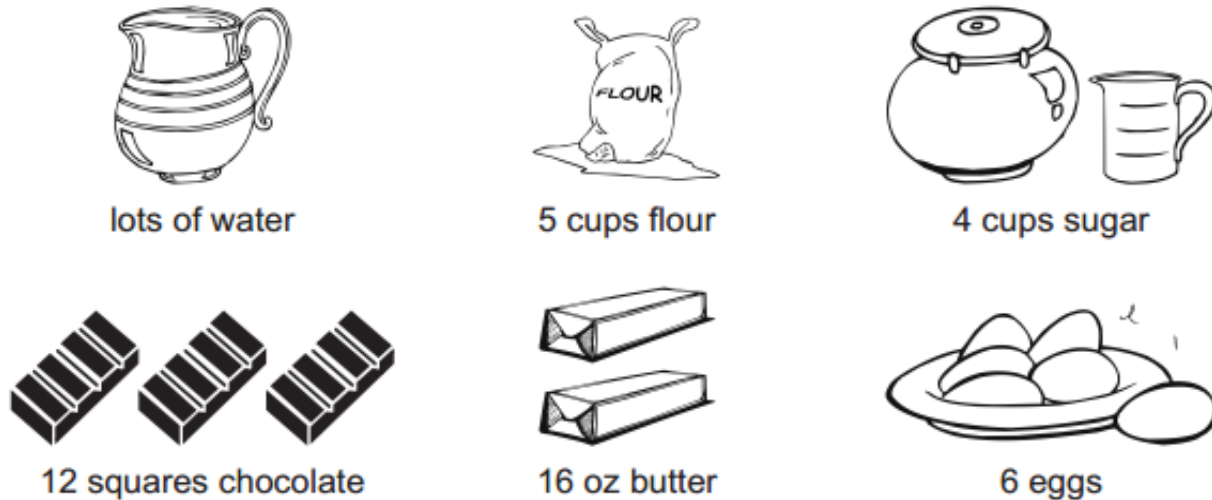
COOKING REACTANTS

A cake recipe calls for:

- 2 cups of water
- 4 cups of flour
- 8 squares of chocolate
- 4 cups of sugar
- 8 oz of butter
- 4 eggs

Ingredients on hand:

Figure 7.1



KEY QUESTIONS

Shaded cells represent completed table entries.

1. According to **Model 1**, how much of each ingredient is necessary to make a cake?

water	flour	chocolate	sugar	butter	eggs

2. If you follow the recipe, using only the ingredients on hand in the model, how much of each ingredient will be left over after you have baked the cake?

water	flour	chocolate	sugar	butter	eggs

3. Which of the ingredients on hand were in excess for the recipe?

4. Which of the ingredients on hand were consumed completely in making the cake?

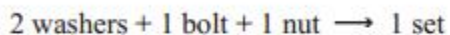
5. Which of the ingredients limit or prevent you from making a second, smaller cake?

6. What would be a good definition for the term limiting ingredient?

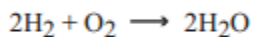
7. What would be a good procedure or methodology to use for identifying the limiting component in some manufacturing process?

8. You want to make 10 dozen standard-sized cookies as specified by a recipe that requires 16 oz of butter, 4 eggs, 3 cups of flour, and 4 cups of sugar.
 - a) Express the recipe for these cookies in the form of a reaction equation as started for you below.
$$16 \text{ oz butter} + 4 \text{ eggs} +$$
 - b) Which ingredient will limit the number of cookies you can make?
 - c) How many standard-sized cookies can you make?

9. You have 100 bolts, 150 nuts, and 150 washers. You assemble a nut/bolt/washer set using the following recipe or equation.



- a) How many sets can you assemble from your supply?
- b) Which is the limiting component?
10. This reaction of hydrogen with oxygen to produce water is described by the following recipe or reaction equation, which says that 2 molecules of hydrogen react with 1 molecule of oxygen to produce 2 molecules of water.



You react 150 H_2 molecules with 100 O_2 molecules to produce H_2O . Which is the limiting reactant, hydrogen or oxygen? How many water molecules can you produce from your supply of hydrogen and oxygen?