Figure 4.12 shows a set of measuring tools.

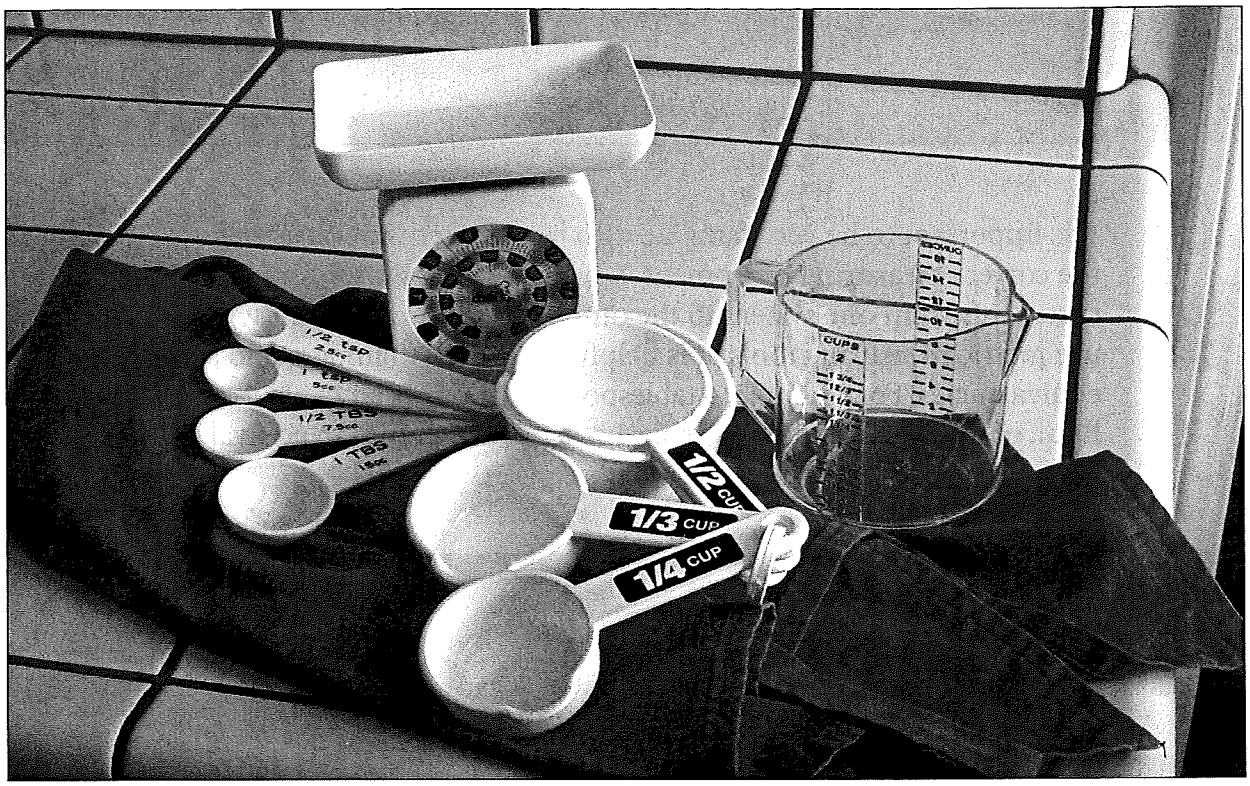

Figure 4.12: Measuring carefully is important in the kitchen.

Measuring Temperature

Chapter 2, *Food Safety*, described how a thermometer is used to measure food's internal temperature. Thermometers measure degrees of temperature in either Fahrenheit (°F), which is the customary measure, or Celsius (°C), which is the metric measure. Convert between the two measurements easily by following the formulas outlined in Table 4.8.

Table 4.8: Temperature Conversion
Fahrenheit (°F) to Celsius (°C): Subtract 32 from the Fahrenheit number, multiply by 5, and then divide by 9.
Celsius (°C) to Fahrenheit (°F): Multiply the Celsius number by 9, divide by 5, and then add 32.
Temperature at which water boils: 212°F (100°C)
Temperature at which water freezes: 32°F (0°C)

Standardized Recipes

A **recipe** is a written record of the ingredients and preparation steps needed to make a particular dish. Recipes used at home can follow any format that helps the cook prepare the dish. But recipes for institutional use, or **standardized recipes,** must follow a format that is clear to anyone who uses them. A standardized recipe lists the ingredients first, in the order they are to be used, followed by assembly directions or the method for putting the ingredients together.

Standardized recipes are critical tools that play an important part in a successful professional kitchen. Control of costs, quality, and consistency of product are no less important to the success of a restaurant than the preparation and service of great looking and tasting food. Consistent production of good food is the result of following a clear standardized recipe.

A standardized recipe includes the following information:

- **Name:** This is the title of the recipe.
- **Ingredients:** This is the food needed to make the recipe, usually listed in the order in which they are used. This makes it easier to follow the recipe and not forget any ingredient. Each ingredient must be clearly defined. For example, stating "onion" provides many choices such as yellow, red, white, green, or pearl.

Amounts of each ingredient are also given. Avoiding terms such as "to taste" and "as needed," makes it more likely the finished product will be what was intended by the creator of the recipe.

In commercial recipes, weight is generally the preferred method for measuring ingredients, rather than using other customary measurements such as cups or quarts or stating "one onion" or "a large apple," because weight is more accurate:

- **Yield**: This is the number of servings or the amount the recipe makes. This information is used to determine how much of the recipe quantity is needed. **Yield** is critical to understanding how much it will cost to produce the recipe.
- **Portion size**: This is the individual amount that serves a person.
- **Temperature, time, and equipment:** This includes size and type of pans and other equipment needed, the oven temperature, cooking time, and any preheating instructions.
- **Step-by-step directions**: This is how and when to combine the ingredients.
- **Nutrition information:** This is not essential, but useful. Nutrition information may include amounts of fat (saturated and unsaturated), carbohydrates, protein, fiber, sodium, vitamins, and minerals.

The recipe is a road map for the cook. To get good results, follow it carefully:

- Read the recipe completely.
- Gather and "*mise en place*" all ingredients as specified. ***Mise en place*** is French for "to put in place." It means the preparation and assembly of ingredients, pans, utensils, and equipment or serving pieces needed for a particular dish or service.
- Measure carefully.
- Follow the instructions for preparation.

Once the recipe has been made as written, then the cook can decide if the end product is of the right quality and taste. Follow the recipe, and when it is clear what the recipe produces, evaluate the result and make changes if desired. In a recipe, each ingredient and method of preparation affects the final product.

The standardized recipe is a critical tool in the restaurant. The functions of standardized recipes include the following:

- Ensuring consistency of quality and portion size
- Helping purchasers to understand what to purchase
- Allowing cooks to understand what to prepare and how much of each ingredient is necessary
- Reducing waste, because no one is guessing amounts
- Helping servers to communicate accurate information to guests, such as dishes with potential allergens
- Meeting customer expectations for consistent dishes
- Helping managers to determine a dish's costs, which helps to control these costs

[trends]

Big or Small Portions

Surprisingly, food can be the least expensive part of a restaurant's costs, so serving big portions can help a restaurant stand out from the competition and attract new and returning diners. This has been key to the success of restaurants throughout the United States. But not only do many restaurants pride themselves on hefty portions, many customers associate "good value" with "lots of food." So why are so many nationally known restaurants beginning to offer smaller portions of their most popular dishes?

Diners are increasingly drawn to healthier eating habits, with mounting concerns over obesity. But as the saying goes, "People eat with their eyes." In other words, new research suggests that people will eat what is put in front of them—no matter how big the portion! Accordingly, offering smaller portions of popular items can attract consumers who want to eat less but still enjoy a satisfying meal, without alienating long-term diners who seek comfort in the familiar. This benefits restaurants because customers ordering these smaller items often spend more money overall. Guests perceiving that they have "saved" calories are more likely to order dessert!

Converting Recipes

Convert a recipe when the yield of the recipe (the amount it provides) is not the same as the amount of product needed. For example, suppose a recipe produces 96 portions, but a chef needs 250 portions for a function. It is necessary to convert the recipe from a recipe for 96 portions to one for 250 portions, as shown in Table 4.9.

Table 4.9: Converting the Yield from 96 Brownies to 250 Brownies

Figuring the Conversion Factor

Desired Yield = 250
Original Yield = 96
Conversion Factor: 250 ÷ 96 = 2.6

Ingredients	Amount for 96 pieces		Conversion Factor		Amount for 250 pieces
Unsweetened chocolate	1 lb = 16 oz	×	2.6	=	41.6 oz = 2 lb 10 oz
Butter	1 lb 8 oz = 24 oz	×	2.6	=	62.4 oz = 3 lb 14 oz
Eggs	1 lb 8 oz = 24 oz	×	2.6	=	62.4 oz = 3 lb 14 oz
Sugar	3 lb = 48 oz	×	2.6	=	124.8 oz = 7 lb 13 oz
Vanilla	2 tbsp	×	2.6	=	5.2 tbsp
Cake flour	1 lb = 16 oz	×	2.6	=	41.6 oz = 2 lb 10 oz
Baking soda	1.5 tsp	×	2.6	=	4 tsp
Chopped walnuts/pecans	1 lb = 16 oz	×	2.6	=	41.6 oz = 2 lb 10 oz

The conversion of the recipe will impact the cost of the recipe, but not necessarily the cost of the portion. In other words, if a recipe for 24 cost $5.25 per portion, then increasing the recipe for 36 (of the same size portions) would not necessarily change that price. When properly converted and prepared, the quality of the product produced from the recipe should not vary from the original, no matter how many portions it yields.

Professional foodservice recipes have a large yield. Sometimes you have to change (or convert) a recipe if the yield is not the amount you need. Using basic math skills, it's easy to increase or decrease many recipes. Most recipes, even those for baked goods, can be doubled successfully.

Essential Skills

Formula for increasing or decreasing recipe yields

1. Decide how many servings you need (or the desired yield).
2. Use the following formula:

   Desired yield ÷ Original yield = **Conversion factor**, which is the number by which to multiply the ingredients.

   For example, if a chili recipe serves 8, and you need to serve 4, then 4/8 or 4 ÷ 8 = 0.5. The conversion factor is 0.5.
3. Multiply each ingredient amount by the conversion factor. This keeps all the ingredients in the same proportion to each other as they were in the original recipe. Be aware that weights and volumes are not interchangeable, so when converting a recipe, do not change volume measurement for weight.

   For example, 1 cup of flour does not weigh 8 ounces.
4. As needed, convert answers to logical, measurable amounts. Think about the equipment you will use for measuring.

   For example: ¾ cup flour = 1 and ½ cup; 12 tbsp brown sugar = ¾ cup
5. Make any necessary adjustments to equipment, temperature, and time. The depth of food in a pan affects how fast it will cook. Use pans that are the right size for the amount of food—neither too large nor too small.

Now, if a change is needed in the portion size, then the calculation requires an additional step. Suppose the cook wants to convert the yield of 250 brownies to small brownies? If 96 big brownies equals 125 small brownies, divide 250 by 125 (the desired yield divided by actual yield)—to get a conversion factor of 2.

The conversion of a recipe to produce more or less product can affect the equipment needed to produce the recipe. The adjustments will include measuring equipment and cooking/service equipment. For example, if a recipe that produces 24 portions and requires the use of 1 hotel pan to do final pan-up of the product is converted to produce 48 portions, 2 hotel pans will be needed. Another example is a recipe that calls for 1 tablespoon of an ingredient. If the recipe is increased by a multiplier of 16, then the item measure would be 1 cup. The cook needs a cup measure rather than a tablespoon measure. The failure to take equipment changes into consideration when converting a recipe can cause problems in preparation. Keep in mind that larger equipment might be needed for mixing and cooking larger amounts of food. Cooking times will often need adjustment as well.

Measuring

The term **measurement** refers to how much of something is being used in a recipe. Ingredients can be measured in several ways. Most ingredients are measured by volume. **Volume** is the amount of space an ingredient takes up. A salad recipe might list 1 cup cooked pasta or ½ teaspoon of pepper. Some ingredients are measured by weight or heaviness, such as 1 pound of fish filets or 2 ounces of butter. Other ingredients may be measured by the count, or number, of items, such as one medium banana or three egg whites. No matter how an ingredient is measured, careful, accurate measurement is necessary for quality and quantity control.

Measuring by Volume

Volume is not as accurate a measure as weight, particularly for solids because the character of the item creates major variations in the amount of space an item occupies. For example, 1 cup of water weighs 8 ounces, but 1 cup of flour weighs approximately 3.5-4 ounces, depending on whether or not it has been "packed." Volume is often used for amounts of dry ingredients such as herbs and spices that are too small to easily and accurately weigh.

Volume measurement is best used for liquids, but remember that even liquids can vary in weight in relation to volume. Always remember that the term fluid ounce is a volume measurement, not a weight. Only with water or a water-like substance is 1 cup (volume measurement) equal to 8 fluid ounces (volume measurement) and to 8 ounces (weight measurement). Examples of water-like liquids in the kitchen include milk, oils, thin liquids such as vinegar, and melted butter.

Dry ingredients are usually measured by leveling them off evenly at the rim of the spoon or cup using a straight-edged utensil. Sometimes, however, a recipe calls for a heaping measure: scoop up the ingredient with a utensil, but do not level it off. A heaping measure can give almost twice the amount of a leveled-off measure. Figure 4.13 shows the proper measure of dry ingredients.

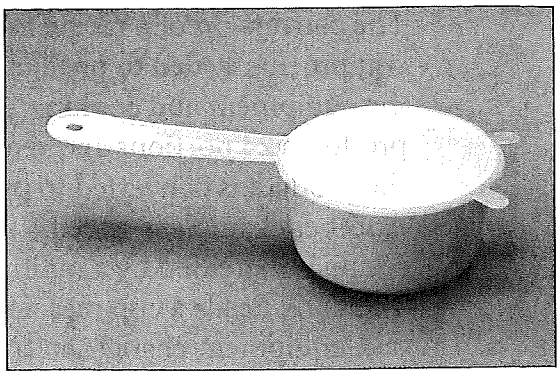

Figure 4.13: To measure dry ingredients, take the straight edge of a knife and level off the ingredient.

Dry ingredient measuring tools usually come in a set of several sizes. A typical customary set of measuring cups includes 1/4 cup, 1/3 cup, 1/2 cup, and 1 cup measures. A metric set includes 50 milliliter, 125 milliliter, and 250 milliliter measures. Even smaller amounts of dry ingredients can be measured as a dash or a pinch—the amount that can be held between the thumb and forefinger. Herbs and spices are often measured this way.

Essential Skills

Measuring Dry Ingredients

1. Fill the cup with the ingredient. Some ingredients, such as flour and sugar, must be spooned into the cup lightly. Other ingredients, like brown sugar, must be packed down, but only if specified in the recipe.
2. Level off the top of the cup using a straight-edge spatula. See Figure 4.14.

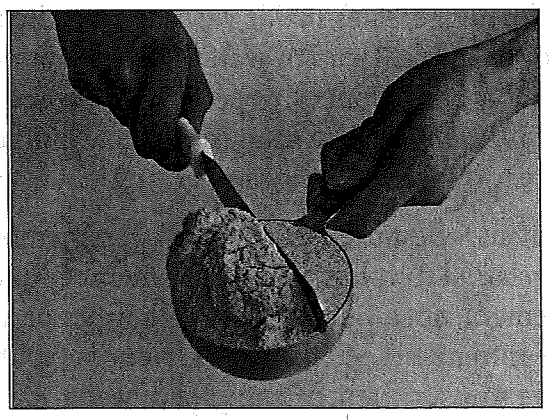

Figure 4.14: Step 2—Use a straight-edge spatula to measure off dry ingredients.

3. Pour the ingredients into the mixture. If needed, use a rubber scraper to make sure all of the ingredient has been emptied out of the cup.

Liquid measuring cups are see-through and have measurement markings on the side. They are typically marked in fractions of a cup, fluid ounces, and milliliters. Customary sizes for measuring cups are 1 cup, 1 pint, 1 quart, and 1 gallon. Metric cups usually come in 250 milliliter and 500 milliliter sizes.

Measuring spoons generally come in a set of four or five. Most customary sets include these sizes: 1/4 teaspoon, 1/2 teaspoon, 1 teaspoon, and 1 tablespoon. Metric sets include 1 milliliter, 2 milliliter, 5 milliliter, 15 milliliter, and 25 milliliter measures.

Essential Skills

Measuring Liquids

When measuring liquid ingredients:

1. Set the measuring cup on a level surface.
2. Carefully pour the liquid into the cup.
3. Bend down to check the measurement at eye level for an accurate reading. See Figure 4.15.

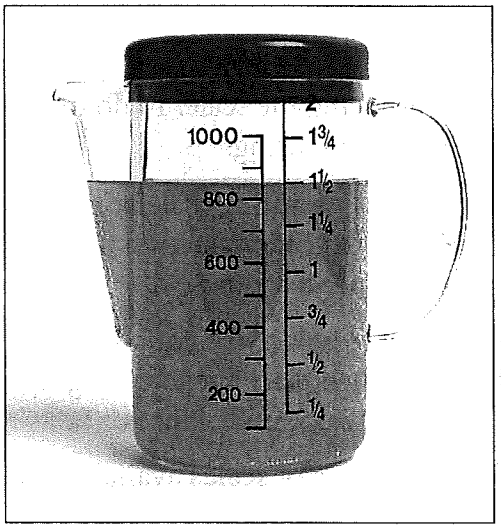

Figure 4.15: Step 3—Check measurement at eye level.

4. Add more liquid, or pour off excess, until the top of the liquid is at the desired measurement mark.
5. Pour the ingredient into the mixing container. If needed, use a rubber scraper to empty the cup completely.
6. For small amounts of liquids, use measuring spoons.

Measuring by Weight

Weight is the measurement of an item's resistance to gravity. Weight is expressed in ounces and pounds. Think of the difference between a cup of popcorn and a cup of water. Both take up the same amount of space, but they do not weigh the same. The water is heavier. To find out how much each cup weighs, use a kitchen scale, not a measuring cup. Weight is often measured in ounces, while volume—as discussed earlier in this section—is measured in fluid ounces.

A food scale is helpful for measuring ingredients by weight. Scales are used to weigh ingredients for preparation and portion control. Both ounce/gram and pound/kilo scales are necessary.

When using a food scale, do the following:

- Decide in what container to weigh the food.
- Place the empty container on the scale.
- Adjust the scale until it reads zero.
- Add the food to the container until the scale shows the desired amount.

Remember to correctly weigh an item and account for the weight of the container in which the item is located. This is known as **taring** the scale. To do this properly, you should do the following:

1. On a movable-face scale (a spring scale or portion control scale) place the container on the scale. Then adjust the face back to zero.
2. On a balance-beam scale, place the container on one end of the scale. Then place the tare weight on the other end until the beam balances.

There are a few different types of scales available for weighing food:

- **Spring scale**: The scale measures the pressure placed on the spring.
- **Balance beam**, also called a **Baker's scale**: The weight of the item is placed on one end and then product is placed on the other end until the beam balances.
- **Electronic scale**: This measures resistance electronically.

Figure 4.16 shows different types of scales.

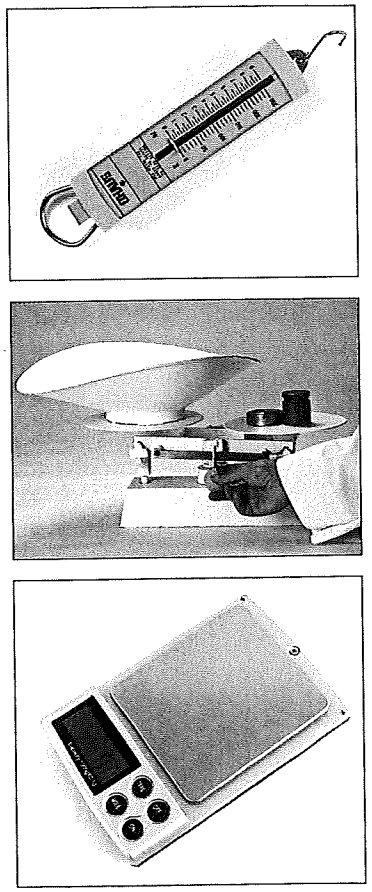

Figure 4.16: Types of scales include a spring scale (top), baker's scale (middle), and electronic scale (bottom).

Measuring Fat

Fat, such as butter, margarine, or shortening, can be measured in several ways:

- **Stick method:** This method is used for fat that comes in 1/4-pound sticks, such as butter or margarine. The wrapper is marked in tablespoons and in fractions of a cup. Simply cut off the amount needed.
- **Dry measuring cup method:** Pack the fat down into the cup, pressing firmly to remove air bubbles. Level off the top. When adding to the recipe, use a rubber scraper to empty as much of the fat as possible from the cup. Apply the same technique when using measuring spoons to measure fat.
- **Water displacement method:** This method involves combining fat with water in a liquid measuring cup. First, do some math: subtract the amount of fat to be measured from one cup. The difference is the amount of water to pour into the measuring cup. For example, to measure 2/3 cup of shortening, start with 1/3 cup of water in a measuring cup. Next, spoon the fat into the cup, making sure it all falls completely below the level of the water. When the water reaches the 1-cup level, you have the right amount of fat. Pour off the water and remove the fat with a rubber scraper. Although this method may seem complicated, it is the most accurate when measuring solid fats. Figure 4.17 shows the water displacement method of measuring fats.

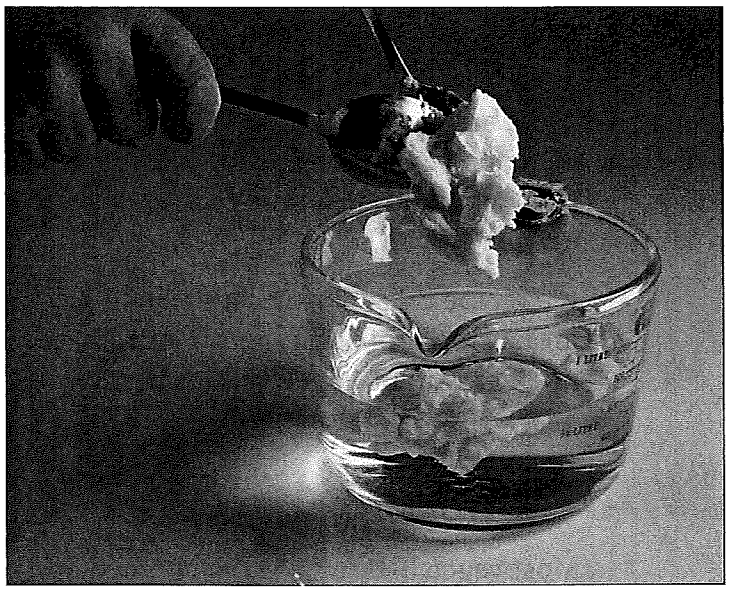

Figure 4.17: To measure irregularly shaped objects such as fat, use the water displacement method.

It is sometimes difficult to be exact with the dry measuring cup method because air bubbles can make the measurement inaccurate. Using the water displacement method also makes the fat easier to scrape out of the measuring cup because it isn't packed tightly.