Cakes

Cakes, cakes, cakes—pound cakes, layer cakes, angel food cakes, sponge cakes, génoise, chiffon cakes, tortes, gâteaux, roulades, biscuits (bees:QWE), meringues, dacquoise, vauchries, etc et cetera. The number and varieties seem infinite. Fortunately, cakes fall into two major groups: foam cakes and shortened (butter) cakes:

- Foam cakes have a high ratio of eggs to flour and fall into three categories: those containing no fat in any form (angel cakes, dacquoises, and meringues), those whose only fat is egg yolk (sponge cakes, some biscuits, some roulades, etc.), and those that contain oil or fat in addition to egg yolks (chiffon cakes, génoise, etc.). Since foam cakes do not depend so much on fat, but rather on eggs, they are not discussed here but are in Chapter 3.

- Shortened cakes contain fat, frequently in a solid form such as butter or shortening. Examples of cakes in this category are pound cakes and all types of creamed cakes (yellow cakes, butter cakes, etc.).

The fascinating roles of fats in shortened cakes

Years ago, when The Cook's Magazine once asked me to do an article on the roles of fats in cooking, I wasn’t sure that I could be enthusiastic about the subject. I asked for a few days to research fats.

I went to my local university library and made copies of the articles about fats in leading technical journals. Armed with a stack of articles, I settled down for an evening of fat reading.

I was fascinated by articles using modern research equipment and video cameras to take pictures inside a cake batter while the cake is baking. The fat in the batter is stained one color, and the milk portion another, so you can see exactly where the bubbles are and what is going on. It is as if you are standing right in the middle of the batter.

I had always assumed, since the baking powder dissolves in the liquid portion of a cake batter, that was where the baking powder made the bubbles. This is not the case at all. Baking powder does not form a single new bubble. It only enlarges the bubbles that already exist in the fat. This adds new significance to the creaming step in shortened cakes. Since the only bubbles in the cake are those in the fat and those beaten into the batter, the creaming of the butter and sugar to incorporate bubbles into the fat is crucial.

All at once, all kinds of things began to make sense to me. I was a terrible cake baker. I never paid any attention to the creaming step. I barely blended the sugar and butter together and then added the eggs and other ingredients. No wonder my cakes were heavy.

Then I remembered the cakes at a nearby restaurant where I sometimes worked for an evening when I thought I wanted to start a restaurant (one frantic evening of heavy-duty cooking was always enough to get me over it). Those made by head chef Patrick, an ex-Dominican monk who happily and casually threw in one ingredient after the other as I did, were about as flat as mine as well. Those contrasted with cakes made by assistant Parsy, who tended to throw the butter and sugar into the mixer, turn it on, and go on to something else until 5 or 6 minutes later, when she returned to add a few eggs. Her chocolate cakes done by the same recipe were a mile high. No wonder—she had aerated the fat like crazy!

It was now midnight, but I was so excited over how important bubbles in the fat were, that I had to share this vital information. I realized that my friend Doris Koplin, an outstanding professional baker, got up at 4:00 A.M.—but this was so thrilling that I knew she would want to know immediately. I called Doris and described the enormous importance of bubbles in the fat, even though it was hard to do over the phone, without the use of both hands. Doris mumbled, “Shirley, I’m so happy for you!” and hung up.

Ingredients

To cake lovers, food literally means cake. If you have ever had chocolate cake with swirls of gooey icing on cake so moist it looked wet, you too may visualize a luscious slice of cake when someone says “food.”
What most cake bakers—home cooks and professionals alike—know well is that cake baking is an exacting art. To get the cake you want, you need to understand how the ingredients work in balance with each other and in concert with cake-making techniques.

**Versatile fats**
In the delicate balance of ingredients, fats and sugar are the heart and soul of shortened (butter) cakes. As tenderizers, they soften and moderate the firm structure made by proteins in flour, eggs, and milk. Fats perform three crucial roles. They make the cake light and delicate by holding tiny air bubbles that are expanded by gases from baking powder or baking soda. They help make the cake melt-in-your-mouth tender by coating the flour proteins so they cannot form tough gluten. And they carry rich flavors and essential nutrients.

Fats in leavening. Solid fats that hold air bubbles well include butter, shortening, margarines, spreads, and solid animal fats. Animal fats, which can have a slightly meaty flavor, are used primarily in Christmas steamed puddings and mincemeat baked goods.

With most solid fats, most of the vital bubbles in the batter that must be enlarged by baking powder and baking soda need to be beaten in during the creaming or mixing of the cake. Shortening has an advantage over other solid fats in that it already contains millions of fine bubbles to aid in leavening. Unprocessed solid shortening has a glassy, unappetizing appearance. For a more appealing snow white, processors bubble nitrogen, a nonreactive gas, into the shortening. Shortenings are, by volume, about 12 percent fine nitrogen bubbles. This means that shortening will make a lighter cake. Also, many shortenings have emulsifiers such as mono- and diglycerides added for better distribution of the fat in the batter. Better distribution of fat means better distribution of the air bubbles and a better-textured cake.

Shortening has an ideal texture to beat for volume and aeration, and even at warm room temperature there is no danger that it will melt and lose its air-holding ability. Butter from the refrigerator must warm slightly to be beaten, and it can melt if the room is too warm. And, of course, butter does not contain the 12 percent of volume in fine bubbles that shortening has. Nevertheless, there is nothing like the taste of real butter, so butter is normally the fat of choice of fine cake bakers. I must say, however, I have been amazed at how good cookies made with butter-flavored shortening are, so it could be a good choice for cakes, too—I haven’t tried it.

Margarines have all the disadvantages of butter without its flavor advantage. Spreads, with their high water content, gums and starches, and major differences from brand to brand, behave in unpredictable ways and do not contribute much to taste.

Fats as tenderizers. Oil coats flour proteins well and prevents them from absorbing liquid from the batter to make gluten. Cakes made with oil can be not only tender but very moist, too. When you want a cake or muffins really moist, think of oil. Excellent carrot cakes can be made with oil, such as the Carrot Oil Cake in the 1975 edition of *The Joy of Cooking*. Oil is also frequently used to make moist, tender muffins. Oil does not have air-holding ability to aid in leavening, so the eggs and any other thick ingredients like fruit purées in the batter must perform that task.

**Sugar: the sweet moderator**
Like fat, sugar tenderizes and moisturizes cake. Sugar prevents the flour proteins from joining to make tough gluten by combining with each of them. Glutenin and sugar combine to form a soluble protein-sugar compound, and glutenin and sugar combine in the same manner. We saw sugar as a great tenderizer in pie crust and cookies, and it plays the same role in cakes. Since sugar can stand in for fat as a tenderizer, it is an important ingredient in reduced-fat baked goods (page 180).

Different sugars have different characteristics in cooking. Honey, which is 42 percent fructose, absorbs water from the atmosphere and makes cakes and muffins good keepers. Under the same conditions, baked goods made with honey will stay moist longer than those made with sugar. Brown sugar contains some fructose too, and baked goods made with it retain moisture well.
Syrups offer an advantage in that the sugar is already dissolved. The dissolved-sugar method of mixing a cake is described on page 150. This method produces good crust color, a tender crust, excellent aeration, fine texture, and a tender crumb.

Syrups are very thick, so with the addition of egg whites they can help hold air bubbles and help with aeration. Corn syrup also gives additional flavor, which is a big help in reduced fat baking.

Corn syrup (glucose) browns at lower temperatures than other sugars. Depending on the specific situation, this enhanced browning may or may not be an advantage.

Flour: strength and structure

For a tender cake, pick a low-protein flour. Cake flour, pastry flour, and Southern bleached all-purpose flours are all low in protein and make tender cakes. National-brand bleached all-purpose dependably has an intermediate protein content and is preferable to an unknown local brand all-purpose, which may be quite high in protein. Most unbleached flours andbread flours have high protein contents and should be avoided for cakes.

Cake flour has numerous advantages for fine texture. Many bakers would not think of using anything other than cake flour. But there are differences of opinion, and some bakers strongly prefer a low-to moderate-protein all-purpose flour. Cake flour gives a definite taste difference. Some object to the fine texture that you get with cake flour and deliberately opt for the coarser texture of bleached all-purpose. Use of unbleached all-purpose or bread flour is a bad idea. All bread flours and most unbleached flours have a higher protein content, meaning more gluten and tough cakes unless you add excess fat and sugar. Here, again, it is a matter of personal preference. You should try different flours and make your own decision.

Cake flour Cake flour will make a finer-textured cake for many reasons:

1. It is a low-protein flour (about 8 grams protein per cup), so it will help produce a very tender cake.
2. It is very finely ground, so it produces better texture.
3. It is chlorinated, which means that it is bleached with chlorine gas and deliberately left slightly acidic. This gives cake flour several advantages over nonchlorinated flour:
   - The acidity causes cakes made with cake flour to set slightly sooner, producing cakes with a finer texture. Rose Levy Beranbaum points out that lower-pH (more acidic) batters produce a sweeter, more aromatic quality in cakes.
   - Chlorination enhances the starch's ability to absorb water.
   - Fat sticks to chlorinated starch but not to starch from the same wheat that has not been chlorinated. Since all the air bubbles are in the fat, this leads to a more even distribution of the bubbles, which produces a finer texture.

Cake flour in the United States is chlorinated; not so, however, in many countries. For example, cake flour in Japan is not chlorinated, and chlorinated flour in the United Kingdom is available only as self-rising, with baking powder (leaveners) already added. This means the flour sometimes has too much leavener for a successful cake. Rose Levy Beranbaum had this problem when adapting The Cake Bible for the United Kingdom. Nick Malgieri (author of Nick Malgieri’s Perfect Pastry) offered Rose a solution—use the leavened chlorinated flour for fine texture and add a small amount of non-self-rising flour to correct for the excess of leaveners. Rose said that she had to make other changes, too, such as an increase in sugar.

Egg whites and yolks: separate roles

As always, eggs are not just eggs—whites are an incredible drying and leavening agent, and yolks are nature’s great emulsifiers for creamy texture. Do not limit yourself to using whole eggs. If a cake or muffins are dry, cut an egg white. Go with two yolks instead of the whole egg and add a little more sugar and fat. Shortened cakes with a large amount of sugar and liquid may require extra emulsifiers. You will see many cake recipes that contain yolks alone. On the other
hand, if you have a cake that's a soggy mess, you may need to add an egg white.

Whites are excellent leavening agents, too. Frequently some whites are beaten and folded into the batter during mixing as described in "Combination Conventional and Sponge (Whipping) Method" (page 150). However, as I relate in the story of the cake that is a soufflé (page 237), if you use all beaten whites in a cake, it will fall like a soufflé. When egg whites are beaten, they no longer contribute to structure as raw eggs do, so you also must have enough raw egg, milk, and flour proteins to cook and set the batter, or the cake will fall. It is true that meringues and angel food cakes are all beaten egg whites; however, they are foam cakes—essentially fat free, very high in sugar, and basically a cooked egg white foam.

**Baking powder and baking soda: less is more**

You might think if a cake falls or does not rise well that you have not used enough baking powder. However, just the opposite is usually true. When you have too much baking powder, the bubbles get too big, run into each other, float to the top, and—*pop!*—there goes your leavening.

Many cake and muffin recipes have too much leavening. Also, remember that baking soda is four times as strong as baking powder. The general rule is 1 to 1 1/2 teaspoons *baking powder* per cup of flour in a recipe. This would be 1/4 or a breath over 1/4 teaspoon *baking soda* per cup of flour in the recipe.

These general rules are just that—general. Many variables determine the proper amount of baking powder to be used, and you need to adjust the general rules for your own cooking conditions. More leavening can be used if the recipe calls for a lot of heavy ingredients like chopped fruits. When you change pan size, the amount of baking powder should be altered. For a larger pan, in which the batter will not be as deep, you will need less baking powder than for a smaller pan with deeper batter. Rose Levy Beranbaum has charts in *The Cake Bible* that give exact amounts of leavener for different batter amounts and pan sizes.

**Balancing a shortened cake recipe**

The major ingredients in cakes must be in balance. A change in any one requires balancing changes in the others. Eggs, flour, and milk contain proteins that set (coagulate) with heat. They form the structure of the cake, but they are also the tougheners.

Sugar and fat, on the other hand, slow down or prevent these proteins from setting and are tenderizers—or "structure wreckers." Sugar combines with the two gluten-forming proteins, glutenin and gliadin, to prevent gluten formation. So sugar can limit how much tough gluten will form. Sugar also slows down the coagulation, or joining together, of egg proteins. This, too, limits the firm-set protein structure. Fats coat the gluten-forming proteins and prevent their joining together with each other and with water to form gluten.

The trick, then, is to use enough sugar and fat to produce a delicate, tender, melt-in-your-mouth structure, but not so much that the cake falls and is a soggy mush. You can think of this as a balance with flour, eggs, and milk on one side, sugar and fat on the other.

The following two sets of formulas reflect this balance, which professionals follow *almost* religiously. They know that it will be a waste of time to test a recipe that isn't within about 20 percent of these conditions. You do not have to be exact, but you do need to be in the ballpark.

The two types of shortened cakes (regular and high-ratio) have slightly different formulas. Many modern cakes fall into the high-ratio category. They have a slightly higher ratio of sugar to flour than a regular cake (which has more flour than sugar or equal weights of flour and sugar). High-ratio cakes also contain extra emulsifiers in the form of egg yolks or in the shortening.

**Formulas for regular shortened cakes**

1. The weight of the sugar should be equal to or less than the weight of the flour.
2. The weight of the eggs should be equal to or greater than the weight of the fat.
3. The weight of the liquids (eggs and milk) should equal the weight of the flour.

Let’s examine the recipe for one of the most successful regular cakes of all time—the classic pound cake—to see how it conforms to the formulas. In strict adherence to a classic recipe, which calls for a pound of flour, a pound of sugar, a pound of butter, and a pound of eggs, all three conditions are satisfied:

1. Sugar (1 pound) equal to or less than flour (1 pound)
2. Eggs (1 pound) equal to or greater than butter (1 pound)
3. Liquid—the eggs—(1 pound) equal to flour (1 pound)

Converting to volume rather than weight units, this gives the following recipe:

1 pound butter (8 ounces/cup) = 2 cups
1 pound sugar (7 ounces/cup) = 2 1/4 cups
1 pound eggs (1.7 ounces/large egg) = 9 large
1 pound flour (4.6 ounces/cup) = 3 1/2 cups

Formulas for high-ratio cakes

Formulas for the popular high-ratio cakes are slightly different:

1. The weight of the sugar should be equal to or greater than the weight of the flour.
2. The weight of the eggs should be greater than the weight of the fat.
3. The weight of the liquid (eggs and milk) should be equal to or greater than the weight of the sugar.

These are the rules if you want a successful cake. This is not to say that master bakers do not make alterations. But you can bet that master cake bakers probably started their breathtaking creations with the math. They first work out a balanced recipe and then alter this recipe for specific differences in the particular cake they are preparing.

Adding leaveners to the mix

In addition to following the rules of balance for shortened cakes in developing recipes, cooks must pay close attention to the amount of leavening. The general rule is that 1 to 1 1/2 ounces of baking powder are required for each pound of milk, water, or cream (liquid other than eggs) in the cake. Because eggs are natural leaveners, a cake that contains no liquid other than eggs (pound cake, for example) may manage with no additional leaveners.

For cakes that do contain liquid other than eggs, another way to estimate the correct amount of leavening is from the amount of flour. You need 1 to 1 1/4 teaspoons baking powder for each cup of flour or 1/4 teaspoon baking soda per cup flour.

For cakes that contain large amounts of butter, remember that about 19 percent of the weight of butter consists of water and milk solids with about 18 percent water. A small amount of extra leavener can compensate for this additional liquid, which tends to make a cake more compact, by opening up the structure and tenderizing a pound cake.

Getting from the numbers to the sublime cake

With the formulas, you can work out recipes that meet your own requirements. As for me, I love very moist, sweet cakes, and I frequently make them with sour cream or cream cheese. Cream cheese makes a fairly dense, moist cake—almost like a pound cake—that slices beautifully. However, I want a basic cake with just a little more openness, as you get from milk or buttermilk. I want an excellent-tasting moist, sweet, thick 9-inch cake that I can slice into three layers for simple cakes. Here is my reasoning.

Buttermilk produces basic cakes with a wonderful taste, so I’ll go with that. Since I want the cake really sweet and moist, I want a high-ratio cake with more sugar than flour. I’ll have to have some extra emulsifier for this much sugar, so I’ll go with yolks in addition to whole eggs. I want it really moist. Oil makes the moistest cakes because it coats flour protein so well and does not allow water-absorbing gluten to be formed. So I want some of my fat from oil, but I want butter for its taste and aerating ability. How can I balance all of this?

Sugar weighs about 7 ounces per cup; with 1 1/3 cups sugar, the weight of sugar equals 9.3 ounces.
**Approximate Weight-Volume Equivalents of Basic Cake Ingredients**

<table>
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<tr>
<th>Volume</th>
<th>Ingredient</th>
<th>ounces</th>
<th>grams</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sweeteners</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cup</td>
<td>Sugar—superfine and granulated</td>
<td>7</td>
<td>200</td>
</tr>
<tr>
<td>cup</td>
<td>Light brown sugar, packed</td>
<td>7.5</td>
<td>213</td>
</tr>
<tr>
<td>cup</td>
<td>Confectioners' sugar</td>
<td>4</td>
<td>113</td>
</tr>
<tr>
<td>cup</td>
<td>Corn syrup</td>
<td>11.5</td>
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</tr>
<tr>
<td>tbsp</td>
<td>Corn syrup</td>
<td>0.7</td>
<td>20.3</td>
</tr>
<tr>
<td>cup</td>
<td>Honey</td>
<td>11.7</td>
<td>333</td>
</tr>
<tr>
<td>tbsp</td>
<td>Honey</td>
<td>0.75</td>
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<tr>
<td><strong>Fats</strong></td>
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</tr>
<tr>
<td>cup</td>
<td>Butter</td>
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</tr>
<tr>
<td>tbsp</td>
<td>Butter</td>
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</tr>
<tr>
<td>cup</td>
<td>Oil</td>
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<td>tbsp</td>
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<td><strong>Eggs</strong></td>
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</tr>
<tr>
<td>cup</td>
<td>Large whole, out of shell</td>
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<td>50</td>
</tr>
<tr>
<td>cup</td>
<td>Large yolk</td>
<td>0.65</td>
<td>18</td>
</tr>
<tr>
<td>cup</td>
<td>Large white</td>
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<td><strong>Dairy</strong></td>
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<tr>
<td>cup</td>
<td>Milk, buttermilk</td>
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<td>242</td>
</tr>
<tr>
<td>cup</td>
<td>Sour cream</td>
<td>8.5</td>
<td>242</td>
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<tr>
<td>cup</td>
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<td><strong>Flour</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>cup</td>
<td>Cake, dipped</td>
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<td>130</td>
</tr>
<tr>
<td>cup</td>
<td>Cake, spooned</td>
<td>4</td>
<td>112</td>
</tr>
<tr>
<td>cup</td>
<td>Cake, sifted</td>
<td>3.5</td>
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</tr>
<tr>
<td>cup</td>
<td>All-purpose, dipped</td>
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<td>All-purpose, spooned</td>
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<tr>
<td>cup</td>
<td>All-purpose, sifted</td>
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<td>114</td>
</tr>
<tr>
<td>cup</td>
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</tr>
<tr>
<td>cup</td>
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<td>95</td>
</tr>
<tr>
<td>cup</td>
<td>Cocoa, spooned</td>
<td>3</td>
<td>85</td>
</tr>
<tr>
<td>cup</td>
<td>Cocoa, sifted</td>
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<td>75</td>
</tr>
<tr>
<td>cup</td>
<td>Cornstarch, spooned</td>
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<td>125</td>
</tr>
<tr>
<td>tbsp</td>
<td>Cornstarch, spooned</td>
<td>0.27</td>
<td>7.8</td>
</tr>
</tbody>
</table>

*The only way to be accurate with flour is to weigh the flour over and over in the manner that you measure volume and take an average.

From personal measurements and "Average Weight of a Measured Cup of Various Foods," Home Economics Research Report No. 41, U.S. Department of Agriculture [1977]. There are many variables in going between weight and volume so these values are therefore approximate.
Cake flour measured by the dip-and-scoop method weighs about 4.6 ounces per cup; with 1½ cups flour, the weight of the flour equals 6.9 ounces. This satisfies the first requirement for a high-ratio cake:

1. The weight of the sugar is equal to or greater than the weight of the flour: 9.3 ounces is greater than 6.9 ounces.

Now, how much eggs and fat am I going to need? I know that for Requirement 3 the weight of the buttermilk and eggs has to be at least 9.3 ounces (the weight of the sugar). If I use 1½ cup buttermilk (4.3 ounces), I must have about 5 ounces of eggs. One whole large egg weighs about 1.7 ounces, and a yolk weighs about 0.65 ounce. With 2 eggs (3.4 ounces) and 3 yolks (1.95 ounces), the weight of the eggs is 5.35 ounces. This brings the total liquid weight to 9.6 ounces, which is greater than my 9.3 ounces of sugar. Perfect! Now I need about 5 ounces of fat to satisfy Requirement 2.

Oil weighs 0.47 ounce per tablespoon, so the weight of 1/3 cup of oil is about 2.3 ounces. With 4 ounces (8 tablespoons) of butter at about 81 percent fat, I will have about 3.2 ounces of fat from the butter. This gives a total fat weight of 5.5 ounces, which is just right.

2. The weight of the eggs is about the weight of the fat: 5.35 ounces is close to 5.5 ounces.

I have actually worked out my last requirement already. With 1½ cup buttermilk (about 4.3 ounces) and 2 eggs and 3 yolks (5.35 ounces), the weight of the liquid is 9.65 ounces.

3. The weight of the liquid (eggs and milk) is equal to or greater than the weight of the sugar: 9.65 ounces is greater than 9.3 ounces.

The following amounts of flour, sugar, fat, eggs, and liquid meet all three requirements, and chances are excellent that I have a working recipe:

1 1/2 cups cake flour
2 large eggs plus 3 large egg yolks
1 1/2 cup buttermilk
1 1/3 cups sugar
1/4 pound (1 stick) butter plus 1/3 cup oil

In the section that follows, I use this recipe to give examples of the two more frequently used mixing techniques, the creaming method and the two-stage method. This is an old-time rich moist cake—in no way low-fat (see page 181 for Mellow Moist Low-Fat Chocolate Cake).

Cake-making techniques

Priorities—light and airy or velvety smooth, melt-in-your-mouth tender?

Mixing methods play a major role in cake texture. Frequently there are no real rights or wrongs in cooking. As the saying goes, “One man’s meat is another man’s poison.” Many times “right” is a matter of personal preference. From the very beginning you may as well do some soul searching and decide what kind of cake person you really are. Do you love a feather-light, airy cake, or do you like fine, close, silky texture and melt-in-your-mouth tenderness enough to give up a little lightness for that smoothness?

If lightness is your first concern, you should choose a mixing method, like creaming, that gives prime importance to volume and aeration. Take care that the oven temperature is not so high that it sets the cake before it reaches the volume you want. On the other hand, if you are a texture person, you should choose the two-stage method, which prevents gluten development, and a higher oven temperature so that those bubbles won’t expand too much and ruin the fine texture.

Mixing the cake

Different mixing methods produce different kinds of cake. The goals in mixing are to achieve a uniform blending of all ingredients, to incorporate a maximum number of air cells for volume and texture, and to develop a minimum amount of gluten for tenderness, texture, and volume.

Each of the currently used mixing methods has both advantages and disadvantages. Although most texts describe essentially the same methods, it can be confusing because a wide variety of names has been applied to the same method. I have included several typical names for each:
Creaming, sugar-shortening, sugar butter, or conventional method
- Two-stage, blending, pastry blend, or flour butter method
- Single-stage, dump, one-bowl, or quick-mix method
- Muffin method
- Combination conventional and sponge (whipping) method
- Dissolved-sugar method

Creaming method: In this popular method—also called sugar-shortening, sugar butter, or conventional method—the sugar and butter are creamed together to incorporate those vital air bubbles into the fat. The eggs are then beaten in (incorporating more air and adding emulsifiers from the egg yolk) to provide better incorporation of the air-bubble-filled fat into the batter. Finally, the dry ingredients (flour, baking powder, salt, etc.) are added alternately with the rest of the liquid ingredients (milk, vanilla, etc.). This method has the advantage of incorporating the maximum amount of air bubbles into the fat for the greatest volume.

An inexperienced cake baker can go wrong during several steps in this method. Possible pitfalls are the temperature of the butter, eggs, sugar, and mixing bowl: insufficient creaming, insufficient blending of baking powder and flour; and development of too much gluten.

Butter and bowl temperature: The temperature of the butter is very important for maximum incorporation of air. Butter can go from rock-hard to melted within a fairly narrow temperature range. Experts disagree on the exact ideal temperature, but most recommend between 65°F and 70°F (18°C and 21°C). Bruce Healy, a classic French pastry expert, says that butter actually melts between 67°F and 68°F (about 20°C), so his preferred starting temperature for the butter is 65°F (18°C). Bruce has done extensive experimentation with the time and butter volume at each stage and the final cake volume. Maximum aeration of the butter and the butter and sugar are the vital steps. He says the length of time of beating after the eggs are added and the blending of flour and liquid are not as important as a thorough creaming of the butter and sugar. Cake expert Susan Purdy, author of Have Your Cake and Eat It, Too, agrees with Bruce 100 percent that the creaming of the butter and sugar is the vital step for volume.

Since this creaming step is so important, rinsing the bowl and beater in ice water is a good idea. Using a heavy metal bowl hot from the dishwasher can lead to disaster. To prevent the butter from starting to melt, stop creaming briefly and dip the bowl in an ice water bath to cool it down.

Bowl, kitchen, and ingredient temperatures present no problem at all in aerating shortening since it remains the same consistency over a wide temperature range and already contains 12 percent fine nitrogen bubbles.

Temperature of the eggs: Most books recommend room-temperature eggs, but not all experts agree on the exact temperature here either. Bruce Healy says that his experimentation shows slightly, but definitely, reduced volume with cold eggs. Eggs from the refrigerator can be warmed fairly rapidly by placing them in their shells in a bowl of hot tap water.

Insufficient creaming: With butter, most of the air bubbles in the cake are created in the creaming step. Baking powder only enlarges bubbles already in the dough. Shortening that is already aerated, as just mentioned, will produce a light cake even with a poor job of creaming, but not butter. In addition to using 65°F (18°C) butter, the length of beating time, the speed and type of mixer, and the bowl and room temperature are all important to get the fat and sugar very light and airy. Flo Braker, author of The Simple Art of Perfect Baking, recommends creaming for 4 to 5 minutes and Carol Walters 6 to 10 minutes. Hand beaters frequently take several minutes longer to cream well than a heavy-duty mixer and require you to move the mixer around the bowl and scrape down the sides several times for complete creaming.

Insufficient blending of leaveners and flour: This is my personal Waterloo. I am always in a hurry, and it seems like such a minor step. But if you do not
sift the leavens, flour, and salt together several times for even distribution, the cake can have a velvety texture in general but numerous unsightly large holes.

Development of gluten When adding flour and liquid alternately, you can develop gluten, which makes the cake tough or leads to tunnels. The first addition of flour will be well coated with fat and not form gluten, but once the liquid is added uncoated flour proteins can combine with milk to form tough gluten. I like to add a lot of the flour in that first addition. Once the liquid is added, you must limit the mixing or you can develop gluten. Simply overbeating the batter at this point can develop gluten.

When you’re using the creaming method for a high-ratio cake, the batter can curdle if you add too much liquid at once. (Switch from the water-in-oil emulsion that you want to an oil-in-water emulsion—see “Two Kinds of Emulsions,” page 296.) This is immediately remedied with the addition of more flour and causes no real problem other than fright when you see the curdled mess.

Creaming Method—Shirley’s Basic Moist Sweet Cake, Version I
MAKEs ONE 9-INCH LAYER

what this recipe shows
A balanced recipe (balanced weights of tenderizing and toughening ingredients) creates a successful cake.
The creaming method of mixing produces a light cake.
Dry ingredients must be well sifted for even texture.
Correct butter, sugar, egg, bowl, and room temperatures, as well as creaming time, contribute to lightness.

1 ¼ cups sugar
Nonstick cooking spray with flour, such as Baker’s Joy, or 1 tablespoon shortening and 1 tablespoon flour, to grease pan
Parchment or wax paper
1 ½ cups cake flour
1 ½ teaspoons baking powder
½ teaspoon salt
½ cup buttermilk at room temperature
1 teaspoon pure vanilla extract
½ pound (1 stick) unsalted butter at about 65°F (18°C)
2 large eggs at room temperature
3 large egg yolks at room temperature
½ cup vegetable or other mild-flavored oil (see Note)

1. Place the mixer bowl and whisk beater in the freezer. Measure the sugar into a zip-top plastic bag, seal, and place in the freezer to chill for about 20 minutes.
2. Place a shelf at the top of the lower third of the oven and preheat to 350°F (177°C).

continued
This book is dedicated to everyone who has ever wondered "Why?"