

Dear Culinary Arts Students,

While we are all at home for the next week or two, I've put together a packet of readings, a small amount of work and some opportunities for cooking at home so we can all stay on track for when we return to the classroom and kitchen. The following instructions are to be used with the Foundations textbook copies that are attached. Please complete each assignment on a separate word doc/ google doc OR on separate sheets of paper and clearly write your name, date, chapter and page number on the top of the page to ensure you receive full credit for your hard work. Please email the work as you do it to: rlena@greenburghgraham.org. If you are doing on looseleaf, please be sure to keep it in a safe, organized location so we can give you the most credit possible.

Chapter 17 Assignments

- Page 351; Key Terms: Please write down a definition, in your own words, that shows me you understand what the term means.
- Read pgs 352-356, answer the questions in the knowledge check.
- Read pgs 356-359, answer the questions in the knowledge check.
- Read pgs 359-365, answer the questions in the knowledge check.
- Read pgs 365-367, answer the questions in the knowledge check.
- Use the summary on page 370 and your knowledge of chapter 17 to complete the exam prep questions on page 372.
- *I will give you full credit for (1) missed lab*: Use one of the recipes in chapter 17 to make a sauce, soup or stock at home

Chapter 18 Assignments

- Page 377; Key Terms: Please write down a definition, in your own words, that shows me you understand what the term means.
- Read pgs 378-390, List (2) common foods that are cooked in both dry and moist heat cooking methods. *"Ex Grilling: hamburgers and chicken breast."*
- Page 391, answer the questions in the knowledge check.
- Read pgs 391-395, answer the questions in the knowledge check.
- Use the summary on page 395 and your knowledge of chapter 18 to complete the exam prep questions on page 397.
- *I will give you full credit for (2) missed labs*: Use one of the recipes/methods in chapter 18 to make something to eat at home.

Chapter 19 Assignments

- Page 399; Key Terms: Please write down a definition, in your own words, that shows me you understand what the term means.
- Read pgs 400-405, answer the questions in the knowledge check.
- Read pgs 406-409, answer the questions in the knowledge check.
- Use the summary on page 410 and your knowledge of chapter 19 to complete the exam prep questions on page 412.
- *I will give you full credit for (2) missed labs*: Use one of the recipes/formulas(baking) in chapter 19 to bake something to eat at home.

*Please be sure to label each assignment with your name, date, chapter and page number in order to get full credit.

****If you have outstanding kitchen periods that you owe me, I will award you (1) additional kitchen credit for filming your cooking process or taking multiple (5+) pictures of your cooking. * Think about making your own cooking show or Blog-***

I will be available by email for any questions, comments or concerns at rlen@greenburghgraham.org, please feel free to contact me any time.

Enjoy this extra time off, be productive, and practice all of the skills you learned about food safety and personal hygiene to stay healthy and ready to jump back in when we come back to school!

Mr. Lena-

CHAPTER 17

STOCKS, SOUPS, AND SAUCES





RECIPE BLUE-CHEESE BURGERS

COOKING TIME: 25 MINUTES • YIELD: 4 SERVINGS



DIRECTIONS

- 1 In a small bowl, mash together cream cheese and blue cheese, then stir in the onion powder and parsley. Taste and season with salt and pepper.
- 2 Divide ground beef into 8 equal pieces. (First divide it into 4 pieces, then divide each piece again, etc.) Form the pieces into balls, then sprinkle the balls lightly with salt and pepper, rolling them around a bit to make sure all sides are covered. Flatten each ball to form thin patties of equal size. It is easiest to form the patties on a sheet of waxed paper.
- 3 To fill burgers, place a tablespoonful of cream cheese mixture in the center of each of 4 patties. Spread the filling out evenly to within half an inch of the edge of each patty. Place the remaining patties on top to form 4 filled burgers. Gently press the edges of each burger together to form a seal.
- 4 Sprinkle burgers liberally with coarsely ground black pepper.
- 5 Prepare your grill and cook burgers until the internal temperature reaches 155°F (68°C) or until desired degree of doneness. Let rest.

INGREDIENTS

4 each	Hamburger buns
4 oz	Cream cheese
4 oz	Crumbled blue cheese
1 tsp	Onion powder
2 tbsp	Fresh parsley, chopped
2 lb	Ground beef
To taste	Flake salt and coarsely ground black pepper

RECIPE NUTRITIONAL CONTENT

Calories	1028
% calories from fat	71
Total fat	81 g
Saturated fat	36 g
Cholesterol	245 mg
Sodium	876 mg
Total carbohydrates	24 g
Dietary fiber	1 g
Protein	50 g
Vitamin A	706 IU
Vitamin C	3 mg
Calcium	255 mg
Iron	6 mg

Nutritional analysis provided by MasterCook®



Study Questions

- 1 What are the four essential parts of a stock and the proper ingredients for each?
- 2 What are the various types of stock and their specific ingredients?
- 3 What are the three methods for preparing bones for stock?
- 4 What are the ingredients for several types of stock?
- 5 How and why do you remove fat from stock?
- 6 What is the proper way in which to cool stock?
- 7 How do you prepare mother sauces? What derivative sauces are made from them?
- 8 What are the proper ingredients for sauces?
- 9 How do you prepare different kinds of sauces?
- 10 How do you match sauces to the appropriate type of food?
- 11 What are the two basic kinds of soup?
- 12 How do you prepare the basic ingredients for broth, consommé, purée, clear, and cream soups?



Key Terms

Mirepoix

Aromatics

Bouquet garni

Sachet d'épices

Stock (see detailed list of terms in Table 17.1)

Blanching

Brown

Sweating

Fat removal

Sauce

Saucier

Roux (see detailed list of terms on page 362)

Mother sauces (see detailed list of terms on page 359)

Small sauces

Demi-glace

Reduction

Beurre manié

Slurry

Liaison

Temper

Different sauces (see detailed list of terms on pages 363–364)

Wringing method

Clear soups

Thick soups

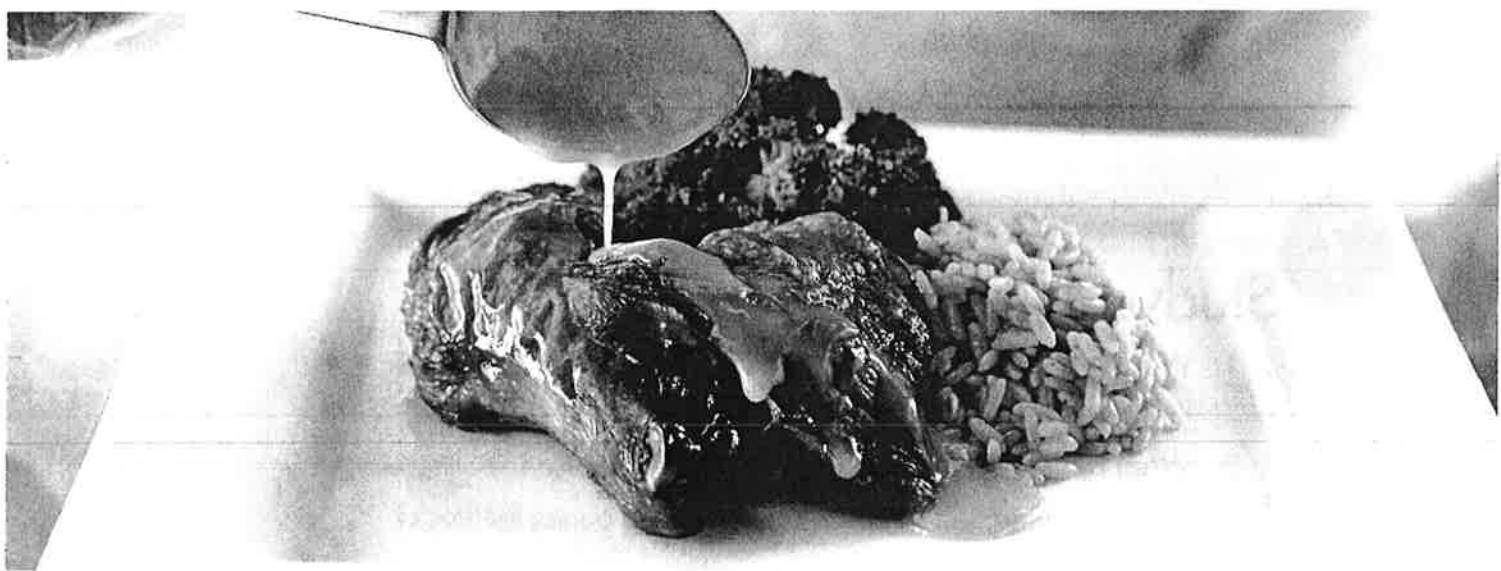
Oignon brûlé

Raft

Clarified

Purée soups

Chowders



INTRODUCTION

STOCKS

SAUCES

SOUPS

PREPARING SOUPS

INTRODUCTION

SOUPS AND SAUCES PLAY IMPORTANT ROLES IN MOST MEALS.

A SOUP CAN BE A STAND-ALONE MEAL ON ITS OWN, OR SERVE AS A LIGHT FIRST COURSE TO A LARGER MEAL. AND A SAUCE CAN BE THE PERFECT COMPLEMENT TO THE FOOD ON YOUR PLATE THAT REALLY BRINGS THE DISH TOGETHER WITH COLOR, FLAVOR, AND AROMA. PERHAPS YOU HAVE A FAVORITE SOUP OR SAUCE? MOST LIKELY A GREAT STOCK IS RESPONSIBLE FOR THE FLAVOR. STOCK IS AN ESSENTIAL INGREDIENT IN MANY SOUPS AND SAUCES. IF YOU CAN MAKE A GREAT STOCK, YOU CAN MAKE A GREAT SOUP AND SAUCE.

STOCKS

Stocks are an important part of any professional kitchen. When preparing stocks, flavor, clarity, and body are the most important attributes to consider. There are four essential parts to all stocks:

- A major flavoring ingredient, such as meat and bones
- A liquid, most often water
- Mirepoix (meer-PWAH)
- Aromatics

Mirepoix is a French word that refers to the mixture of coarsely chopped onions, carrots, and celery that provides a flavor base for stock. The mixture is usually 50 percent onions and 25 percent each of carrots and celery (see Figure 17.1). For pale or white sauces, such as fish fumet, cooks usually use white mirepoix, in which they substitute parsnips, additional onions, leeks, and even chopped mushrooms for carrots.

Aromatics, such as *bouquet garni* and *sachet d'épices*, are the herbs, spices, and flavorings that create a savory smell. ***Bouquet garni*** (boo-KAY gahr-NEE), French for “bag of herbs,” is a bundle of fresh herbs, such as thyme, parsley stems, and a bay leaf tied together (see Figure 17.2). ***Sachet d'épices*** (sah-SHAY day-PEESE) is similar to *bouquet garni*, except it really is a bag of herbs and spices. The cook places the spices, including parsley stems, dried thyme, bay leaf, and cracked peppercorns, together in a cheesecloth bag, as shown in Figure 17.3. If the stock is going to be strained, these ingredients do not need to be contained in a bag.



Figure 17.3: *Sachet d'épices*.

Types of Stock

A **stock** is a flavorful liquid made by gently simmering bones and/or vegetables. This extracts the flavor, aroma, color, body, and nutrients of the ingredients. Some stocks may take up to 24 hours to properly cook, but stocks are one of the most cost-effective ways to use vegetable, meat, and fish trimmings.

Stocks are often called the cook's “building blocks.” They form the base for many soups and sauces. There are many types of stock; several are shown in Table 17.1 on the next page.

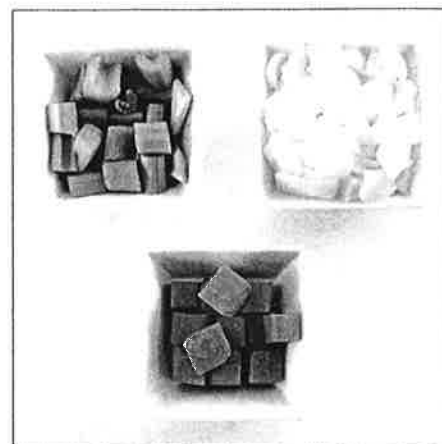


Figure 17.1: Mirepoix.

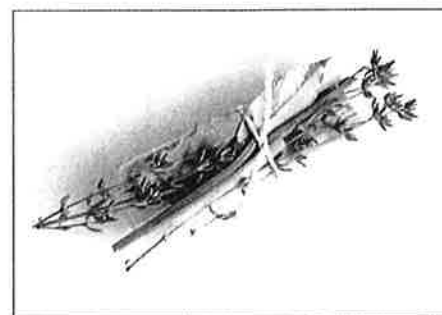



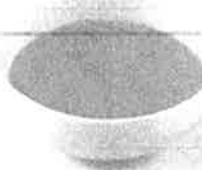
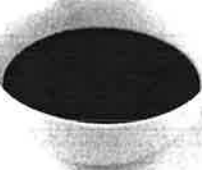






Figure 17.2: *Bouquet garni*.

TABLE 17.1: TYPES OF STOCK

	<p>Bouillon (BOO-yon) This is the liquid that results from simmering meats or vegetables; also referred to as broth.</p>		<p>Brown stock This is an amber liquid made by simmering poultry, beef, veal, or game bones that have been browned first.</p>
	<p>Court bouillon (court boo-YON) This is an aromatic vegetable broth used for poaching fish or vegetables.</p>		<p>Fumet (foo-MAY) Very similar to fish stock, this is a highly flavored stock made with fish bones and reduced to intensify flavor.</p>
	<p>Glace (glahs) Sometimes referred to as "glaze," this is a reduced stock with a jelly-like consistency, made from brown stock, chicken stock, or fish stock.</p>		<p>Jus This is a rich, lightly reduced stock used as a sauce for roasted meats.</p>
	<p>Remouillage (ray-moo-LAJ) This is a weak stock made from bones that have already been used in another preparation, sometimes used to replace water as the liquid used in a stock; <i>remouillage</i> is the French word for "rewetting."</p>		<p>Vegetable stock This is usually made from mirepoix, leeks, and turnips. Tomatoes, garlic, and seasonings may also be added to flavor or darken the stock. Any vegetable can be included in vegetable stock, but avoid leafy greens, as they tend to make the stock bitter.</p>
	<p>White stock This is a clear, pale liquid made by simmering poultry, beef, or fish bones.</p>		

Some kitchens use convenience items such as prepared stocks, stock or sauce bases, and commercial concentrates to cut the costs of food and labor in the kitchen. It is ideal to prepare all items from scratch, but it may not always be possible due to budget issues or staff skill levels. Fortunately, there are many quality convenience products available that can be used to good advantage in today's kitchen. The key to choosing any of these products is careful evaluation to make sure they provide a good level of quality. The quality of the stock affects the quality of all dishes prepared from it; if the prepared stock, base, or concentrate is high quality and has good flavor, then using it will not compromise quality. High-quality stock helps deliver high-quality product. Keep in mind, though, that commercially prepared stocks may contain a large amount of sodium (salt), depending on how they are produced.

Preparing Bones for Stock

To use bones for stock, they must first be cut to the right size and then prepared by blanching, browning, or sweating.

Blanching the bones rids them of some of the impurities that can cause cloudiness in a stock. For blanching, put the bones in a stockpot, cover them with cold water, and bring them to a slow boil. When the pot is at full boil, remove the floating waste or scum. See Figure 17.4.

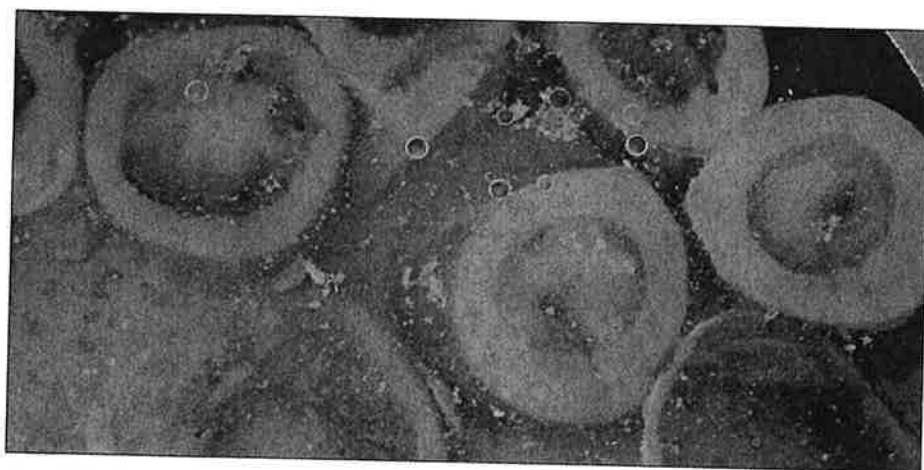


Figure 17.4: Blanching beef bones.

To **brown** bones, roast them in a hot (400°F or 200°C) oven for about an hour, until they are golden brown. See Figure 17.5. Once they are evenly browned, place them in a stockpot, cover them with cold water, and then bring it to a simmer. This will give the stock a richer flavor and deeper color.

Sweating causes the bones and mirepoix to release flavor more quickly when liquid is added. In the sweating process, cook the bones and/or vegetables in a small amount of fat over low heat until they soften and release moisture. For example, bones used for making fish fumet must be sweated with vegetables before adding the cooking liquid and seasoning. See Figure 17.6.



VIDEO

How to Prepare Stock

For a video on how to prepare stock, please go to: Textbooks.Restaurant.org/Videos.

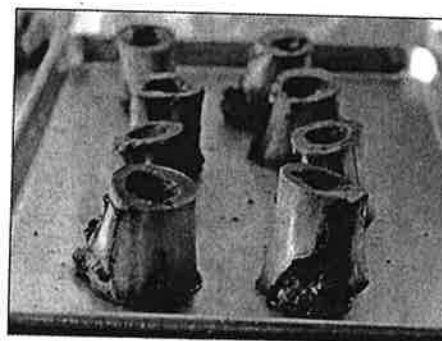


Figure 17.5: Browned beef bones.



Figure 17.6: Fish bones sweating with vegetables.

ESSENTIAL SKILLS **BLANCHING BONES**

- 1 Place at least eight pounds of bones in a stockpot and cover with cold water. See Figure 17.7a.
- 2 Bring the water to a slow boil. Skim the surface if necessary.
- 3 Once the water reaches full boil, drain the bones through a sieve or, if the stockpot has one, allow the water to drain away through a spigot. Discard the water.
- 4 Now the bones are ready for any recipe that calls for blanched bones. See Figure 17.7b.



Figure 17.7a: Cover bones with water.



Figure 17.7b: Blanched bones.

KNOWLEDGE CHECK

- 1 What is blanching?
- 2 List the four essential parts of stock.
- 3 Why are stocks often referred to as the cook's "building blocks"?
- 4 Describe the following types of stock: white stock, brown stock, fumet, court bouillon, glace, *remouillage*, bouillon, jus, and vegetable stock.

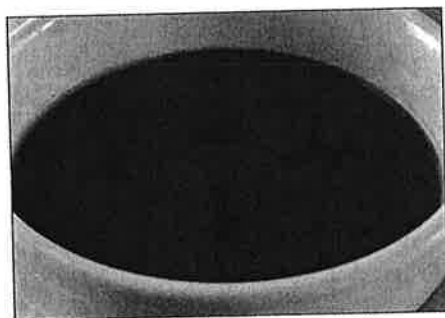


Figure 17.8: Hot, clear stock.

Preparing Ingredients for Stock

Flavor, color, body, and clarity determine the quality of stock. A stock should be flavorful, but not so strong that it overpowers the other ingredients in the finished dish. In a chicken noodle soup, for example, you should taste the chicken, noodles, and vegetables as well as the broth. Fish, chicken, and beef stock have the strongest flavors, while white veal stock is considered neutral. With the exception of fumet, stocks should be almost crystal clear when they are hot. See Figure 17.8.

Mirepoix should be trimmed and cut into a size suited for the type of stock. For stocks with short cooking times, like fish stock, the mirepoix should be sliced or diced in half-inch cuts. For stocks with cooking times of longer than one hour, such as beef stock, the vegetables may be cut into larger pieces (one to two inches long), or even left whole.

Bouquet garni or *sachet d'épices* can be added to the simmering stock.

Aromatics are added to allow the heat to bring out their flavors. Aromatics are usually not added until the last hour of cooking, to prevent the loss of flavor (or development of unpleasant flavors) caused by overcooking. The flavors and aromas will be released from the herbs and spices as the stock cooks. Once the stock is flavored to taste, remove the aromatics.

To make stock, the ratio of liquid to flavoring ingredients is standard. To make one gallon of stock, use the following proportions:

- Chicken, beef, veal, and game stock: 8 pounds of bones to 6 quarts of water, adding 1 pound of mirepoix
- Fish/shellfish stock or fumet: 11 pounds of bones or shells to 5 quarts of water, adding 1 pound of mirepoix
- Vegetable stock: 4 pounds of vegetables to 4 quarts of water, adding $\frac{3}{4}$ pound of mirepoix

ESSENTIAL SKILLS PREPARING STOCK

- 1 Combine the major flavoring ingredient and the cold liquid.
- 2 Bring to a simmer.
- 3 Skim as necessary throughout the cooking time.
- 4 Add the mirepoix and aromatics at the appropriate time, usually in the last hour of cooking. See Figure 17.9a.
- 5 Simmer until the stock develops flavor, body, and color.
- 6 Strain, then use immediately, or cool and store. Straining through cheesecloth or a coffee filter helps to remove fat (see Figure 17.9b). Straining from the bottom is another option. If you do not have a stockpot with a spigot and lifting the stockpot is not realistic, move the hot stock to a table and place another stockpot with a china cap with cheesecloth below it on the floor. Use a food-grade hose that reaches the bottom of the hot stock, and use bellows (a device that sucks or blows a current of air when its sides are pushed together or pulled apart) to draw it into the hose. Once the hot stock is in the hose, quickly place the other end of the hose in the empty stockpot.



Figure 17.9a: Adding aromatics.



Figure 17.9b: Straining through cheesecloth.

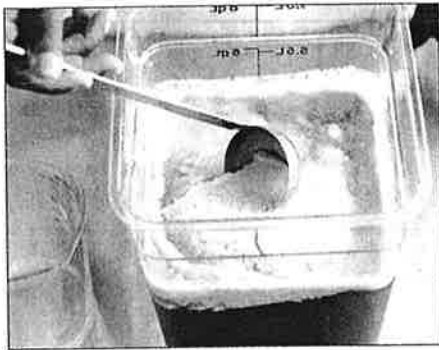


Figure 17.10: Removing fat from the stock.

Fat Removal from Stock

After the stock has been stored, it must be separated from the fat on the surface before it can be used. **Fat removal** is the process of removing fat that has cooled and hardened from the surface of the stock. Just lift or scrape away the fat before reheating the stock. Figure 17.10 shows the layer of fat being removed from the stock.

Fat removal gives the stock a clearer and purer color. It also removes some of the fat content, making the stock more healthful. As the stock reheats, additional fat and impurities will rise to the top; skim these off to keep the stock clear.

Cooling Stock

Foodborne pathogens need time and moisture to grow, but most pathogens will not grow when the temperature of the food is colder than 41°F (5°C) or hotter than 135°F (57°C). The temperatures between 41°F and 135°F (5°C and 57°C) are in the temperature danger zone (also known as TDZ). Follow proper food safety practices when cooling stock, so that you minimize the time the stock spends in the temperature danger zone.

ESSENTIAL SKILLS COOLING STOCK

- 1 Transfer hot stock into a clean, cool stockpot or container, and put that into an ice-water bath (see Figure 17.11a). Stir stock often. When cooled, place the container in the cooler. Alternatively, break down hot stock into smaller portions.
- 2 Stir occasionally so the contents of the container cool at the same rate (see Figure 17.11b).

Note: Do not put a large stockpot of hot stock in the cooler. It will warm the cooler and its contents. Cool it the proper way. First, cool stock from 135°F to 70°F (57°C to 21°C) within two hours. Then cool it from 70°F to 41°F (21°C to 5°C) or lower in the next four hours. The most effective way to do this is using an ice bath and stirring the stock.



Figure 17.11a: Place stock in an ice-water bath.



Figure 17.11b: Stir the stock in an ice-water bath.

KNOWLEDGE CHECK

- 1 How is the quality of a stock determined?
- 2 When making beef stock, you should use how much mirepoix for 8 pounds of bones and 6 quarts of water?

SAUCES

The word “sauce” comes from the French word that means “a relish to make food more appetizing.” All types of sauces are important in cooking. A good sauce adds flavor, moisture, richness, color, and visual appeal. Sauces should complement food, not disguise it. You can also use sauces as a contrasting flavor. For example, the sweetness of roasted pork goes well with a Dijon sauce (a brown sauce with Dijon mustard).

Mother Sauces

A **sauce** is a liquid or semisolid product that is used in preparing other foods. A **saucier** is a cook who specializes in making sauces.

Most sauces start with a roux as one of the main ingredients. **Roux** (ROO) is a thickener made of equal parts cooked flour and a fat, such as clarified butter, oil, or shortening. There are five classical **mother sauces** that are the basis for most other sauces. These are sometimes called “grand sauces.” They include the following:

- **Béchamel** (BAY-shah-MELL): This is made from milk and white roux.
- **Velouté** (veh-loo-TAY): This is made from veal, chicken, or fish stock and a white or blond roux.
- **Brown** or **Espagnole** (ess-spah-NYOL) **sauce**: This is made from brown stock and brown roux.
- **Tomato sauce**: This is made from a stock and tomatoes (roux is optional).
- **Hollandaise** (HALL-en-daze): This is an emulsion made from eggs, butter, and lemon.

INTRODUCTION

STOCKS

SAUCES

SOUPS

PREPARING SOUPS



DID YOU KNOW

The History of Mother Sauces

In the early nineteenth century, Marie-Antonin Careme identified four mother sauces: *Allemande*, béchamel, velouté, and *espagnole*. However, in the early twentieth century, Cook Auguste Escoffier downgraded *Allemande* to a secondary sauce and promoted tomato and Hollandaise to the list of mother sauces. These five sauces are called mother sauces because each one is the head of its own unique family of sauces.



INDUSTRY

Deglazing

To deglaze a pan means to add liquid such as stock or wine to a pan to loosen and dissolve food particles (called fond) that are stuck to the bottom.

When something is sautéed, such as mirepoix for the base of a sauce, small particles of the food will break off in the bottom of the pan. While these cook, the sugars caramelize and change the flavor profile of the ingredient. Deglazing helps to capture these flavors into the final sauce by “rinsing” these off with the addition of a liquid and scraping the pan well to loosen these particles off the bottom.

For example, when making a brown sauce, the bones and vegetables are roasted to gain color and caramelization. These are removed from the pan, and then normally wine is added to the hot pan to deglaze the pan and ensure that all the flavors are captured.

Mother sauces are rarely used by themselves. They are often used to make **small sauces** (also known as derivative sauces). For example, **demi-glace** (deh-mee glahs), a rich brown sauce, is traditionally made by combining equal parts *espagnole* sauce and veal stock and reducing to 50 percent of its starting volume. Table 17.2 lists the mother sauces and their small sauces.

TABLE 17.2: MOTHER SAUCES AND THEIR DERIVATIVES



Béchamel

Small Sauce	Additional Ingredients	Examples of Sauce Usage
Cream	Cream (instead of milk)	Over chicken or fish
Cheddar cheese	Cheddar cheese	Macaroni and cheese
Soubise (soo-BEEZ)	Puréed cooked onions	Roasted meats, game, poultry, and vegetables



Brown (*espagnole*)

Small Sauce	Additional Ingredients	Examples of Sauce Usage
Bordelaise (bohr-dl-AYZ)	Red wine, parsley	Red meats such as filet mignon
<i>Chasseur</i> (sha-SUR) (also called hunter's sauce)	Mushrooms, shallots, white wine, tomato <i>concassé</i>	Wild game meats, such as venison and rabbit
Lyonnaise (lee-oh-NEHZ)	Sautéed onions, butter, white wine, vinegar	Roasts and steaks
Madeira (mah-DEER-uh)	Madeira wine	Roasts and steaks



Hollandaise

Small Sauce	Additional Ingredients	Examples of Sauce Usage
Béarnaise (behr-NAYZ)	Tarragon, white wine, vinegar, shallots	Steaks, asparagus, or salmon
Maltaise (mahl-TEHZ)	Blood orange juice and zest	Fish and vegetables



Tomato

Small Sauce	Additional Ingredients	Examples of Sauce Usage
Creole (KREE-ohl)	Sweet peppers, onions, chopped tomatoes	Shrimp, chicken, or sausages
Portuguese	Onions, chopped tomatoes, garlic, parsley	Chicken and fish

When making a small sauce, sometimes you will need to perform a reduction. A **reduction** means you reduce a liquid ingredient in order to concentrate its flavor within the dish. It also helps with the final consistency of the finished sauce, so that it will coat and hold on the plate.



Chicken velouté

Small Sauce	Additional Ingredients	Examples of Sauce Usage
Mushroom	Cream, mushrooms	Steak, chicken, or potatoes
Supreme	Reduced with heavy cream	Chicken and vegetables
Hungarian	Cream, Hungarian paprika	Chicken, fish, veal, and dumplings



Fish velouté

Small Sauce	Additional Ingredients	Examples of Sauce Usage
White wine	White wine	White fish
Bercy	White wine, shallots, butter, parsley	White fish
Herb	White wine, herbs	White fish



Veal velouté

Small Sauce	Additional Ingredients	Examples of Sauce Usage
<i>Allemande</i> (ah-leh-MAHND)	Egg yolks	Veal
Hungarian	Egg yolks, Hungarian paprika	Chicken, fish, veal, and dumplings
Curry	Egg yolks, curry spices	Meats and vegetables



SAFETY

Using Eggs

Food safety can be an issue with hollandaise sauce. Use pasteurized eggs to decrease the risk of foodborne illness, such as *Salmonella*.



VIDEO

How to Make a Roux

For a video on how to make a roux, please go to: Textbooks.Restaurant.org/Videos.

Basic Ingredients in Sauces

Sauces need a liquid component, such as stock, milk or cream, wine, or a mother sauce. You also may add aromatics (herbs and spices) to add complexity and character to a sauce. A key ingredient in sauce is the thickener, which adds richness and body. Some examples of thickeners are roux, *beurre manié*, slurry, and liaison.

To make a roux, the fat is heated in a pan, and then the flour is added. The mixture is stirred until the flour and fat are fully blended. The color of the roux is determined by how long the mixture has been heated.

There are three commonly used types of roux:

- **White roux:** This is cooked for a very short period of time and is used in sauces where little color is needed, like béchamel. White roux is bland and a little starchy and has the most thickening power.
- **Blond roux:** This is cooked longer than white roux, until the flour turns golden and has a nutty aroma. It is used in ivory-colored sauces like velouté. Blond roux is a bit more flavorful and has a nutty taste to match the aroma.
- **Brown/dark brown roux:** This is cooked until it develops a dark brown color, and is used in dishes that require a dark brown color. Brown roux is nutty and a rich medium-brown color, while dark brown roux is quite dark, with a nutty, roasted flavor. It has the least thickening ability because the starch has been cooked the longest.



ESSENTIAL SKILLS MAKING ROUX

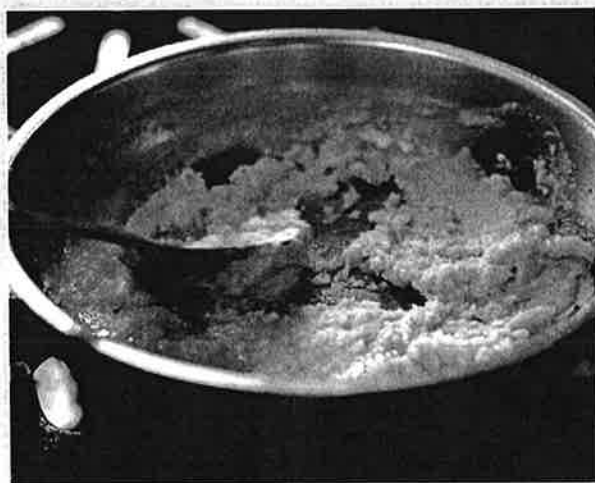


Figure 17.12: Stir flour and fat to form a paste.

- 1 Heat clarified butter or other fat in a heavy saucepan.
- 2 Add flour and stir together with the fat to form a paste. See Figure 17.12.

Note: Most often, cooks use equal parts flour and fat (by weight), but some sources suggest 60 percent flour and 40 percent fat.

- 3 Stir the roux continually to prevent burning.
- 4 Cook the paste over medium heat until the desired color is reached.

Beurre manié (byurr man-YAY) is a thickener made of equal parts flour and soft, whole butter. Mix flour and butter together, and then shape the mixture into small-sized balls and add to the cooking sauce. See Figure 17.13. Use *beurre manié* to thicken a sauce quickly at the end of the cooking process. See Figure 17.14.

A **slurry**, which is cornstarch mixed with a cold liquid, can be used instead of roux. You cannot add cornstarch directly to a sauce; it will make the sauce lumpy. First, dissolve the cornstarch in a cold liquid. The consistency should look like heavy cream. Do not boil sauces thickened with cornstarch too long or the starch will break down, creating a watery sauce.

A **liaison** (lee-AY-zohn) is a mixture of egg yolks and heavy cream, often used to finish some sauces, such as *Allemande* sauce. Liaison adds a rich flavor and smoothness to the sauce without making it too thick. It is important to temper the liaison to prevent the egg yolks from curdling. To **temper** the sauce, slowly mix a little bit of the hot sauce with the eggs-and-cream mixture to raise the temperature, and then add the warmed-up egg mixture into the sauce.

Preparing Different Kinds of Sauce

There are various kinds of sauce besides mother sauces and small sauces. These include compound butters, cold or thick sauces like salsa and coulis (koo-LEE), and sauces made from the natural juices of meat.

Compound butter is a mixture of raw butter and various flavoring ingredients, such as herbs, nuts, citrus zest, shallots, ginger, and vegetables. Use compound butters to finish grilled or broiled meats, fish, poultry, game, pastas, and sauces, among other uses. Roll the butter into a long tube shape, then chill and slice for use as needed. One blend is **maître d'hôtel** (MAY-tra doe-TEL) **butter**, a softened butter flavored with lemon juice and chopped parsley. See Figure 17.15. It is often used to garnish grilled meat or fish.



Figure 17.13: A chef shaping the mixture of flour and butter into small-sized balls.

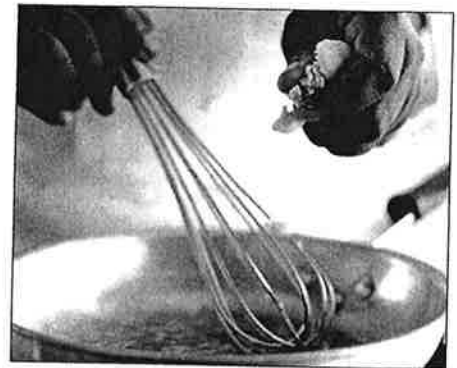


Figure 17.14: A chef using *beurre manié* to thicken a sauce.



Figure 17.15: Rolled maître d'hôtel butter.



Figure 17.16: Tomato coulis.



Figure 17.17: Salsa being added to fish tacos.

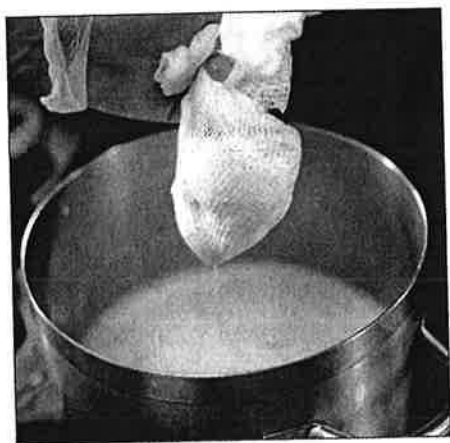


Figure 17.18: Straining sauce using the wringing method.

Other miscellaneous sauces that add flavor, texture, and color to a dish include salsa and coulis. **Coulis** is a thick puréed sauce, such as the tomato coulis pictured in Figure 17.16. **Salsa** is a cold mixture of fresh herbs, spices, fruits, and/or vegetables. It can be used as a sauce for meat, poultry, fish, or shellfish. These sauces allow cooks to change a menu item by adding flavor, moisture, texture, and color to a dish. One advantage is that these sauces can provide a lower-fat alternative to the usually heavy mother or small sauces. Figure 17.17 shows salsa being used to add flavor to fish tacos.

Sauces are sometimes made with the natural juices of meat. **Jus lié** (ZHEW lee-AY) is a sauce made from the juices of cooked meat and brown stock. Meats served with their own juices are called **au jus** (oh ZHEW).

To finish a sauce, adjust the consistency. For example, it may be necessary to add stock to a sauce to thin it out. The added stock will also help flavor the sauce. Sometimes using a red or white wine can add a very distinctive taste to a sauce. A sauce that is not thick enough can be adjusted by further reduction.

Once the flavor and consistency have been adjusted, the sauce may need to be strained to make sure it is smooth. The easiest way to strain sauce is the **wringing method**. In this method, place clean cheesecloth over a bowl, and pour the sauce through the cheesecloth into the bowl. The cloth is then twisted at either end to squeeze out the strained sauce. The cheesecloth catches the unwanted lumps of roux, or herbs, spices, and other seasonings. Sauces may also be strained through a China cap lined with cheesecloth, a fine-meshed strainer, or a *chinois* (chin-WAH). Figure 17.18 shows sauce being strained using the wringing method.

As in all cooking, the final step in finishing a sauce is to adjust the seasonings. Salt, lemon juice, cayenne, and white pepper can all be used to bring out the flavor of the sauce.

Appropriate Sauce Usage

It is important to understand how to use a sauce and how to determine what dish should be paired with a particular sauce. Obviously, there are classic pairings that have been used over time, such as eggs Benedict and hollandaise sauce.

Several factors help to determine the right sauce for a dish:

- **What will be the style of service?** Some sauces are plated (put on the plate with the food). Others may be available self-serve on a buffet.
- **How is the main ingredient of the dish being cooked?** Bold sauces and garnishes work well for roasted meat. Lighter sauces are best for white meat and food cooked with light techniques, such as poaching or steaming.

- **How does the sauce's flavor work with the dish's flavor?** The sauce should complement, not clash with, the flavor and texture of the dish. Please remember that a sauce is a flavor accent that should boost the flavor of the dish instead of hiding it.
- **Are there any dietary concerns that need to be considered?** For example, a roux made with wheat flour cannot be used as a thickener for a guest that has a gluten allergy.
- **Can the sauce be prepared correctly with the available equipment and kitchen setup?** It is hard to make hollandaise on the line if no space is available during service.
- **Can the sauce be held without compromising its quality?** Some sauces do not retain their quality if left in a pan for some time.
- **Can the sauce be prepared correctly by your staff?** Have they been well trained both on the technique for making it and the proper sanitation concerns during preparation, holding, and serving?

Remember that taste is the most important factor, but do not ignore the color, opacity (degree of light that passes through), texture, and viscosity (thickness).

KNOWLEDGE CHECK

- 1 Identify one classic pairing of a sauce and a dish.
- 2 Think of three factors that can help determine the right sauce for a dish.
- 3 Identify the primary ingredients in each of the five mother sauces.

SOUPS

Serving soup at the beginning of a meal provides an opportunity to make a good first impression. Preparing and serving soups helps you learn more about basic culinary techniques, seasonings, garnishing, and serving foods.

Basic Kinds of Soup

There are two basic kinds of soup—clear soups and thick soups. **Clear soups** include flavored stocks, broths, and consommés. Examples include chicken noodle soup, minestrone (a tomato-based vegetable soup), and onion soup. **Thick soups** include cream soups and purée soups, such as bisques, chowders, cream of tomato, lentil, and split pea soup. Figure 17.19 shows a line cook preparing a clear soup.

INTRODUCTION
STOCKS
SAUCES
SOUPS
PREPARING SOUPS



Figure 17.19: A line cook preparing stock for a clear soup.

INTRODUCTION

STOCKS

SAUCES

SOUPS

PREPARING SOUPS

There are many variations of these basic soups, including the following:

- Dessert soups, such as *ginataan*, a Filipino soup made from coconut milk, milk, fruits, and tapioca pearls, and served hot or cold.
- Fruit soups, such as winter melon or gazpacho, a savory soup with a tomato base.
- International soups, which can be hot or cold. Examples of cold soups are borscht, a beet soup, and vichyssoise (vi-shee-SWAHZ), a French-style soup made of puréed leeks, onions, potatoes, cream, and chicken stock. Hot soups include Vietnamese pho (pronounced fuh), a rich beef stock with noodles and thinly shaved beef, or French onion soup, made with beef stock and topped with melted Gruyère cheese.
- Traditional regional soups, such as New England clam chowder, which is cream sauce based, Manhattan clam chowder, which is red sauce based, or gumbo, which is a Creole soup made with okra and shrimp.

PREPARING SOUPS

Soups must be cooked properly. Most soups are cooked at a gentle simmer and stirred occasionally. If a soup is cooked for too long, the flavor can become flat and nutrients will be lost. Adding chopped fresh herbs, lemon juice, or a dash of hot pepper sauce to soup can brighten its flavor. Finishing techniques are important when preparing soup for service. For example, the line cook should remove the surface fat on the soup before service by blotting the soup with strips of unwaxed brown butcher paper. Soups should also be garnished just before service.

Clear Soups

Stock or broth is the basic ingredient in clear soups. Broth is made from a combination of water; vegetables; beef, fish, chicken, or veal; mirepoix; and *bouquet garni*. It should be clear to pale amber in color and have the flavor of the major ingredient.

One type of clear soup is consommé (kon-sah-MAY). This is a rich, flavorful broth or stock that has been clarified. A consommé is made by adding a mixture of ground meats with mirepoix, tomatoes, egg whites, and *oignon brûlé* (oy-NYON broo-LAY) to bouillon or stock. This mixture is called clearmeat. *Oignon brûlé* is a “burnt onion” (see Figure 17.20). For *oignon brûlé*, cut an onion in half across its hemisphere, and then char the flat part either on a flat-top range or grill, or in a dry (fat-free) pan. This adds color and flavor to the consommé. Care must be taken to prevent too much burning.

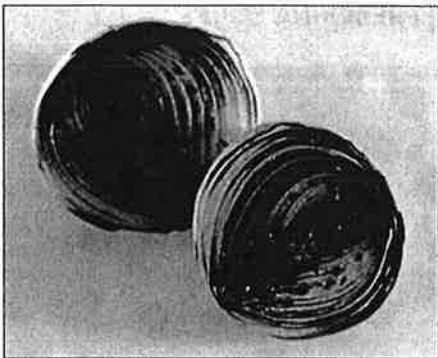


Figure 17.20: *Oignon brûlé*.

Slowly simmer the mixture until the impurities come to the surface, trapped in a **raft**, which is the floating layer of egg whites, meat and vegetable solids, and fats. Remove the raft, and the result is pure and clear, or **clarified**. Good consommé should be clear and aromatic and should emphasize the flavor of the major ingredient. If the consommé is too weak, a meat or poultry glaze may be added to enhance the flavor.

Thick Soups

There are two kinds of thick soup—cream soups and purée soups. Both purée and cream soups are made with a liquid and either *sachet d'épices* or *bouquet garni*. Then a puréed main ingredient, to provide the main flavor, is blended into this base.

The main difference between a purée and cream soup is that cream soups are usually thickened with an added starch, such as roux. **Purée soups** are thickened by the starch found in the puréed main ingredient, such as potatoes. Purée soups are coarser than cream soups but should be liquid enough to pour easily from a ladle.

Cream soups must be thick with a smooth texture. They should never be boiled. Boiling can cause the milk fat to break down, making the soup thin and watery. Garnish cream soups with a bit of the soup's main ingredient. For instance, place a few small blanched broccoli florets on top of cream of broccoli soup.

Bisques are another kind of thick soup. Bisque (BISK) is a cream soup traditionally made from puréed shells from shellfish such as lobster, shrimp, or crab. The shells are puréed along with vegetables, making the texture slightly grainy. The bisque is then strained, garnished, and served. A properly prepared bisque should be a pale pink or red color and have the flavor of the shellfish. Figure 17.21 shows a bisque soup.

Chowders are hearty, thick soups made in much the same way as cream soups. Chowders are not puréed before the cream or milk is added. They are usually thickened with roux and typically include large pieces of the main ingredients (usually potatoes or seafood) and garnishes.



INDUSTRY

Soup Is Profitable

Soup is a highly profitable menu item. Research shows that having soup on the menu can increase the check average by 15 percent or more. Contrary to popular belief, soup is popular year-round, regardless of the season. Soups are seen as a healthy menu option. Offering soups that are filled with vegetables and lean meats will appeal to those guests who want to eat healthier. Be sure to have a variety of items so that guests do not get bored. Offering signature soups will boost your soup orders too.



DID YOU KNOW

Frozen Soups

Frozen soups can ensure consistency from batch to batch and shift to shift, so that the restaurant never compromises its signature soup experience for guests.

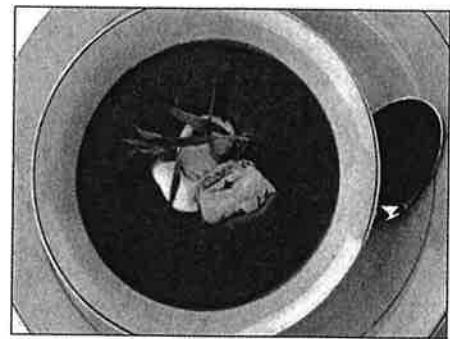


Figure 17.21: A lobster bisque soup.



KNOWLEDGE CHECK

- 1 Describe the difference between clear soups and thick soups. Give examples of each.
- 2 What is the main difference between cream and purée soups?
- 3 What differentiates a chowder from a cream soup?



ESSENTIAL SKILLS PREPARING BASIC BROTH



Figure 17.22: Add mirepoix and *bouquet garni*.

- 1 Combine the meat or vegetables and water.
- 2 Bring to an even simmer.
- 3 Add the mirepoix and *bouquet garni*. See Figure 17.22.
- 4 Simmer for the appropriate cooking time depending on the main ingredient in the broth:
 - Beef, veal, game, chicken: 2 to 3 hours
 - Fish: 30 to 40 minutes
 - Vegetables: 30 minutes to 1 hour
- 5 Skim and strain. Cool and store, or finish and garnish for service.

Remember: *A good broth should be clear, pale amber, with the distinct flavor of the major ingredient.*

PREPARING BASIC CONSOMMÉ



Figure 17.23: Bring the mixture to a slow simmer.

- 1 Combine the ground meat, mirepoix, seasonings, tomato product, *oignon brûlé*, and egg white.
- 2 Blend in the stock.
- 3 Bring the mixture to a slow simmer (see Figure 17.23), stirring frequently until the raft has formed.
- 4 Do not stir after the raft has formed.
- 5 Carefully break a hole in the raft and continue to simmer.
- 6 Strain using a stockpot with a spigot (best option), or by tilting the pot so that the now clear soup can be ladled from the top of the raft.
- 7 Cool and store, or finish and garnish for service.

Remember: *Good consommé should be crystal clear, aromatic, and emphasize the flavor of the major ingredient.*

CLARIFYING STOCK



Figure 17.24: Break a hole in the raft so the stock can be removed.

- 1 Use egg whites, a mild acid (such as tomato or lemon juice), and a browned onion.
- 2 Whip egg whites until the whites are foamy.
- 3 Add these ingredients to the stock when the stock is about 100°F (38°C).
- 4 Simmer gently, at medium heat, for half an hour or more.
- 5 When the raft of the egg structure and the scum has gathered, be careful not to stir the raft.
- 6 Remove the raft by letting it settle completely to the bottom as it cools and then pouring off the clarified stock, or carefully break a hole in the raft and gently ladle out the stock. See Figure 17.24.
- 7 Discard the raft.



ESSENTIAL SKILLS HOW TO MAKE CREAM SOUP



Figure 17.25: Cream of mushroom soup.

- 1 Sauté the major flavoring—such as mushrooms for a cream of mushroom soup—in a little butter or oil.
- 2 Add flour to make a roux, and cook for a short time to remove any starchy taste.
- 3 Add stock, *sachet d'épices*, and any vegetables, and then simmer until tender.

Note: Stock also includes aromatics, but these are separate aromatics being added to the finished stock and other ingredients.

- 4 Purée and strain the mixture.
- 5 Add additional stock to adjust the consistency as necessary.
- 6 Add cream and garnish before serving. See Figure 17.25.

MAKING BISQUE



Figure 17.26a: Sweat the shells and mirepoix.

- 1 Sear crustacean shells in a fat or sweat in stock.
- 2 Add mirepoix and sweat. See Figure 17.26a.
- 3 Add tomato product.
- 4 Reduce until the mixture is *au sec* (oh SEK). This means reduce it until it is very dry.
- 5 Add stock and *sachet d'épices* or *bouquet garni*.

- 6 Mix in the roux.
- 7 Simmer and skim.

- 8 Discard the *sachet d'épices* or *bouquet garni* when you have the desired flavor.
- 9 Strain the soup and purée the solids. See Figure 17.26b.

Note: The solids that are puréed in this step include crustacean shells, which is why the soup must be strained in step 11 below.

- 10 Remix the liquid to the proper consistency.

Note: "Remix" refers to combining the reserved liquid that was strained out in step 9 with the puréed solids. It may not be necessary to use all of the liquid to achieve the desired consistency in the finished soup.

- 11 Strain, then cool and store, or finish and garnish with the cooked, reserved meat from the crustacean.

Remember: A properly prepared bisque should have the flavor of the crustacean and a pale pink or red color.



Figure 17.26b: Puréeing the solids for a bisque.



SUMMARY

In this chapter, you learned the following:

- Stocks contain four essential parts: a major flavoring ingredient, liquid, mirepoix, and aromatics.
- A stock is a flavorful liquid made by gently simmering bones and/or vegetables.
- When using bones for stock, they must be cut to the right size and prepared by blanching, browning, or sweating.
- Flavor, color, body, and clarity determine the quality of stock.
- Fat removal gives the stock a clearer, purer color. It also removes some of the fat content, making the stock healthier.
- To cool stock, place it in a clean stockpot, and then put that pot into an ice-water bath. Stir it often. When cooled, place the pot into the cooler.
- Sauces add flavor, moisture, and visual appeal to another dish.
- There are five classical mother sauces: béchamel, velouté, brown or *espagnole*, tomato, and hollandaise.
- Thickeners such as roux, *beurre manié*, slurry, and liaison add richness and body to sauces.
- There are other sauces that are not classified as mother sauces, such as compound butters, coulis, salsa, and *jus lié*.
- Sauces should be matched to the type of food that is being served. Consider factors such as the main ingredient of the dish and how the flavors will complement each other.
- Clear soups and thick soups are the two basic kinds of soup. Clear soups include flavored stocks, broths, and consommés. Thick soups include cream and purée soups.
- The main difference between a purée and a cream soup is that cream soups are usually thickened with an added starch.



CASE STUDY FOLLOW-UP

Refer back to the unit-opening case study, and answer these questions.

Question 1: Chef Kate is responsible for cooling a large amount of veal stock. How will she do this?

Question 2: One of the waitresses at Downtown Grille sees Chef Kate degreasing stock and asks why it is important to degrease stock before using it. What will Chef Kate tell the waitress?

CHAPTER ACTIVITIES

Language Arts: Change the Sauce

Research a classical menu (a minimum of eight courses) that contains sauces. Take each course and rewrite the menu to today's modern standards. For example, instead of a Mornay sauce, describe the item as an aged cheddar sauce.

Science: Thickening

Starch thickeners provide structure and body to soups, sauces, pie fillings, and other liquids. The starch swells with water and forms a gel structure that gets thick. As the gel forms and heats it becomes clearer, so the product does not look as milky as the starch solution did at first. Thickening is a chemical reaction that cannot be reversed. Once a dry powdered starch becomes a thickened gel, it will not return to a dry powder on its own.

Take the time to test and create a reference chart about four starch thickeners: wheat flour, cornstarch, arrowroot, and tapioca.

- Test the wheat flour in melted butter and then in hot water.
- Test the cornstarch in cold water and then in hot water.
- Test the arrowroot with hot water and then with melted butter.
- Test the tapioca with hot water and then with melted butter.

Which thickeners and methods worked best? Write down the results of your tests, and create a table detailing your findings.

Math: Math Makes a Good Soup

With a good recipe, you can make a good soup every time. However, a recipe makes a given amount of a dish, called the yield. If the recipe makes four cups of soup, the yield is four cups. This might be the perfect amount to make if you are serving four people; each person would get one cup of soup. But if you have 10 people to serve, how do you convert the recipe? Select a soup recipe and convert it to a ratio formula.

Collaboration: Study the Sauce

Break into five small groups. Each group will be assigned a mother sauce (*béchamel*, *velouté*, brown or *espagnole*, tomato, or *hollandaise*). Each group should come up with as many dish names as possible using that mother sauce or its derivatives.

Career: Bones to Bordelaise

Make a flow chart of the various steps involved in making a specific derivative sauce, such as bordelaise sauce, Creole sauce, *béarnaise* sauce, etc. The chart should use arrows to indicate the direction and order of the process. Be sure to include the ingredients added at various steps. For example, you may start with beef bones. It is acceptable to use flour or bones or butter as starting points. Exhibit your flowchart, eliminating the name of the sauce. See how many of your classmates can guess the right sauce.

Critical Thinking: Which Sauce Should I Use?

Create a main dish with an accompanying sauce for a specific event as assigned by your teacher. Some examples might include a family brunch, a dinner at home, an open house, or a wedding. Create the recipe and then describe why you chose that specific dish for the event.

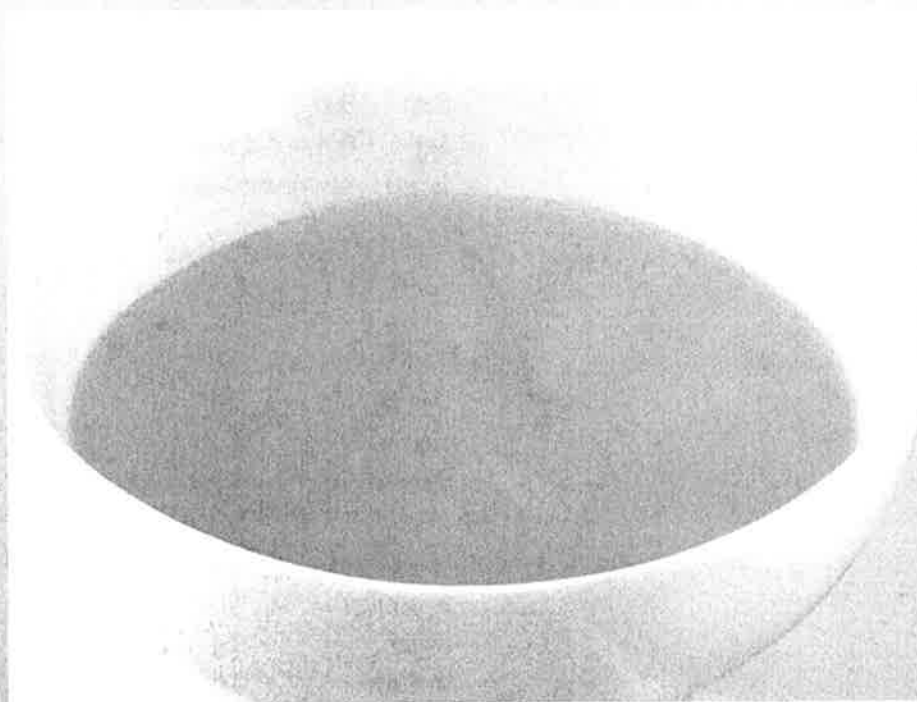
EXAM PREP QUESTIONS

- ① The essential part of stock that is a mixture of coarsely chopped onions, carrots, and celery is called
 - A mirepoix.
 - B aromatics.
 - C *sachet d'épices*.
 - D *bouquet garni*.
- ② What liquid is usually used for making stock?
 - A Water
 - B Boullion
 - C Beef broth
 - D Chicken broth
- ③ Roasting bones to enhance the flavor and color of stock is a process known as
 - A sweating.
 - B browning.
 - C blanching.
 - D parboiling.
- ④ The ratio of liquid to flavoring ingredients in vegetable stock is
 - A 4 lb of vegetables to 4 qt of water to yield 1 gal of stock.
 - B 2 lb of vegetables to 4 qt of water to yield 1 qt of stock.
 - C 11 lb of vegetables to 5 qt of water to yield 1 gal of stock.
 - D 8 lb of vegetables to 6 qt of water to yield 1 gal of stock.
- ⑤ After the stock has been stored, it must have the fat removed before it can be used. This is because
 - A it is easier to heat up stock with no fat.
 - B the fat will ruin the flavor of the stock, turning it rancid.
 - C the fat will make the stock inedible.
 - D fat removal makes the stock clearer and purer, as well as a bit more healthful.
- ⑥ Béchamel, velouté, and hollandaise are all called
 - A thickeners.
 - B mother sauces.
 - C derivative sauces.
 - D compound butters.
- ⑦ A slurry, a liaison, and a roux are all considered to be
 - A soups.
 - B stocks.
 - C aromatics.
 - D thickeners.
- ⑧ What is a mixture of egg yolks and heavy cream that adds a rich flavor and velvety smoothness to the sauce without making it too thick?
 - A Slurry
 - B Liaison
 - C Hollandaise
 - D Compound butter
- ⑨ Stocks, broths, and consommés are all what type of soup?
 - A Clear
 - B Thick
 - C Puréed
 - D Bisque
- ⑩ Thick soups can be thickened with
 - A cream.
 - B starch.
 - C *bouquet garni*.
 - D compound butter.



RECIPE FISH STOCK

COOKING TIME: 1 HOUR • YIELD: 1 GALLON



DIRECTIONS

- 1 Sweat mirepoix and mushroom trimmings in butter until tender, for 1 to 2 minutes.
- 2 Combine all ingredients except the *sachet d'épices* in a stockpot.
- 3 Bring to a simmer and skim impurities as necessary.
- 4 After 15 to 30 minutes into the cooking process, add the *sachet d'épices* and simmer uncovered for 30 to 45 minutes.
- 5 Strain, cool, and refrigerate.

INGREDIENTS

- 1 lb White mirepoix, small dice (omit carrots and add leeks)
- 8 oz Mushroom trimmings
- 2 fl oz Clarified butter
- 10 lb Fish bones or crustacean shells
(Fish bones should be cut with a knife to release the albumin into the liquid. Albumin is a clarifying agent.)
- 5 qt Water

Sachet d'épices:

- 2 Bay leaves
- ½ tsp Dried thyme
- ¼ tsp Peppercorns, crushed
- 8 Parsley stems
- 2-3 Garlic cloves

RECIPE NUTRITIONAL CONTENT

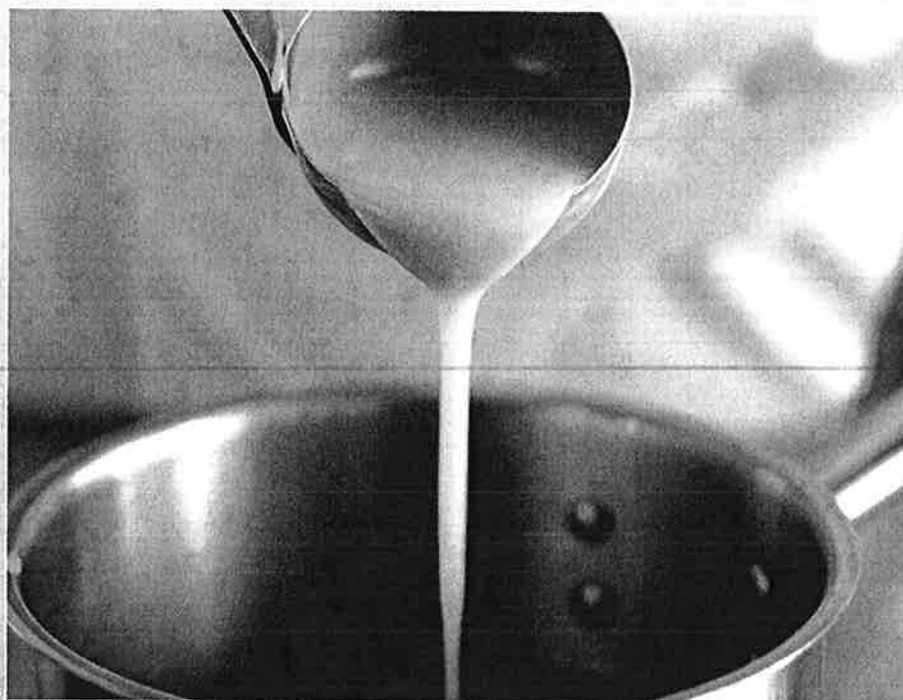
Calories	54
% calories from fat	59
Total fat	4 g
Saturated fat	2 g
Cholesterol	9 mg
Sodium	37 mg
Carbohydrates	5 g
Dietary fiber	2 g
Protein	1 g
Vitamin A	4058 IU
Vitamin C	42 mg
Calcium	57 mg
Iron	2 mg

Nutritional analysis provided by MasterCook®



RECIPE VELOUTÉ

COOKING TIME: 45 MINUTES • YIELD: 1 GALLON



DIRECTIONS

- 1 Heat the butter in a heavy saucepan. Add the flour and cook to make a blond roux.
- 2 Gradually add the cold stock a little at a time to the hot roux for proper tempering, stirring constantly with a whisk to prevent lumps. Bring to a boil and reduce to a simmer. (Seasonings are optional; their use depends on the seasonings in the stock and the sauce's intended use.)
- 3 Simmer and reduce to 1 gallon (4 liters), approximately 30 minutes.
- 4 Strain through a china cap lined with cheesecloth.
- 5 Melted butter may be carefully ladled over the surface of the sauce to prevent a skin from forming. Hold for service or cool in an ice-water bath.

INGREDIENTS

8 fl oz	Clarified butter
8 oz	Flour
5 qt	Chicken, veal, or fish stock, cold
To taste	Salt and white pepper

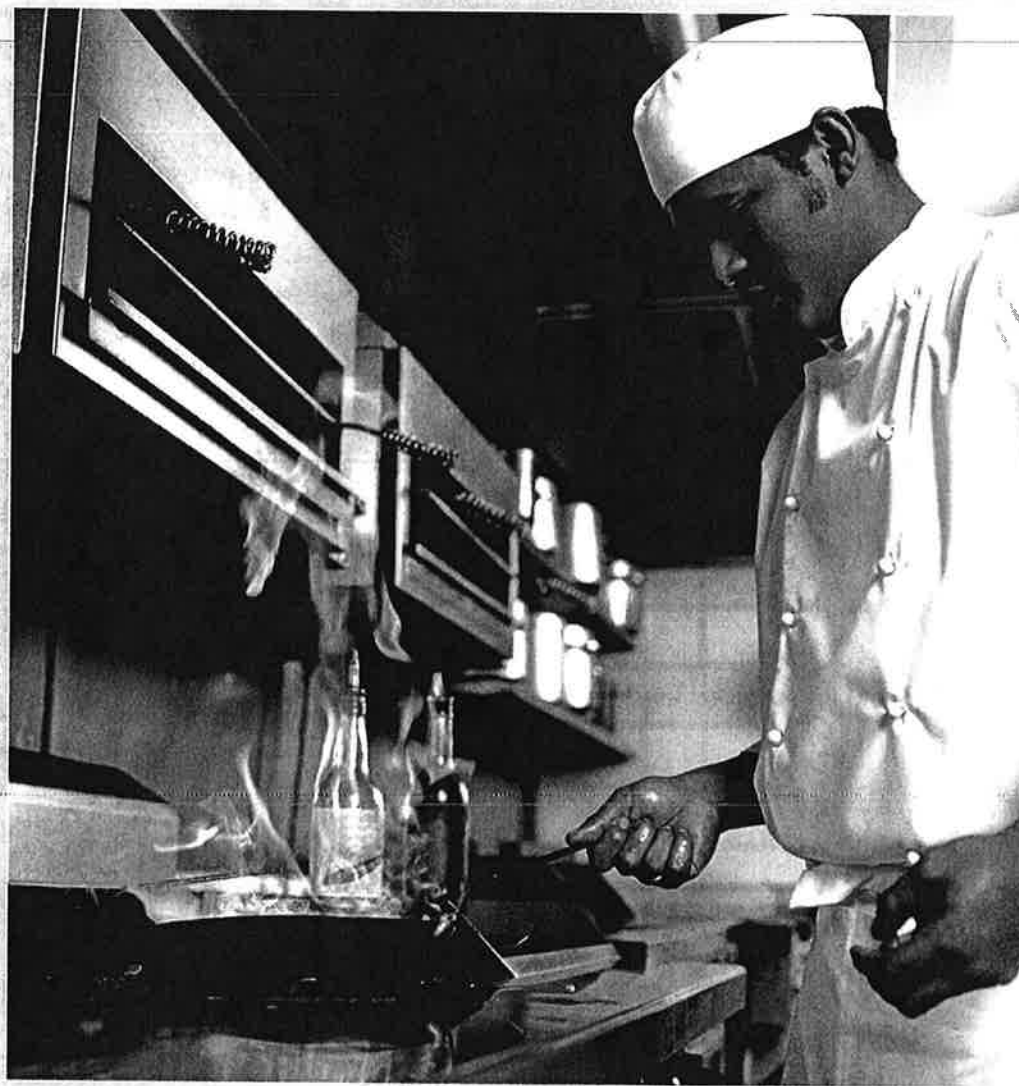
RECIPE NUTRITIONAL CONTENT

Calories	51
% calories from fat	69
Total fat	4 g
Saturated fat	2 g
Cholesterol	9 mg
Sodium	671 mg
Carbohydrates	3 g
Dietary fiber	trace
Protein	1 g
Vitamin A	133 IU
Vitamin C	0 mg
Calcium	1 mg
Iron	1 mg

Nutritional analysis provided by MasterCook®

CHAPTER 18

COOKING METHODS





RECIPE NEW ENGLAND-STYLE CLAM CHOWDER

COOKING TIME: 45 MINUTES • YIELD: 3½ QUARTS



INGREDIENTS

2 qt	Canned clams with juice
Approximately 1½ qt	Water or fish stock
1 lb 4 oz	Potatoes, small dice
8 oz	Salt pork, small dice
2 oz	Whole butter
1 lb	Onions, small dice
8 oz	Celery, small dice
4 oz	Flour
1 qt	Milk
8 fl oz	Heavy cream
To taste	Salt and pepper
To taste	Hot sauce
To taste	Worcestershire sauce
To taste	Fresh thyme
As needed for garnish	Fresh parsley
As needed for garnish	Carrot, julienned

DIRECTIONS

- 1 Drain the clams, reserving the clams and putting their liquid in the stockpot. Add enough water or stock to the clam liquid so that the total liquid equals 2 quarts.
- 2 Simmer the potatoes in the clam liquid until nearly cooked through. Strain and reserve the potatoes and the liquid.
- 3 Render the salt pork with the butter. To render fat, melt it over low heat until the fat is liquid. Strain the liquid fat to remove any particles of pork that remain.
- 4 Add the onions and celery to the rendered fat and sweat until tender but not brown.
- 5 Add the flour and cook to make a blond roux.
- 6 Add the cold clam liquid to the hot roux for proper tempering, whisking away any lumps.
- 7 Simmer for 30 minutes, skimming as necessary.
- 8 Bring the milk and cream to a boil and add to the soup.
- 9 Add the clams and potatoes, and season to taste with salt, pepper, hot sauce, Worcestershire sauce, and thyme.
- 10 Garnish each serving with fresh parsley and julienned carrot as desired.

RECIPE NUTRITIONAL CONTENT

Calories	862
% calories from fat	18
Total fat	17 g
Saturated fat	9 g
Cholesterol	109 mg
Sodium	330 mg
Carbohydrates	136 g
Dietary fiber	12 g
Protein	41 g
Vitamin A	1090 IU
Vitamin C	154 mg
Calcium	251 mg
Iron	31 mg

Nutritional analysis provided by MasterCook®



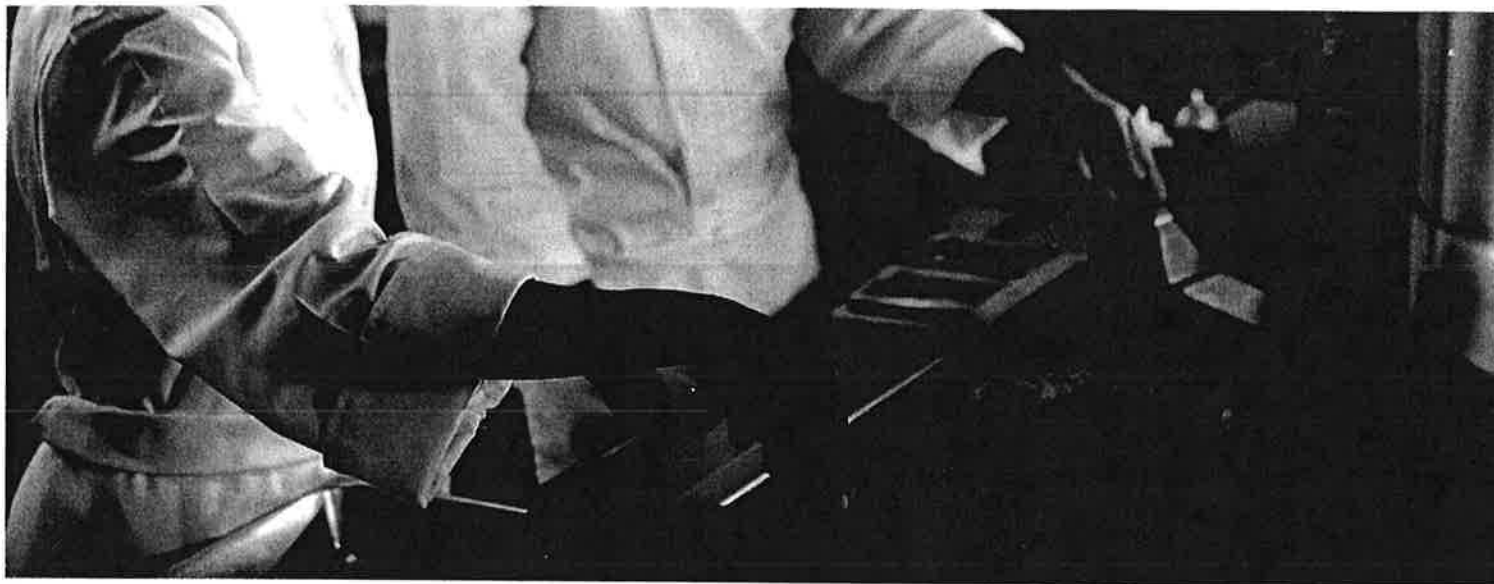
Study Questions

- 1 How is heat transferred to food through conduction, convection, and radiation?
- 2 What are the types of dry-heat cooking methods and which food items are best suited for them?
- 3 What is moist-heat cooking, and which food items are best suited for it?
- 4 What is combination-heat cooking, and which food items are best suited for it?
- 5 What are the *sous vide* and microwave cooking techniques?
- 6 How do you determine when food is done cooking?



Key Terms

Conduction	Deep-fry	Cuisson
Convection	Batter	Blanching
Radiation	Breading	Parcooking
Infrared heat	Float	Shocking
Broiling	Swimming method	Steaming
Grilling	Basket method	Combination cooking
Roasting	Double-basket method	Braising
Baking	Recovery time	Pot roasting
Griddling	Smoking point	Stewing
Sautéing	Simmering	<i>Sous vide</i>
Sear	Poaching	Carryover cooking
Stir-frying	Shallow poaching	
Pan-fry	Paupiettes	



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COOKING IS—SIMPLY PUT—THE PROCESS OF PREPARING FOOD FOR EATING. WHAT IS YOUR FAVORITE WAY TO PREPARE POTATOES, FISH, OR BEEF? THESE FOOD ITEMS ARE STAPLES IN MOST RESTAURANTS, AND THERE ARE A VARIETY OF COOKING METHODS, EACH PRODUCING DIFFERENT RESULTS. TO BE A GOOD CHEF, YOU MUST MASTER THE SKILL OF CHOOSING AN APPROPRIATE METHOD FOR EACH SPECIFIC FOOD.

The three general types of cooking methods are dry-heat cooking, moist-heat cooking, and combination cooking. Each method can be used to bring out the flavor and tenderness of specific dishes. In addition, these methods can reflect cultural and regional preferences.

HEAT TRANSFER

Heat is a type of energy. When two items of different temperatures have contact, energy, in the form of heat, transfers from the warmer item to the cooler until they both reach the same temperature. Heat travels in items in three ways: conduction, convection, and radiation.

Conduction is the transfer of heat from one item to another when the items come into direct contact with each other. Sometimes the heat is transferred to the air or from surface to surface. An example is when a cold plate begins to warm when covered with hot food. The heat of the food is conducted into the surface of the plate.

Convection is the transfer of heat caused by the movement of molecules (in the air, water, or fat) from a warmer area to a cooler one. When heating water, natural convection occurs. As water heats at the bottom of the pot, it travels upward. In the process, it transfers energy to the cooler water higher in the pot. This is a continuous process, with the hot water constantly rising and replacing the cooling water. It also occurs as mechanical convection in a convection oven when hot air is forced into the chamber.

Note: Chefs often think of convection cooking simply as moving air, which is in line with the common use of convection ovens. Remember, cooking methods might use two or more methods of heat transfer. So, for example, both conduction and convection heat are used in sautéing, pan-frying, braising, and stewing.

Radiation does not require physical contact between the heat source and the food being cooked. Instead, heat moves by way of microwave and infrared waves. **Infrared heat** is created when the heat from a source is absorbed by one material and then radiated out to the food. The flame in a broiler heats the tiles in the broiler, which radiate the heat to the food. Microwaves agitate the water molecules in the food, creating a form of friction that heats the water and thereby the food. Figure 18.1 illustrates the three types of heat transfer.



Figure 18.1: Heat transfer through conduction, convection, and radiation (from left to right).

It is important to remember that infrared waves affect the exterior of the food. Heat on the outside of the food then spreads inward through conduction. The result is that the outside of the food browns. Microwaves penetrate the item and cook it from the inside out, so browning does not take place. Microwaving is good for some recipes, but many food items can quickly become tough and rubbery or dried out if microwaved too long.



DID YOU KNOW

How to Add Moisture to Dry-Heat Cooking

Some food may lose moisture and become dry when cooked using dry heat. Any food prepared using dry heat must be naturally tender or prepared by adding moisture. There are several ways to add moisture. Here are a few:

Barding: Wrapping an item (usually a naturally lean piece of meat, such as pork tenderloin) with strips of fat before cooking to baste the meat, making it moister.

Larding: Inserting long, thin strips of fat into a large, naturally lean piece of meat with a special needle before cooking to baste the meat from the inside.

Marinating: Soaking an item in a combination of wet and dry ingredients to provide flavor and moisture.

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DRY-HEAT COOKING METHODS

In dry-heat cooking, food is cooked either by direct heat, like on a grill, or by indirect heat in a closed environment, like in an oven.

Dry-heat cooking methods without fat include the following:

- Broiling
- Grilling
- Roasting
- Baking

Another way to prepare food is to use dry-heat cooking methods with fat and oil. These methods include the following:

- Sautéing
- Pan-frying
- Stir-frying
- Deep-frying

Broiling

Broiling is a rapid cooking method that uses high heat from a source located above the food. Broiled food becomes browned on the top. Food items that can be broiled include tender cuts of meat, young poultry, fish, and some fruits and vegetables.

Grilling

Grilling is a very simple dry-heat method that is excellent for cooking smaller pieces of food. The food is cooked on a grill rack above the heat source. No liquid is added to the food during cooking. A cook might add small amounts of fat or oil during the cooking process simply to add flavor to the finished dish.

The result of grilling is food with a highly flavored outside and a moist inside. Grilled food has a smoky, slightly charred flavor because the fat melts and drips down into the heat source, along with some of the meat's juices. As the fat and juices burn, the smoke helps provide the charred flavor. The crosshatching look common to grilled food comes from the hot metal grill rack that the food sits on. Special woods, such as mesquite, hickory, or apple, can be used in the heat source to flavor the grilled food. Using a marinade can give the food a unique flavor, as well as making it moister.

ESSENTIAL SKILLS BROILING FOOD

- 1 Preheat the broiler.
- 2 Oil the broiler grid lightly or oil item lightly, if necessary.
- 3 Place the item on the broiler grid and move it into the broiler cavity. See Figure 18.2a.
- 4 Adjust the distance between the item and the heat as needed to control the rate of cooking. Place the food farther away and cook it a little longer to reach a higher internal temperature in the finished product, and move it closer for less time for a lower internal temperature in the finished product. To cook red meat to a rare level, use shorter cooking times with more heat; for well-done use longer cooking times with less heat. Both should have a well-browned, flavorful crust on the outside and a juicy interior when finished. See Figure 18.2b.
- 5 Turn the item over halfway through the cooking process to achieve even cooking on both sides of the product. See Figure 18.2c.



Figure 18.2a: Chicken placed on broiler grid.



Figure 18.2b: The finished chicken on the left is moved away from the heat.

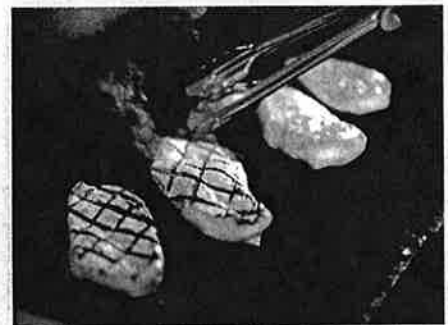


Figure 18.2c: Turn the chicken over halfway through the cooking process.

GRILLING FOOD

- 1 Thoroughly clean and preheat the grill.
- 2 Season the main item. Marinate or brush it with oil, if necessary, to prevent it from sticking to the grill. See Figure 18.3a.
- 3 Place the item on the grill.
- 4 Turn the item about 60 degrees to produce crosshatch marks. See Figure 18.3b.
- 5 Flip the item over to complete cooking to the desired doneness.
- 6 The finished product should be cooked to the desired doneness and should be golden brown with no burning or charring. Achieving this requires control of the heat source.



Figure 18.3a: Brush the item with oil to prevent it from sticking to the grill.



Figure 18.3b: Crosshatch marks on a steak.



VIDEO

How to Roast Meat

For a video on how to roast meat, please go to:
Textbooks.Restaurant.org/Videos.

Roasting

Roasting and **baking** are techniques that cook food by surrounding the items with hot, dry air in the oven. As the outer layers of the food become heated, the food's natural juices turn to steam and are absorbed into the food. These juices create a natural sauce. Food items that can be baked or roasted include fish, tender meats and poultry, and some fruits and vegetables.

You can bake food covered or uncovered, depending on the recipe. Food items that are baked uncovered, such as cookies and casseroles, develop a golden-brown color on top.

Roasting generally requires longer cooking times and often for the food to be raised off the pan by a rack or a bed of mirepoix. Roasting is most often used with large cuts of meat, whole birds (poultry), or fish. Adding liquid to the pan and/or basting during the roasting process will add flavor, moisture, and color to the food. Roasted food should have a golden-brown exterior and moist, tender interior.

Griddling

Griddling is cooking a food item on a hot, flat surface (known as a griddle) or in a relatively dry, heavy-bottomed fry pan or cast-iron skillet. The goal is to give the product an even, golden-brown finish and a slightly crisp exterior texture. When cooking meats on a high-heat griddle or in a cast-iron pan, the result is a high level of browning that gives the finished product a unique taste and texture not achieved with other cooking methods. In particular, steaks, chops, and chicken breasts are often cooked on a griddle or in a hot cast-iron skillet.

The griddle is also used to prepare one of the most popular breakfast menu items—griddle cakes (pancakes). To produce a quality product, clean the griddle well and make sure the temperature of the griddle surface is appropriate for the item being cooked.

Sautéing

The **sautéing** (saw-TAY-ing) method cooks food rapidly in a small amount of fat over relatively high heat. The fat adds to the flavor. Select cuts of meat, chicken, and fish or seafood are often prepared this way. The thinner and more delicate the piece of meat, the faster it will cook.

The literal translation of the French term sauté is “jump.” To sauté is to cook the food quickly to keep water and vitamin loss at a minimum, while gaining a high degree of color and flavor. When sautéing, the pan is heated first, and just enough fat is added to coat the bottom of the pan.

ESSENTIAL SKILLS ROASTING MEAT

- 1 Season, stuff, or marinate the main item. For meat other than a bird, sear, or quickly brown, its surface over direct heat.
- 2 Place the food on a rack in a roasting pan so that hot air can touch it on all sides. See Figure 18.4a.
- 3 Roast the item uncovered or covered, as the recipe calls for, until the desired temperature is reached. Allow for carryover cooking. Carryover cooking describes what happens to food after it has been removed from the oven. The roasted item holds a certain amount of heat that continues to cook the food.
- 4 Allow the roasted item to sit or rest before carving. Doing this allows the juices, which are being drawn out to the edges of the meat during roasting, to return to the center of the item and make it juicier.
- 5 Prepare pan gravy in the roasting pan.
- 6 Carve the roasted item (see Figure 18.4b), and serve it with the appropriate gravy or sauce.



Figure 18.4a: Chicken in a roasting pan.

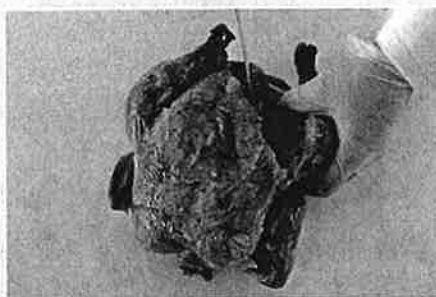


Figure 18.4b: Carve the chicken and serve with gravy or sauce.

SAUTÉING



Figure 18.5a: Use just enough fat to prevent sticking and to conduct heat and flavor.



Figure 18.5b: Allow food to brown, but move it often enough to prevent burning.

- 1 Perform thorough *mise en place*.
- 2 Cut food into appropriately sized pieces to allow maximum surface contact with the pan.
- 3 Select the correct pan, which should have the following characteristics:
 - a Large enough to allow food to spread well in pan (overloading the pan does not allow rapid cooking)
 - b Sides that slant outward to allow moisture vapors to easily escape
 - c Made of a metal that provides good heat conductivity
- 4 Use high to medium heat that can be easily controlled.
- 5 Use minimal fat or clarified butter; just enough to prevent sticking and help conduct heat and flavor. See Figure 18.5a.
- 6 Preheat the pan and fat to a high temperature (but not burning).
- 7 Place a thin layer of food in the hot pan (overloading the pan drops the temperature of the pan too rapidly and items will not brown).
- 8 Allow food to remain in contact with the surface long enough to brown, but move it often enough to prevent burning. See Figure 18.5b.

Stir-Frying

Stir-frying is a cooking method closely related to sautéing. Like sautéing, it is a quick-cooking, dry-heat method. Food is cooked over a very high heat, generally in a wok with little fat, and stirred quickly. In this Asian style of cooking, sauce is usually created in the same pan after the product has been sautéed.

The items to be stir-fried, usually meats and fresh vegetables, are cut into bite-sized pieces. Figure 18.6 is an example of stir-fry cooking.

The wok, a bowl-shaped pan, makes stir-frying easy. A wok is usually made of rolled steel and is used for nearly all Chinese cooking methods.



Figure 18.6: Stir-frying in a wok.

Pan-Frying

Cooking techniques that use more fat than those discussed so far include pan-frying and deep-frying. To **pan-fry** food, cook it in oil over less intense heat than that used for sautéing or stir-frying. Many recipes call for coating the food with batter, seasoned flour, or breading first. The hot oil seals the food's coated surface and locks the natural juices inside, instead of releasing them. The oil should be deep enough to come halfway up the side of the food being cooked. The object of pan-frying is to produce a flavorful exterior with a crisp, brown crust that helps retain the food's juices and flavor.

Food to be pan-fried, such as beef tenderloin cuts or fish fillets, is not cut into small pieces before cooking. So, pan-frying requires a lower heat so that the exterior of the food does not overcook while the interior reaches the proper temperature. Even after cooking, the food should be tender and moist. Pan-fried food may be held for only a short time before being served. The outside of the food should be evenly golden brown, with a firm crust.

ESSENTIAL SKILLS STEPS FOR STIR-FRYING

- 1 Perform thorough *mise en place*.
- 2 Heat a small amount of oil in a wok or large sauté pan. See Figure 18.7a.
- 3 Add the main item.
- 4 Stir-fry, keeping the food in constant motion with a wooden paddle or spoon. See Figure 18.7b.
- 5 Add additional ingredients, including seasonings, in the proper sequence (longest-cooking ingredient in first, shortest-cooking ingredient in last).
- 6 Add the liquid ingredients to the pan to create the sauce. Then add the thickener, as necessary.
- 7 Serve the food immediately.

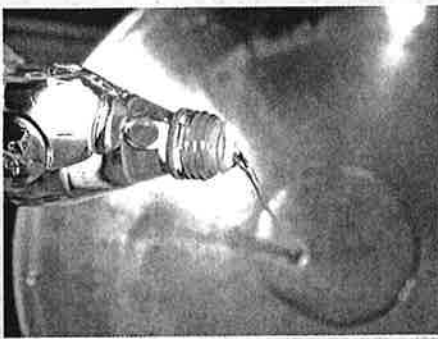


Figure 18.7a: Heat oil in a wok.



Figure 18.7b: Stir-frying food.

PAN-FRYING

- 1 Perform thorough *mise en place*.
- 2 Fill a fry pan half to two-thirds full with appropriate oil or fat.
- 3 Heat the cooking oil to about 350°F (177°C). (Oil that is too cool will result in excess oil absorption by the item, and oil that is too hot will burn the outside coating before the item is cooked.)
- 4 Add the food item (usually breaded, coated with seasoned flour, or batter-coated) to the pan in a single layer.
- 5 Pan-fry the food on the first side until it is well browned.
- 6 Turn the item and cook it to the desired doneness. (If the item is extremely thick, it can be finished in the oven to prevent burning the crust.) See Figure 18.8.
- 7 Drain the item on absorbent paper.
- 8 Season and serve it with the appropriate sauce and garnish.



Figure 18.8: Pan-frying chicken, turning to cook to desired doneness.



NUTRITION

Fat or No Fat?

Some cooking techniques are naturally more nutritious than others. Sautéing and grilling, for instance, use a minimal amount of fat, while steaming and poaching require none at all. Deep-frying and pan-frying, on the other hand, increase the fat content of the final product. However, fat can help carry flavor. For most people, it is possible to find a balance between the more and less healthy cooking methods. Practicing moderation is the key. Using herbs, spices, and other flavoring ingredients can help people lower their fat intake without sacrificing great taste.

Deep-Frying

To **deep-fry** food, bread or batter coat it, immerse (completely cover) it in hot fat, and fry it until it is done. The outside of the food item develops a crispy coating, while the inside stays moist and tender. The coating on the food item can be a standard breading or a batter. A **batter** combines dry and wet ingredients. It is a mixture of the primary dry ingredient (wheat flour, all-purpose flour, cornmeal, or rice flour), the liquid (beer, milk, wine, or water), and a binder (generally egg), which helps the mixture adhere to the product. Examples include the beer batter often used on fish, cornmeal batter used on corn dogs, and tempura batter (light batter) used on tempura vegetables and fish.

A **breading** has the same components as batter, but they are not blended together. A standard breading would be seasoned all-purpose flour and an egg and milk dip.

Food that can be deep-fried must be naturally tender and of a shape and size that allows it to cook quickly without becoming tough or dry. As much as 35 percent of the flavor of a deep-fried food comes from the oil in which it is fried. Always use a good-quality oil.

The **float** of the item—the point when the item rises to the surface of the oil and appears golden brown—indicates doneness. To ensure doneness, check a piece of the item being cooked for the proper internal temperature. The crust should be crisp and delicate, surrounding a moist, tender piece of meat, fish, poultry, or vegetable. There are three methods for deep-frying food:

- 1 In the **swimming method**, gently drop a breaded or batter-coated food in hot oil, where it falls to the bottom of the fryer and then swims to the surface. Once the food items reach the surface, turn them over, if necessary, so they brown on both sides.
- 2 In the **basket method**, bread the food, place it in a basket, lower the basket and food into the hot oil, and then lift it all out with the basket when the food is done.
- 3 Use the **double-basket method** for certain foods that need to be fully submerged in hot oil for a longer period of time in order to develop a crisp crust. In this method, place the food item in a basket, and then fit another basket on top of the first. The top basket keeps the food from floating to the surface of the oil.

Recovery time is the amount of time it takes oil to reheat to the correct cooking temperature once food is added. The more food items dropped into the oil at one time, the longer the recovery time. The **smoking point** is the temperature at which fats and oils begin to smoke, which means that the fat has begun to break down. Use oil for deep-frying that has a neutral flavor and color and a high smoking point, around 425°F (218°C).

ESSENTIAL SKILLS STANDARD BREADING PROCEDURE

Cooks often give fried food items a crisp coating through the standard breading procedure, which involves dredging the seasoned items in flour, egg wash, and finally a crunchy ingredient (such as breadcrumbs or grated cheese).

- 1 Prepare an assembly line. Working from left to right (if you are right-handed), organize your seasoned, uncoated items, a pan of flour, a pan of egg wash, a pan of breadcrumbs or other crunchy substance, and a parchment-lined pan for the coated product.
- 2 Keeping one hand for wet food and one hand for dry food, submerge each item first in flour, then in egg wash, and then in crumbs, removing any excess as you go. See Figure 18.9a. Make sure to coat the entire product. See Figure 18.9b.
- 3 Carefully arrange the coated items on the lined pan, separating layers with additional parchment paper as needed.
- 4 Store the finished product in the refrigerator or freezer until needed.
- 5 Discard all unused flour, egg wash, and crumbs to prevent cross-contamination.



Figure 18.9a: Standard breading procedure using one hand for dry ingredients and the other hand for wet ingredients.



Figure 18.9b: A properly breaded chicken breast.

DEEP-FRYING

- 1 Heat the fat or oil to the proper temperature, usually 325°F to 375°F (163°C to 191°C).
- 2 Add the food item (usually breaded, floured, or batter-coated) to the hot oil, using the appropriate method (swimming, basket, or double-basket). See Figure 18.10a.
- 3 Turn the item during frying, if necessary.
- 4 If the item is too thick to cook fully in the oil, then crisp the item on the outside and finish it in the oven.
- 5 Place fried food on a rack to drain or on absorbent, single-use paper towels.
- 6 Season and serve with the appropriate sauce and garnish. See Figure 18.10b.

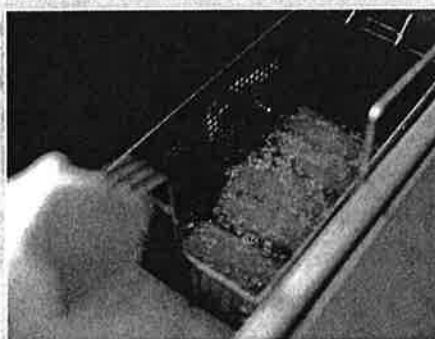


Figure 18.10a: Fish fillets submerged in hot oil using the basket method.



Figure 18.10b: Fried fish and French fries plated with sauce and garnish.

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MOIST-HEAT COOKING METHODS

Moist-heat cooking techniques produce food that is delicately flavored and moist, sometimes with a rich broth that can be served as a separate course or used as a sauce base. In fact, an entire dinner, complete with meat, fish, or poultry and vegetables, can be cooked in one pot. One example of this is the classic New England boiled dinner, consisting of corned beef, cabbage, carrots, and potatoes. Moist-heat cooking methods provide the opportunity to create nutritious, appealing dishes with a range of flavors and textures.

Moist-heat cooking methods include the following:

- Simmering
- Poaching and shallow poaching
- Blanching
- Steaming

Simmering

When **simmering**, you completely submerge food in a liquid that is at a constant, moderate temperature. Use well-flavored liquid and cuts of meat that are less tender than those recommended for dry-heat cooking methods. Simmering less-tender items cooks them at a slightly higher temperature than other moist-heat methods, 185°F to 205°F (85°C to 96°C). Simmering differs from boiling in that bubbles in a simmering liquid rise gently and just begin to break the surface. Do not allow the water to come to a full boil, because the boiling motion will cause meat to become stringy and rubbery.

Poaching

When **poaching**, cook food between 160°F and 180°F (71°C and 82°C). The surface of the poaching liquid should show some motion, but no air bubbles should break the surface. Use well-flavored liquid, and make sure the food is naturally tender. Cooks commonly poach chicken and seafood.

Cooks also often serve poached and simmered items with a flavorful sauce prepared from the poaching/simmering liquid to add zest to the dish's mild flavor. Be careful not to overcook poached and simmered food.

Shallow poaching cooks food using a combination of steam and a liquid bath. Shallow poaching is a last-minute cooking method most suitable for food that is cut into portion-sized or smaller pieces. The food is partially covered by a liquid containing an acid (usually wine or lemon juice), herbs, and spices in a covered pan. The steam cooks the items that are not directly covered by the poaching liquid. Food that has been shallow poached should be very tender and moist, with a fragile texture. Cooks commonly shallow poach paupiettes of sole and other white fishes. **Paupiettes** are long, thin slices of fish or meat that are rolled and stuffed with a filling. Shallow poaching transfers much of the flavor of the food from the food item to the liquid. To keep this lost flavor, use the liquid as a sauce base. This liquid is called a **cuisson**.

Blanching

Blanching is a variation of boiling. When **blanching**, partially cook food (also called **parcooking**), and then finish cooking it later. Cooks frequently use blanching to pre-prepare vegetables.

Blanching is a two-step process. Take green beans as an example. Once you know that the green beans are cooked, quickly remove them from the boiling water and plunge them into the ice bath to halt the cooking process. This technique is called **shocking**. Then give them a quick toss with seasoned butter in a hot pan at service. The result is a green bean cooked to perfection, with bright color, but prepared fresh and quickly at service. Many times, cooks blanch food that would otherwise take too long to cook thoroughly, before they deep-fry it.

ESSENTIAL SKILLS SHALLOW POACHING

- 1 Heat butter in a saucepan.
- 2 Add the seasonings to the pan, and level them out evenly.
- 3 Add the poaching liquid and the food item. See Figure 18.11a. The liquid should come partway up the food item.
- 4 Bring the liquid to a proper cooking temperature, usually 160°F–180°F (71°C–82°C).
- 5 Cover the saucepan with buttered parchment paper or a lid.
- 6 Finish the food in the saucepan, either over direct heat or in an oven.
- 7 Remove the food item from the poaching pan, and keep it warm and moist.
- 8 Reduce the poaching liquid, and prepare a sauce as desired.
- 9 Plate the food item (see Figure 18.11b) and serve it with the sauce and appropriate garnish.



Figure 18.11a: Adding salmon to poaching liquid.



Figure 18.11b: Plated poached salmon.

BLANCHING

- 1 Bring water to a boil, and then place items in the boiling water.
- 2 Boil the food for a short time, not cooking it all the way.
- 3 Remove the item from the pot, and then shock it by placing it in ice water. This immediately stops the cooking. See Figure 18.12.
- 4 Drain and dry the item, and then hold it until it is time for finishing.



Figure 18.12: Green beans being shocked in ice water after blanching.

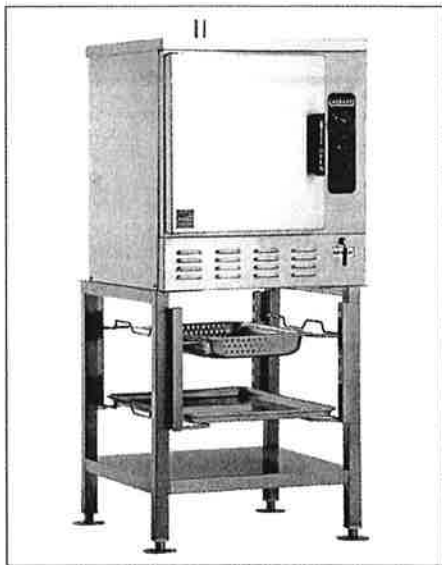


Figure 18.13: Commercial steam cabinet.



Figure 18.14: Professional combi-oven.

Steaming

Steaming is cooking food by surrounding it in steam in a confined space such as a steamer basket, steam cabinet, or combi-oven. Direct contact with the steam cooks the food. Care should be taken when removing items from a steamer, to avoid burns.

Steaming can take place with or without pressure. Placing food in a steamer basket on top of a pot of boiling water directly exposes the food to steam, which is 212°F (100°C). Placing food in a commercial steam cabinet (as shown in Figure 18.13) or combi-oven (as shown in Figure 18.14) also cooks food through direct contact with the steam, but the temperature is generally higher because the steam is under pressure. It cannot escape the cabinet or oven. Both methods cook in the same way, but steaming with pressure cooks faster than steaming without pressure. Take this into consideration when preparing a dish.

Enhance the flavor of food steamed over, but not directly in, boiling liquid by using broth instead of water as the liquid. Use naturally tender food, cut it into small pieces, and place it on a rack above the boiling liquid within a closed cooking pot. As the liquid comes to a boil, the steam created surrounds the food, heating it evenly and keeping it moist. Once all the ingredients are in the steamer and the cover is in place, do not remove the lid because the steam will escape, slowing down the cooking process.

When you cook with steam, food keeps more of its nutritional value and there are no added calories from fat or oil. Items cooked with steam have mild, delicate flavors and often have a fresher taste, color, and appearance. Cooking time is longer with steaming than with boiling or simmering. But you have to be careful that food is not overcooked. Steamed food should be moist and plump, not rubbery or chewy.



ESSENTIAL SKILLS STEAMING FOOD ON TOP OF THE RANGE



Figure 18.15: Green beans steamed to correct doneness.

- 1 Bring the liquid to a boil.
- 2 Add the food item to the pot in a single layer on a rack raised above the boiling liquid.
- 3 Cover the pot.
- 4 Steam the food to the correct doneness. See Figure 18.15.
- 5 Serve the food immediately with the appropriate sauce and garnish.

KNOWLEDGE CHECK

- 1 Describe the differences among conduction, convection, and radiation.
- 2 How do the methods of dry-heat cooking and moist-heat cooking differ?

COMBINATION-COOKING METHODS

Sometimes the best method for preparing a certain food is a combination of both dry-heat and moist-heat cooking methods. Such cooking is called **combination cooking**. For example, braising and stewing use both dry and moist heat to cook food that is less tender. Combination-cooking techniques are useful because they can transform the less tender and less expensive main ingredients into delicious and tender finished products.

Combination-cooking methods include the following:

- **Braising:** Primarily used for larger cuts of meat
- **Stewing:** Used for smaller pieces of food

Braising

In **braising**, first sear the food item in hot oil, and then partially cover it in enough liquid to come halfway up the food item. Then cover the pot or pan tightly, and finish the food slowly in the oven or on the stove top until it is tender. A bed of seasonings adds moisture and flavor to the food. If the recipe calls for them, add vegetables to braised meat or poultry near the end of the cooking time. As the meat cooks, its flavor is released into the cooking liquid, which becomes the accompanying sauce. The key to quality braising is long, slow cooking. In an item such as coq au vin (chicken cooked in red wine), the meat should slide from the bone in the final product, and the meat itself should fall apart with a gentle touch.

Slow, gentle braising causes the tougher connective tissue of lean meat to become fork tender and well done. More tender food requires less cooking fluid and can be heated at lower temperatures for a shorter time. Few nutrients are lost with braising. Braised food that is finished in the oven is less likely to be scorched than food that is finished on the stove top. Braised food should be extremely tender, but should not fall into shreds.

An example of a braising technique is **pot roasting**, which is a common American term for braising, and the name of a traditional dish (pot roast).

Stewing

Stewing techniques are similar to braising, but the pre-preparation is a little different. First, you cut the main food item into bite-sized pieces and either blanch or sear them. As with braising, you cook the food in oil first, and then add liquid. Stewing requires more liquid than braising. Cover the food completely while it is simmering.

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DRY-HEAT COOKING METHODS

MOIST-HEAT COOKING METHODS

**COMBINATION-COOKING
METHODS**

OTHER COOKING METHODS

DETERMINING DONENESS



VIDEO

How to Braise

For a video on how to braise, please go to:
Textbooks.Restaurant.org/Videos.



ESSENTIAL SKILLS BRAISING

- 1 Preheat both the pan and the oil.
- 2 Sear meat on all sides. See Figure 18.16a.
- 3 Add mirepoix and tomato. Be sure to *pincé* (peen-say) the mixture. (*Pincé* is a French culinary term for caramelizing sugars in tomato paste to a rusty brown color to add flavor.)
- 4 Stir a small amount of liquid into the mirepoix to deglaze the pan.
- 5 Add the appropriate amount of liquid.
- 6 Cover the pot and finish the braise.
- 7 Check to see if the braised food items are done. See Figure 18.16b.
- 8 Place the pot over the direct heat, and continue to reduce the sauce to develop its flavor, body, and consistency. See Figure 18.16c.



Figure 18.16a: Searing meat before braising.

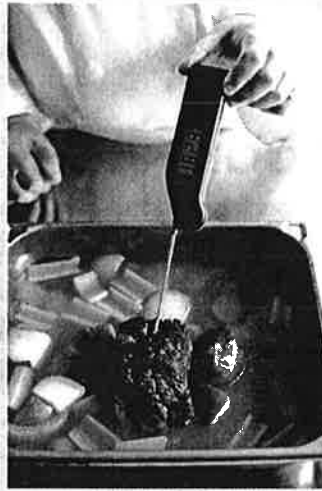


Figure 18.16b: Braised meat being tested for doneness.



Figure 18.16c: Reducing the sauce with braised meat.

STEWING

- 1 Cut the food to be stewed into uniform-sized pieces. Dredge pieces in flour (optional).
- 2 Heat fat in a small rondo. Brown pieces on all sides, until golden brown. See Figure 18.17a.
- 3 Add other ingredients and sauté.
- 4 Add roux or thickening agent.
- 5 Gradually add liquid, stirring to prevent lumps. Liquid should cover food items completely.
- 6 Bring the stew to temperature. Place lid on container and stew on stove top until pieces are tender and cooked through.
- 7 Remove food items and hold them in a warming drawer or on a warm stove top. See Figure 18.17b.
- 8 Return sauce to a simmer and thicken as desired.
- 9 Return held items to the stew, then heat through and serve. See Figure 18.17c.



Figure 18.17a: Browning meat for stewing.



Figure 18.17b: Food items held on a warm stove top.



Figure 18.17c: Stew being heated through before service.

OTHER COOKING METHODS

Two other cooking methods are *sous vide* and microwave cooking. *Sous vide* involves sealing the food in sturdy plastic bags to keep in the juices and aroma that otherwise would be lost in the process. Microwave cooking involves heating food by passing microwave radiation through it.

Sous Vide Cooking

Sous vide, as shown in Figure 18.18, is a method in which food is cooked for a long time, sometimes well over 24 hours. *Sous vide* is French for “under vacuum.” Rather than placing food in a slow cooker, the *sous vide* method places food in airtight plastic bags in water that is hot but well below boiling point. This cooks the food using precisely controlled heating, at the temperature at which it should be served.

The water might feel about as hot as a hot bath in a bathtub, but feeling is not enough. For safety and quality reasons, *sous vide* water-bath temperatures are measured in tenths of a degree. The exact range is narrow and precise.

The aroma of food cooking actually means that precious molecules of flavor are escaping from the food. *Sous vide* locks all of those flavor molecules in with the vacuum seal. *Sous vide* food items do not lose flavor. In fact, in some cases, the flavors actually intensify and improve.

Microwave Cooking

Many food items can be baked or roasted in a microwave oven. However, microwave ovens do not give the same results as convection or conventional ovens because they cook food with waves of energy or radiation, rather than with heat.

Microwave cooking alters protein, causing it to toughen. This can be a problem in breads, eggs, and meats. Cooks can use special techniques with specific microwave recipes to maintain the quality of the finished recipe. Because there is no external heat source, there is no browning. Food cooks because microwave radiation increases molecular activity inside the food. It begins at the center, so the surface does not turn a crispy golden brown while the inside slowly cooks, as in a conventional oven.

Glass and ceramic cookware and plastics that are labeled microwave safe can be used in the microwave oven. Never use brown grocery bags, newspaper, metal, or foil in the microwave oven. Figure 18.19 shows a microwave oven.

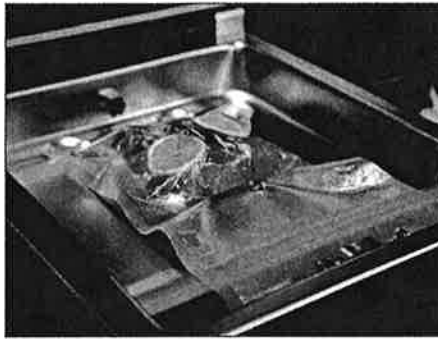


Figure 18.18: Fish cooked with *sous vide* method.

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INDUSTRY

To Microwave or Not to Microwave

Microwave ovens have been the traditional go-to appliance for quick cooking and reheating. But they do have their shortcomings, such as the possible toughness and dryness of microwaved leftovers. Infrared radiation cooking, using infrared burners and grills, offers several advantages over the traditional microwave, including the ability to rapidly reheat food without causing it to dry out or radically change the texture. So, this will sear meat and create the needed texture and flavor far faster than regular cooking.



Figure 18.19: Broccoli cooked in a microwave oven.

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SAFETY

Cooking Guidelines

- Specify cooking time and the required minimum internal cooking temperature in all recipes.
- Use a thermometer with a probe that is the right size for the food.
- Avoid overloading ovens, fryers, and other cooking equipment.
- Give the cooking equipment time for temperature to recover between batches.
- Use utensils or gloves to handle food after cooking.
- Taste food correctly to avoid cross-contamination.

DETERMINING DONENESS

There are two important qualities that are used to determine a product's doneness:

- Has it achieved the desired texture?
- Has it reached the minimum internal temperature it needs to be safe?

For products that are made in large quantities, many restaurant and foodservice operations will test the products to determine the standardized cooking temperature and the length of cooking time that will produce the same doneness every time. This type of control depends on cooking the same size or quantity of product every time.

It is important to check the temperature of the item both in the tests that lead to standardized cooking times and temperatures and in the determination of doneness in smaller quantities and individual items, such as a steak or chicken breast. Never assume that an item is at the right temperature because it has finished its standardized cooking time. Table 18.1 shows minimum cooking temperatures for most food items. In addition, carryover cooking needs to be taken into consideration when gauging cooking times. **Carryover cooking** refers to the process of continued cooking after a food item has been removed from its heat source.

TABLE 18.1: COOKING REQUIREMENTS FOR SPECIFIC TYPES OF FOOD

MINIMUM INTERNAL TEMPERATURE	TYPE OF FOOD
165°F (74°C) for 15 seconds	Poultry—including whole or ground chicken, turkey, or duck Stuffing made with TCS ingredients Stuffed meat, seafood, poultry, or pasta Dishes that include previously cooked TCS ingredients (raw ingredients should be cooked to their correct minimum internal temperatures)
155°F (68°C) for 15 seconds	Ground meat—including beef, pork, and other meat Injected meat—including brined ham and flavor-injected roasts Mechanically tenderized meat Ground seafood—including chopped or minced seafood Shell eggs that will be hot held for service
145°F (63°C) for 15 seconds	Seafood—including fish, shellfish, and crustaceans Steaks/chops of pork, beef, veal, and lamb Shell eggs that will be served immediately
145°F (63°C) for 4 minutes	Roasts of pork, beef, veal, and lamb
135°F (57°C)	Commercially processed, ready-to-eat food that will be hot held for service (e.g., cheese sticks, deep-fried vegetables)
135°F (57°C)	Fruit, vegetables, grains (e.g., rice, pasta), and legumes (e.g., beans, refried beans) that will be hot held for service

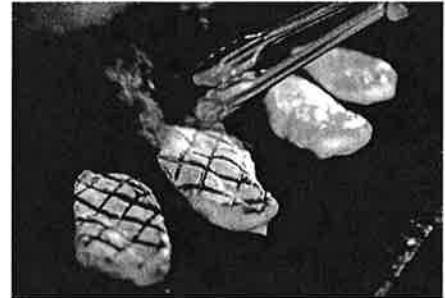
KNOWLEDGE CHECK

- 1 What is combination cooking?
- 2 Why are braising and stewing called combination-cooking methods?
- 3 What is *sous vide* cooking?

SUMMARY

In this chapter, you learned the following:

- Heat is transferred to food in three ways: conduction, convection, and radiation.
- Dry-heat cooking methods include broiling, grilling, and roasting.
- Dry-heat cooking methods with fat and oil include sautéing, pan-frying, stir-frying, and deep-frying.
- Moist-heat cooking produces food that is delicately flavored and moist. Serve it as a separate course or use it as a sauce base. Simmering, poaching, blanching, and steaming are techniques used in moist-heat cooking.
- Combination cooking uses techniques from both dry-heat and moist-heat cooking. Braising and stewing are types of combination cooking.
- *Sous vide* is a cooking method in which food is cooked for a long time in sealed bags, sometimes 24 hours.
- Microwaves cook items using microwave radiation, agitating water molecules from the inside out, so browning does not occur.
- To determine when food is done cooking, identify if the product has its desired texture and required minimum internal temperature.



CASE STUDY FOLLOW-UP

Refer back to the unit-opening case study, and answer these questions.

- Question 1:** Chef Kate needs to determine if her veal is done cooking. How will Chef Kate determine if the veal is cooked?
- Question 2:** Chef Kate is teaching a new sous chef how heat is transferred to food. What are the three ways heat is transferred, and what does each involve?

CHAPTER ACTIVITIES

Language Arts: Cooking Methods

Describe the differences between roasting and baking. How are they the same? Why/when would you use one method rather than the other? Write a three-paragraph essay explaining your position.

Science: Maillard Reaction

Think about a steaming piece of chicken in your favorite soup recipe. Now think about a piece of grilled chicken with perfect crosshatching. Both are delicious, but the flavors are very different. Why?

Research the Maillard reaction, and then cook two chicken breasts, one by a dry-heat method and one by a moist-heat method. What have you learned? Write three paragraphs on your findings.

Math: Cooking the Beef

You have to roast enough meat to serve 50 4-ounce fillets at dinner service. What size piece of meat do you need to purchase and how long do you need to roast it? See roasting times below (taken from USDA website).

RED MEAT, TYPE	OVEN °F (°C)	TIMING	MINIMUM INTERNAL TEMPERATURE AND REST TIME
Beef, tenderloin roast, whole; 4 to 6 lb	425 (218)	45 to 60 minutes total	145°F (63°C) and allow to rest for at least 3 minutes
Beef, tenderloin roast, half; 2 to 3 lb	425 (218)	35 to 45 minutes total	

Collaboration: Cooking in Teams

Several classic dishes are made with combination-cooking techniques. Combination-cooking techniques are useful because they can transform less tender and less expensive main ingredients into delicious and tender finished products. Divide into two teams. Using the same piece of protein, each group should select a recipe using combination-cooking techniques. Compare the results. Which result tasted better? Which looked better? What made the difference?

Career Readiness: Pick a Protein

Work with two other students to select a protein (not one used in the Critical Thinking activity below), and identify three appropriate techniques for cooking it. For each technique, develop a recipe for the protein.

Critical Thinking: Cooking Methods

Which of the cooking methods discussed in the text are appropriate or inappropriate ways to cook the following items and why?

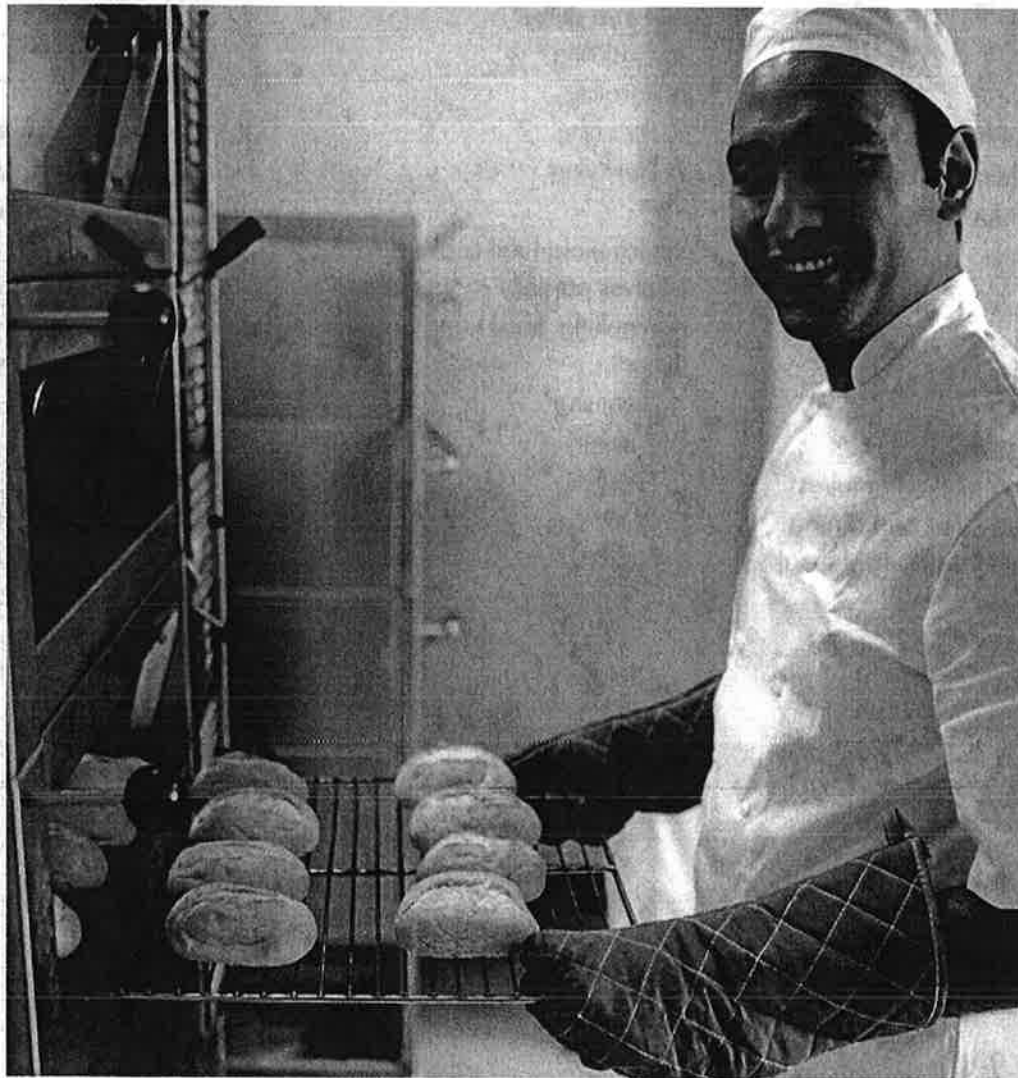
- Cod fillet
- Chicken thigh
- T-bone steak
- Chunks of lamb shoulder
- Duck breast

EXAM PREP QUESTIONS

- ① The cooking method that cooks food quickly, often uncovered, in a very small amount of fat over high heat is
 - A stewing.
 - B sautéing.
 - C pan-frying.
 - D simmering.
- ② Poaching requires a cooking temperature of
 - A 200°F–210°F (93°C–99°C).
 - B 160°F–180°F (71°C–82°C).
 - C 250°F–260°F (121°C–127°C).
 - D 300°F–310°F (149°C–154°C).
- ③ The transfer of heat from one item to another when the items come into direct contact with each other is known as
 - A radiation.
 - B *sous vide*.
 - C convection.
 - D conduction.
- ④ Which cooking method requires longer cooking times and is most often used with large cuts of meat or poultry?
 - A Grilling
 - B Roasting
 - C Poaching
 - D Pan-frying
- ⑤ Estouffade is a braised dish usually made with red meat and vegetables. Which cooking method does estouffade rely on?
 - A Dry-heat cooking
 - B *Sous vide*
 - C Moist-heat cooking
 - D Combination cooking
- ⑥ Which dry-heat cooking method cooks a food item on a hot, flat surface or in a relatively dry, heavy-bottomed pan or cast-iron skillet?
 - A Griddling
 - B Roasting
 - C Poaching
 - D Pan-frying
- ⑦ Which moist-heat cooking method involves partially cooking, or parcooking, food using boiling water?
 - A Steaming
 - B Simmering
 - C Poaching
 - D Blanching
- ⑧ What types of materials are safe for microwave use?
 - A Steel pans
 - B Aluminum pans or foil
 - C Ceramic pans
 - D Brown paper bags
- ⑨ Which moist-heat cooking method completely submerges food in a liquid that is at a constant moderate temperature?
 - A Simmering
 - B Poaching
 - C Blanching
 - D Steaming
- ⑩ The process of continued cooking after a food item has been removed from its heat source is known as
 - A cooking time.
 - B finish cooking.
 - C carryover cooking.
 - D blanching.

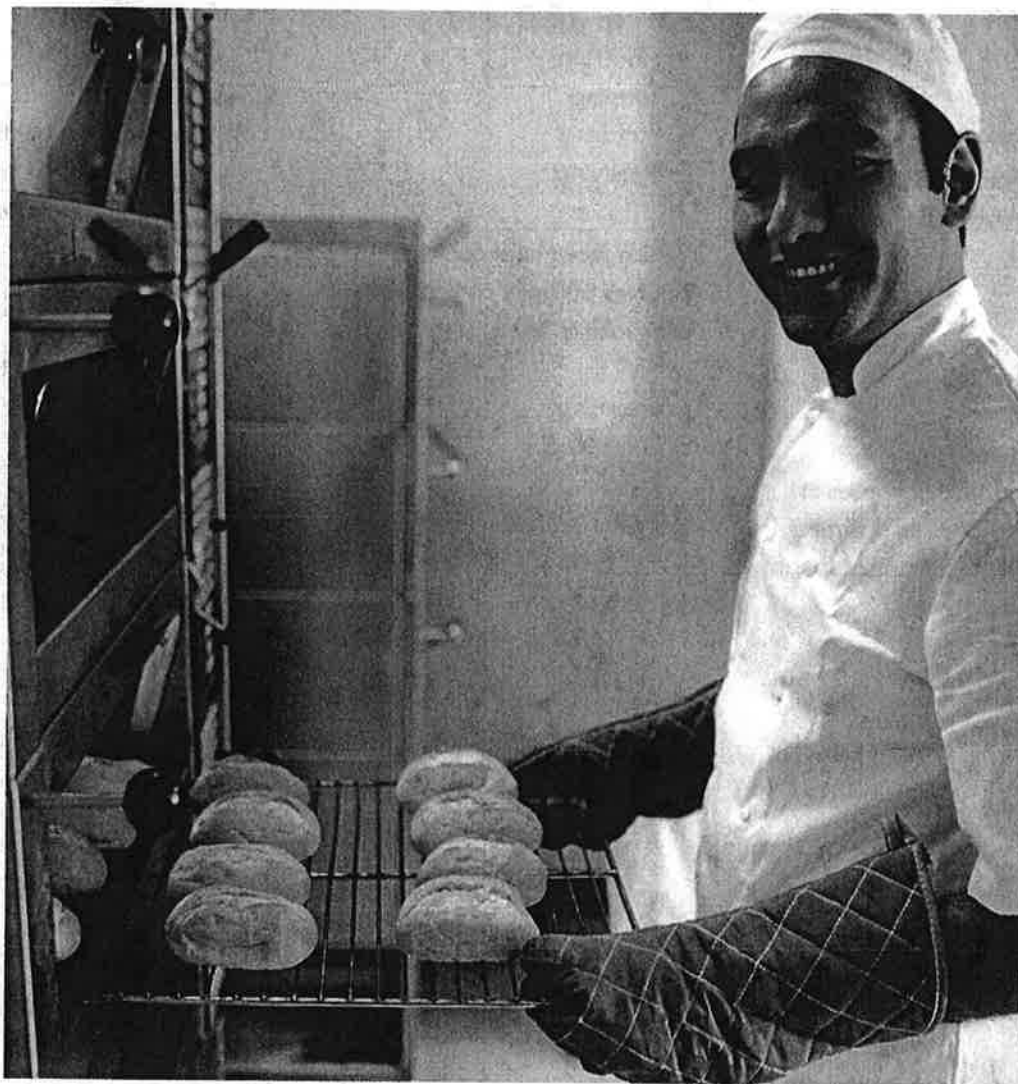
CHAPTER 19

INTRODUCTION TO BAKING



CHAPTER 19

INTRODUCTION TO BAKING



EXAM PREP QUESTIONS

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Study Questions

- 1 What are the main ingredients used in baking?
- 2 How do you calculate the ingredient weights in a recipe using baker's percentages?
- 3 How do you convert to a new recipe yield using baker's percentages?
- 4 List and identify the seven types of cookies.
- 5 What are quick breads, and how are they prepared?



Key Terms

Strengtheners

Gluten

Types of flour (see terms
in Table 19.1)

Fats/shortenings

Sweeteners

Caramelization

Leaveners (see terms
in Table 19.2)

Thickeners

Flavorings

Extracts

Liquids

Additives

Creaming method

Foaming method

Ferments

Formulas

Baker's percentages

Cookie

Types of cookies
(see terms in Table 19.4)

Quick breads

Muffin method

Biscuit method



INTRODUCTION

BAKER'S INGREDIENTS

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INTRODUCTION

HAVE YOU EVER HEARD THE SAYING “LET’S SAVE THE BEST FOR LAST” AT SOME POINT IN YOUR LIFE? MOST DINERS FEEL THAT WAY WHEN IT COMES TO DESSERT. A PERFECTLY MOIST, RICH SLICE OF CHOCOLATE CAKE OR A WARM PIECE OF PIE WITH A LIGHT, FLAKY CRUST ARE THE PERFECT ENDING TO A MEAL. BUT NO SMALL AMOUNT OF TIME, EFFORT, AND PRECISION GOES INTO CREATING SUCH DELICIOUS DESSERTS. UNDERSTANDING THE BASICS OF BAKING WILL HELP YOU TO CREATE THESE TASTY TREATS.

BAKER’S INGREDIENTS

Nearly all bakery products are prepared using a common list of ingredients that fall into eight categories:

- **Strengtheners**, such as flour and eggs
- **Fats/shortenings**, such as butter and oils
- **Sweeteners**, such as sugars and syrups
- **Chemical, organic, and physical leaveners**, such as baking powder, baking soda, yeast, and steam
- **Thickeners**, such as cornstarch, flour, and eggs
- **Flavorings**, such as extracts and spices
- **Liquids**, such as water, milk, cream, eggs, honey, molasses, and butter
- **Additives**, such as food coloring

In baking, **strengtheners** provide stability and ensure that the baked item does not collapse once it is removed from the oven. Flour is a main strengthener used in baking. There are six popular types of wheat flour, as described in Table 19.1. To check the gluten content of a particular flour, look at the nutrition label: the higher the protein content, the higher the gluten content. **Gluten** (gloo-ten) is a protein found in flour. The more bakers mix, work, and knead yeast doughs, the more the gluten becomes elastic and stretchy. When baked, it helps provide the firm structure and light, even texture needed in bread production.









NUTRITION

Trans Fat

Trans fat is an unhealthy type of fat. Artificial trans fat is formed by adding hydrogen to vegetable oil. At room temperature, the oil becomes solid. Common sources of trans fat used in baking include vegetable shortening and margarine. Trans fat is used because it is inexpensive, has a longer shelf life, and provides food with texture.

However, trans fat can raise your bad cholesterol (LDL) and lower your good cholesterol (HDL). Higher levels of LDL cholesterol are associated with increased risk of heart disease.

TABLE 19.1: TYPES OF WHEAT FLOUR

	TYPE OF FLOUR	DESCRIPTION
	All-purpose flour	This flour falls between pastry and bread flour. It is good to use in cookies, biscuits, and general production work. Gluten content is 10%–12%.
	Bread flour	As its name suggests, this is a strong flour that is used for making breads, hard rolls, and any product that needs high gluten for a strong texture. Gluten content is 12.5%–13.5%.
	Cake flour	This flour has a low gluten content, a very soft, smooth texture, and a pure white color. Use cake flour for cakes and other delicate baked goods. Gluten content is 7%–9%.
	Durum flour	This is a hard wheat flour used to make breads; its gluten content is a little higher than that of typical bread flour. Gluten content is about 13.5%–14%.
	Pastry flour	This flour is not as strong as bread flour and not as delicate as cake flour. Use pastry flour for baking cookies, pie pastry, and some sweet yeast doughs, biscuits, and muffins. It feels like cake flour, but has the creamy color of bread flour. Gluten content is 9%–10%.
	Semolina flour	This is a type of durum flour, but it is more coarsely ground than the flour used to make most breads. It has a fine texture with a high gluten content and is primarily used to make pastas and certain Italian pastries. Gluten content is 13.5% or more.

Fats/Shortenings make baked goods moist, add flavor, and keep baked items fresh longer. Any fat, such as oil or butter, acts as a shortening in baking. The more thoroughly mixed, the more the fat will affect the item's overall texture. Fats that are rubbed, cut, or rolled into doughs tend to separate the dough into layers, creating a flaky texture. When the fat is thoroughly creamed together with the other ingredients, the resulting texture of the baked item will be smooth, soft, and more cake-like.



NUTRITION

Artificial Sweeteners and Baking

If you decide to use artificial sweeteners when baking or cooking, there are a few important things to know:

- Baked products may be lighter in color because real sugar has a caramelizing/browning effect and artificial sweeteners do not.
- Volume may be lower in cakes, muffins, and quick breads because artificial sweeteners do not have the same bulking ability as sugar.
- Texture may be altered in some baked products, especially cookies.
- Taste may be slightly altered if you are sensitive to the sweetener's aftertaste.
- Sugar naturally holds in moisture and increases keeping quality, so baked products with the sugar removed will not keep as long.

Sweeteners include refined sugars, sugar syrups, molasses, brown sugar, corn syrup, honey, and malt syrup (usually used in yeast breads). Sweeteners add flavor and color to baked goods. They also help the shortening blend with other ingredients and make the product soft and tender. When a product containing refined sugars is baked, the heat causes the sugar to turn a light brown color.

This process is called **caramelization** and occurs whenever sugar is used as an ingredient in baked items. Artificial sweeteners and sugar substitutes used in baking do not create caramelization, so they will produce baked goods that are lighter in color.

Leaveners are necessary in baking because they allow the dough or batter to rise. It is important to measure all leavening agents very carefully. Even small changes can produce major defects in baked products. Leaveners fall into three categories: chemical, organic, and physical. Table 19.2 describes each leavener.

Thickeners include gelatin, flour, arrowroot (a powdered starch made from a tropical root), cornstarch, and eggs. Thickeners, combined with the stirring process, determine the consistency of the finished product. For example, custard cooked over direct heat and stirred constantly will result in a sauce. The same custard recipe can be cooked (without stirring) by placing it in a bain-marie and then gently cooking it by surrounding the pan with simmering water. Then, it will set into a firm custard that can be sliced.



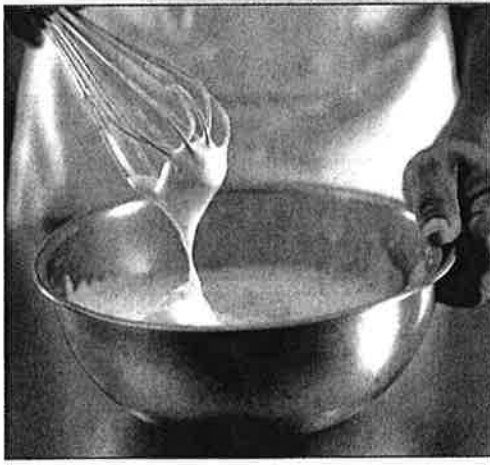

Flavorings, such as cocoa, spices, salt, nuts, and extracts, affect a baked item's taste and color. Cocoa is the basis of all chocolate desserts and is absolutely vital to any dessert menu. Spices used most often in baking are cinnamon, nutmeg, mace, cloves, ginger, caraway, cardamom, allspice, anise, and poppy seed.

Salt plays an important role in baking. In addition to enhancing flavor, it improves the texture of breads and controls how yeast ferments in bread doughs. **Extracts** are flavorful oils (some are alcohol based) taken from such food items as vanilla bean, lemon, and almond. A few drops of extract will greatly enhance the flavor of baked goods. Flavorings need to be measured accurately so that the flavor of the spice or extract will not overwhelm the flavor of the finished baked product.

Liquids are one of the most important elements used in baking. The liquid used in baking can be water, milk, cream, molasses, honey, vegetable oils, or butter. Liquid is used in baking to provide moisture to the product and to allow the gluten to properly develop. Water is the most basic and common form of liquid used in baking. Often, milk products such as whole milk, buttermilk, cream, or dried milk are used. Milk provides the baked product with flavor, nutritional value, and texture. Honey, molasses, eggs, oil, and butter also act as liquids in baking by contributing moisture to the baked item, as well as a unique taste and texture.

The final, eighth category of elements used in baking is additives. **Additives** are substances added to food to enhance its taste and/or appearance. Additives, such as food coloring or xanthan gum, are often used in baking to enhance the product's color, texture, and taste, as well as to extend its shelf life.

TABLE 19.2: TYPES OF LEAVENERS

	LEAVENER	DESCRIPTION
	Baking powder	Chemical leaveners react with other ingredients to produce carbon dioxide gas, which helps batter to rise as it is heated. Baking powder is a very versatile chemical leavener. It is a mixture of baking soda and an acid with an inactive material, like starch. Because there is acid in the baking powder, the pastry chef does not need to add any acid to the batter for leavening to take place. Leavening occurs when liquid and heat are added.
	Baking soda	Baking soda (sodium bicarbonate) is a chemical leavener that releases carbon dioxide gas when mixed with a liquid and an acid. For example, baking soda will leaven a batter when mixed with an acid such as lemon juice, yogurt, or buttermilk. Other, less reliable reactants are honey, molasses, cocoa, and chocolate. Because heat is not necessary for the leavening process to occur, bake the item right away to prevent the gases from escaping and leavening the item too soon.
	Physical leaveners	Introducing air into the batter is another way to leaven a baked item. The air expands during baking and leavens the product. Pastry chefs use two methods to introduce air into batter: creaming and foaming. In the creaming method , beat the fat and sugar together. Use the creaming method most often in cake and cookie making. In the foaming method , beat eggs, with or without sugar. Use whole-egg foams in sponge cakes, and egg-white foams in angel food cakes, meringues, and soufflés. Steam plays a role in all baked goods. When water is converted to steam, the volume increases. Steam is used as a leavener in cream puffs and pie crusts.
	Yeast	An organic leavener, yeast is a microscopic fungus used often in baking. It comes in two forms: fresh or dry. When yeast is mixed with carbohydrates (such as sugar and flour) and liquid it ferments , or produces carbon dioxide gas and alcohol. Yeast works in much the same way that the chemical leaveners do, by releasing carbon dioxide gas, causing the bread dough to rise.

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- BAKER'S INGREDIENTS
- BAKER'S PERCENTAGES**
- COOKIES
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BAKER’S PERCENTAGES

Standardized recipes for bakery products are called **formulas**, and they are set up a bit differently than those for other food items. Proportions for each ingredient are given in the form of percentages. A percentage indicates a part of a whole. For example, a pizza with four pieces is divided into quarters. Each slice is 25 percent of the pizza. Two slices, half the pizza, is 50 percent, and three slices is 75 percent. The whole pizza is 100 percent.

In baking, flour always has a proportion of 100 percent, and the percentages of all other ingredients are calculated in relation to the flour. These are known as **baker’s percentages**. In this way, pastry chefs can convert recipes to give larger or smaller yields. They simply change ingredient amounts while keeping proportions and percentages the same. The formula for baker’s percentages is expressed like this:

$$(\text{Weight of ingredient} \div \text{Weight of flour}) \times 100 \text{ Percent} = \text{Percent of ingredient}$$

Table 19.3 shows a formula for soft rolls using baker’s percentages. Although the example in Table 19.3 does not include directions, usually the formula also shows the various directions given in a bakeshop recipe, such as mixing, yeast fermentation time, scaling, and baking temperature.

TABLE 19.3: FORMULA FOR SOFT YEAST DINNER ROLLS USING BAKER’S PERCENTAGES	
INGREDIENT	BAKER’S PERCENTAGES
Active dry yeast, 2 ounces	4.5%
Water (temperature controlled), 1 pound 8 ounces	54.5%
Bread flour, 2 pounds 12 ounces	100%
Salt, 1 ounce	2.3%
Granulated sugar, 4 ounces	9%
Nonfat dry milk powder, 2 ounces	4.5%
Shortening, 2 ounces	4.5%
Unsalted butter, softened, 2 ounces	4.5%
Eggs, 3.2 ounces (2 eggs)	7.3%
Egg wash, as needed	
Total dough weight: 5 pounds 4 ounces	

Converting Baking Yields

Not every baking recipe will produce enough product for every situation.

In baking, it is necessary to convert recipes to yield different amounts.

Understanding baker's percentages makes it easy to calculate the weight of any ingredient or to convert a formula to a new yield. A yield is how much of something is produced.

To calculate the weight of a particular ingredient, change the ingredient percentage to decimal form. Then, multiply the weight of the flour by this decimal to get the weight of the ingredient. For example, if a formula calls for 20 percent sugar and the pastry chef is using 10 pounds of flour, how much sugar does the chef need by weight?

$$20 \text{ percent} = 0.20$$

$$10 \text{ pounds flour} \times 0.20 = 2 \text{ pounds sugar}$$

Use the weight of the flour and remaining ingredient percentages to calculate the weights of the other ingredients. Check recipes carefully to see whether ingredients are to be scaled (or measured) before or after sifting. Sifting is very important in baking. Dry ingredients must be sifted before they are mixed into the dough or batter.

ESSENTIAL SKILLS SIFTING: WHY IT MATTERS

If you have ever tasted soap in your mouth, you can appreciate the need to sift dry ingredients.

It used to be necessary to sift flour to remove little twigs or stones or other items that might have infiltrated it, but most flour is free of debris today. So, why does sifting matter, and what does this have to do with soap?

Soap is alkaline, giving it a bitter taste. Baking soda is also alkaline, and tastes like soap. Baking soda tends to form small clumps, especially in humid conditions. Sifting the dry ingredients together forces the clumps of soda to break apart as they pass through the sieve. See Figure 19.1. This prevents little clumps from remaining whole in the final product. One little clump of soda in a muffin will taste like a mouthful of soap—probably not the flavor you want.

In addition, sifting adds air to the flour, making it lighter and fluffier. This is important for many recipes, especially cakes and light baked goods.



Figure 19.1: Sifting dry ingredients.

KNOWLEDGE CHECK

- 1 What is the most basic strengthener?
- 2 Name two chemical leaveners used in baking.
- 3 Why is sifting an important part of baking?

INTRODUCTION

BAKER'S INGREDIENTS

BAKER'S PERCENTAGES

COOKIES

QUICK BREADS



DID YOU KNOW

Toll House Cookie

The chocolate chip cookie was invented by Ruth Graves Wakefield. Wakefield owned the Toll House Inn in Whitman, Massachusetts. Toll House chocolate chip cookies are named after the inn.

COOKIES

A **cookie** is a sweet baked food made from flour and sugar that is usually small, flat, and round. Many pastry chefs mix the fat and sugar together to achieve a creamy texture. This “creaming” of the dough determines how far a cookie will spread in the pan during baking. Many cookies require a lot of shaping by hand during preparation. Consistency in shape and size will allow the cookies to bake evenly and look the same when they are finished baking.

Cookies should be decorative and appetizing. Due to their high sugar content, cookies are best when they are baked in convection ovens. In a convection oven, the air is pulled in by the fan, and then gently pushed out through the holes. This creates a gentler environment for baked goods that tend to burn quickly because of their high sugar content. Table 19.4 describes the seven different types of cookies based on how they are made.

TABLE 19.4: TYPES OF COOKIES

Bagged cookies

(also known as piped cookies):

Make bagged cookies by forcing soft dough through a pastry bag. Varieties include ladyfingers, macarons, and tea cookies.

**Bar cookies:**

Make bar cookies by baking three or four bars of dough the length of the baking pan, and then slicing them into small bars. One variety is biscotti.

**Dropped cookies:**

Make dropped cookies, such as chocolate chip cookies and oatmeal cookies, from a soft dough and drop them from a spoon or scoop onto the cookie sheet.

**Icebox cookies:**

Make icebox cookies by rolling dough into a log, chilling it, and then slicing it just before baking. Butterscotch icebox cookies and chocolate icebox cookies are examples.

**Molded cookies:**

Mold stiff dough by hand into any shape to make molded cookies. Peanut butter cookies are an example.

**Rolled cookies:**

Rolled cookies are made more often at home than in commercial kitchens because they take a lot of work. Cut these cookies from a stiff dough that has been rolled out on a baking bench. Varieties include decorated sugar cookies and shortbread.

**Sheet cookies:**

Pour the batter into the entire baking pan and then slice it into individual squares or rectangles after baking. Brownies are usually made this way. Other types of sheet cookies include butterscotch brownies or blondies.



QUICK BREADS

Quick breads generally refer to any baked good not leavened by yeast or eggs. Typical leaveners used in quick breads are chemical leaveners, such as baking powder or baking soda. The quick chemical reaction of these leaveners allows the bread to be baked immediately.

Quick breads are staples in the American diet. Some examples of quick breads include biscuits, muffins, scones, banana bread, soda bread, and even pancakes and waffles. In the morning, you are likely to see a bigger selection of quick breads in the form of scones and muffins. Later in the day and into the evening, you are likely to see a wider variety of breads or cakes instead.

There are primarily three methods for mixing quick breads. The creaming method uses solid fat, which is creamed with sugar for three to four minutes, before adding the liquids and dry ingredients. It is important to add ingredients gradually to avoid curdling. The **muffin method** uses liquid or melted fat, which is mixed with the liquids and added to the dry ingredients. The **biscuit method** uses solid fat, which is "cut" into the flour to resemble pea-sized pieces, before the liquids are added. Table 19.5 shows the three basic methods of preparing quick breads.



SAFETY

The Danger of Eating Raw Cookie Dough

The reason why eating raw cookie dough is dangerous is because of the raw egg. Raw eggs can contain *Salmonella*, which can cause serious illness. Cookie dough made with pasteurized eggs decreases the risk of *Salmonella* poisoning because the eggs have been treated to kill all bacteria. It is best to cook the dough thoroughly for food safety, and to never serve raw dough to high-risk populations.



VIDEO

How to Make Biscuits

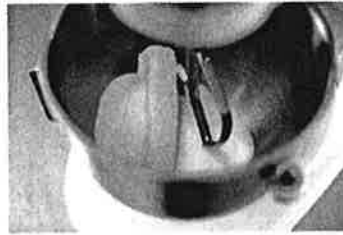
For a video on how to make biscuits, please go to: Textbooks.Restaurant.org/Videos.

TABLE 19.5: THE THREE METHODS OF PREPARING QUICK BREADS

Creaming method (fat is creamed with sugar):

- This mixing method is best done with the aid of an electric mixer and a paddle attachment.
- The fat is a solid fat and is always mixed with sugar until creamy.

Chocolate chip or raisin spice muffins are examples of quick breads made using the creaming method.



Muffin method (liquid/melted fat is used):

- This mixing method may be done by hand or done with a paddle attachment for larger-volume recipes.
- The fat is always a liquid/melted fat.

Cornbread and blueberry muffins are examples of quick breads made using the muffin method. Pancakes are also mixed this way.



Biscuit method (solid fat is "cut" into flour by hand):

- This mixing method is best done by hand.
- The fat is always a solid fat and is mixed into flour into pea-sized pieces. It is often recommended that all ingredients are very cold for this method.

Buttermilk biscuits, cornbread biscuits, and scones are examples of quick breads made using the biscuit method.



✚✚ ESSENTIAL SKILLS CREAMING METHOD FOR QUICK BREADS

- 1 Cream the fat and sugar together for three to four minutes. See Figure 19.2a.
- 2 Combine eggs with liquids.
- 3 Add combined liquids to creamed fat and blend thoroughly; scrape sides. See Figure 19.2b.
- 4 Add sifted dry ingredients to fat and liquid mixture; mix just until incorporated. See Figure 19.2c.



Figure 19.2a: Cream fat and sugar together.

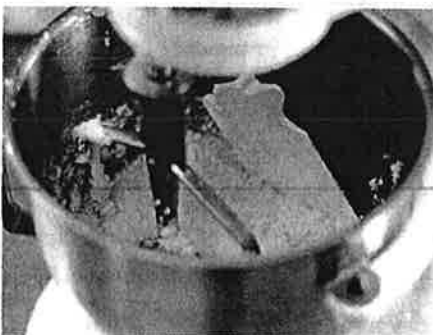


Figure 19.2b: After thoroughly blending mixture, scrape the sides.



Figure 19.2c: Add sifted ingredients to fat and liquid mixture.

MUFFIN METHOD FOR QUICK BREADS

- 1 Mix dry ingredients for 30 seconds. See Figure 19.3a.
- 2 Combine all liquids, including melted fat.
- 3 Add liquids to dry ingredients (see Figure 19.3b); mix just until incorporated (see Figure 19.3c).



Figure 19.3a: Mix dry ingredients.



Figure 19.3b: Adding liquids to dry ingredients.



Figure 19.3c: Mix liquid and dry ingredients until incorporated.



ESSENTIAL SKILLS BISCUIT METHOD FOR QUICK BREADS

- 1 Sift dry ingredients into a bowl.
- 2 Cut solid fat into the flour until it resembles coarse/mealy pea-sized pieces. See Figure 19.4a.
- 3 Combine liquids and add them to dry ingredients; mix just until incorporated. See Figure 19.4b.
- 4 Shape kneaded dough into a round ball (see Figure 19.4c); fold in half and rotate 90 degrees (see Figure 19.4d).
- 5 Repeat kneading process three to four times. Do not overmix.



Figure 19.4a: Solid fat cut into flour.



Figure 19.4b: Mix liquid and dry ingredients until incorporated.



Figure 19.4c: Shape kneaded dough into a round ball.



Figure 19.4d: Fold dough in half and rotate 90 degrees.



KNOWLEDGE CHECK

- 1 List three of the seven makeup methods for cookies and describe each of them.
- 2 Describe the three methods for preparing quick breads.



SUMMARY

In this chapter, you learned the following:

- There are eight main categories of ingredients used in baking: strengtheners, shortening, sweeteners, leaveners, thickeners, flavorings, liquids, and additives.
- Flour is a main ingredient used in baking.
- Standardized recipes, or formulas, for bakery products are set up a bit differently than those for other food items. Proportions for each ingredient are given in the form of percentages. In baking, flour always has a proportion of 100 percent, and the percentages of all other ingredients are calculated in relation to the flour.
- Understanding baker's percentages makes it easy to calculate the weight of any ingredient or to convert a formula to a new yield, which is how much a recipe produces.
- The seven makeup methods for cookies are bagged, bar, dropped, icebox, molded, rolled, and sheet.
- Cookies are best when they are baked in a convection oven because of their high sugar content.
- The three basic methods for preparing quick breads are the creaming method, the muffin method, and the biscuit method.



CASE STUDY FOLLOW-UP

Refer back to the unit-opening case study, and answer these questions.

Question 1: Using a make-or-buy analysis, do you think Uptown Grille should make its own bread or buy it from a trusted vendor? Explain your answer.

Question 2: Chef Kate has not baked in a long time and cannot remember the formula for baker's percentages. What would you tell her?

CHAPTER ACTIVITIES

Language Arts: Cookies of the World

Research a traditional cookie from another country. For example, you might select a cookie from Austria called the *Linzer Augen*. Describe the cookie, where it is from, and how it is made.

Science: Violent Reactions

Divide the class into groups of four or five students. Each group should gather four small 2-ounce soufflé cups, one half sheet tray, 2 tablespoons of baking soda, 2 tablespoons of baking powder, 4 ounces of white vinegar, and 4 ounces of water.

Label two of the soufflé cups "SODA," and label the other two "POWDER." Add 1 tablespoon of baking soda to each of the soda cups. Add 1 tablespoon of baking powder to each of the powder cups. Place the two soda cups on one side of the sheet tray, and the two powder cups on the other side of the tray. Add 2 ounces of water to one of the soda cups. What did you notice about this reaction? Why did this happen? Add 2 ounces of vinegar to the other soda cup. What did you notice? Why did this happen? Why is this reaction important in baking quick breads? Perform the same experiment using the powder cups. Note your results.

Math: Wedding Cookies

You are the pastry chef in a bakery that is responsible for preparing chocolate chip cookies for a wedding of 320 people. Your owner has determined that you will prepare $1\frac{1}{2}$ cookies per person. First, determine the correct amount of cookies you will need to prepare. Next, use your knowledge of baker's percentages to decrease the formula to yield the proper amount of cookies for the wedding using the recipe to the right.

Collaboration: Good Batter, Bad Batter

Overmixing quick bread batter causes more gluten to develop than you need, and that creates tunnels in the product. Divide into groups. One group should make a "bad example" of a muffin with overmixed batter. Slice it open and observe the tunnels. Another group should make a "good example" of a properly mixed muffin. Slice it open to observe the crumb. Compare the two products. Sample them and compare the tenderness.

Career Readiness: "86" My Baker's Dozen!

There are many terms used in the restaurant business that are not found in many other places. One such term is "86," referring to an item that is no longer available. Another term is a "baker's dozen." Do an Internet search for these terms and see what you can find about their significance in the industry. What is the history behind having 13 as a "baker's dozen?" What does the term "86" mean? Write a one-page paper to describe your findings. Be prepared to talk about it in class.

Critical Thinking: It's All about the Fat

There are many different types of fat used in preparing cookies. Find three of your favorite cookie recipes, and identify all of the types of fat used in their preparation. What if you substituted a different type of fat for the one listed in the recipe(s)? Chances are high that the recipe will not turn out the same. What do you think the different results would be and why? Write a one-page paper describing your findings.

Chocolate Chip Cookies (Creaming Method)

Yield: 80 dozen

10 lb	Waxy butter
7.5 lb	Brown sugar
7.5 lb	Granulated sugar
40	Eggs
7 oz	Vanilla
17.5 lb	Pastry flour
2.5 lb	Powdered oatmeal
10 oz	Salt
10 oz	Baking powder
10 oz	Baking soda
15 lb	Chocolate chips
2.5 lb	Coconut (macaroon style)
5 lb	Coarsely chopped nuts

EXAM PREP QUESTIONS

- ① In baking, ingredients are given percentages in relation to
A eggs.
B milk.
C flour.
D sugar.
- ② A scone is an example of a
A cake.
B soufflé.
C yeast bread.
D quick bread.
- ③ Which ingredient makes baked goods moist, adds flavor, and keeps baked items fresh?
A Gluten
B Leavener
C Thickener
D Shortening
- ④ Which ingredient used in baking causes the dough to rise?
A Gluten
B Leavener
C Thickener
D Shortening
- ⑤ Baking soda and baking powder are what type of leavening agent?
A Organic
B Physical
C Chemical
D Biological
- ⑥ In baking, flour always has a proportion of what percentage?
A 25
B 50
C 75
D 100
- ⑦ If the total amount of flour in a recipe is 44 ounces, and the weight of water is 1 pound 8 ounces, what baker's percentage best represents the water?
A 54.5%
B 100%
C 55.4%
D 45.4%
- ⑧ Which type of cookie is most often prepared by baking three or four bars of dough the length of the baking pan, and then slicing them into small shapes?
A Bagged
B Bar
C Dropped
D Icebox
- ⑨ Which type of cookie is most often prepared from a soft dough and then dropped from a spoon or scoop onto the cookie sheet?
A Bagged
B Bar
C Dropped
D Icebox
- ⑩ If a formula calls for 54.5 percent water and the pastry chef is using 10 pounds of flour, how much water does the chef need by weight?
A 54 pounds
B 545 pounds
C 5.45 ounces
D 5.45 pounds