Skills for Success Curriculum Resource Cover Page

Organization

College Sector Committee for Adult Upgrading (CSC)

Curriculum Resource

Food Services Preparation Module 1 - Measurement Conversion: This module is the first in a five-part series. It can be used to support learners in LBS and/or pre-apprenticeship who are interested in food service/cooking. In this module, participants will learn to convert weight, volume, and temperature measurements within and between the metric and U.S./Imperial measurement systems, using a calculator and internet applications. Answer keys for practice activities are provided in the document..

OALCF Alignment

Competency	Task Group	Level
Competency A -Find and Use Information	A1. Read continuous text	3
Competency C - Understand and Use Numbers	C3. Use measures	3
Competency D - Use Digital Technology	N/A	2

Goal Paths (check all that apply)

☒ Employment
☒ Apprenticeship
☐ Secondary School Credit
☒ Postsecondary
☒ Independence

Embedded Skills for Success (check all that apply)

☐ Adaptability
☐ Collaboration
☐ Communication
☐ Creativity and innovation
☒ Digital
☒ Numeracy
☒ Problem Solving
☒ Reading
☐ Writing

Notes:
This resource can be used in a teacher-led or self-directed format.
Note that fonts used in the equation editor differ from the rest of the text.
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Introduction

This resource is the first module of a five-part series pertaining to the basic theory and calculations used in the kitchens of food service establishments such as restaurants, cafeterias, and food trucks. For cooks, managers, and owners alike, a thorough understanding and proficient application of these fundamental principles is essential to one's job description as well as to the proper functioning and economic survival of any food service establishment.

In this module, learners will be introduced to the measurement systems, measurements, units, conversion factors, and calculations commonly used in small to medium-sized Canadian foodservice kitchens. Please note: All cooks should have the ability to competently perform the conversion calculations covered in this resource. Individual proficiency in this valuable skill will contribute to an increased likelihood of batch-to-batch recipe consistency in food production, whether the batch size is scaled-up or scaled-down.

To complete the module successfully, learners should have an elementary knowledge of fractions and order of operations. The content of this module is covered in the following order: measurement systems, weight measurement, volume measurement, temperature measurement, final exercise, conclusion, and Appendix. The second, third, and fourth chapters provide learners with theory and example calculations associated with the measurement type specific to each chapter, followed by problem sets with answers.

The last chapter is a final problem set, consisting of a mixed order of measurement conversion questions of all measurement types covered in this module; learners will also be able to compare and contrast their hand calculated answers to answers

obtained from the use of an online unit converter. Finally, the Appendix is intended for use as a quick reference sheet; it contains all the conversion factors and formulas used in the module.

If at any time a learner encounters difficulties with the content of this resource, the instructor can provide assistance.

Acknowledgement:

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Chapter 1 - Measurement Systems

When we cook, we may use one or more measurement systems when following a recipe. Measurement systems allow us to measure standardized quantities of ingredients, where the quantity of each ingredient required for a food product is listed in its recipe.

In Canada, we use the metric measurement system in our daily lives. Outside the kitchen, we see the presence of the metric system on highway distance signs where the distance between different cities or towns is presented in the metric unit of kilometers (km). In the kitchen, length measurements are rarely used, except for knowing the size dimensions of knife cuts in either metric centimetres (cm) and millimetres (mm) or U.S./imperial inches (in), but we often use metric measurements of weight, volume, and temperature, such as the units of grams (g), litres (L), and degrees Celsius (°C), respectively.

Although the metric system has been the official system in Canada since 1971, Canadians still regularly encounter the U.S. customary system of measurement, which was one of the primary measurement systems in Canada prior to metrication (Kennedy, 1976). As an example, in the grocery store, shoppers will likely notice certain products measured in pounds (lbs) and ounces (oz). These two units are measurements of weight. We see these U.S. customary measurements of weight in the kitchen as well, along with measurements of volume, such as the units of tablespoon (T) or teaspoon (t). Furthermore, when you use the oven, you may notice that the temperature is often displayed in degrees Fahrenheit (°F), a unit of temperature measurement in the US customary system. Books, magazines, and websites often present baking, roasting, braising, or deep-frying temperatures in Fahrenheit too.

Additionally, there is another measurement system that was frequently used in Canada prior to 1971 although not currently used as frequently as the metric and U.S. systems. This system is the imperial measurement system. In comparison to the U.S. system, many units of length, weight, and temperature are similar in the imperial system. For example, units of inches, pounds, ounces, and degrees Fahrenheit do not vary between systems. On the other hand, many units of volumetric measurement are similar in name but differ in quantity. For example, both systems utilize the unit of fluid ounces (fl oz) however the quantity of substance in a fluid ounce differs between them. When contrasted to metric quantities of volumetric measurement, one imperial fluid ounce contains 28.4 mL while one U.S. fluid ounce contains 29.6 mL.

Differences also exist between those two systems in terms of the volume of a substance being measured using gallons, quarts, pints, tablespoons, and teaspoons. However, in a Canadian kitchen you will rarely see volumetric measurements in imperial units. Consequently, volumetric measurement conversion calculations in this resource are primarily based on the metric and U.S. customary measurement systems.

The next three chapters will further introduce you to the measurement concepts of weight, volume, and temperature. You will learn how to convert measurements within both metric and U.S systems as well as between these systems. The imperial system will be included in the chapters where its measurements are comparable to the U.S. customary system, specifically weight and temperature.

Let’s get measuring!

Chapter 2 - Weight Measurements

Weight can be defined as “the mass or heaviness of a substance” (Labensky et al., 2006, p. 61). Weight is measured with balances or scales in the kitchen. The most common units of weight you will see and use in the kitchen are grams (g), kilograms (kg), ounces (oz), and pounds (lbs). Grams and kilograms are units of weight in the metric system, and ounces and pounds are units of weight in the U.S. and the imperial systems.

This chapter will show you how to convert weight measurements within measuring systems and between measuring systems. In the following pages of this chapter, you will first learn how to convert weight within the metric system, then how to convert weight within the U.S./Imperial systems, and finally, how to convert weight between the metric system and the U.S./Imperial systems.

To convert measurements, you can use the general conversion formula below.

Unit Converting From x Conversion Factor = Unit Converting to

or

$$\text{Unit Converting From} \times \frac{\textit{Unit Converting To}}{\textit{Unit Converting From}} = \text{Unit Converting To}$$

In this formula, we can see that the unit we are converting from cancels out when it is multiplied by the conversion factor, which leaves us with the unit we require in the final answer.

$$\sout{\text{Unit Converting From}} \times \frac{\textit{Unit Converting To}}{\sout{\textit{Unit Converting From}}} = \text{Unit Converting To}$$

The general conversion formula will be utilized repeatedly in the coming examples to convert measurements from one unit to another.

Section A – Converting Weight Measurements within the Metric System

To convert weight measurements within the metric system, it is also essential to know that 1 kilogram equals 1000 grams (1 kg =1000 g). Once you know this conversion factor, you have half the information you need to convert a metric weight measurement from a recipe into either grams or kilograms. The other half of the information you need to know is the weight of the substance in the recipe, for example flour, in either grams or kilograms.

Example 1: Converting Grams (g) to Kilograms (kg)

Convert 2220 grams to kilograms: 2220 g = ___ kg

Step 1: To calculate this conversion, we must use the conversion factor 1 kg = 1000 g, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ kg}{1000\ g}$ or $\frac{1000\ g}{1\ kg}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting grams to kilograms, we choose the fraction that contains the unit we want to convert to in the numerator and the unit that we are converting from in the denominator: $\frac{numerator}{denominator} \rightarrow \frac{1\ kg}{1000\ g}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$2220\ \text{g} \times \frac{1\ kg}{1000\ g} = \text{Unit Converting To}$$

Now multiply 2220 grams by the fraction, $\frac{1\ kg}{1000\ g}$. Therefore, we multiply the 2220 g by 1 kg and then divide by 1000 g to calculate the final answer.

$2220\ \text{g} \times \frac{1\ kg}{1000\ g} = \frac{2220\ \cancel{g} \times 1\ kg}{1000\ \cancel{g}} = 2.22\ \text{kg}$ *Notice: the unit we are changing from (g) cancels out*

Thus, the answer is 2.22 kg, so $2220\ \text{g} = 2.22\ \text{kg}$.

Example 2: Converting Kilograms (kg) to Grams (g)

Convert 10 kilograms to grams: 10 kg = ___ g

Step 1: To calculate this conversion, the process is similar to the previous example. First, we must use the conversion factor 1 kg = 1000 g, and we again rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ kg}{1000\ g}$ or $\frac{1000\ g}{1\ kg}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting kilograms to grams, we choose the fraction that contains the unit we want to convert to in the numerator (g) and the unit that we are converting from in the denominator (kg): $\frac{numerator}{denominator} \rightarrow \frac{1000\ g}{1\ kg}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$10\ \text{kg} \times \frac{1000\ g}{1\ kg} = \text{Unit Converting To}$$

Now multiply 10 kilograms by the fraction. In this step, we multiply the 10 kg by 1000 g and then divide by 1 kg to calculate the final answer.

$$10 \text{ kg x } \frac{1000\ g}{1\ kg} = \frac{10\ \cancel{kg} \ x\ 1000\ g}{1\ \cancel{kg}} = 10\ 000 \text{ g}$$

Notice: the unit we are changing from (kg) cancels out

Thus, the answer is 10 000 g, so 10 kg = 10 000 g

Problem Set 2a

Complete the unit conversions below. The correct answers are listed after the questions.

I. 500 g = ___ kg

II. 20.50 kg = ___ g

III. 10 650 g = ___ kg

IV. 5 kg = ___ g

V. 35 000 g = ___ kg

VI. 12 kg = ___ g

VII. 10 000 g = ___ kg

VIII. 0.5 kg = ___ g

IX. 66 620 g = ___ kg

X. 0.14 kg = ___ g

Answers to Problem Set 2a

I. 0.5 kg

II. 20 500 g

III. 10.65 kg

IV. 5000 g

V. 35 kg

VI. 12 000 g

VII. 10 kg

VIII. 500 g

IX. 66.62 kg

X. 140 g

Section B – Converting Weight Measurements within the U.S./Imperial Systems

To convert weight measurements within the U.S./Imperial systems, it is essential to know that 1-pound equals 16 ounces (1 lb = 16 oz). Once you know this *conversion factor*, you have half the information you need to convert a weight measurement from a recipe into either pounds or ounces. The other half of the information you need to know is the quantity of the measurement and the unit it was measured in, either pounds or ounces.

Example 1: Converting Ounces (oz) to Pounds (lb)

Convert 10.0 oz to pounds: 10.0 oz = ___ lb

Step 1: To calculate this conversion, we must use the conversion factor 1 lb = 16 oz, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ lb}{16\ oz}$ or $\frac{16\ oz}{1\ lb}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting ounces to pounds, we choose the fraction that contains the unit we want to convert to in the numerator (lb) and the unit that we are converting from in the denominator (oz): $\frac{numerator}{denominator} \rightarrow \frac{1\ lb}{16\ oz}$

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$10.0\ \text{oz} \times \frac{1\ lb}{16\ oz} = \text{Unit Converting To}$$

Now multiply 10.0 oz by the fraction. In this step, we multiply the 10.0 oz by 1 lb and then divide by 16 oz to calculate the final answer.

$$10.0 \text{ oz x } \frac{1\ lb}{16\ oz} = \frac{10.0\ \cancel{oz}\ x\ 1\ lb}{16\ \cancel{oz}} = 0.625 \text{ lb}$$

Notice: the unit we are changing from (oz) cancels out

Thus, the answer is 0.625 lb, so 10.0 oz = 0.625 lb

Example 2: Converting Pounds (lb) to Ounces (oz)

Convert 8 pounds to ounces: 8 lb = ___ oz

Step 1: To calculate this conversion, we must use the conversion factor 1 lb = 16 oz, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ lb}{16\ oz}$ or $\frac{16\ oz}{1\ lb}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting pounds to ounces, we choose the fraction that contains the unit we want to convert to in the numerator (oz) and the unit that we are converting from in the denominator (lb): $\frac{numerator}{denominator} \rightarrow \frac{16\ oz}{1\ lb}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$8 \text{ lb x } \frac{16\ oz}{1\ lb} = \text{Unit Converting To}$$

Now multiply 8 lb by the fraction. In this step, we multiply the 8 lb by 16 oz and then divide by 1 lb to calculate the final answer.

$8\text{ lb} \times \frac{16\ oz}{1\ lb} = \frac{8\ \cancel{lb} \times 16\ oz}{1\ \cancel{lb}} = 128\text{ oz}$ *Notice: the unit we are changing from (lb) cancels out*

Thus, the answer is 128 oz, so $8\text{ lb} = 128\text{ oz}$.

Problem Set 2b

Complete the unit conversions below. The correct answers are listed after the questions.

I. 16 oz = ___ lb

II. 22 lb = ___ oz

III. 368 oz = ___ lb

IV. 0.5 lb = ___ oz

V. 192 oz = ___ lb

VI. 7.5 lb = ___ oz

VII. 8 oz = ___ lb

VIII. 1 lb = ___ oz

IX. 32 oz = ___ lb

X. 17 lb = ___ oz

Answers to Problem Set 2b

I. 1 lb

II. 352 oz

III. 23 lb

IV. 8 oz

V. 12 lb

VI. 120 oz

VII. 0.5 lb

VIII. 16 oz

IX. 2 lb

X. 272 oz

Section C – Converting Weight Measurements between Metric and U.S./Imperial Systems

To convert weight measurements between metric and U.S./Imperial systems, it is essential to know the conversion factors that allow you to perform these calculations. You should note that different kitchens may use slightly different conversion factors. This is because small to medium kitchens that make small-batch recipes can produce high-quality and consistent products with less precise conversion factors while industrial-sized kitchens or production plants that make much larger batch recipes must use more precise conversion factors to maintain recipe quality and consistency.

Slight differences in calculation numbers can create big differences when larger quantities of product are being produced. For example, smaller establishments may use the conversion factor of 28.4 g = 1 oz, but larger establishments may use 28.3495 g = 1 oz for more precision in the outcome of the final product.

In this resource, we're most concerned with small to medium-sized food service establishments. While it's always a good idea to confirm the preferred conversion factors with your chef or employer, in general, the two *conversion factors* that are typically used for intersystem weight conversions in these establishments are 1 ounce equals 28.4 grams (1 oz = 28.4 g) and 1 kilogram equals 2.20 pounds (1 kg = 2.20 lb). These conversion factors, along with those you learned in the previous sections of this resource, will most often be the only conversion factors that you'll use to convert weight measurements in the kitchen.

One of the reasons cooks learn how to convert between systems is to standardize the measurements system in recipes, so all the measurements are in either metric or U.S./Imperial. It is not advisable to work with a recipe that uses two systems of measurement because this can cause inaccuracies which can lead to inconsistencies in the quality and yield of a food product. Most scales in Canada (digital and analog) have both metric and U.S./Imperial settings, so measuring in either system is simple and convenient once you decide which measurement system you would like to use.

The following four examples will show you how to convert measurements between the metric and U.S./Imperial systems. You should be able to convert each metric weight unit to an U.S./Imperial weight unit and vice versa. The problem set in this section will provide you with practice in doing so. Fortunately, if you know or can find the conversion factor that equates the two units that you're converting between, the calculation process is very similar to the calculations that we've already completed above.

Example 1: Converting Metric Weight to U.S./Imperial Weight

Convert 235 grams to ounces: 235 g = ___ oz

Step 1: To calculate this conversion, we must use the conversion factor 1 oz = 28.4 g, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ oz}{28.4\ g}$ or $\frac{28.4\ g}{1\ oz}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting grams to ounces, we choose the fraction that contains the unit we want to convert to in the numerator (oz) and the unit that we are converting from in the denominator (g): $\frac{numerator}{denominator} \rightarrow \frac{1\ oz}{28.4\ g}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$235\text{ g x } \frac{1\ oz}{28.4\ g} = \text{Unit Converting To}$$

Now multiply 235 g by the fraction. In this step, we multiply the 235 g by 1 oz and then divide by 28.4 g to calculate the final answer.

$235\text{ g x } \frac{1\ oz}{28.4\ g} = \frac{235\ \cancel{g}\ x\ 1\ oz}{28.4\ \cancel{g}} = 8.27\text{ oz}$ *Notice: the unit we are changing from (g) cancels out*

Thus, the answer is 8.27 oz, so 235 g = 8.27 oz.

Example 2: Converting U.S./Imperial Weight to Metric Weight

Convert 10.5 pounds to kilograms: 10.5 lb = ___ kg

Step 1: To calculate this conversion, we must use the conversion factor 1 kg = 2.20 lb, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ kg}{2.20\ lb}$ or $\frac{2.20\ lb}{1\ kg}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting pounds to kilograms, we choose the fraction that contains the unit we want to convert to in the numerator (kg) and the unit that we are converting from in the denominator (lb): $\frac{numerator}{denominator} \rightarrow \frac{1\ kg}{2.20\ lb}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$10.5 \text{ lb} \times \frac{1\ kg}{2.20\ lb} = \text{Unit Converting To}$$

Now multiply 10.5 lb by the fraction. In this step, we multiply the 10.5 lb by 1 kg and then divide by 2.20 lb to calculate the final answer.

$10.5 \text{ lb} \times \frac{1\ kg}{2.20\ lb} = \frac{10.5\ \cancel{lb} \times 1\ kg}{2.20\ \cancel{lb}} = 4.77 \text{ kg}$ *Notice: the unit we are changing from (lb) cancels out*

Thus, the answer is 4.77 kg, so 10.5 lb = 4.77 kg.

Example 3: Converting Mixed U.S./Imperial Weight Measurements to Metric Weight Measurements

Convert 2 pounds 6 ounces to grams: 2 lb 6 oz = ___ g

Step 1: To begin this calculation we first need to change the U.S./Imperial weight measurement from two units (pound and ounces) to one unit, either pounds or ounces. Since the final unit we want to report is grams, converting the 2 pounds to ounces and then adding the remaining 6 oz is a good approach because we'll get a round number (a number without a decimal value). To calculate the conversion from pounds to ounces, we must use the conversion factor 1 lb = 16 oz, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ lb}{16\ oz}$ or $\frac{16\ oz}{1\ lb}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation. In this step, since we're converting pounds to ounces, we choose

the fraction that contains the unit we want to convert to in the numerator (oz) and the unit that we are converting from in the denominator (lb): $\frac{numerator}{denominator} \rightarrow \frac{16\ oz}{1\ lb}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$\text{2 lb x } \frac{16\ oz}{1\ lb} = \text{Unit Converting To}$$

Now multiply 2 lb by the fraction. In this step, we multiply the 2 lb by 16 oz and then divide by 1 lb.

2 lb x $\frac{16\ oz}{1\ lb} = \frac{2\ \cancel{lb}\ x\ 16\ oz}{1\ \cancel{lb}}$ = 32 oz *Notice: the unit we are changing from (lb) cancels out*

So, 2 lb equals 32 oz, 2 lb = 32 oz

Step 4: We now add the 6 oz from the first part of the question to our newly calculated 32 oz, so we know how many ounces in total we're converting to grams.

6 oz + 32 oz = 38 oz

Step 5: 38 oz = ___ g

To calculate the last conversion in this problem, we must use the conversion factor 1 oz = 28.4 g, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ oz}{28.4\ g}$ or $\frac{28.4\ g}{1\ oz}$.

Step 6: Next, we must choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting ounces to grams, we choose the fraction that contains the unit we want to convert to in the numerator (g) and the unit that we are converting from in the denominator (oz): $\frac{numerator}{denominator} \rightarrow \frac{28.4\ g}{1\ oz}$.

Step 7: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$\text{38 oz x } \frac{28.4\ g}{1\ oz} = \text{Unit Converting To}$$

Now multiply 38 oz by the fraction. In this step, we multiply the 38 oz by 28.4 g and then divide by 1 oz to calculate the final answer.

38 oz x $\frac{28.4\ g}{1\ oz} = \frac{38\ \cancel{oz}\ x\ 28.4\ g}{1\ \cancel{oz}}$ = 1080 g *Notice: the unit we are changing from (oz) cancels out*

Thus, the answer is 1080 g, so 2 lb 6 oz (38 oz) = 1080 g.

Example 4: Converting Decimal Pounds into Ounces

Sometimes, after converting from metric to U.S./Imperial weights, you may have decimal pounds in your answer, such as 4.5 lb — in this number the .5 is in decimal pounds. You should covert the decimal pounds to ounces because scales often do not measure in decimal pounds; they measure in pounds and ounces. Converting decimal pounds to ounces is very similar to converting pounds to ounces, as seen in previous examples and problem sets in this resource.

Step 1: Subtract the number of whole pounds from your measurement to find decimal pounds.

4.5 lb – 4 lb = 0.5 lb

Step 2: To calculate this conversion, we must use the conversion factor 1 lb = 16 oz, but we should rearrange the factor into a fraction for easy calculation. This conversion factor can be rearranged as two possible fractions: $\frac{1\ lb}{16\ oz}$ or $\frac{16\ oz}{1\ lb}$.

Step 3: The third step is to choose the appropriate form of the fraction for our specific calculation. In this case, since we're converting pounds to ounces, we choose the fraction that contains the unit we want to convert to in the numerator (oz) and the unit that we are converting from in the denominator (lb): $\frac{numerator}{denominator} \rightarrow \frac{16\ oz}{1\ lb}$.

Step 4: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$0.5 \text{ lb x } \frac{16\ oz}{1\ lb} = \text{Unit Converting To}$$

Now multiply 0.5 lb by the fraction. In this step, we multiply the 0.5 lb by 16 oz and then divide by 1 lb to calculate the final answer.

0.5 lb x $\frac{16\ oz}{1\ lb} = \frac{0.5\ \cancel{lb}\ x\ 16\ oz}{1\ \cancel{lb}}$ = 8 oz *Notice: the unit we are changing from (lb) cancels out*

Thus, 0.5 lb = 8 oz, so 4.5 lb = 4 lb 8 oz.

Problem Set 2c

Complete the unit conversions below. The correct answers are listed after the questions.

I. 11 lb = ___kg

II. 284 g = ___ oz

III. 10 kg = ___ lb

IV. 1 oz = ___ g

V. 5 kg = ___ lb

VI. 142 g = ___ oz

VII. 4.5 lb = ___ kg

VIII. 30 oz = ___ g

IX. 2.5 kg = ___ lb ___oz

X. 1052 g = ___ lb ___oz

XI. 17.5 oz = ___ g

XII. 450 oz = ___ kg

Answers to Problem Set 2c

I. 5 kg

II. 10 oz

III. 22 lb

IV. 28.4 g

V. 11 lb

VI. 5 oz

VII. 9.9 kg

VIII. 852 g

IX. 5 lb 8 oz

X. 2 lb 5 oz

XI. 497 g

XII. 12.78 kg

Chapter 3 - Volume Measurements

Volume can be defined as “the space occupied by a substance” (Labensky et al., 2006, p. 62). Substances measured in the kitchen are either in solid or liquid form, such as sugar, a solid, and milk, a liquid. Volume is often measured in the kitchen with tools, such as food containers, measuring jugs, measuring cups, tablespoons, and teaspoons.

The most common units of volume you will see and use in a Canadian kitchen are the litre (L), millilitre (mL), cup (c), fluid ounce (fl oz), tablespoon (T), and teaspoon (t). Litres and millilitres are units of volume in the metric system while cups, fluid ounces, tablespoons, and teaspoons are units of volume in the U.S. and imperial systems. However, there is such a thing as a metric cup, which is 250 mL in contrast to the U.S customary cup (237 mL) and the U.S. legal cup (240 mL), so when following a recipe, be sure you know which measurement system the recipe was written for.

As mentioned earlier in this resource, capacities also vary between similar unit names in the U.S. customary system and the imperial system. For example, a U.S. fluid ounce (29.6 mL) has a larger capacity than an imperial fluid ounce (28.4 mL). Since you’re more likely to encounter the metric and U.S. customary systems in the kitchen, we will concern ourselves with the conversion factors pertaining to these systems when converting volume measurements in this resource.

This chapter will show you how to convert volume measurements within measuring systems and between measuring systems. In the following pages of this chapter, you will first learn how to convert volume within the metric system, then how to convert volume within the U.S system, and, finally, how to convert volume between the metric and U.S. systems.

Section A – Converting Volume Measurements within the Metric System

To convert volume measurements within the metric system, you must know the *conversion factor* that equates litres to millilitres. More specifically, 1 litre (L) equals 1000 millilitres (mL) or 1 L = 1000 mL.

Example 1: Converting Millilitres to Litres

Convert 1500 mL to L: 1500 mL = ___ L

Step 1: To calculate this conversion, we must use the conversion factor 1 L = 1000 mL.

This conversion factor can be rearranged as two possible fractions: $\frac{1\ L}{1000\ mL}$ or $\frac{1000\ mL}{1\ L}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{1\ L}{1000\ mL}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$1500\ \text{mL} \times \frac{1\ L}{1000\ mL} = \text{Unit Converting To}$$

Now multiply 1500 millilitres by the fraction. In this step, we multiply the 1500 mL by 1 L and then divide by 1000 mL to calculate the final answer.

$1500\ \text{mL} \times \frac{1\ L}{1000\ mL} = \frac{1500\ \cancel{mL} \times 1\ L}{1000\ \cancel{mL}} = 1.5\ \text{L}$ *Notice: the unit we are changing from (mL) cancels out*

Thus, the answer is 1.5 L, so 1500 mL = 1.5 L.

Example 2: Converting Litres to Millilitres

Convert 2.2 L to mL: 2.2 L = ___ mL

Step 1: To calculate this conversion, we again use the conversion factor 1 L = 1000 mL. This conversion factor can be rearranged as two possible fractions: $\frac{1\ L}{1000\ mL}$ or $\frac{1000\ mL}{1\ L}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{1000\ mL}{1\ L}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$2.2\ \text{L x } \frac{1000\ mL}{1L} = \text{Unit Converting To}$$

Now multiply 2.2 litres by the fraction. In this step, we multiply the 2.2 L by 1000 mL and then divide by 1 L to calculate the final answer.

$2.2\ \text{L x } \frac{1000\ mL}{1L} = \frac{2.2\ \cancel{L}\ x\ 1000\ mL}{1\ \cancel{L}} = 2200\ \text{mL}$ *Notice: the unit we are changing from (L) cancels out*

Thus, the answer is 2200 mL, so 2.2 L = 2200 mL.

Problem Set 3a

Complete the unit conversions below. The correct answers are listed after the questions.

I. 1 L = ___ mL

II. 3300 mL = ___ L

III. 0.6 L = ___ mL

IV. 5500 mL = ___ L

V. 0.9 L = ___ mL

VI. 750 mL = ___ L

VII. 1.8 L = ___ mL

VIII. 13 750 mL = ___ L

IX. 9 L = ___ mL

X. 4100 mL = ___ L

Answers to Problem Set 3a

I. 1000 mL

II. 3.3 L

III. 600 mL

IV. 5.5 L

V. 900 mL

VI. 0.75 L

VII. 1800 mL

VIII. 13.75 L

IX. 9000 mL

X. 4.1 L

Section B – Converting Volume Measurements within the U.S. Customary System

To convert volume measurements within the U.S. customary system, we must use more conversion factors than are required in the metric system. Table 1, below, lists the *conversion factors* most necessary to know in a Canadian kitchen when working with U.S. recipes.

Table 1

U.S. Customary System Conversion Factors

1 gallon (gal)	=	4 quarts (qt)
1 gallon (gal)	=	128 fluid ounces (fl oz)
1 quart (qt)	=	2 pints (pt)
1 quart (qt)	=	32 fluid ounces (fl oz)
1 pint (pt)	=	2 cups (c)
1 pint (pt)	=	16 fluid ounces (fl oz)
1 cup (c)	=	16 tablespoons (T)
1 cup (c)	=	8 fluid ounces (fl oz)
1 fluid ounce (fl oz)	=	2 tablespoons (T)
1 tablespoon (T)	=	3 teaspoons (t)

Example 1: Converting Quarts to Gallons

Convert 20 quarts to gallons: 20 qt = ___ gal

Step 1: To calculate this conversion, we must use the conversion factor 1 gal = 4 qt.

This conversion factor can be rearranged as two possible fractions: $\frac{1\ gal}{4\ qt}$ or $\frac{4\ qt}{1\ gal}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{1\ gal}{4\ qt}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$20 \text{ qt x } \frac{1\ gal}{4\ qt} = \text{Unit Converting To}$$

Now multiply 20 quarts by the fraction. In this step, we multiply the 20 qt by 1 gal and then divide by 4 qt to calculate the final answer.

$20 \text{ qt x } \frac{1\ gal}{4\ qt} = \frac{20\ \cancel{qt}\ x\ 1\ gal}{4\ \cancel{qt}} = 5 \text{ gal}$ *Notice: the unit we are changing from (qt) cancels out*

Thus, the answer is 5 gal, so 20 qt = 5 gal.

Example 2: Converting Fluid Ounces to Pints

Convert 32 fl oz to pt: 32 fl oz = ___ pt

Step 1: To calculate this conversion, we must use the conversion factor 1 pt = 16 fl oz. This conversion factor can be rearranged as two possible fractions: $\frac{1\ pt}{16\ fl\ oz}$ or $\frac{16\ fl\ oz}{1\ pt}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{1\ pt}{16\ fl\ oz}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$32 \text{ fl oz x } \frac{1\ pt}{16\ fl\ oz} = \text{Unit Converting To}$$

Now multiply 32 fl oz by the fraction. In this step, we multiply 32 fl oz by 1 pt and then divide by 16 fl oz to calculate the final answer.

$32 \text{ fl oz x } \frac{1\ pt}{16\ fl\ oz} = \frac{32\ \cancel{fl\ oz}\ x\ 1\ pt}{16\ \cancel{fl\ oz}} = 2 \text{ pt}$ *Notice: the unit we are changing from (fl oz) cancels out*

Thus, the answer is 2 pt, so 32 fl oz = 2 pt.

Example 3: Converting With an Intermediary Step

Sometimes to calculate a desired unit within and between any measuring system, you may need to convert to another unit first as an intermediary step if you do not know the specific conversion factor linking the original unit to the desired unit. In this instance we must use two conversion factors to find the answer.

Convert 64 T to pt: 64 T = ___ pt

Step 1: When you look at Table 1 above, you probably notice that there isn't a direct conversion factor from tablespoons to pints provided. In this case, we must use two conversion factors and, consequently, two conversion calculations to find our answer. The first conversion factor we'll use is 1 c = 16 T, and the second conversion factor we'll use is 1 pt = 2 c because it links our first calculation to the unit we want in our answer.

These conversion factors can be rearranged as the possible fractions:

$\frac{1\ c}{16\ T}$ or $\frac{16\ T}{1\ c}$ and $\frac{1\ pt}{2\ c}$ or $\frac{2\ c}{1\ pt}$.

Step 2: Second, we choose the appropriate form of the fraction for our first conversion: $\frac{1\ c}{16\ T}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$64\ \text{T x } \frac{1\ c}{16\ T} = \text{Unit Converting To}$$

Now multiply 64 T by the fraction. In this step, we multiply 64 T by 1 c and then divide by 16 T to calculate the final answer.

$64\ \text{T x } \frac{1\ c}{16\ T} = \frac{64\ \cancel{T}\ x\ 1\ c}{16\ \cancel{T}} = 4\ \text{c}$ *Notice: the unit we are changing from (T) cancels out*

Step 4: Fourth, we choose the appropriate form of the fraction for our second conversion: $\frac{1\ pt}{2\ c}$.

Step 5: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$4\ \text{c x } \frac{1\ pt}{2\ c} = \text{Unit Converting To}$$

Now multiply 4 c by the fraction. In this step, we multiply 4 c by 1 pt and then divide by 2 c to calculate the final answer.

$4\ \text{c x } \frac{1\ pt}{2\ c} = \frac{4\ \cancel{c}\ x\ 1\ pt}{2\ \cancel{c}} = 2\ \text{pt}$ *Notice: the unit we are changing from (c) cancels out*

Thus, the answer is 2 pt, so 64 T = 2 pt.

Problem Set 3b

Complete the unit conversions below. The correct answers are listed after the questions.

I. 44 qt = ___ gal

II. 15 t = ___ T

III. 18 pt = ___ qt

IV. 4 c = ___ pt

V. 6 fl oz = ___ T

VI. 10 pt = ___ fl oz

VII. 32 T = ___ c

VIII. 20 gal = ___ pt

IX. 32 pt = ___ gal

X. 6 t = ___ fl oz

Answers to Problem Set 3b

I. 11 gal

II. 5 T

III. 9 qt

IV. 2 pt

V. 12 T

VI. 160 fl oz

VII. 2 c

VIII. 160 pt

IX. 4 gal

X. 1 fl oz

Section C – Converting Volume Measurements Between Metric and U.S. Customary Systems

As mentioned previously, cooks in Canada will frequently come across both the metric and U.S. customary systems in Canadian kitchens. Competent cooks are proficient in converting measurements within and between these two systems. Table 2 (below) lists the conversion factors most necessary in a Canadian kitchen when converting between the metric and U.S. measuring systems.

Please note: the conversion factors provided in Table 2 are rough approximations for ease of conversion and application in busy, small to medium-sized food service establishments. Some kitchens, including industrial kitchens, may use more precise conversion factors, so it's always a good idea to observe the measuring tools in the kitchen to know which conversion factors are relevant for that particular context. As an example, measuring cups and spoons often have their measurements marked in **mL** on their handles.

Table 2

Intersystem Conversion Factors for the U.S. and Metric Systems

U.S.		Metric
1 teaspoon (t)	=	5 millilitres (mL)
1 tablespoon (T)	=	15 millilitres (mL)
1 fluid ounce (fl oz)	=	30 millilitres (mL)
1 **legal** cup (c)	=	240 millilitres (mL)
1 pint (pt)	=	480 millilitres (mL)
1 quart (qt)	=	960 millilitres (mL)
1 gallon (gal)	=	3.84 litres (L)

Example 1: U.S. to Metric

Convert 2 cups to millilitres: 2 c = ___ mL

Step 1: To calculate this conversion, we must use the conversion factor 1 c = 240 mL. This conversion factor can be rearranged as two possible fractions: $\frac{1\ c}{240\ mL}$ or $\frac{240\ mL}{1\ c}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{240\ mL}{1\ c}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From} \times \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$2\text{ c} \times \frac{240\ mL}{1\ c} = \text{Unit Converting To}$$

Now multiply 2 cups by the fraction. In this step, we multiply the 2 cups by 240 mL and then divide by 1 c to calculate the final answer.

$2\text{ c} \times \frac{240\ mL}{1\ c} = \frac{2\ \cancel{c} \times 240\ mL}{1\ \cancel{c}} = 480\text{ mL}$ *Notice: the unit we are changing from (c) cancels out*

Thus, the answer is 480 mL, so 2 c = 480 mL.

Example 2: Metric to U.S.

Convert 10 millilitres to teaspoons: 10 mL = ___ t

Step 1: To calculate this conversion, we must use the conversion factor 1 t = 5 mL. This conversion factor can be rearranged as two possible fractions: $\frac{1\ t}{5\ mL}$ or $\frac{5\ mL}{1\ t}$.

Step 2: The second step is to choose the appropriate form of the fraction for our specific calculation: $\frac{1\ t}{5\ mL}$.

Step 3: Use the general conversion formula and substitute the quantity and unit we're converting from into the formula. We must also substitute the conversion factor into the formula.

$$\text{Unit Converting From x } \frac{Unit\ Converting\ To}{Unit\ Converting\ From} = \text{Unit Converting To}$$

$$10\ \text{mL x}\ \frac{1\ t}{5\ mL} = \text{Unit Converting To}$$

Now multiply 10 mL by the fraction. In this step, we multiply 10 mL by 1 t and then divide by 5 mL to calculate the final answer.

$10\ \text{mL x}\ \frac{1\ t}{5\ mL} = \frac{10\ \cancel{mL}\ x\ 1\ t}{5\ \cancel{mL}} = 2\ \text{t}$ *Notice: the unit we are changing from (mL) cancels out*

Thus, the answer is 2 t, so 10 mL = 2 t.

Problem Set 3c

Complete the unit conversions below. The correct answers are listed after the questions.

I. 480 mL = ___ c

II. 2 pt = ___ mL

III. 240 mL = ___ fl oz

IV. 6 T = ___ mL

V. 960 mL = ___ c

VI. 5 t = ___ mL

VII. 3 gal = ___ L

VIII. 2880 mL = ___ qt

IX. 3 c = ___ mL

X. 2 qt = ___ mL

Answers to Problem Set 3c

I. 2 c

II. 960 mL

III. 8 fl oz

IV. 90 mL

V. 4 c

VI. 25 mL

VII. 11.52 L

VIII. 3 qt

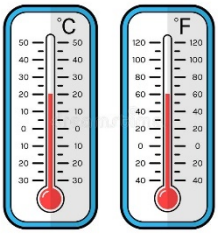
IX. 720 mL

X. 1920 mL

Chapter 4 – Temperature Measurements

From setting temperatures on ovens to checking temperatures on food products, kitchen workers work with temperature measurements daily. As with other measurements, Canadian kitchens can use more than one measuring system, although the most common system used is the metric system.

Since most thermometers provide temperature measurements in both degrees Celsius (°C) and degrees Fahrenheit (°F), converting between measurement systems is often not required. However, learning how to do so is a helpful skill to have, especially if an oven or stove is only equipped to indicate the temperature settings for one measurement system. This chapter will teach you how to mathematically convert between metric (°C) to U.S./Imperial (°F) temperature measurements.



Section A – Converting Temperature Measurements from U.S./Imperial to Metric

If you're converting from degrees Fahrenheit to degrees Celsius, you're converting from a U.S./Imperial unit to a metric unit. In this instance, you need two pieces of information to perform the calculation: the temperature in degrees Fahrenheit and the appropriate formula. Below is the formula for °F to °C conversions.

$$C = (F - 32)/1.8$$

To convert to Celsius, simply substitute the temperature in Fahrenheit into the F portion of the formula then perform the calculation.

Example: Convert Fahrenheit to Celsius

Convert 100 degrees Fahrenheit to degrees Celsius: 100 °F = ___ °C

Step 1: To calculate this conversion, we must use the formula below.

$$C = (F - 32)/1.8$$

Step 2: The second step is to replace the F in the formula with the temperature we're converting from.

$$C = (100 - 32)/1.8$$

Step 3: The next step is to perform the calculation using the order of operations (BEDMAS). First, subtract 32 from 100 then divide by 1. 8.

$$C = 68/1.8$$

$$C = 37.8\ ^\circ\text{C} \text{ or approximately } 38\ ^\circ\text{C}$$

Thus, the answer is approximately 38 °C, so 100 °F ≈ 38 °C.

Problem Set 4a

Complete the unit conversions below. The correct answers are listed below after the questions. Round all answers to the nearest whole number.

I. 32 °F = ___°C

II. 212 °F = ___ °C

III. 160 °F = ___ °C

IV. 350 °F = ___ °C

V. 425 °F = ___ °C

VI. 180 °F = ___ °C

VII. 300 °F = ___ °C

VIII. 500 °F = ___ °C

IX. 250 °F = ___ °C

X. 375 °F = ___ °C

Answers to Problem set 4a

I. 0 °C

II. 100 °C

III. 71 °C

IV. 177 °C

V. 218 °C

VI. 82 °C

VII. 149 °C

VIII. 260 °C

IX. 121 °C

X. 191 °C

Section B – Converting Temperature Measurements from Metric to U.S./Imperial

To convert a temperature in degrees Celsius to degrees Fahrenheit, you can algebraically manipulate the previous formula to find degrees Fahrenheit rather than degrees Celsius.

$$C = (F - 32)/1.8$$

Alternatively, you can use the following formula which has been rearranged for this purpose:

$$F = 1.8C + 32$$

To convert to Fahrenheit, simply substitute the temperature in Celsius into the C portion of the formula then perform the calculation.

Example: Converting Celsius to Fahrenheit

Convert 150 degrees Celsius to degrees Fahrenheit: 150 °C = ___ °F

Step 1: To calculate this conversion, we must use the formula below.

$$F = 1.8C + 32$$

Step 2: The second step is to replace the C in the formula with the temperature we're converting from.

$$F = 1.8(150) + 32$$

Step 3: The next step is to perform the calculation using the order of operations (BEDMAS). First, multiply 1.8 by 150 then add 32.

$$F = 270 + 32$$

$$C = 302\ °\mathrm{F}$$

Thus, the answer is 302 °F, so 150 °C = 302 °F.

Problem Set 4b

Complete the unit conversions below. The correct answers are listed below after the questions. Round all answers to the nearest whole number.

I. 0 °C = ___ °F

II. 100 °C = ___ °F

III. 32 °C = ___ °F

IV. 135 °C = ___ °F

V. 260 °C = ___ °F

VI. 246 °C = ___ °F

VII. 30 °C = ___ °F

VIII. 107 °C = ___ °F

IX. 232 °C = ___ °F

X. 200 °C = ___ °F

Answers to Problem Set 4b

I. 32 °F

II. 212 °F

III. 90 °F

IV. 275 °F

V. 500 °F

VI. 475 °F

VII. 86 °F

VIII. 225 °F

IX. 450 °F

X. 392 °F

Chapter 5 – Final Problem Set

The final problem set consists of a variety of measurement conversion questions, so you can consolidate what you've learned in this resource. Additionally, you're expected to use an online conversion calculator to find an additional answer to each question. The online conversion calculator is handy because it will easily and quickly convert measurements within and between measurement systems. The user simply enters the quantity and unit to be converted into the calculator; the user must also choose the desired unit to be converted to. The conversion calculator will do the rest of the work.

To find an online "conversion calculator" or "unit converter," simply search for one with the use of an internet browser. Once you find an online converter that you want to use, confirm with your professor or instructor to ensure the converter is appropriate. After finding your hand-calculated and online converter calculated answers for each question, you should be able to answer the following questions:

1. Are your hand calculated answers different from the answers provided by the online converter?

2. If so, why do you think there are differences?

** Please refer to the Quick Reference Sheet in the Appendix for formulas and conversion factors when hand calculating your answers.*

Final Problem Set

Complete the unit conversions below. The correct answers are listed after the questions. Round temperatures to the nearest whole number.

Hand-Calculated	**Online Converter**
1. 142 g = ___ oz	142 g = ___ oz
2. 2 c = ___ fl oz	2 c = ___ fl oz
3. 2.2 lb = ___ kg	2.2 lb = ___ kg
4. 6T = ___ t	6T = ___ t
5. 80 oz = ___ lb	80 oz = ___ lb
6. 1 L = ___ mL	1 L = ___ mL
7. 3 fl oz = ___ T	3 fl oz = ___ T
8. 2650 g = ___ kg	2650 g = ___ kg
9. 3 qt = ___ pt	3 qt = ___ pt
10. 600 ml = ___ c	600 ml = ___ c
11. 525 °F = ___ °C	525 °F = ___ °C
12. 3 gal = ___ qt	3 gal = ___ qt
13. 1.40 lb = ___ g	1.40 lb = ___ g
14. 2500 mL = ___ L	2500 mL = ___ L
15. 3 c = ___ mL	3 c = ___ mL
16. 4 °C = ___ °F	4 °C = ___ °F
17. 4 t = ___ mL	4 t = ___ mL
18. 2 kg = ___ g	2 kg = ___ g

Answers to Final Problem Set

Hand-Calculated

1. 5 oz
2. 16 fl oz
3. 1.0 kg
4. 18 t
5. 5 lb
6. 1000 mL
7. 6 T
8. 2.65 kg
9. 6 pt
10. 2.5 c
11. 274 °C
12. 12 qt
13. 636 g
14. 2.5 L
15. 720 mL
16. 39 °F
17. 20 mL
18. 2000 g

Online Converter

Online converter answers will differ if the conversion factors differ in precision from the conversion factors on the Quick Reference Sheet.

Summary

This module is the first in a five-part series meant to provide those interested in food service, cooking and/or restaurant operations with basic theoretical knowledge pertaining to kitchen math and science.

In this module, you learned how to convert primarily within and between the metric and U.S. customary systems with a focus on measurements and units that are most commonly used in small to medium-sized Canadian food service establishments. In the next module, you will learn how to scale up and scale down recipes, using a calculator in the first section and Excel in the second section. You will also learn how to conduct a yield test and calculate a yield factor.

References

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Appendix

Quick Reference Sheet

General Conversion Formula

Unit Converting From x $\frac{Unit\ Converting\ To}{Unit\ Converting\ From}$ = Unit Converting To

Weight Conversion Factors

Metric
1 kg = 1000 g

U.S./Imperial
1 lb = 16 oz

Metric		U.S./Imperial
1 kg	=	2.2 lb
28.4 g	=	1 oz

Volume Conversion Factors

Metric
1L = 1000 mL

U.S. Customary

1 gal	=	4 qt
1 gal	=	128 fl oz
1 qt	=	2 pt
1 qt	=	32 fl oz
1 pt	=	2 c
1 pt	=	16 fl oz
1 c	=	16 T
1 c	=	8 fl oz
1 fl oz	=	2 T
1 T	=	3 t

U.S.		Metric
1 t	=	5 mL
1T	=	15 mL
1 fl oz	=	30 mL
1 **legal** c	=	240 mL
1 pt	=	480 mL
1 qt	=	960 mL
1 gal	=	3.84 L

Temperature Conversions

Fahrenheit to Celsius

$$C = (F - 32)/1.8$$

Celsius to Fahrenheit

$$F = 1.8C + 32$$