Chapter 3

Customary Culinary Units of Measure

In this chapter, you will learn the following to World Class standards:

- ☑ Customary Kitchen Volumetric Measurers
- ☑ Larger Kitchen Volume Measurers
- ☑ Weight Measures
- ☑ Length Measures

Lesson 3-1:
Measuring Volume

Accurate measurement is important in the culinary profession, and as a result, we find that experienced chefs know the types of volumetric containers in the kitchen and have them committed to memory. A common kitchen measurement scheme we will study is the English volume system. We learning the types of containers with the gallon and we will move downwards all the way to a smidgen.

The **gallon** container is an especially common unit of measurement. Originally, known as the Queen Anne's Gallon and measuring 3 inches by 7 inches by 11 inches or 231 cubic inches. The gallon contains two half gallons, four quarts, eight pints, sixteen cups, thirty-two half cups, sixty-four quarter cups or 128 fluid ounces. The abbreviation for gallon in capital "G" or gal.

Gallon (G, gal)

There are two half gallons in a full gallon. Every step in the standard volumetric measurers down to the tablespoon is a multiple of two. The half-gallon container holds two quarts, four pints, eight cups, sixteen half cups, thirty-two quarter cups or 64 fluid ounces. The abbreviation for half gallon is ½ gal.

Half Gallon (½ gal)

The quart container is ¼ of a gallon. The quart holds two pints, four cups, eight half cups, sixteen quarter cups or 32 fluid ounces. The abbreviation for quart is qt.

Quart (Qt)

The pint container is $^{1}/_{8}$ of a gallon. The pint holds two cups, four half cups, eight quarter cups or 16 fluid ounces. The abbreviation for pint is pt.

Pint (Pt)

The standard measuring cup set will have a stackable sequence of containers which are a quarter cup (2 fluid ounces), a third of a cup (2 $^{2}/_{3}$ fluid ounces), a half of a cup (4 fluid ounces) and a full cup (8 fluid ounces). The abbreviation for cup is capital "C" or lower case "c".

¼, $^{1}/_{3}$, ½ and 1 Cup (C, c)

In the image of the measuring cup, each tick mark on the scale represents a fluid ounce. The fluid ounce is a measurement of volume. In Section 3-3, we will learn about the ounce which is a quantity of weight, $^{1}/_{16}$ of a pound actually. One half of a fluid ounce is a tablespoon. The abbreviation for fluid ounce is fl. oz.

Fluid Ounce (fl. oz.)

The standard measuring spoon set comes with a quarter (¼) teaspoon, a half (½) teaspoon, a teaspoon and a tablespoon. There a three teaspoons in a tablespoon. Some measuring spoon sets can have the smaller dash, pinch and smidgen spoons added to the grouping. The abbreviation for tablespoon is capital "T" or tbsp and for teaspoon, lower case "t" or tsp.

Table and Teaspoons
(T, tbsp) (t, tsp)

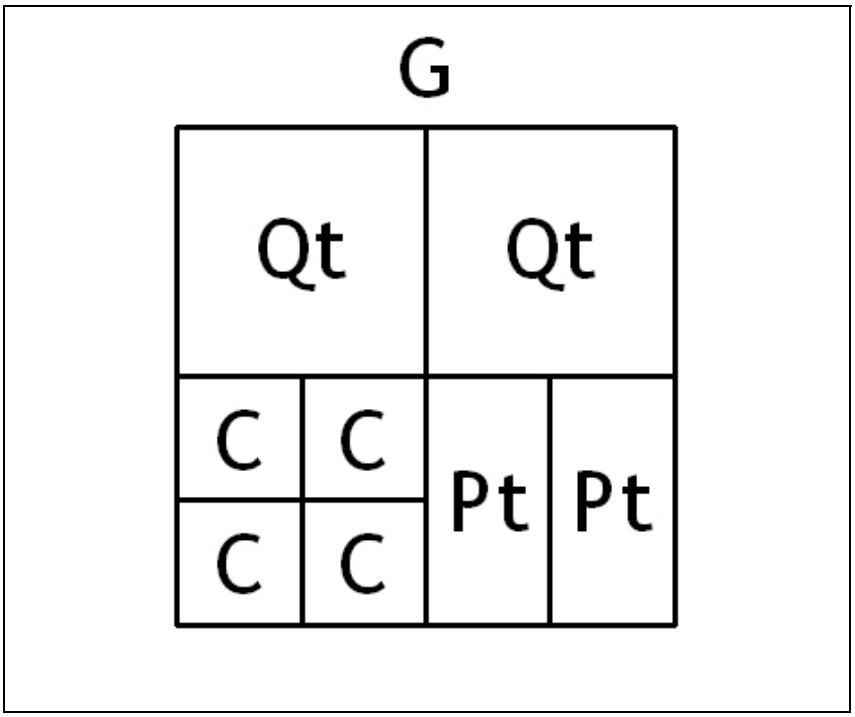
Dash – $^{1}/_{8}$ of a teaspoon

Pinch – $^{1}/_{16}$ of a teaspoon

Smidgen – $^{1}/_{32}$ of a teaspoon

Dash, Pinch, and Smidgen

There are many ways for a chef to commit these volume measurements to memory and we have several visual methods to help. Learning to sketch a small diagram showing the kitchen volume measures quickly can assist us early in our culinary career. Eventually, after a few weeks, we know the relationships by heart.



For Visual Learners:

Draw a two-inch box and divide the box into four squares. Over the top of the box, write a "G" which represents the whole gallon. In the two top squares, write "Qt" for quart, since there are four quarts in a gallon and the quart is in the quarter-sized area. In the lower right quadrant, split the box and write "Pt" in each section for Pint, because there are two pints in a quart. In the lower left quadrant, divide the quart section into four and write "C" in each partition for cup.

Practice drawing this diagram in less than 15 seconds and use the graphic whenever needed. You can quickly associate the units of measure.

Practice Problems

Convert the following units to their equivalent volume measurements.

1 gallon =	___ cups	1 bushel =	___ gallons	8 tbsp =	___ cups
4 pints =	___ quarts	2 quarts =	___ cups	2 gallon =	___ fl oz
4 ½-cup =	___ cups	6 tsp =	___ tbsp	3 quarts =	___ gallon
2 cups =	___ pints	24 fl oz. =	___ pints	12 tsp =	___ tbsp
4 pecks =	___ bushel	64 fl.oz. =	___ gallons	2 pints =	___ cups
32 fl. oz.. =	___ quarts	1.5 pints =	___ cups	6 ½ cups =	___ pints

Real Kitchen Exercise

Chef wants to know how many cups of oil we can get from a container holding 3.5 quarts of oil.

Lesson 3-2
Larger Culinary Volumes

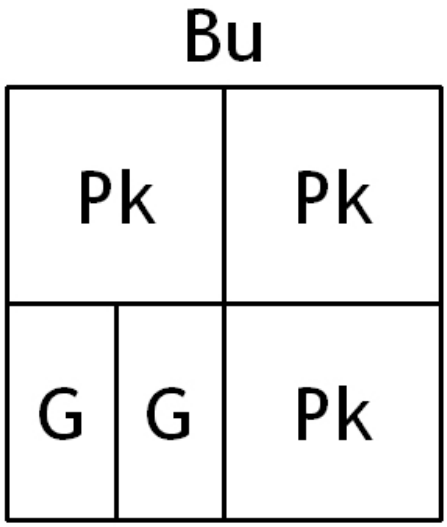
For larger dry volumetric measures, the bushel and peck offer a method to accept dry produce. The bushel can vary in weight depending upon the product and many agricultural departments and organizations have charts that show weight per bushel.

A bushel is a dry measure of volume equal to eight gallons. The agricultural industry assigns weights to different commodities that are shipped by bushel, so although the bill states cost per bushel, the purchase is really done by the agreed weight assigned to the bushel for that item. For example, apples are 48 pounds per bushel, while onions measure 57 pounds per bushel. The abbreviation for bushel is “Bu” or bsh.

Bushel (Bu, bsh)

A peck is one fourth of a bushel or two gallons. The peck can be seen where fruit suppliers will sell multiple units of agriculture products and are selling eight quarts of produce in one container. Again, the bill can maintain that the sale is cost per peck, but in many instances the weight of the commodity is measured so that every container holds the same amount of product. The abbreviation for peck is pk.

Peck (Pk)



For Visual Learners:

Draw a two-inch box and divide the box into four squares. Over the top of the box, write a “Bu” which represents the whole bushel. In the two top and lower right squares, write “Pk” for peck, since there are four pecks in a bushel. In the lower left quadrant, divide the peck section into two and write “G” in each partition for gallon, because there are 2 gallons in a peck.

Practice drawing this diagram in less than 15 seconds and use the graphic whenever needed. You can quickly associate the units of measure.

Practice Problems

Convert the following units to their equivalent volume measurements.

1 gallon =	___ cups	1 bushel =	___ gallons	8 tbsp =	___ cups
4 pints =	___ quarts	2 quarts =	___ cups	2 gallon =	___ fl oz
4 ½-cup =	___ cups	6 tsp =	___ tbsp	3 quarts =	___ gallon
2 cups =	___ pints	24 fl oz. =	___ pints	12 tsp =	___ tbsp
4 pecks =	___ bushel	64 fl.oz. =	___ gallons	2 pints =	___ cups
32 fl. oz.. =	___ quarts	1.5 pints =	___ cups	6 ½ cups =	___ pints

Real Kitchen Exercise

There are 3 pecks of strawberries in the kitchen. Chef wants to know how many quarts of strawberries we have?

How many pecks are there in three bushel of onions?

Lesson 3-3
Measuring by Weight

In the English system of measurement, we use two common weight units in the kitchen, pounds and ounces. There are 16 ounces in a pound. Products can be weighed and reported in the following combinations: pounds-decimal, pounds-ounces or ounces. A common skill the chef needs to know is how to convert between the three types of measurements.

The pound is a measurement of weight. We can hold two different recipe items in our hands. The parsley, which weighs $^{1}/_{16}$ of a pound per cup and the butter, which weighs ½ of pound per cup occupy the same volume. What makes them heavier is the density of their substance. Whatever kitchen we work in, the chef will use recipes quantities that reflect their measuring preference.

Pound (lb or #)

For example, some chefs prefer to measure the all purpose flour by the cup, where others feel they can measure a more accurate amount using a spring or digital scale. A half cup of all purpose flour weighs 2 ounces, so we can choose to measure by using the ½ cup container or weighing the flour on the scale.

Converting Pounds to Ounces

When chef gives us the weight of a commodity such as 2 pounds of onions and we would like to convert the measurement to ounces, we need to multiply the measurement by 16 since there are 16 ounces in a pound. In the conversion below, we can see the steps to change the pounds to ounces. In later chapters, we will become very efficient developing the brackets to convert from one type of unit to another.

$$\frac{2lb}{1}\times\frac{16oz}{1lb}=32oz$$

So the formula for converting pounds to ounces is:

$$\frac{\_\_\_\_lb}{1}\times\frac{16oz}{1lb}=\_\_\_\_oz$$

And all we have to do is insert the pounds or pounds-decimal and compute by a factor of 16 to get the number of ounces.

Converting Ounces to Pounds

What if chef wants 20 four-ounce servings of the Salmon for the dinner party. We multiply the four ounces by 20 to get 80 ounces. How do we convert the total ounces to pounds? In this conversion, we will divide by sixteen to get pounds.

$$\frac{80oz}{1} \times \frac{1lb}{16oz} = 5lb$$

So the formula for converting pounds to ounces is:

$$\frac{\_\_\_\_oz}{1} \times \frac{1lb}{16oz} = \_\_\_\_ lb$$

And all we have to do is insert the ounces and compute by a factor of $^{1}/_{16}$ to get the number of pounds.

Sometimes the answer is not going to be a whole number, but when we divide by 16 ounces, we will gat a pounds-decimal answer.

Converting Pounds-Ounces to Ounces

Chef has 20 pounds and 7 ounces of all purpose flour in stock. How many ounces of flour does chef have?

First, separate the two weight measures. Multiply the 20 pounds times 16 ounces per pound to get 320 ounces. Add the 7 ounces to the 320 ounces to get 327 ounces

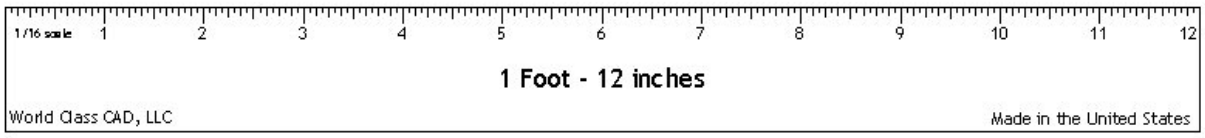
$$\frac{20lb}{1} \times \frac{16oz}{1lb} = 320oz$$

$$320oz + 7oz = 327oz$$

So the formula for converting pounds to ounces is to convert the pounds to ounces and add the answer to the ounces in the original amount.

Lesson 3-4
Measuring by Length

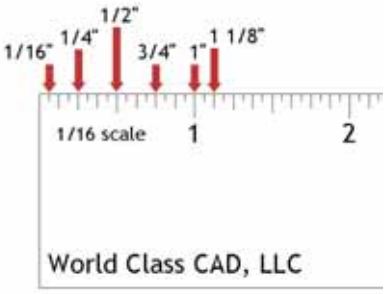
Understanding the sizes of items in the kitchen is just as important as their volume and weight and when we address these measurements, we are mainly speaking of inches and feet. The foot is the cornerstone measurement in the English system, where restaurants drawings show the kitchen and front room in feet.



Foot (ft or ')

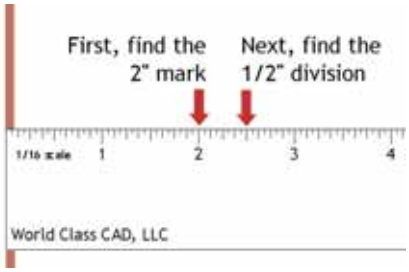
The foot comprises of 12 inches. Where feet help us with larger sizes in the restaurant, the inch is the measurement of choice when discerning the width of diced vegetables and the size of dessert bars being cut. Many automated cutting devices have settings that will slice the food at the desired inch setting and have the inch scale built into the machine. The abbreviation for the foot is ft or ‘.

In the scale shown above and to the right, the smallest division is the $^{1}/_{16}$ inch. Two of these divisions make a $^{1}/_{8}$ of an inch. Four $^{1}/_{16}$ divisions make a quarter of an inch. Eight divisions make a half of an inch. 12 divisions make ¾ of an inch. On most rulers, each inch mark has the number of inches from the origin or zero mark. When reading a scale, first read the inch and then proceed to the fraction of the inch to finish the measurement. The abbreviation for the inch is in or “”.



Inch (in or ")

For example, to measure 2 ½ inch with the scale, we place the on the end of the item, then we read to the 2 inch mark on the scale as shown. Next, we find the ½” division which happens to be half way to the 3” mark. On the $^{1}/_{16}$” scale, this turns out to be 8 division places from the 2” indication.



Measuring 2 ½ Inches

Knowing and being able to use the inch and foot scale is just as important as understanding the volumetric and weight units of measures.

Lesson 3-5
Real Kitchen Exercise

1. The Fresh Salmon Coulibiac calls for 1 tablespoon of oil. How many teaspoons of oil would you use in the recipe?

2. A cup of cooked rice weighs 8 ounces. How many pounds of cooked rice does Chef need for the recipe that calls for 2 cups?

3. There is ½ pound of salmon fillets in chef's recipe. How many pounds of salmon would Chef need for the Fresh Salmon Coulibiac if he asked you to increase the recipe by 250%?

4. Chef wants to know how many four ounces servings we can obtain from 1 ½ pounds of Salmon.

5. There are eight jars of Velouté sauce in the kitchen. Each jar holds 32 fluid ounces. Chef's recipe call for 2 cups of sauce. How many cups of sauce are available?

6. Chef has a salad made of 3 ¾ cups of spinach, 2 ½ cups of lettuce, ½ cup of red pepper, ¼ cup of mandarin oranges, ¼ cup mushroom, and ¼ cup red onion. If chef serves all of the salad to four people, what is the portion size for each?

7. Chef has thirty-four 7-oz steaks. What is the total weight of the steaks in pounds and ounces?

8. Chef Apprentice Ron added 2 quarts of chicken stock, 2 pints of pureed squash, 4 cups of purred carrots, 8 fluid ounces of cream and a half cup of pureed red onion to his Butternut Squash – Carrot soup[1]. How many fluid ounces of soup does chef have?

9. Chef asks you to spread cream cheese on each of 320 hors d'oeuvres. Each of the hors d'oeuvre has a 2 ¼ tsp of cream cheese. How many cups of cream cheese are required?

10. Chef is making hors d'oeuvres for a party of 412 guests on Friday. Each guest will get four samples on their plate. There is a cream sauce for dipping the hors d'oeuvres and chef says to plan for ½ tsp of sauce per item. How many pints of cream sauce should you prepare?

11. What are the abbreviations for the following measurements:

Tablespoon		Teaspoon	
Half Gallon		Bushel	
Peck		Foot	
Cup		Inch	
Gallon		Quart	
Pint		Ounce	
Fluid Ounce		Pound	

[1] Butternut Squash – Carrot Soup recipe by Ron Olzak, Chef Apprentice at the Columbus Culinary Institute