Lesson 5-1: Determining the Recipe Conversion Factor

Early in our culinary career, the executive chef of our kitchen will want us to be able to resize a recipe for the number of servings. Sometimes the recipe will decrease in size to one or two servings where a personal chef is preparing for a small number of people. For a caterer, the directing chef will ask us to increase the recipe to accommodate a large party such as 240 people celebrating a wedding. Whether we are increasing or decreasing the quantities in the recipe, we must know what the original serving size was. So just after learning our kitchen measurements, we need to know how to factor those amounts without making any errors.

When we train in the kitchen, the first recipe conversion is most likely decreasing the servings to one. The first recipe we will convert together is for Roasted Red Pepper / Fire Roasted Tomatoes Soup.

Roasted Red Pepper / Fire Roasted Tomatoes Soup[1] – makes 20 – 1 cup servings

2 tbsp	**Olive oil**
1	**Lg. red onion, diced**
8-10	**Roasted red peppers (6 ½ c)**
6	**Garlic cloves**
1 c	**Dry white wine**
10	**Fire roasted tomatoes, chopped (4 ¼ c)**
8 c	**Chicken broth**
2 tsp	**Worcestershire sauce**
2 tsp	**Cayenne pepper**
1 tbsp	**Balsamic vinegar**

Now, let us compute the recipe for two servings. The first step is to create a recipe conversion factor, which is a fraction that has the numerator as the new recipe amount over the denominator that signifies the original recipe amount. Sometimes these numbers are the number of servings and other times they are a quantity of the recipe such as 20 cups.

$$\text{Recipe Conversion Factor} = \frac{\text{New Recipe Amount}}{\text{Original Recipe Amount}}$$

The recipe conversion factor is 0.1 as shown in the next formula.

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[1] Roasted Red Pepper / Fire Roasted Tomatoes Soup recipe by Ron Olzak, Chef Apprentice at the Columbus Culinary Institute

$$\text{RCF} = \frac{2c}{20c} = 0.1$$

The next step is to multiply each of the original amounts by the recipe conversion factor of 0.1. For example, the olive oil shown in the table computes to 0.6 teaspoon. In the kitchen, we want to round the amount to a measurement that we can easily use. The closest we can effortlessly come to 0.6 teaspoon is ½ tsp. By continuing with each item, we can use the techniques we learned in the first three chapters to develop a new recipe for the new amount.

Ingredient	Org. Amt.	Calculation	New Amount
Olive oil	**2 tbsp**	$2T \times 0.1 = \dfrac{0.2T}{1} \times \dfrac{3t}{1T} = 0.6 \text{ tsp}$	**½ tsp**
Lg. red onion	**1**	$1 \text{ onion} \times 0.1 = 0.1 \text{ onion}$	**$^1/_{10}$ onion**
Roasted red peppers	**9**	$9 \text{ peppers} \times 0.1 = 0.9 \text{ peppers}$	**1 pepper**
Garlic cloves	**6**	$6 \text{ cloves} \times 0.1 = 0.6 \text{ cloves}$	**½ clove**
Dry white wine	**1 c**	$1c \times 0.1 = \dfrac{0.1c}{1} \times \dfrac{16 \text{ tbsp}}{1c} \times \dfrac{3 \text{ tsp}}{1 tbsp} = 4.8 \text{ tsp}$	**5 tsp**
Fire roasted tomatoes	**10**	$10 \text{ tomatoes} \times 0.1 = 1 \text{ tomato}$	**1 tomato**
Chicken broth	**8 c**	$8c \times 0.1 = \dfrac{0.8c}{1} \times \dfrac{8 \text{ fl.oz.}}{1c} = 6.4 \text{ fl.oz.}$	**6.5 fl. oz.**
Worcestershire sauce	**2 tsp**	$2t \times 0.1 = 0.2 \text{ tsp}$	**¼ tsp**
Cayenne pepper	**2 tsp**	$2t \times 0.1 = 0.2 \text{ tsp}$	**¼ tsp**
Balsamic vinegar	**1 tbsp**	$1T \times 0.1 = \dfrac{0.1T}{1} \times \dfrac{3t}{1T} = 0.3 \text{ tsp}$	**¼ tsp**

When we reduce a recipe, we want to make the converted list of ingredients accurate; however we also want to make the new amounts easy to measure with existing kitchen tools. Recipe lessening is more challenging in this respect than increasing a recipe; since we reach a point in the standard measuring tools where there not a common spoon to assist us. This is where the pinch and the smidgen spoons now are helpful.

Dash – $^1/_8$ of a teaspoon

Pinch – $^1/_{16}$ of a teaspoon

Smidgen – $^1/_{32}$ of a teaspoon

Dash, Pinch and Smidgen

In some cases, we will use mixed units to solve the problem. A dash is $^1/_8$ or 0.125 of a teaspoon. A pinch is $^1/_{16}$ or 0.0625 of a teaspoon. A smidgen is $^1/_{32}$ or 0.03125 of a teaspoon. Presently, we have ¼ or 0.25 tsp of balsamic vinegar and we want 0.3 teaspoons. Using the mix units, we can create the 0.3 by adding the ¼ (0.25) and the $^1/_{16}$ (0.0625) which is 0.3125. This is a much closer than just the previous measurement.

Balsamic vinegar 1 tbsp	$1T \times 0.1 = \dfrac{0.1T}{1} \times \dfrac{3t}{1T} = 0.3 \text{ tsp}$	**¼ tsp + 1 pinch**

When we are in a kitchen and working on our recipe, we should ask the executive chef who is training us whether our conversion is accurate enough. Whether measuring with a set of small spoons or using our finger and thumb to estimate the amount, small recipes do require a talent of adding diminutive amounts to gain the required total.

Lesson 5-2
Increasing Recipes

Chef Bennet now wants us to increase the recipe for a larger benefit by making one gallon of the Roasted Garlic and Pine Nut Butter. The recipe that yields 2 ½ quarts is shown below. We will use the same Recipe Conversion Factor formula, but instead of placing the amount of servings into the fraction, we will write the new recipe yield (1 gallon) in the numerator and the original recipe amount of 2 ½ quarts in the denominator.

Roasted Garlic and Pine Nut Butter
Yield: 2 ½ quarts

Ingredients
3 lbs.	Butter (softened)
1 ¼ cup	Roasted Garlic
2 cups	Pine Nuts (toasted)
2 tsp	Salt
2 tsp	White Pepper

Method:

Mix butter in a robot coupe until smooth. Add garlic, nuts, salt, and pepper. Serve at room temperature.

To Roast Garlic:

Place garlic in a baking pan and cover with olive or salad oil. Cover tightly with aluminum foil. Roast at 375 degrees for 35-45 minutes until golden brown. Strain from the oil when cool and puree. You can save the flavored oil for dressings, dipping, or sautéing.

$$\text{Recipe Conversion Factor} = \frac{\text{New Recipe Amount}}{\text{Original Recipe Amount}}$$

$$RCF = \frac{1 \text{ gal}}{2\frac{1}{2}\text{qt}}$$

As we can see in the recipe conversion formula, we cannot divide with gallons in the numerator and quarts in the denominator, so we will change the 1 gallon to 4 quarts and then divide to get a recipe conversion factor of 1.6.

$$RCF = \frac{1 \text{ gal}}{2\frac{1}{2}\text{qt}} = \frac{4\text{qt}}{2\frac{1}{2}\text{qt}} = 1.6$$

The next step is to multiply each of the original amounts by the recipe conversion factor of 1.6. For example, the butter shown in the table computes to 4.8 lbs. By continuing with each item, we can use the techniques we learned in the first three chapters to develop a new recipe for the new amount.

Ingredient	Org. Amt.	Calculation	New Amount
Butter	**3 lbs**	$3 \text{ lbs} \times 1.6 = 4.8 \text{ lbs}$	**4.8 lbs**
Roasted Garlic	**1 ¼ cup**	$1\frac{1}{4}\text{c} \times 1.6 = 2\text{c}$	**2 c**
Pine Nuts (toasted)	**2 cups**	$2\text{c} \times 1.6 = 3.2\text{c} \quad \frac{0.2\text{c}}{1} \times \frac{48\text{tsp}}{1\text{c}} = 9.6\text{tsp}$	**3 c + 3 Tbsp + ½ tsp**
Salt	**2 tsp**	$2\text{tsp} \times 1.6 = 3.2\text{tsp}$	**1 Tbsp + ¼ tsp**
White Pepper	**2 tsp**	$2\text{tsp} \times 1.6 = 3.2\text{tsp}$	**1 Tbsp + ¼ tsp**

When we get answers like 3.2 cups, we could make the recipe 3 ¼ cups, however if Chef Bennett wants the recipe exact, we would convert the 0.2 cups to 9.6 teaspoons. Nine teaspoons equals three tablespoons with 0.6 teaspoons left over. We will make this a half of a teaspoon to make the toasted pine nuts 3 cups + 3 tablespoons + ½ teaspoon.