

17.1

Introduction to Baking

READING PREVIEW

Key Concepts

- Identifying bakeshop ingredients and their functions
- Identifying and using bakeshop equipment
- Understanding formulas used in the bakeshop

Vocabulary

- all-purpose flour
- baking stones
- bench scraper
- blooming (gelatin)
- bread flour
- cake comb
- cake flour
- chemical leavener
- confectioner's sugar
- corn syrup
- denaturing
- dough divider
- dough sheeter
- egg wash
- formulas
- gelatin
- gluten
- granulated sugar
- knead
- leavener
- loaf pans
- organic leavener
- parchment paper
- pastry bag
- pastry blender
- pastry brush
- pastry wheel
- pectin
- peel
- physical leavener
- proofer
- retarder
- SilPad
- springform pans
- superfine sugar
- tapioca
- tart pans
- tube pans
- turntable

Bakeshop Ingredients

Although they share certain similarities, cooking and baking (and making desserts) are fundamentally different. Although a soup, stew, or even a sauté can be changed at virtually any stage of preparation, most breads, cookies, muffins, cakes, or custards need to be put together exactly as the recipe describes before you bake, chill, or freeze them. Once a batter is ladled into the pan, for example, it is usually too late to adjust the amount of salt or change the texture.

Another important distinction between cooking and baking or dessert-making is that most baked goods and desserts require more advance planning. Cakes need to cool and be frosted, custards and puddings need to chill and firm up in the refrigerator, and yeast breads need plenty of time to rise.

Approach baking and dessert-making in a systematic way. Before you begin baking, gather all the equipment and measure out the ingredients called for in your recipe. Read the recipe carefully; you may need to sift dry ingredients together, melt and cool some ingredients, or permit others to warm slightly to room temperature. Plan ahead so your frozen dessert is perfectly chilled when you want to serve it, your pastry dough is ready to roll out when your filling is complete, and a cake is cooled before you start to frost and decorate it.



Source: Culinary Institute of America

Ingredients function in specific ways to help determine the final texture, flavor, and color of baked goods and desserts. Good bakers know how each ingredient affects the outcome.

Flour Perhaps no ingredient is as important to a baker as flour. The amount of protein and starch in a particular type of flour determines how it will behave in a recipe.

Wheat flour is the most common type of flour used in the bakeshop. It contains the right amounts and types of certain proteins, such as glutenin (GLU-teh-nin) and gliadin (glee-AH-din), which give structure to yeast-raised dough. You should first moisten a wheat flour and then **knead** (NEED) it, working it by hand or in a mixer to distribute the ingredients. Kneading develops **gluten** (GLOO-tih), a network of long, stretchy strands that trap the carbon dioxide given off by yeast in the dough. This is what causes yeast-based dough to rise.

Flour also contains starch that thickens when it is heated and absorbs liquids. Different flours contain different types of starch. That is why the results you get when you cook or bake with different types of flour differ greatly. For example, a cornstarch-thickened pudding has a different look and feel than a flour-thickened pudding.

Because of these differences in the proteins and starches in different types of flours, it is important to follow a recipe precisely when selecting flour. The following are some of the more common types of wheat flour used in baking recipes:

- **All-Purpose Flour.** A blend of half “soft” (low-protein) and half “hard” (high-protein) wheat, **all-purpose flour** is probably the most common type of flour used in the bakeshop.
- **Bread Flour.** Considered “harder” or “stronger” than all-purpose flour because it has more protein in it, **bread flour** is most appropriate for use in most yeast-bread recipes.
- **Cake Flour.** With less protein than either bread or all-purpose flour, **cake flour** is “softer” than the other two flours. It is used in most cake recipes and many cookie and muffin recipes because it provides a less chewy, more tender texture.
- **Whole-Grain and Stone-Ground Flour.** Whole-grain flour is milled to leave some of the bran intact. Stone-ground flour is milled by using stone mill wheels and is usually produced in small batches. Both whole-grain flour and stone-ground flour usually retain more oil and are more flavorful.

To store opened packages of flour, transfer the contents to an airtight container or a large resealable plastic bag to keep out moisture, dirt, and pests.



FIGURE 17-1

Approach Baking in a Systematic Way

Baking requires that you follow a recipe and measure ingredients precisely.

DRAWING CONCLUSIONS *Why might professional bakers be less willing than other types of chefs to share their recipes?*

Source: Pearson Education

Chef's Tip

Perishable Flour

Whole-grain and stone-ground flours are more perishable than other types of flour. They are best stored in the refrigerator after opening so their oils don't turn rancid.



Classes of Wheat

In the United States, wheat has two growing seasons. Winter wheat is planted in the fall and harvested in the spring or summer. It accounts for 70 to 80 percent of the wheat grown in the United States. Spring wheat is planted in the spring and harvested in late summer or early fall.

Although many varieties of wheat are grown in the United States, all of it falls into six classes, as shown in the table below.

Typically, white wheat has a lighter color and a milder, sweeter flavor than red wheat. The protein levels of flour vary within a class based on environmental conditions such as soil or weather. For example, a drought causes wheat to contain more protein. So flour produced from that wheat

will behave differently than flour of the same type of wheat that comes from a crop that didn't experience a drought.

Lab Activity

Pick a bread recipe. Research to locate and purchase wheat flour made exclusively from a single class of flour. (You may have to search online for this.) Divide into as many groups as you have classes of flour. Each group will make soft rolls (Recipe Card 122) using a different class of wheat flour, but keeping all other ingredients and recipe steps the same. Evaluate the results. (This can be done in conjunction with Project 17, "Differences in Flour.")

Classes of Wheat	Level of Protein	Where Grown	Uses
Hard red spring	Highest	Montana, Dakotas, Minnesota	Bread
Durum (spring)	High	North Dakota	Pasta
Hard red winter	Medium to high	Great Plains, between the Mississippi and Rockies	Bread, rolls, all-purpose flour
Hard white winter	Similar to hard red winter	Previously the Pacific Northwest, but increasing in the Great Plains	Bread, rolls, bulgur, tortillas, Asian noodles
Soft red winter	Low to medium	East of the Mississippi	Cakes, pastries, flatbreads, crackers
Soft white winter	Low	Primarily Pacific Northwest	Cakes, crackers, cookies, pastries, quick breads, muffins, snack foods

Unopened packages of white flour keep for up to two years in a cool, dry location. Once opened, they should be used within eight months. Store other types of standard-ground flour (such as potato, rice, rye, oat, or corn flour) in a cool, dry location and use them within two or three months after opening. You could also keep them in the refrigerator for up to six months.

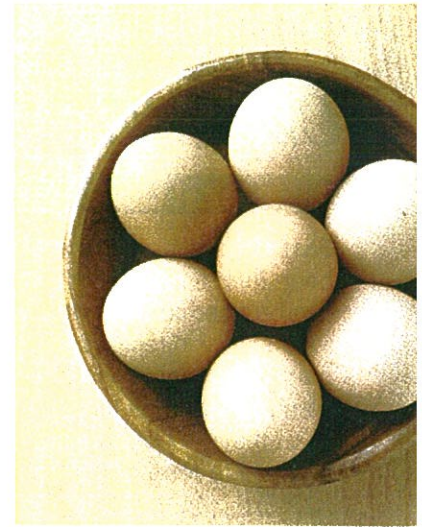
Eggs Eggs contribute proteins, fat, and moisture to baked items. They also provide structure and texture. As eggs are stirred, whipped, or heated, their protein strands unfold and recombine. This creates a network that traps liquids or air, resulting in a texture that can range from a soft foam, such as a meringue, to a sliceable custard, such as a quiche. Other ingredients in

the recipe, as well as the way you mix and cook egg-rich dishes, can give a variety of results.

Egg substitutes (powdered or liquid) may be substituted for fresh eggs in some cases. When you use substitutes, you will find some differences in the flavor, color, and texture of the baked goods. Egg substitutes can be refrigerated in unopened containers for up to ten days. Once they are opened, they should be used within three days.

Here are some examples of how eggs are used in the bakeshop:

- When eggs are stirred over direct heat, as when making a custard, the stirring keeps the protein strands short enough to prevent a solid network from forming. This produces a product with a smooth, spoonable consistency.
- When a custard is baked in the oven, the mixture is not stirred as it cooks. This allows longer strands of protein to form, which settle into a firm structure that holds its shape.
- When eggs are whisked, they trap enough air to make a foam, giving lightness to soufflés and similar dishes.
- Adding eggs to dough provides the dough with moisture, helping it stick together. Eggs also provide additional protein to the dough for a firmer and drier product after baking. The water in eggs expands when you bake cakes and muffins, helping them to rise.
- Adding egg yolks to dough adds a rich golden color to the final item, such as a sponge cake, bread, or a vanilla sauce.
- Brushing the tops of breads and pastries with an **egg wash**—a mixture of egg and water or milk—before baking gives a glossy sheen. Egg washes that include only the whites become very shiny, and those that include the yolks give a brilliant golden hue.



Eggs

Source: Viktor Lugovskoy/Fotolia

FIGURE 17-2

Brushing with an Egg Wash

Brushing the top of dough with an egg wash before baking gives the product a glossy sheen when baked.

COMMUNICATING *What does a glossy sheen add to the final baked product?*

Source: Ian O'Leary, Dorling Kindersley

Chef's Tip

Pasteurized Eggs

Pasteurized eggs have been heat-treated and can be used to guarantee food safety in recipes that call for uncooked or semicooked eggs (any eggs that are not cooked to the safe temperature of 160°F).

FIGURE 17-3

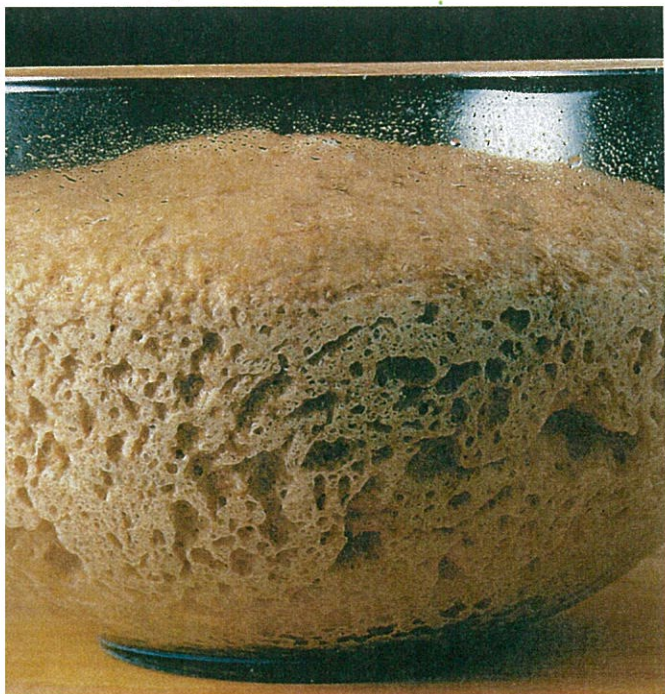
Yeast Increases the Volume of Dough

Yeast produces carbon dioxide that increases the volume of the dough.

INTERPRETING ILLUSTRATIONS

Can you see the carbon dioxide bubbles in this rising dough?

Source: Dave King © Dorling Kindersley



Eggs are an enormously versatile ingredient, but they are also a potential source of pathogens such as Salmonella. Controlling the temperature of eggs as you cook, cool, and store them is one of the most important ways to keep eggs wholesome. Shell eggs should be refrigerated at a temperature between 33°F and 38°F. Cooking egg dishes to a safe temperature of 160°F also helps prevent illness by killing any pathogens. Cool egg-based dough quickly to keep it from sitting too long in the temperature danger zone (between 41°F and 135°F).

Leaveners A **leavener** (LEV-en-er) increases the volume of a dough or batter by adding air or other gas. Bakers rely on three basic types of leaveners—organic leaveners, chemical leaveners, and physical leaveners—to raise breads, cakes, and cookies.

- **Organic Leaveners.** Yeast, a tiny single-celled organism, is an **organic leavener**. It must be living to do its work. Like any living organism, yeast needs the right environment in order to live. When the conditions are right, yeast cells grow and reproduce, giving off carbon dioxide and alcohol in the process. Carbon dioxide increases the volume of dough when the yeast is first added to the dough and then again when the dough is exposed to the heat of the oven. This is what gives bread its spongy texture. To grow and reproduce, yeast requires moisture, warmth, and food (in the form of sugar, whether added to the dough or naturally present in the flour). Yeast grows most rapidly between 60°F and 90°F. Cooler temperatures slow the yeast down, although they don't kill it. Yeast is destroyed when the temperature of a baked good reaches temperatures between 130°F and 140°F.

- **Chemical Leaveners.** Baking powder is a **chemical leavener**. It reacts rapidly to leaven a baked good when it is combined with moisture and heat. When we say that a baked good has been leavened, we mean that the volume of the batter has been increased by the addition of air or gas. Baking soda is similar to baking powder, but it also requires an acidic ingredient. When these leaveners are blended with liquid in a batter, a chemical reaction produces gas that forms bubbles. As the batter settles into a firm structure during baking, these bubbles give the baked item a spongy, springy texture, sometimes known as its *crumb*. If baking soda and baking powder are not properly blended into the batter, the bubbles may be too large, resulting in tunnels or big air pockets. Recipes often call for chemical leaveners to be sifted with the flour and other dry ingredients to break up any clumps and make sure they are mixed well.

- **Physical Leaveners.** Steam and air are **physical leaveners**. When moisture from butter, eggs, or other liquid is heated in a batter, it turns to steam. The steam takes up more space than water. Air also expands when it is heated, thereby leavening a batter. Creaming butter or whipping egg whites incorporates air into a batter, and as items such as cakes or soufflés bake in the oven, the pockets of air are trapped while the batter dries enough to take on a relatively firm structure. The trapped pockets give baked goods height as well as a soft, spongy crumb.

Fat Fat is critical to the success of most baked goods. Fats contribute to a baked good's flavor, texture, and freshness.

- **Flavor.** Some fats, such as butter, lard, and nut oils, contribute their own flavor to baked goods. Other fats, such as vegetable oil, margarine, and shortening, are chosen because they lack flavor. Flavorless fats allow the flavors of other ingredients to come to the front. The fat in a batter or dough also encourages browning on crusts and edges; this provides extra flavor for the baked good.
- **Texture.** Fats determine the texture of baked goods. Depending on the type of fat you use in a baked good and the way it is worked into a batter or dough, the resulting texture may range from meltingly smooth to flaky and brittle. The more fat in the recipe, the softer the batter or dough. Baked goods that are made from soft batters or doughs have a tendency to spread out while they bake. The way batter spreads is important, for example, in making cookies of the right size. Fats also produce a texture contrast, as the outer edges become crisper than the middle of the baked good.
- **Freshness.** Fat extends the life of a baked good by holding in moisture, so the baked good stays fresh longer.



Chef's Tip

Self-Rising Flour

Flours labeled *self-rising* contain a chemical leavener, such as baking powder.



Chef's Tip

Butter and Baking

When baking, use unsalted grade AA butter. If you substitute a European-style butter, which has a slightly higher butterfat content and less moisture, you may need to add a bit more liquid.



FIGURE 17-4

Flaky Pie Crust

The flavor and flakiness of a pie crust depends on the type of fat used.

INTERPRETING ILLUSTRATIONS

Does this pie crust look flaky to you?

Source: Brent Hofacker/Fotolia

Solid Fats

Fat	Description	Flavor and Use
Butter	Made from cream	Adds flavor and flakiness to pastry or biscuits.
Lard	Made from refined pork fat	Has a unique flavor. Makes a very flaky pastry. Substitute it in equal amounts for the shortening or butter in pie dough. Especially good in pastry for savory dishes.
Shortening	Made from vegetable oil that has been processed (hydrogenated) to make it solid at room temperature	Lacks flavor. Used like butter or lard, but adds extraordinary flakiness.
Margarine	Production process is similar to that of shortening	Lacks flavor (unless flavoring is added). Used as a substitute for butter.

Liquid Fats

Fat	Description	Flavor
Neutral oil	Canola, corn, safflower oils	Lacks flavor.
Vegetable oil	Blend of neutral oils	Lacks flavor.
Oil from nuts and seeds	Nut oils (walnut, peanut, sesame, almond) and olive oil	Has a distinctive flavor.

FOCUS ON Nutrition

Hydrogenation

Many shortenings and margarines contain trans fatty acids, by-products of hydrogenation, which turns liquid fats into solid fats. Some people are concerned about the health risks of trans fatty acids and search for products without trans fatty acids.

Fats can be divided into two basic types: solid fats, which are firm at room temperature, and liquid fats, which are liquid at room temperature. The texture of solid fats permits them to be worked into the dough or batter. If you melt a solid fat, such as butter or shortening, you can use it in a recipe as a liquid fat. An oil is a pure liquid fat.

The mixing method used for a batter or dough often dictates the form a fat must take. Some recipes for cakes and breads require a fat in liquid form—oil, melted butter, or melted shortening. Some recipes call for butter or shortening to be room temperature, and other recipes require the solid fat to be firm, even chilled, before you add it to other ingredients.

Sweeteners A variety of sweeteners are used in the bakeshop. Different sweeteners behave differently when they are mixed and baked, so it is important to use the type specified in a recipe.

The following are the most commonly used sweeteners.

- **Granulated Sugar.** Refined from sugarcane or sugar beets, **granulated sugar** is ordinary white sugar.
- **Superfine Sugar.** Granulated sugar that is more finely ground so it dissolves more easily is called **superfine sugar** (also referred to as *baker's sugar* and *castor sugar*).

Chef's Tip

Superfine Sugar

In a pinch, you can make superfine sugar by grinding regular sugar in a food processor or blender.

- **Confectioner's Sugar.** Sugar that has been ground into a fine, white, easily dissolvable powder is called **confectioner's sugar** (also referred to as *powdered sugar*).
- **Brown Sugar.** Thick, dark molasses is combined with white sugar to make flavorful and moist light or dark brown sugar.
- **Molasses.** A by-product of sugar refining, molasses is a thick, sweet, brownish-black syrup that has a distinctive, slightly bitter flavor.
- **Honey.** Ranging in color from very light to almost as dark as molasses, honey is often identified by the flowers from which the bees gathered nectar.
- **Maple Syrup.** The boiled-down sap of maple trees, maple syrup is graded according to color, body, and flavor. Grade B is richer in flavor than grade A and is suggested for baking.
- **Corn Syrup.** Made from cornstarch, **corn syrup** is a thick, sweet syrup that is available light or dark; the dark has added caramel flavor and color.

Sweeteners provide baked goods with more than sweetness and flavor. They also provide texture. In some cases, they help baked products rise. Sweeteners attract moisture, making baked goods softer and longer-lasting than those with little or no sugar. Because of caramelization, sweeteners develop a rich brown color when heated. This adds appealing color, as well as flavor.

Sugar interacts with other ingredients on a chemical level. When combined with liquids, sugar raises the temperature at which the liquid will boil. Adding sugar makes eggs less prone to overcook, even over direct heat.

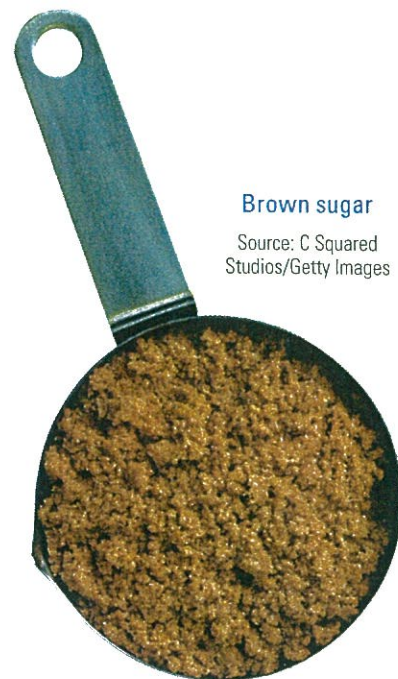
Adding liquids to hot sugar can cause the sugar to splatter or foam up. To lessen the chances of burning yourself, take the pan away from the heat before you add liquid. Wear oven mitts to protect your hands when you add a liquid, and keep your face partially turned away. Even if the mixture doesn't splatter, the steam can scald you.

Acids Citrus and other fruit juices, wine, vinegar, yogurt, and buttermilk are some of the acids used in baked goods. Acids change the structure of proteins, an effect known as **denaturing**. When an acid is added to a protein, the strands that compose the protein either tighten or loosen, depending on the specific proteins the food contains. By changing the amount and type of acid in a recipe, you can create different textures. For example, adding lemon juice to a cream-cheese tart filling breaks down the texture of the cream cheese so it becomes lighter and spreadable.

Fermenting yeast cells give off alcohol—an acid—to produce a good flavor and texture in breads. The alcohol relaxes the gluten strands so they can stretch while the dough increases in volume and bakes. Acidic ingredients are also added to batters leavened with baking soda to start the leavening action.

Brown sugar

Source: C Squared Studios/Getty Images



Chef's Tip

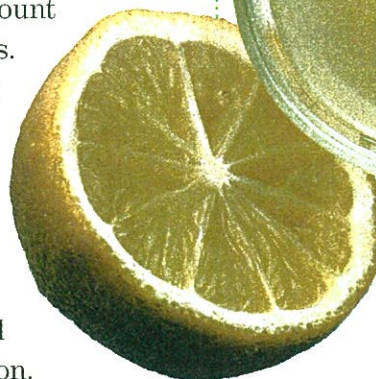
Salvaging Honey

If honey (and molasses) crystallizes or becomes solid, you can liquefy it by warming it briefly in a microwave.



Lemon juice

Source: Ian O'Leary/Dorling Kindersley





Chef's Tip

Special Salts

In baking, coarse salt and sea salt are used primarily as toppings. The larger crystals add both flavor and texture to breads and rolls.

FIGURE 17-5

Blooming Gelatin

Dissolving gelatin in water is referred to as blooming the gelatin.

APPLYING CONCEPTS *Would vegetarians eat a product that was thickened with gelatin?*

Source: Dorling Kindersley



Salt Salt is a powerful flavor enhancer and seasoning, even for sweet dishes. In small amounts as a seasoning, salt does not actually add an identifiable flavor to a dish. Instead, it balances other flavors and makes them more vivid. As you add salt in larger quantities, it begins to contribute its own distinctive flavor.

Salt is important in baking because of the way it reacts with other ingredients. Salt controls the activity of yeast, keeping it from overfermenting and thereby ensuring a good texture. If the yeast is not controlled, the bread may rise rapidly at first, only to deflate.

Thickeners Bakeshops often use thickeners to give body to liquid mixtures. The following are some of the most common thickeners:

- **Cornstarch and Arrowroot.** After being blended with cold liquid, cornstarch and arrowroot are added as thickeners to such dishes as a simmering pudding or pie filling. (You can substitute an equal amount of arrowroot for cornstarch in most recipes.) Both of these thickeners last for up to eight months on the shelf.
- **Gelatin.** A protein processed from the bones, skin, and connective tissue of animals, **gelatin** is used as a gelling agent to thicken and stabilize foams or liquids. Gelatin is widely available in granulated or powdered form, in tins or individual packets (1 package equals 2¼ tsp and weighs ¼ oz). When substituting the less widely available gelatin sheets, use the same weight as powdered gelatin (refer to the package information; different types of gelatin sheets may have different weights). Packages of powdered gelatin desserts contain flavorings and sweeteners in addition to gelatin and cannot be used in place of unflavored powdered gelatin in a recipe. Dissolving gelatin in water is referred to as **blooming** the gelatin.
- **Pectin.** Working like gelatin to thicken a liquid, **pectin** is a substance naturally found in high concentration in certain fruits, especially apples and citrus fruit. Unlike gelatin, pectin does not usually require chilling to reach its full thickening potential, making it well suited for fruit preserves and confections. Also unlike gelatin, pectin requires the presence of both a liquid and the correct amount of acid to thicken properly.
- **Tapioca.** Quick-cooking or instant **tapioca** (tap-ee-OH-kah) is made from the cassava root, a starchy tropical tuber. Because tapioca contributes no flavor of its own and imparts transparent gloss to fruit, it is often used to thicken fruit pie fillings and to make pudding.
- **Other Thickeners.** Molecular gastronomy (see Section 14.2) has introduced a variety of thickeners—such as xanthan gum, gellan gum, and agar agar—that

can be used in place of gelatin, pectin, and tapioca. They have different attributes and uses but are commonly used as vegetarian alternatives to gelatin.



READING CHECKPOINT

What are the three types of leaveners?

Bakeshop Equipment

The quality of the equipment you use for baking has a distinct effect on the quality of your baked goods.

Tools for Measuring Scales, thermometers, measuring cups, and measuring spoons are necessary to make accurate measurements in the bakeshop. You can review the various types of measuring tools and the right way to use them in Section 4.2. In addition to these tools, bakers and pastry chefs also use some other measuring tools.

- Wooden dowels of various thicknesses make rolling dough to the proper thickness easier.
- Rulers or tape measures make rolling dough to the proper thickness and dimensions easier. They are also useful when you need to determine the dimensions of a baking pan or mold.
- Timers keep track of time as you bake. The classic dial-type timer works by counting down the time, but some digital timers give you the option of counting time down or up. Some timers allow you to keep track of the baking times for as many as four different items, which is a helpful feature when you are making multiple batches or a variety of baked goods. Many digital timers have a cord or clip so you can carry them with you if you leave the kitchen.

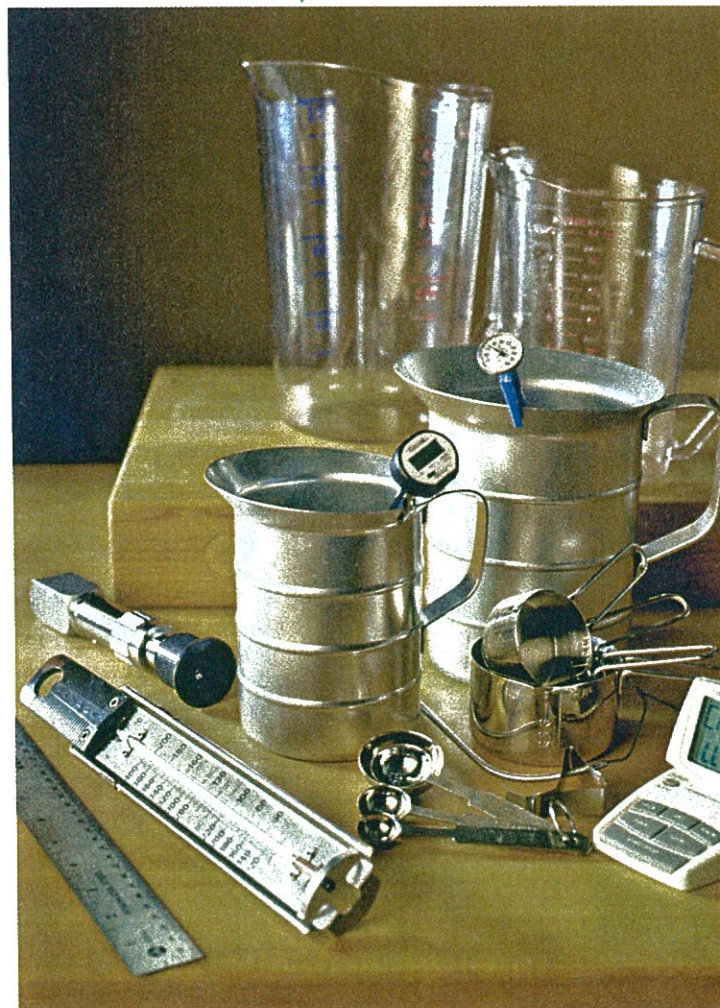
FIGURE 17-6

Tools for Measuring

Bakeshop measuring tools include a ruler, a timer, and a candy thermometer.

INFERRING How might a bakeshop's specialty influence the types of measuring tools it uses?

Source: Culinary Institute of America



CULINARY MATH

A Pint's a Pound?

There's a famous expression, "A pint's a pound the world around," which means that 1 pint by volume (that is, 2 cups) of anything weighs 1 pound by weight (that is, 16 ounces). But is this really true?

Lab Activity

Weigh 2 cups of flour and 2 cups of sugar. Is a pint a pound? Now try it with water.



FIGURE 17-7

Marble Work Surface

Fudge cooling on a marble work surface.

DRAWING CONCLUSIONS Why is a marble work surface better than a wooden work surface for this use?

Source: Myrleen Ferguson Cate/PhotoEdit, Inc.

Work Surfaces Two work surfaces are commonly seen in a bakeshop: wood surfaces are required when you want to keep the item you are making warm, and marble surfaces are used when you want to keep the item from getting warm.

Wood surfaces are excellent for kneading bread dough. A wooden surface has a texture that grabs the dough, making it easier to stretch the dough. It is also relatively warm, compared to marble, metal, or even plastic materials.

Marble, on the other hand, is a cool, smooth stone with no texture. It is useful

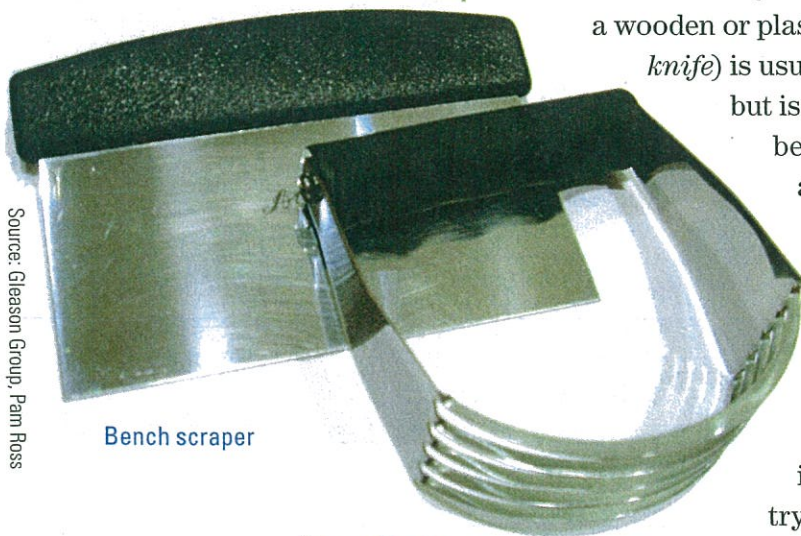
for making items such as chocolates, fudge, or caramels when you don't need to stretch dough and want to keep the item cool as you work it. Marble is very good for rolling out delicate pastry dough and cookies; you can work them more easily with less chance of their warming up and getting too soft.

Tools for Cutting Bakers and pastry chefs use many of the same cutting tools that are used throughout the kitchen, including a basic set of knives. Serrated knives are especially good for slicing breads and cakes without tearing them. Some tools, however, are more common in the bakeshop:

- **Bench Scrapers.** With a rectangular steel blade and capped with a wooden or plastic handle, a **bench scraper** (also called a *bench knife*) is usually six inches wide. The steel blade has a dull edge but is thin enough to cut through dough. You can use a bench scraper like a knife to cut soft ingredients such as butter or soft cheese or to lift and turn soft or wet dough as you knead it, as well as to transfer ingredients such as chopped nuts from your work surface to the mixing bowl. Bench scrapers also make short work of cleaning off a work surface.

- **Pastry Blenders.** With a crescent-shaped loop of thin wires attached to a handle, a **pastry blender** is used to mix fat into flour when you make a pastry dough. If you don't have one, substitute two table knives to cut the fat into the flour.

- **Biscuit and Cookie Cutters.** Made of thin metal sheets or molded plastic, biscuit cutters and cookie cutters have edges that are sharp enough to cut through pastry or cookie dough cleanly. Biscuit cutters may have straight or scalloped edges; 3-inch cutters are a good basic size. Cookie cutters are sold in a variety of shapes and sizes; a 3-inch-diameter round cutter is common for rolled and cutout cookies.



Bench scraper

Pastry blender

Source: Gleason Group, Pam Ross

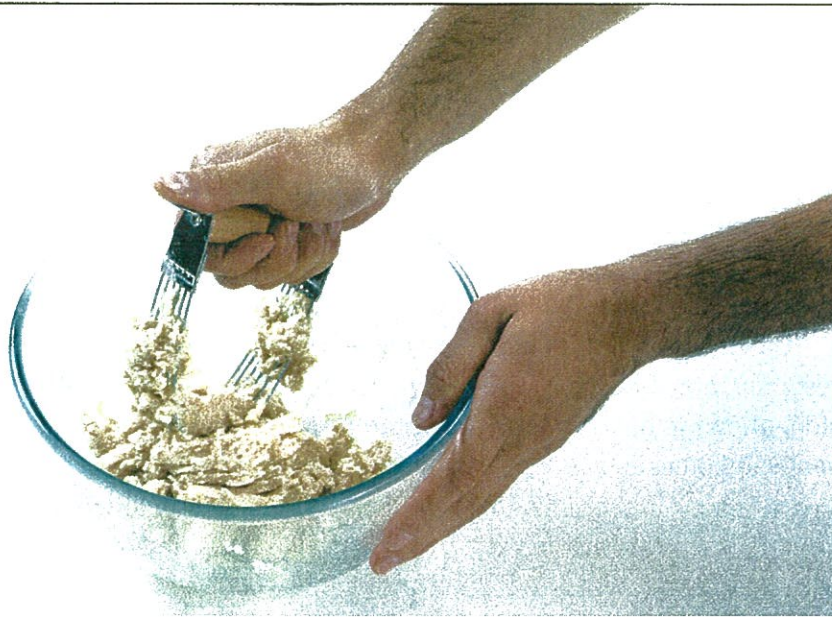


FIGURE 17-8

Pastry Blender

A pastry blender is a specialized hand tool for mixing fat into flour.

DRAWING CONCLUSIONS How does a pastry blender help a chef avoid overmixing?

Source: Dave Murray, Dorling Kindersley

Bread-Baking Equipment Bakers use special bread-baking equipment, such as the following:

- **Baking Stones.** Unglazed ceramic pieces used to line an oven rack are called **baking stones**. These stones or tiles help develop a crisp crust on breads and pizza by holding and transferring the oven's heat evenly. The stones need to pre-heat along with the oven for best results.
- **Peels.** A large flat wooden or metal paddle used to slide bread onto baking stones and to retrieve them when they are done is called a **peel**. If you don't have a peel, you can use a cookie sheet that has no sides.

Appliances Mixers make baking tasks easier and more efficient. As you may recall from Section 3.3, bakeshops tend to use free-standing mixers, which are capable of mixing and kneading heavy yeast dough. Mixers, food processors, blenders, and other large equipment share space in the bakeshop with other specialized equipment such as the following:

- **Proofer.** A **proofer** is a special box that holds dough as it rises. Most models have thermostats to control heat and are able to generate steam.
- **Dough Sheeters.** A **dough sheeter** rolls large batches of dough into sheets. Some dough sheeters also roll dough into loaves and cut out doughnuts or croissants.
- **Dough Dividers.** A **dough divider** (also called a *dough press*) cuts a quantity of dough into equal pieces so they can be shaped into rolls.
- **Retarder.** To control fermentation by slowing it down, bakers use a refrigerated cabinet called a **retarder**.

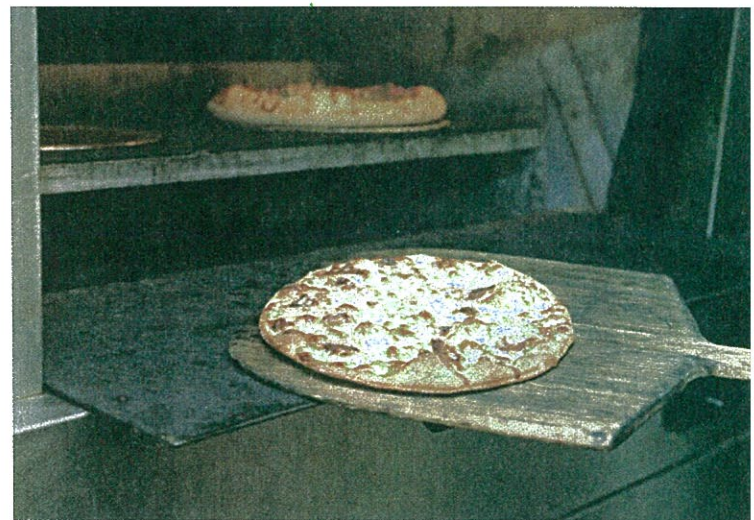


FIGURE 17-9

Peel

The peel is also used to slide pizzas into and out of ovens.

INFERRING How much practice do you think it would take to use a peel effectively?

Source: David Levinson/Fotolia

FOCUS ON Safety

First Aid for Bakers

Burns are the most common baking hazard. If you are burned, immediately flush the affected area with cool water. Keep a cool compress on the area until it feels more comfortable, and then apply a bandage.

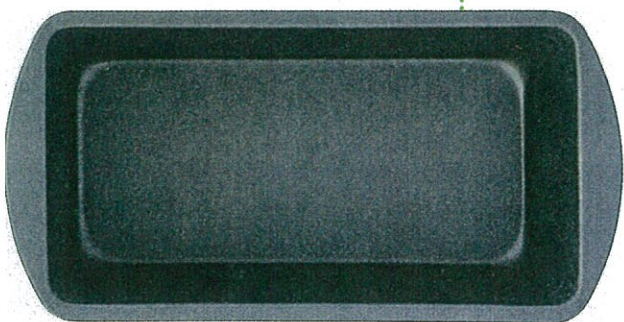
Baking Pans and Molds The surface of a pan has an effect on how items bake. Darker pans produce baked goods with a deep crust color, and those with shiny or light surfaces tend to produce goods with a lighter color. Lining pans properly makes it easier for you to get baked goods out without sticking or tearing.

Bakers use parchment paper to line pans. **Parchment paper** is a grease-resistant, nonstick, heatproof paper. The paper is coated with silicone on one side, allowing baked goods to spread properly and release from the paper easily. It comes in rolls, or precut for use as pan liners.

Bakers also use a special liner made of silicone, sometimes known as a **SilPad**, that can be used over and over again. Silicone can withstand temperatures up to 600°F. Flexible silicone mats, sold in several sizes, give baking pans a nonstick surface and provide a heat-resistant surface for candy making. Baking pans and molds made of the same material are available in a variety of sizes.

The following are some more common baking pans and molds:

- **Loaf Pans.** Rectangular pans used for simple cakes and quick breads are called **loaf pans**. Mini loaf pans are available for making small loaves. You can buy loaf pans in metal, glass, and ceramic, with or without a nonstick coating.
- **Pie Pans.** Pie pans have sloped sides and are made from aluminum, glass, or earthenware. The sides of the pan may be up to 3 inches tall. The deeper the pan, the more filling you will need. One of the most common sizes is a 9-inch pie pan with sides that are 1½ inches tall. If you prefer to use glass pie pans, reduce the oven temperature by about 25°F and the baking time by 5 to 10 minutes. Glass conducts heat efficiently, so the edges and bottom of your pie may brown too rapidly if you use the recipe's temperature and baking time.
- **Tart Pans.** Made of tinned steel or ceramic, **tart pans** have short, often scalloped sides and usually have a removable bottom. They may be round, square, or rectangular. Some pans have a nonstick coating. Tartlet pans are simply small tart pans, sized to make individual pastries.
- **Cake Pans.** Cake pans are manufactured of tinned steel, aluminum, glass, or silicone. They may have a nonstick coating. Common cake pans range in size from 6 inches to 18 inches.
- **Springform Pans.** Consisting of a hinged ring that clamps around a removable base, **springform pans** are used for baking delicate cakes that might otherwise be difficult to unmold, such as a cheese cake.
- **Tube Pans.** With a center tube of metal that conducts heat through the center of the batter, **tube pans** bake heavy batters evenly, without overbrowning the outside of the cake. A tube pan (also called



Loaf pan

Source: Dave King/Dorling Kindersley



Tart pan

Source: Philip Watkins/Dorling Kindersley



Tube pan

Source: Martin Cameron/Dorling Kindersley



FIGURE 17-10

Springform Pan

Removing the frame of a springform pan from a cake.

PREDICTING What advantages would a springform pan offer?

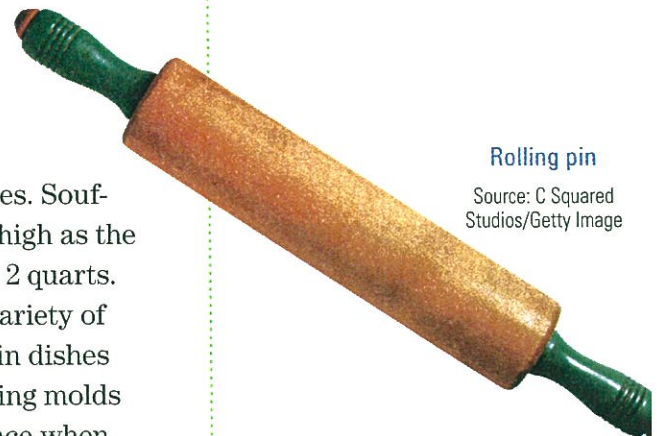
Source: Dave King/Dorling Kindersley

an *angel food cake pan* or a *Bundt pan*) works well for batters that need to bake quickly. Tube pans are typically made of thin metal, with or without a nonstick coating. They come in a range of sizes, and the sides may be fluted, molded, or straight.

- **Soufflé Dishes and Custard Cups.** Soufflé dishes, custard cups, and pudding molds are ovenproof ceramic, glass, or earthenware dishes used to bake a variety of dishes. Soufflé dishes have straight, smooth sides that are typically as high as the dish is wide and come in a range of sizes, from 2 ounces to 2 quarts. Custard cups have straight or sloped sides and come in a variety of sizes. Petits pots are custard cups that may have lids. Gratin dishes may be oval or round and have relatively short sides. Pudding molds may have smooth or patterned sides for a special appearance when the pudding is unmolded.

Tools for Pastry Bakers use special tools for working with pastry, such as the following:

- **Rolling Pins.** Rolling pins stretch dough into thin sheets. Ball-bearing rolling pins have a steel rod extending through the pin and fixed to the handles. Ball bearings on each end of the rod make it easy to roll the pin. Rolling pins may be made of wood, marble, metal, or a synthetic material. Straight (or French) rolling pins are just round rods that are often 16 inches long. They have no handles. Tapered rolling pins are good for rolling dough into circles. Marble rolling pins stay cool, which is helpful to a pie baker or pastry maker. Specialty rolling pins may have grooves or patterns to imprint in the dough as you roll.



Rolling pin

Source: C Squared Studios/Getty Image

Chef's Tip

Rolling Pin Care

Wooden rolling pins should never be soaked in water because they will absorb moisture and could warp. Soap should never be used on them. Wipe wooden rolling pins well with a moist towel and air-dry thoroughly.





Pastry brush

Source: Martin Cameron/
Dorling Kindersley



Pastry wheel

Source: Martin Cameron/
Dorling Kindersley

FIGURE 17-11

Pastry Bag

Applying whipping cream using a pastry bag.

RELATING CONCEPTS *As a customer, would you rather have whipped cream applied this way or spread on the pie with a palette knife?*

Source: Dorling Kindersley



- **Pastry Brushes.** Used to apply egg wash and to butter pans and muffin tins, a **pastry brush** is made of soft, flexible nylon, silicone, or unbleached hog bristles. Unlike brushes used for paint, pastry brushes have no reservoir in the handle, so they are easy to clean completely after each use. Soak the brush briefly if dried food needs to be loosened, but avoid prolonged soaking. Let the brush air-dry as soon as it is clean. A 1- to 1½-inch wide brush is suitable for most uses. Brushes used for pastry work should be kept separate from those used to apply barbecue sauces, marinades, and other savory ingredients.
- **Pastry Wheels.** A round blade mounted on a handle is called a **pastry wheel**. As you roll the blade over pastry dough, it makes a single, clean cut. The blade may be straight or scalloped to make a decorative edge. You can also use a sharp paring knife or scissors to cut pastry.
- **Pastry Bags and Tips.** A **pastry bag** is a cone-shaped bag with two open ends. On the smaller, pointed end, you apply a decorative tip. Into the larger opening you add dough, fillings, or whipped cream. You squeeze the bag to force the contents through the tip, allowing you to add fillings to pastries, make delicate cookies, and apply decorative finishes to cakes and pastries. Tips that are round or star-shaped are the most versatile, but you can buy specialty tips to make leaves, flowers, and other shapes. Pastry bags are typically made of nylon or plastic. Some bags are designed for only a single use. If your bag is reusable, wash it well in warm soapy water inside and out, rinse it thoroughly, and air-dry completely before storing.
- **Metal Spatulas and Palette Knives.** The bakeshop often uses metal spatulas and palette knives with long metal blades and blunt edges. The handle may be offset (angled) to make it easier to lift baked goods from the pan. Palette knives are long and narrow, with a rounded, blunt end. They are good for spreading fillings, icings, and glazes; decorating cakes and pastries; and spreading batter or dough into an even layer before baking. Some palette knives have a serrated edge for slicing cakes into layers.
- **Cake Combs.** Used to create a decorative edge on iced cakes or to give texture to a chocolate coating, a **cake comb** is a triangular or rectangular piece of metal

or plastic with serrated edges. The teeth vary in their size and shape, giving you a choice of three or four different effects.

- **Turntables.** Although not essential, a **turntable** makes it easier to decorate cakes. You can easily turn the cake with one hand while the other is free to use the palette knife or cake comb.



READING CHECKPOINT

What are at least five of the most common types of baking pans and molds found in the bakeshop?

Formulas

Bakers and pastry chefs often call their recipes **formulas**. This distinction helps point out the importance of accuracy in all aspects of baking, from measuring ingredients to having them at the right temperature. For success, ingredients must be prepared correctly and combined in the right order, using the right technique.

Bakers' Percentages Baking formulas often include percentages as a type of measurement for ingredients. Any recipe that has been written in percentages shows the baker how each ingredient compares to the total amount of flour. In a formula written in percentages, the flour called for in the formula is considered to be 100 percent.

If your formula calls for 2 pounds of flour and 1 pound of sugar, the flour is 100 percent and the sugar is 50 percent. If the formula calls for 2 pounds of flour and 3 pounds of sugar, the flour is still 100 percent, but now the sugar is 150 percent. Knowing how the ingredients relate to each other as a percentage makes it easy for bakers to accurately increase or decrease recipes.

Dry Ingredients Flour, granulated or powdered sugar, baking soda, baking powder, cocoa powder, and similar powdery ingredients are generally referred to as dry ingredients. These ingredients may need to be sifted together, sometimes two or three times, to remove any clumps and to incorporate some air. Sifting also distributes ingredients such as salt and chemical leaveners evenly throughout the baked item.

Wet Ingredients Milk, water, eggs, oil, melted butter, honey, and vanilla extract are all examples of wet ingredients. Be sure you check the formula carefully. Sometimes liquid ingredients are combined and then added to dry ingredients all at once. At other times, they are added in sequence. You may also be asked to add wet ingredients in parts, adding some of the wet ingredients, then some of the dry ingredients, and then some more of the wet ingredients, and so on.

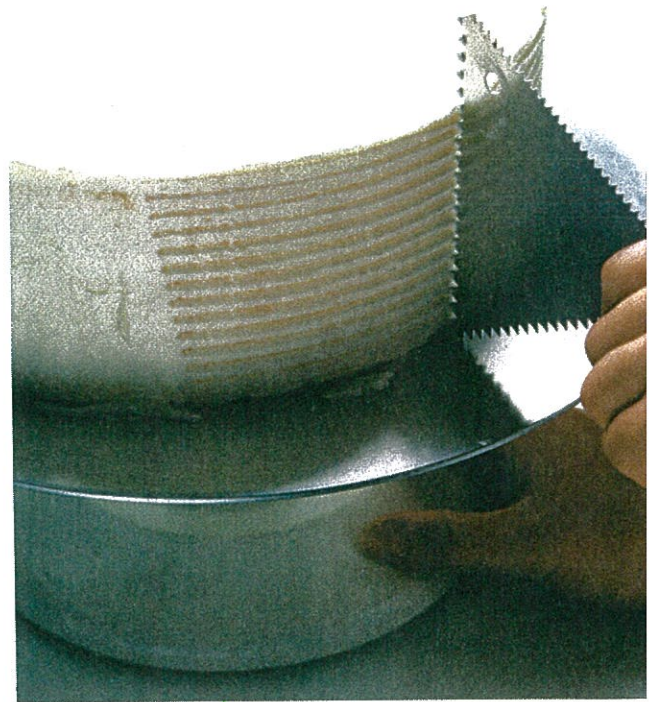


FIGURE 17-12

Cake on a Turntable

Turning the cake with one hand while using a cake comb to create a pattern with the other hand.

APPLYING CONCEPTS Why is it usually more efficient to use a turntable than to move around the cake yourself?

Source: Richard Embery/Pearson Education/PH College

FIGURE 17-13

Sifting Dry Ingredients

Some recipes call for dry ingredients to be sifted.

DRAWING CONCLUSIONS Why might it be necessary to sift dry ingredients more than once?

Source: Richard Embery/Pearson Education/PH College



READING CHECKPOINT

What is a baking formula?

17.1 ASSESSMENT

Reviewing Concepts

1. What are the three types of leaveners?
2. What are five of the most common types of baking pans and molds found in the bakeshop?
3. What is a baking formula?

Critical Thinking

4. **Comparing/Contrasting** What is the difference between a pie pan and a tart pan?
5. **Inferring** In a bakeshop, when would you want to use a fat that lacked flavor?
6. **Classifying** If you were working with chocolates, fudge, or caramel, which type of work surface would you use?

Test Kitchen

- Divide into four teams. Each team will locate a baking recipe that is not written as a baking formula. Every team will share a copy of its baking recipe with the other three teams (so each team will have the same four recipes). Each team will then convert the recipes to baking formulas. Compare the results.

SCIENCE

Maple Sugar

Research the history and process of making maple sugar. Discuss how the various grades are made.