Scaling a Recipe

When cooking and baking, we may find it necessary to increase or decrease the yield (the amount of what we are making) of a recipe. Yield may be expressed in quantity, serving, or portion. Increasing or decreasing the yield is called “scaling” a recipe. We can do it by multiplying and dividing each ingredient by a scaling factor.

For example:

<table>
<thead>
<tr>
<th>Recipe: Peanut Butter and Jam Sandwiches</th>
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</thead>
<tbody>
<tr>
<td>Yield: 2 sandwiches</td>
</tr>
<tr>
<td>4 slices of bread</td>
</tr>
<tr>
<td>30 mL peanut butter</td>
</tr>
<tr>
<td>30 mL jam</td>
</tr>
</tbody>
</table>

The yield of this recipe is two sandwiches. If we want to increase the yield to four sandwiches, we have to double the recipe—in other words, scale it by a factor of two.

To double the recipe, we multiply each ingredient by two:

- 4 slices of bread $\times 2 = 8$ slices of bread
- 30 mL peanut butter $\times 2 = 60$ mL peanut butter
- 30 mL jam $\times 2 = 60$ mL jam

If we wanted to decrease the yield to just one sandwich, then we would divide the recipe by two—in other words, scale it by a factor of $\frac{1}{2}$.

To half the recipe, we divide each ingredient by two:

- 4 slices of bread $\div 2 = 2$ slices of bread
- 30 mL peanut butter $\div 2 = 15$ mL peanut butter
- 30 mL jam $\div 2 = 15$ mL jam

If we would like to make a specific yield—let’s say nine sandwiches—we have to determine what the scaling factor is. We can do this by dividing the yield that we want, by the original yield.

yield that we want $\div$ original yield = scaling factor
9 sandwiches $\div 2$ sandwiches = $9/2 = 4.5$

This means that our scaling factor is 4.5, so we would multiply each ingredient by 4.5 in order to scale the recipe to make nine sandwiches.
Use the following recipe to answer the questions on scaling.

**Fresh Fruit Salad with Yogurt on the Side**

**Scrambled Eggs**

**Raspberry Scones**

**Coffee and Tea**

**Recipe: Fresh Fruit Salad**

*Yield: 1 portion*

- 230 mL Fresh fruit (in season), chopped
- Fresh mint, as a garnish
- 125 mL Yogurt

**Recipe: Scrambled Eggs**

*Yield: 5 portions*

- 6 Eggs
- 15 mL Milk
- Butter

Procedure:
1. Mix eggs with milk
2. Turn into buttered skillet on medium heat
3. Stir while cooking
Serve immediately

**Recipe: Raspberry Scones**

*Yield: 24 scones*

- 1 lbs All-purpose Flour
- 4 oz. Unsalted Butter, cold
- 30 mL Baking Powder
- 2 Egg Yolks
- 5 mL Baking Soda
- 11 oz. Cream
- 5 mL Salt
- 125 mL Raspberries
- 1.5 oz. Sugar

Procedure:
1. Mix flour, baking powder, baking soda, salt, sugar and raspberries together
2. Cut in cold butter until pea-sized
3. Add eggs and cream – mix very little
4. Roll out dough to thickness of 1 ½ inches, cut as desired.
5. Bake at 400º F. approximately 10 minutes
1. How many mL of prepared fruit will serve 35 portions? ____________mL
2. How many mL of prepared fruit will serve 50 portions? ____________mL
3. How many mL of yogurt will serve 30 portions? ____________mL
4. How many mL of yogurt will serve 20 portions? ____________mL
5. How many eggs will serve 40 portions of scrambled eggs? ____________eggs
6. How many eggs will serve 2 portions of scrambled eggs? ____________eggs
7. How many mL of milk will serve 3 portions? ___________mL

8. To quadruple the recipe for Raspberry Scones you need:
   a) __________ pounds of flour
   b) __________ egg yolks
   c) __________ ounces of cream
   d) __________ millilitres of salt
   e) __________ millilitres of raspberries

9. To make 12 Raspberry Scones you need:
   a) __________ ounces of butter
   b) __________ egg yolks
   c) __________ ounces of cream
   d) __________ millilitres of salt
   e) __________ ounces of sugar

10. If 1 lb. coffee yields approximately 25 servings, how many pounds will be needed for 400 servings?
    _________________________ lbs

11. If 1 lb. of tea yields approximately 175 servings, how many pounds of tea will be needed for 60 servings? _________________________ lbs

Remember: The line in a fraction means “divide”. Some ingredient measurements have fractions in them, like this:

   2 ¾ oz

To solve problems with these types of measurements, we must first convert that fraction into a decimal by dividing. Then we add that decimal to the whole number:

   2 ¾

Step 1: ¾ = 3÷4
        = 0.75

Step 2: 2 + 0.75
        = 2.75 oz

Now this number can be easily multiplied, divided, added, or subtracted.

For a review of fractions, please see the Fractions Study Guide and the General Math Study Guide.
**Scaling a Recipe: Answer Sheet**

1) 8 050 ml
2) 11 500 ml
3) 3 750 ml
4) 2 500 ml
5) 48
6) 2.4
7) 9
8)  
   a) 4 lbs  
   b) 8  
   c) 44  
   d) 20 ml  
   e) 500
9)  
   a) 2 oz.  
   b) 1  
   c) 5.5 oz.  
   d) 2.5 ml  
   e) 0.75 oz.
10) 16 lbs
11) 0.34 lbs