

Yeast Breads and Rolls

SECTIONS

27.1 Yeast Dough Basics

27.2 Yeast Dough Production

WRITING ACTIVITY

Summary

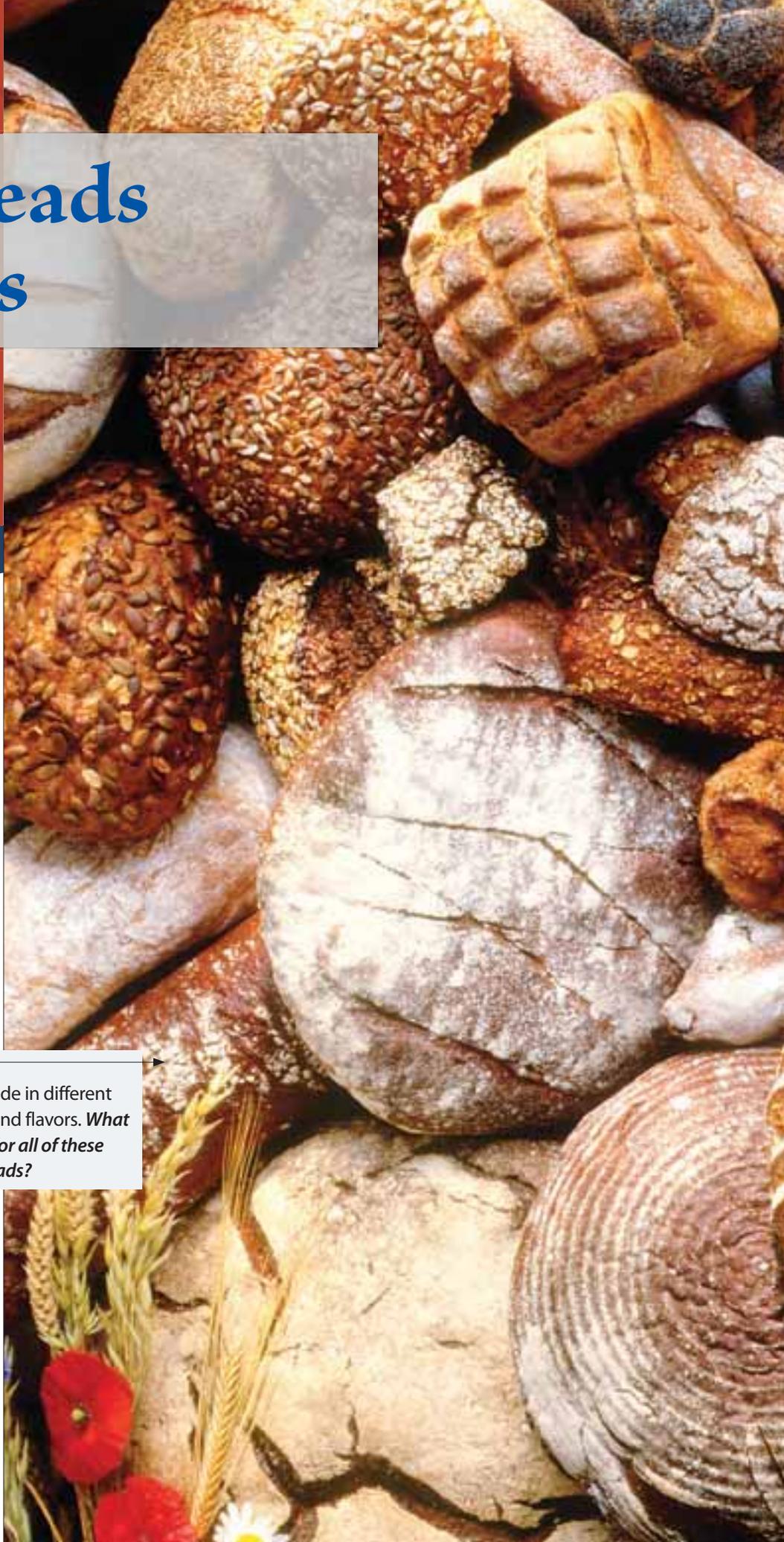
A summary is a short explanation of the basic information in a larger text. Practice by writing a summary of the different types of ingredients you would use in baking.

Writing Tips

- 1 Skim the text and focus on any headings and subheadings.
- 2 Write a statement to summarize the main point.
- 3 Follow with statements that briefly explain the information.

EXPLORE THE PHOTO

Yeast breads can be made in different shapes, sizes, textures and flavors. *What do you think accounts for all of these differences in yeast breads?*



Yeast Dough Basics

Reading Guide

Before You Read

Prior Knowledge Look over the Key Concepts at the beginning of the section. Write down what you already know about each concept and what you want to find out by reading the lesson. As you read, find examples for both categories.

Read to Learn

Key Concepts

- **List** yeast dough ingredients and their functions.
- **Distinguish** between the three different types of yeast doughs.
- **Summarize** the characteristics and uses of rolled-in-fat yeast doughs.

Main Idea

Breads are usually a part of every meal. Learn about the characteristics of quality yeast products to plan a variety of menu accompaniments.

Graphic Organizer

Before you read the section, list the details of what you know already and what you wish to learn about yeast dough products in the first two columns. Fill in the last column after you have read this section.

What I Know	What I Want to Know	What I Learned

 **Graphic Organizer** Go to this book's Online Learning Center at glencoe.com for a printable graphic organizer.

Quality yeast breads can be a substantial part of any meal.

ACADEMIC STANDARDS

Mathematics

NCTM Algebra Use mathematical models to represent and understand quantitative relationships.

Science

NSES B Develop an understanding of chemical reactions.

Social Studies

NCSS II B Apply key concepts such as time, chronology, and change, and show connections among patterns of historical change and continuity.

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards

NCSS National Council for the Social Studies

Yeast Dough Ingredients

From bagels to flaky croissants, breads are usually a part of every meal. Yeast breads appeal to your eyes, nose, and taste buds. Learning about the characteristics of quality yeast products is important to foodservice professionals. It will help you plan a variety of nutritious and flavorful menu accompaniments that delight customers.

Yeast breads and rolls are made from dough. Dough is basically flour or meal mixed with liquid that forms a paste. Yeast **leavens** ('le-vəns), or causes dough to rise as it fills with CO₂ bubbles. This process is called fermentation.

Quality yeast products are the result of a careful balancing act. (Figure 27.1 on page 707 shows how these ingredients work together.) The leavening action of the yeast is balanced with the development of gluten. Gluten, along with wheat protein, gives bread texture. The formation of gluten is controlled by mixing water and wheat flour, and by the way dough is handled during preparation. Most yeast doughs are oven-baked in pans, on sheets, or pushed into the oven on peels. A **peel** is a wooden board that a baker uses to slide breads onto the oven floor or hearth ('härth).

Yeast

As described in Chapter 26, the three most commonly used yeasts in baking are compressed yeast, active dry yeast, and quick-rise dry yeast.

Be sure to check which form of yeast is called for in a formula. Dry yeast is about twice as strong as compressed yeast, but the two forms are similar in taste when the correct proportions are used. When you substitute compressed yeast for dry yeast, use double the amount of dry yeast called for in the formula. When you substitute dry yeast for compressed yeast, use half the amount. Too much or too little yeast will affect the yeast fermentation. Quick-rise dry yeast can be used in the same proportions as active dry yeast.

All yeast is sensitive to temperature. Yeast growth slows down at temperatures below 34°F (1°C). Temperatures above 138°F (59°C) kill yeast cells. The ideal temperature range for yeast fermentation is 78°F to 82°F (26°C to 28°C).

Because yeast loses its potency as it ages, all yeast is labeled with an expiration date. Yeast must be used before this date to produce the best quality yeast products.

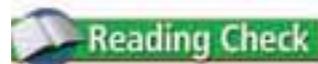
Starters

The unique flavor and texture of some breads, such as sourdough, come from the use of a starter. A **starter** is a mixture of flour, yeast, and a warm liquid that begins the leavening action. A portion of the starter is then used to leaven dough. Sourdough starters are also available as active dry cultures and are used much like dry yeast.

Other Yeast Dough Ingredients

The variety of yeast products you see in a bakery display case all begin with flour, water, and yeast. The type and amount of additional ingredients, along with factors such as shaping and baking methods, determine the end product. Each ingredient in a yeast dough carries out a special function for the end product.

Choosing the appropriate flour is critical to the preparation of quality yeast breads and rolls. Different types of flour give the product different qualities. (For more information on flour, see Chapter 26.)



Define What is leavening?

Small Bites

Use Compressed Yeast To blend compressed yeast with other ingredients, you must first soften the yeast. To soften compressed yeast, mix it with liquid that is about 85°F (29°C). Use a portion of the liquid to be used with the dough.

Baking Yeasts Pictured here are two common types of yeast used in baking. *Why is temperature control important when you prepare yeast doughs?*



FIGURE 27.1 Yeast Dough Ingredient Functions

Proper Functions Each ingredient in a baked good has several functions in a formula.
What ingredients add to a baked good's nutritional value?

Ingredient Function	Flour	Salt	Sugar	Fat	Milk Solids	Water	Yeast
Binds ingredients	✓	✓				✓	
Absorbs liquids	✓	✓	✓		✓		
Adds to shelf life	✓	✓	✓	✓	✓	✓	✓
Adds structure	✓	✓	✓	✓		✓	
Affects eating quality	✓	✓	✓	✓	✓	✓	✓
Adds nutritional value	✓	✓	✓	✓	✓		✓
Affects flavor	✓	✓	✓	✓	✓		✓
Affects rising	✓	✓	✓			✓	✓
Affects gluten	✓	✓	✓	✓		✓	
Adds texture	✓	✓	✓	✓	✓		✓
Colors crust	✓	✓	✓	✓	✓		
Affects shape	✓		✓		✓		
Affects volume	✓	✓			✓		✓
Adds tenderness			✓	✓	✓		

Regular Yeast Doughs

Yeast products are generally classified according to the type of dough used to produce them. Regular yeast doughs are prepared by combining yeast with the other ingredients into one mixture. The three most common regular yeast doughs used in food-service operations are hard lean doughs, soft medium doughs, and sweet rich doughs.

Hard Lean Doughs

A hard lean dough consists of 0% to 1% fat and sugar. Hard lean doughs are the most basic yeast doughs. A **hard lean dough** is often made solely from flour, water, salt, and yeast. Hard lean doughs yield products with a relatively dry, chewy crumb and a hard crust. The crumb is the internal texture of a bread or roll. The **crust** is the outer surface of a bread or roll.

Fats make a hard lean dough easier to manipulate, but they also soften the crumb.

In commercial baking operations, **chemical dough conditioners** such as chlorine dioxide ('klór-ēn dī-'āk-sīd) are sometimes used. These chemical dough conditioners may be added during the baking process to strengthen the glens that give hard lean dough products their dense structure.

Similar to traditional hard lean doughs are whole-grain breads, rye breads, and sourdoughs. Their textures are much more dense because of the coarser, heavier flours and hotter baking methods used. The crumb is chewier and the crust is usually darker and crisper.

Small Bites

Enriched Hard Lean Doughs Hard lean doughs are stiff, dry, and more difficult to work with than soft medium doughs. Some bakers add eggs or oil to hard lean doughs to make them richer. Whole eggs may be added for color, fat, or additional moisture.



Forms of Dough Hard lean doughs are used for breads such as crusty rolls, while soft medium doughs are used for sandwich breads and buns. *What other types of breads are similar to traditional hard lean doughs?*

A TASTE OF HISTORY

1928

Rohwedder bread slicing machine is introduced in Chillicothe, Missouri

1929

Wall Street stock market crash occurs

The Origins of Yeast Doughs

Yeast provides the leavening action in many of the baked goods produced in foodservice. The world's earliest breads were unleavened and made from mixtures of ground grain and water. Archaeological evidence suggests that the Egyptians were making leavened bread as early as 4,000 BCE, and probably began to do so by accident. Unbaked, flattened bread dough left in the open air probably picked up wild yeast spores, leavening the bread.

History Application

Document the effect yeast has on bread dough by photographing the different stages the dough goes through during the breadmaking process. Label the photos during each stage.

NCSS II B Apply key concepts such as time, chronology, and change, and show connections among patterns of historical change and continuity.

is soft and heavy. The high gluten content of bread flour helps sweet rich doughs support the additional fat and sugar.

Most sweet rich doughs are moist and soft. When you work with a sweet rich dough, you may be **tempted**, or enticed, to add more flour to make the dough easier to handle. However, adding flour will toughen the final product. Use only a light dusting of flour on your hands and work surfaces when working with sweet rich doughs.

Many sweet rich dough products are famous for their golden yellow crumb and brown crust. The traditional means of achieving this golden color is to add many eggs to the dough. However, the egg can break down the gluten and make the dough too heavy. Many commercial bakeshops use yellow food coloring to enhance the color of dough. You can also add shortening to increase the dough's richness. Some examples of sweet rich dough products are yeast-raised coffee cakes, cinnamon buns, and doughnuts.



Reading Check

Name What are three types of regular yeast doughs?

Soft Medium Doughs

A **soft medium dough** produces items with a soft crumb and crust. The percentage of fat and sugar in these doughs is 6% to 9%. Soft medium dough is elastic and tears easily.

Yeast products made from soft medium dough include Pullman bread. Pullman bread is white or wheat sandwich bread that is made into squared-off loaves. These loaves get their shape from baking in a 2-pound loaf pan that is enclosed on all sides. Other soft medium dough products include dinner rolls, such as cloverleaf and Parker House rolls.

Sweet Rich Doughs

At the other extreme from regular yeast doughs are sweet rich doughs. A **sweet rich dough** incorporates up to 25% of both fat and sugar. Because sweet rich doughs use such large amounts of fat and sugar, their structure

Rolled-In Fat Yeast Doughs

Bakers use rolled-in fat yeast doughs to make rolls and pastries. Rolled-in fat doughs differ from regular yeast dough.

When you make a **rolled-in fat yeast dough**, combine the fat into the dough through a rolling and folding action. This process yields a dough made of many thin, alternating layers of fat and dough. As the dough bakes, the heated fat layers release moisture in the form of steam. The steam becomes trapped between the layers of dough, pushing them apart and lifting them. The finished products are **notable**, or well known, for their rich, flaky texture. Two popular kinds of rolled-in fat yeast dough products are croissants and Danish pastries.



Sweet Rolls Sweet rich doughs can be used to create a vast array of taste-tempting bread products. *Why are sweet rich doughs so moist and soft?*

Rolled-in fat yeast doughs traditionally use butter for the fat layers. Butter adds a rich flavor and aroma, but it is difficult to handle while rolling and folding. Butter must be at the right temperature. Warm butter is too soft to roll, and cold butter cracks when folded. Instead, you may want to use other high-moisture fats, such as margarine or shortening. They may be substituted partially or completely for the butter. This will improve handling ability and lower costs.

Rolled-in fat yeast doughs also differ from regular yeast doughs in gluten development. Gluten develops during folding and rolling, so little kneading is required with rolled-in fat yeast doughs. Overdeveloping the gluten in a rolled-in fat yeast dough will make the finished product tough and chewy. Larger foodservice operations often use sheeters to ensure consistent rolled-in fat yeast dough production.

Croissants

Croissants are crescent-shaped, flaky rolls. They can be used appropriately for either sweet or savory dishes, including sandwiches. Croissant dough is a soft, wet mixture of bread flour, yeast, cold milk, salt, butter, and a little sugar. You can add dry milk solids and cold water to the dough instead of milk. The cold water or milk slows the leavening action of the yeast. Eggs are not part of the traditional formula, but can be added for additional richness. Butter or another high-moisture fat equal to 25% to 50% of the weight of the dough is rolled in.

A freshly baked croissant should be light golden brown. It should have a flaky, layered texture and an open grain or crumb. Croissant dough can be shaped into traditional crescents or the tighter half circles that Swiss and German bakers call **gipfels** ('gāp-fels).

Danish Pastry

Danish pastry dough is sweeter and richer than croissant dough. Danish pastry is usually eaten as a breakfast or dessert item. Unlike croissant dough, Danish pastry dough is rich in eggs. It can also include milk. Many different flavorings and additives, such as nuts, fruits, extracts, and sugar glazes, make these products tempting treats.

Danish pastry is also softer, flakier, and more tender than croissants. These characteristics, along with a more intense flavor, are because of the Danish pastry's higher percentage of rolled-in fat. This percentage can range from 10% to 50%.

 **Reading Check** **Explain** What is the difference between croissant and Danish pastry dough?



 **Balancing Act** All ingredients in baked products must work together. *What will happen if they do not?*

SECTION 27.1 After You Read

Review Key Concepts

1. **Describe** the function of a starter.
2. **List** products that can be made from a soft medium dough.
3. **Summarize** the characteristics of a quality croissant.

Practice Culinary Academics



Science

4. **Procedure** Make a yeast balloon. Take a balloon and stretch it out by blowing it up a few times. Add a packet of yeast and 2 tablespoons of sugar to 1 cup of very warm water. Once the yeast and sugar have dissolved, pour the mixture into a bottle and stretch the balloon over the mouth of the bottle.

Analysis What happens to the balloon? Keep a log of any events, and write a summary of what happened, and why you think any changes occurred.

NSES B Develop an understanding of chemical reactions.



Mathematics

5. Christine has baked 80 croissants to sell at her bakery. Each croissant costs Christine \$0.60 to make, and she sells each one for \$1.25. How many croissants must Christine sell during the day to cover the cost of the products used to make the croissants?

Math Concept **Calculating Profit** Calculate profit with the formula $\text{Profit} = \text{Income} - \text{Expenses}$. A positive result represents a profit, while a negative answer indicates a loss. The break-even point occurs when $\text{income} = \text{expenses}$.

Starting Hint Christine's expenses will equal $80 \times \$0.60 = \48 . Determine the break-even point by calculating the number of croissants (x) needed for income to equal expenses: $\$1.25(x) = \48 . The next whole number higher than x will represent a profit.

NCTM Algebra Use mathematical models to represent and understand quantitative relationships.



Check your answers at this book's Online Learning Center at glencoe.com.

Yeast Dough Production

You must carefully prepare yeast dough for it to rise correctly.

Reading Guide

Before You Read

Think of an Example Look over the Key Concepts for this section. Think of an example of how or when you could use one of the skills from the Key Concepts. Thinking of how you might apply a skill can help motivate your learning by showing you why the skill is important.

Read to Learn

Key Concepts

- **Describe** the mixing methods for yeast doughs.
- **Outline** the stages in properly preparing yeast doughs.
- **Demonstrate** the baking of quality yeast breads.
- **Illustrate** how to cool, store, and serve yeast breads.

Main Idea

Yeast dough production requires proper mixing and careful preparation. A baker must learn to avoid common causes of failure when preparing yeast doughs.

Content Vocabulary

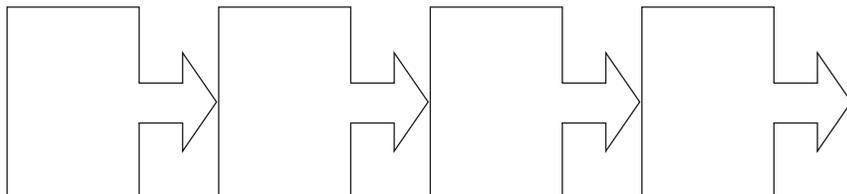
- straight-dough method
- modified straight-dough method
- sponge method
- preferment
- let down
- continuous bread-making
- punch
- rounded
- bench box
- bench rest
- shape
- seams
- pan loaf
- free-form loaf
- pan
- proof
- wash
- slash
- dock
- oven spring

Academic Vocabulary

- critical
- correspond

Graphic Organizer

Use this sequence chart to list the four stages of baking in sequence.



Graphic Organizer Go to this book's Online Learning Center at glencoe.com for a printable graphic organizer.

ACADEMIC STANDARDS

Mathematics

NCTM Number and Operations Compute fluently and make reasonable estimates.

NCTM Measurement Understand measurable attributes of objects and the units, systems, and processes of measurement.

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards

NCSS National Council for the Social Studies

Yeast Dough Preparation

The production of quality yeast breads and rolls requires good technique, patience, and creativity. To produce a good yeast product, you will need to learn dough mixing methods.

The steps involved in making yeast breads vary depending on the type of dough that is used and the item that is being produced. However, the same general stages apply to all yeast dough products:

1. Scaling ingredients
2. Mixing and kneading
3. Fermentation
4. Dividing dough
5. Rounding dough
6. Bench rest
7. Shaping dough
8. Panning dough
9. Final proofing
10. Baking dough
11. Cooling dough
12. Packaging dough

Keep these quality guidelines in mind:

- Maintain personal cleanliness at all times.
- Keep utensils, materials, and machinery clean and in good working order.
- Use the best quality ingredients.
- Read all formulas carefully and measure ingredients properly.
- Maintain the appropriate environmental temperatures.
- Regulate dough temperatures.
- Serve only freshly baked and properly stored yeast products.

Mixing Methods

There are three basic methods of mixing yeast dough ingredients: the straight-dough method, the modified straight-dough method, and the sponge method. Each of these methods gives its own characteristics to the finished product. Each method also affects the activity of the yeast and the formation of the gluten.

Straight-Dough Method

You will use the straight-dough method to mix the ingredients for most basic breads. The **straight-dough method** calls for mixing all the ingredients together in a single step. Ingredients may be mixed by hand or with a bench mixer. The straight-dough method is the method by which nearly all the bread in the world is made.

In doughs mixed by the straight-dough method, the yeast begins acting on all the ingredients immediately. As you continue mixing or working the dough, the gluten develops.

Modified Straight-Dough Method

The **modified straight-dough method** breaks the straight-dough method into steps. These steps allow for a more even distribution of sugars and fats throughout the dough. This modification is commonly used to prepare rich doughs.

Sponge Method

Some yeast products, such as crusty hearth breads or sweeter doughs, benefit from the sponge method. The **sponge method** allows the yeast to develop separately before it is mixed with the other ingredients. The sponge method mixes the dough in two stages to give yeast extra time to leaven the bread. This method results in a more intense flavor and a lighter, airy texture. The sponge method makes a very soft, moist, and absorbent dough.

Preferment One modification of the sponge method is sometimes called the preferment method. **Preferment** is the process of removing a portion of the dough. It is kept dormant for 8 to 24 hours and then added to the next day's bread products. This method enhances the fermentation, color, and taste of the final baked products.

 **Reading Check** **Examine** What is the main benefit of using the sponge method?

Use the Modified Straight-Dough Method

- 1 Combine the fat, sugar, salt, milk solids, and flavorings in the mixer. Mix well, but do not whip.



- 2 Add eggs one at a time, as they are absorbed into the mixture.



- 3 Add the rest of the liquids and mix briefly.

- 4 Add the flour and the yeast last.

- 5 Mix until a smooth dough forms.



Stages of Making Yeast Dough

Because each step in the process of making yeast dough is critical, it is important that you complete each step in the proper order. Skipping any steps or being unprepared for a step can lead to the failure of your product.

Scaling Ingredients

Accurate, or correct, measurement, or scaling, of all ingredients is **critical**, or necessary, in the preparation of yeast doughs. Successful formulas are based on proportional mixtures of ingredients. Too much or too little of an ingredient will affect yeast activity, gluten formation, and product quality.

Use a baker's scale to weigh all ingredients that are denser than milk or water. This includes flour, yeast, shortening, eggs, honey, molasses, malt, and oil. Milk and water may be measured with volume measures.

Scale each ingredient separately. Make sure the weight of each ingredient will **correspond** to, or match, the weights called for in the formula. Remember that weight and volume are not the same unit of measurement. Even a small error in measuring can cause a baked product to fail. This will waste time, and will cost extra money through wasted resources. In some formulas, ingredients are given as a percentage of the total weight of the flour. Foodservice operations usually post procedures for converting percentages to weights and weights to percentages.

Use the 240 Factor

The desired dough temperature for yeast dough is 80°F. Several factors affect dough temperature, including flour temperature, room temperature, friction temperature (which depends on the mixer speed), and water temperature. Of these, only the water temperature can be easily modified by the baker. Commercial bakers use a shortcut known as the 240 Factor to easily calculate desired water temperature. Simply add together the flour, room, and friction temperatures, and subtract that total from 240°F. The result is the target water temperature.

Find the ideal water temperature for yeast rolls given the following conditions: flour temperature = 62°F; room temperature = 25°C; and friction temperature = 30°F.

Math Concept **Converting Temperature**

Celsius temperatures (C) can be converted to Fahrenheit (F) using the following formula:
 $F = (9/5 \times C) + 32$

Starting Hint Because the 240 Factor calculations utilize degrees Fahrenheit, start by converting the room temperature from Celsius to Fahrenheit using the conversion formula above. Then add the three temperatures (flour, room, and friction), and subtract that sum from 240 to get the desired water temperature.

NCTM Number and Operations Compute fluently and make reasonable estimates.

Mixing and Kneading

When you mix dough ingredients thoroughly, it ensures even yeast distribution, gluten development, and a uniform mixture. Be careful not to overmix, as it can lead to let down. A **let down** is a condition in which the ingredients in a dough completely break down. Once the ingredients are mixed, the dough must be kneaded to further develop the gluten. Kneading means to work the dough until it is smooth and elastic.

In **continuous breadmaking** or commercial baking, mixing and kneading are done in a spiral mixer.

There are four stages to the continuous breadmaking process:

- **Pickup** Use a low speed to mix the water and yeast. If oil is used, add it immediately after the liquid ingredients. Then, incorporate the dry ingredients, and add solid fats or shortenings last. Once all ingredients have been added to the mixer, turn the speed to medium.
- **Cleanup** During this stage the ingredients come together into a ball around the dough hook. The bottom of the mixing bowl can be clearly seen. All liquid is absorbed into the flour.
- **Development** During this longest stage of mixing and kneading, oxygen is incorporated into the dough and gluten is developed. The dough will be uneven in color and will tear easily.
- **Final Clear** This stage is reached when proper gluten has developed. To verify gluten formation, cut off a small piece of dough and stretch it apart with your fingers. It should stretch to such a thinness that light can be seen through the dough. You should also be able to stretch the dough several times without it breaking. At this point, remove the dough from the mixer.

Fermentation

Once a regular yeast dough has been kneaded thoroughly by hand or has reached the final clear stage in a mixer, the dough is ready for fermentation. Fermentation is the process by which yeast converts the sugars in dough into alcohol and carbon dioxide. Gases that are trapped in the gluten cause the dough to rise.

For fermentation to take place, you must:

- Shape the kneaded dough into a ball.
- Coat it with a thin film of oil.
- Cover the dough to keep it from drying out. Avoid popping any bubbles that may appear beneath the dough surface.
- Place the dough in a proofing cabinet, or proofer.

Use the Sponge Method

- 1 Combine 50% water with 50% flour.



- 2 Add the yeast. Sugar or malt may also be added to this mixture to promote faster yeast growth.



- 3 Cover the sponge. Let it rise in a warm place for two to three hours or until it doubles in bulk.



- 4 Combine the sponge with the remaining ingredients either by hand or in a mixer.

Use a probe thermometer to measure the dough temperature before you place it in the proofer. If you are not using a proofer, regularly measure dough temperature throughout fermentation. Remember that allowing dough to become too cool will slow yeast action, while heat over 90°F (32°C) will cause fermentation to accelerate.

Fermentation is complete when the dough has approximately doubled in size. Although you will be able to see the increased volume of the dough, there is a way you can test to see if it is ready. You can test whether fermentation is complete by inserting two fingers into the dough up to the knuckles and then removing them. If the finger pressure leaves a slight impression around which the dough closes very slowly, fermentation is complete. The dough is then ready to be punched.

Punching Dough

The action of turning the sides of the dough into the middle and turning the dough over is called **punching**. This is done by pressing gently and firmly, not by hitting or kneading the dough.

Small Bites

Overmixing If you overmix or over knead a regular yeast dough, you will cause the ingredients in the dough to let down. Once the ingredients have let down, they have broken down completely. Overmixed dough is warm and sticky and falls apart easily. Adding flour can help offset overmixing to a certain extent. However, it is better to avoid overmixing dough in the first place.

Punching accomplishes four important actions:

Maintains Dough Temperature By effectively turning the dough inside out, punching moves the cooler exterior surfaces to the middle. This evens the dough temperature.

Releases Carbon Dioxide If too much of the gas developed during this first stage of fermentation remains within the dough, it will become concentrated and slow the later stages of fermentation.

Introduces Oxygen Punching the dough incorporates oxygen from the air.

Develops Gluten Any handling of the dough strengthens the gluten.

Dividing Dough

Once the dough has been punched, it must be divided for baking. Commercial bread formulas give portions by weight. To divide dough, use a bench scraper to cut the dough

into uniform pieces. Weigh the pieces on a baker's scale, as when scaling ingredients.

You will need to work quickly when you portion dough. Fermentation continues during this process. The last pieces portioned may become over fermented if there is any delay. Keep the large mass of dough covered as you work so that its surface does not dry out. If any small pieces of dough are left, divide them evenly and add them to the larger pieces. Tuck them under each portion so that they will be well incorporated. Otherwise, the smaller pieces will ferment too fast.

Rounding Dough

Divided dough must be **rounded**, or shaped into smooth balls. To do this, put the dough on the bench. With the palm of your hand, cup the dough with a circular motion, working the dough with your fingertips. This will cause the dough to form into a smooth, firm, round ball.

HOW TO

Knead Yeast Dough

1 Grasp the dough and bring it toward you.



2 Flip the dough, then form a fist and push the dough away with your knuckles.



3 Repeat the process until the dough is smooth and elastic.



Rounding dough provides it with a skin to prevent the loss of too much carbon dioxide. Some formulas call for the dough to be folded over during rounding. This provides a kind of second punching after dividing. If the dough is not rounded, it will rise and bake unevenly, with a lumpy or rough surface.

When you round, perform each of the subsequent actions, such as shaping and panning, in the same order, so that the dough ferments consistently. The first portion rounded should also be the first piece to be shaped, and so on.

Bench Rest

Depending on the formula, at this time the rounded portions may need to be placed in bench boxes or left covered on the work bench. A **bench box** is a covered container in which dough can be placed before shaping. This short, intermediate proofing stage, called a **bench rest**, allows the gluten to relax. The dough becomes lighter, softer, and easier to shape.

Shaping Dough

Once the portions have been properly rounded and, if necessary, rested, they must be shaped. **Shaping** forms the dough into the distinctive shapes associated with yeast products.

Some general principles apply to the shaping process:

- **Work Quickly** Fermentation continues during shaping. Cover the portions you are not working with to prevent them from drying out.
- **Shape Pieces in Order** Start with the first piece you rounded. Keep the same order to ensure consistency.
- **Use Very Little Flour** A dusting of flour on your hands and the work surface will keep the dough from sticking. Too much will dry it out.
- **Place Any Seam at the Bottom** **Seams**, or the places where edges of the dough meet, should be straight and tight. The seam is the weakest part of the piece. Seams can open during baking and ruin the product's shape.

- **Shaping Loaves** Although bread loaves come in a wide variety of textures and tastes, there are essentially two ways to shape dough into loaves. **Pan loaves** are rolled and placed, seam down, into prepared loaf pans. In baking, loaves receive their characteristic shape from the support offered by the high sides of the loaf pans. **Free-form loaves**, such as braided loaves and artisan breads, are shaped by hand. They are baked, seam side down, on flat pans, and they can be baked directly on a hearth.
- **Shaping Rolls** Yeast rolls are like individually portioned loaves. Shape rolls with the same care used to shape loaves. This will produce items with an attractive, even surface and uniform size. Depending on the formula, rolls may be shaped and baked on flat sheets, like free-form loaves. They may also be placed in special pans that offer additional structure during baking. Cloverleaf and butterflake rolls, for example, are baked in greased muffin pans. Brioche (brē-'òsh) rolls, like brioche loaves, are baked in special fluted tins. Pan rolls, Parker House rolls, and knots are baked on flat sheets or in shallow baking pans.

When you pan rolls, allow enough room between the rolls to ensure even browning. Avoid crowding. Most formulas indicate how many rolls will fit on a sheet and how they should be placed.

Panning Dough

Shaped dough is ready for **panning**, or placing in the correct type of pan. Pizza is sometimes shaped directly on the pan. Other breads are shaped on the bench. Each formula specifies the size and type of pan to be used and indicates how the pan should be prepared. In general, pans dusted with cornmeal are used for baking lean doughs. The cornmeal keeps the baked product from sticking to the pan. It does not change the flavor. Sheet pans that have been lined with parchment or lightly greased are used for soft medium doughs.

Final Proofing

The final fermentation stage for regular yeast dough items is called final proofing. **Proofing** allows the leavening action of yeast to achieve its final strength before yeast cells are killed by hot oven temperatures. Yeast dough items are proofed once they have been shaped and panned.

Final proofing requires higher temperatures and humidity levels than fermentation—temperatures of 85°F to 95°F (29°C to 35°C) and humidity levels of 80% to 90%. The use of a proofer is essential to maintain these conditions.

The length of the final proofing time depends on the type of dough. Most doughs are fully proofed when finger pressure leaves an indentation that closes slowly around the center but does not collapse. Fully proofed items are slightly less than double in size.

Proofing time is shortened for rich and sweet doughs. This is done to keep the weight

of the heavier dough from collapsing during baking. Some other items, such as rye breads, are also deliberately underproofed. Underproofed dough is known as young dough. Overproofed dough, or dough that has more than doubled in size during final proofing, is called old dough.

Washing, Slashing, and Docking

Many yeast dough products require special additional preparations before baking. These preparations, called washing, slashing, and docking, affect the baking quality and eye appeal of the finished items.

Washing Applying a thin glaze of liquid to the dough's surface before baking is called **washing**. Depending on the type of item and the wash used, washing can lighten or darken the crust's color, and make the surface shiny and glossy. (See **Figure 27.2** on page 721 for different types of washes and how they affect baked goods.)

HOW TO

Create a Braided Loaf

- 1 Divide dough into three parts. Roll into three equal strips.



- 2 Cross strip 3 over strip 2. Cross strip 1 over strip 2. Cross strip 2 over strip 1. Repeat until half the bread is braided.



- 3 Flip the bread over so the three unbraided strips are facing you. Repeat step 2 until the whole loaf is braided.



Soft Rolls

YIELD: 26 LBS., 15 OZ. (18 DOZEN)
SERVING SIZE: ONE 2-OZ. ROLL

Ingredients

9 lbs.	Water
1 lb.	Dry milk solids
1 lb.	Sugar, granulated
8 oz.	Yeast, compressed
14 lbs.	Flour, bread
4½ oz.	Salt
1 lb.	Shortening, vegetable

Method of Preparation

1. Gather the equipment and ingredients.
2. Scale the ingredients.
3. Soften the compressed yeast in part of the water. The water temperature should be 78°F to 82°F (26°C to 28°C).
4. Use the straight-dough method for mixing the dough. Combine all of the ingredients in the bench mixing bowl.
5. Mix until proper gluten development occurs. To test the gluten development, cut a small piece of dough from the mass in the bowl. Stretch the dough to a thinness that allows light to clearly shine through. If the dough can be stretched a few times without tearing, it is ready for fermentation.
6. Lightly coat the dough with oil before putting it into the proof box.
7. Ferment the dough.
8. Punch the dough down when it is almost double in bulk. (See Chef Notes.)
9. Divide the dough using a bench scraper.
10. Round the dough.
11. Allow the dough to rest for a short time to relax the gluten.
12. Shape the rolls.
13. Place the rolls in parchment-lined or lightly-greased pans.
14. Put the panned rolls into the proofing cabinet to ferment prior to baking. (See Chef Notes.)
15. Bake the rolls at 375°F (191°C) for 20 minutes or until evenly browned.

International Flavor

Bread is a staple in many countries, especially in Europe, and the soft roll is a favorite. Research these rolls from other cultures, and create a visual presentation to show the differences in shape.

- Brioche (France)
- Baps (Scotland)
- Potato roll (Ireland)

Cooking Technique

Pastry Technique (See the Method of Preparation.)

Chef Notes

To test the dough for punching readiness, insert two fingers into the dough. If the indentation remains, the dough is ready for punching. The rolls are properly proofed when almost double in bulk, or when the dough closes around a finger indentation without collapsing.

Substitutions

- Use butter instead of shortening for a richer flavor.
- Add crumble topping for coffee rolls, cinnamon or pecans to transform the rolls into sweet treats.

Glossary

Gluten elastic protein substance that makes dough stay together
Fermentation breakdown of a compound caused by an enzyme, such as yeast

HACCP

- Bake at 375°F (191°C)

Hazardous Foods

- Yeast

Nutrition

Calories 140	Calories from Fat 25
Total Fat 2.5g	
Saturated Fat 0.5g	
Trans Fat 0g	
Cholesterol 0mg	
Sodium 250mg	
Total Carbohydrate 25g	
Fiber 1g	
Sugars 3g	
Protein 5g	
• Vitamin A 0%	• Vitamin C 0%
• Calcium 4%	• Iron 2%

FIGURE 27.2 Baking Washes

Wash Types A wash can give an enhanced color and gloss to baked yeast rolls. *With what other baked goods can you use a wash?*

Desired Effect	Type of Wash
A crisp crust	Water
A glossy, firm crust	Egg white and water
A deep-colored, glossy crust	Whole egg and water
A deep-colored, soft, glossy crust	Whole egg and milk
A deep-colored, soft crust	Milk

Apply the wash with a pastry brush, either before or after proofing. Check the formula for timing. If you apply the wash after proofing, be careful not to puncture the surface and deflate the dough. Avoid puddling or dripping egg washes, which cause uneven browning. Excess washing can burn or cause items to stick to the pan.

Slashing Making shallow cuts in the surface of the item, done just before baking, is called **slashing**. Slashing, also called stippling, helps gases escape from hard-crustured breads during baking. This allows for higher rising and the development of a more tender crumb. Improperly slashed breads will burst or break along the sides during baking. The patterns made by slashing, which leave a scarred or cross-hatched impression in the baked crust, also add visual appeal.

To slash dough, follow these guidelines:

1. Use both hands, steadying the item with one hand while you cut with the other.
2. Use a utility blade; a sharp, unserrated knife; or a clean, sharp razor. Blunt or serrated edges bruise or tear the surface of the dough.
3. Make shallow, slightly angled cuts, just under the surface of the dough.
4. Make all cuts of equal length, overlapping cuts by one-third of their length.
5. Make the slashes on the full surface of the dough in a symmetrical pattern.



Bread Slashes Use a utility blade or sharp knife to make slashes. *Why are many breads slashed before baking?*

Docking The process of making small holes in the surface of an item before baking is called **docking**. Used primarily with rich doughs or rolled-in doughs, docking allows steam to escape and promotes even baking. Docking also keeps rich doughs from rising too much during baking. Follow the formula's directions for docking. Use a sharp-tined fork or a skewer to dock the dough.



Reading Check

Explain When does fermentation take place?

Baking Yeast Dough

Baking is the process that changes dough into breads or rolls through the application of heat. Oven temperature and baking time are determined by five factors.

- **Dough Type** Young, under fermented doughs require cooler oven temperatures, higher humidity, and longer baking times than fully proofed doughs. Old, over fermented doughs require higher oven temperatures, less humidity, and shorter baking times.
- **Dough Richness** Lean doughs require higher oven temperatures and shorter baking times. Rich doughs require lower oven temperatures and longer baking times.
- **Portion Size** Smaller items, such as rolls, require shorter baking times than larger items, such as loaves.
- **Desired Color** The desired color of the crust often depends on the tastes of the customer. Higher oven temperatures

Sanitation Check

✓ Avoid Contamination

Never apply an egg wash to a product that has already been baked. The egg will remain uncooked, presenting the risk of salmonella bacteria.

CRITICAL THINKING *When should you apply an egg wash to the product?*

and longer baking times generally yield a darker crust color than lower temperatures and shorter baking times. An egg wash can add color to a crust that must be baked at a low temperature or for a short time. Egg washes should never be added to baked goods after baking. This can create a potential for foodborne illness, and will make the baked product soggy.

Formulas will list the ideal oven temperature and baking time. Slight adjustments may be necessary. Appropriate placement of pans in the oven is also important. Air and heat must be allowed to circulate freely around the pans. This can be accomplished by placing pans at the appropriate distance from the heating element. Crowding the oven slows baking time and results in unevenly baked items.

Baking with Steam

Breads with thin, crispy crusts, such as French and Italian loaves, benefit from the addition of steam to the oven during baking. The steam keeps the crumb soft while adding a glossy shine to the surface. As the sugars in the crust caramelize, a thin, crispy crust is formed.

Some bakery ovens are equipped to inject a desired amount of steam into the oven for several seconds depending on the type of bread and the formula. In ovens without steam injectors, a pan can be added with just enough water so the water evaporates during the early stages of baking.

Stages of Baking

As yeast dough products bake, their internal temperatures rise. Each of the four stages of the baking process contributes to the final product.

Oven Spring

During the first five minutes of baking, the dough suddenly rises and expands as the yeast reacts to the heat of the oven. This final leavening effort, occurring before internal temperatures become hot enough to kill the yeast cells, is called **oven spring**.

Steam injection helps achieve oven spring. Oven spring will not occur if there is too much salt or not enough yeast in the dough or if the dough was overproofed. At this early stage, the dough is very soft and will collapse if touched.

Structure Develops

As the internal temperature rises from 130°F (54°C), starch granules in the dough begin to absorb moisture and swell up. At 150°F (66°C), the starches gel and become the final structure of the bread. At 165°F (74°C), the gluten begins to dry out and coagulate as the starch gel replaces it. The crumb is formed during this stage.

Crust Forms

At 165°F (74°C), the crust begins to form as the starches and sugar on the surface of the dough brown and thicken. The product will appear done at this stage, but additional baking time is needed to evaporate the alcohol given off by the yeast. Yeast products removed from the oven too early will not taste right.

Finished Product

By the time the internal temperature has reached 176°F (80°C), the alcohol will have evaporated. Finished products have an internal temperature of approximately 220°F (104°C).

Test for Doneness

A gauge of whether a product is done is the thump test. Tap the top of the loaf. If the loaf gives off a hollow sound, indicating that it is filled with air and not moisture, it is done. Watch rolls and small loaves carefully, as their bottom surfaces may burn before the crust color develops fully.

Another way to test for doneness is to look at the crust. If it is evenly brown on top and bottom, it is done. **Figure 27.3** explains some common problems when baking yeast dough.



Reading Check

Summarize What happens during oven spring?

Cooling, Storage, and Serving

Once a yeast dough product is removed from the oven, it must be cooled and stored properly to maintain the highest possible quality.

- Remove yeast products from their pans immediately.
- Place them on cooling racks or screens at room temperature. One exception is rolls baked on sheets. These may be left on the sheets to cool, if they are well spaced.
- Cool yeast products completely before slicing or wrapping.

Glazing

In some cases, you will brush melted butter or shortening or a glaze onto a hot yeast dough product immediately after removing it from the oven. Sweet dough products such as coffee cake and Danish pastry may be glazed with a mixture of water and sugar or corn syrup while they are still warm.

Staling Prevention

Yeast dough products begin the process of staling as soon as they are baked. Staling causes yeast dough products to lose their freshness. During staling, the crust becomes moist and tough, while the interior crumb of the bread becomes dry and crumbly. Staling also causes breads to lose flavor.

Small Bites

Altitude The moisture in dough evaporates more slowly at higher altitudes, such as those found in mountainous areas. Oven temperatures may need to be increased slightly in high altitudes to prevent the dough from expanding too much and breaking down the cell structure in the bread.

FIGURE 27.3 Yeast Bread Troubleshooting

Common Problems There are many problems that can go wrong when baking yeast bread.

How do you know if a loaf of yeast bread is baked properly?

Product Failure	Possible Cause
Poor shape	<ul style="list-style-type: none"> • Too much liquid in dough • Improper shaping of dough • Incorrect proofing • Too much steam in oven
Blisters on crust	<ul style="list-style-type: none"> • Too much liquid in dough • Improper fermentation
Top crust separates from the loaf	<ul style="list-style-type: none"> • Loaf poorly shaped • Top not slashed • Dough dried out during proofing • Lack of moisture in oven
Large holes in crumb	<ul style="list-style-type: none"> • Too much yeast • Over kneaded dough • Inadequate punching of dough
Poor flavor	<ul style="list-style-type: none"> • Improper fermentation • Inferior, spoiled, or rancid ingredients

You can slow the staling process:

- **Additions to Dough** Depending on the formula, ingredients such as malt syrup may be added to the dough at the mixing process to help slow staling.
- **Adequate Proofing** Underproofed items stale more quickly than those that have received proper proofing.
- **Avoid Refrigeration** Refrigeration speeds up the staling process of yeast breads.

Proper Packaging and Storage

Do not wrap products while they are still warm. Most breads should not be kept for more than one day in a foodservice operation. If you will be keeping them longer than one day, wrap them tightly in moisture-proof wrapping and store them in a freezer to prevent staling. Items with thin crusts, such as French bread, should be wrapped in paper when they are stored. If thin-crust products are wrapped in plastic, they will become soggy.



Reading Check

Explain How do you prevent staling in yeast doughs?

SECTION 27.2



After You Read

Review Key Concepts

1. **Describe** the straight-dough mixing method.
2. **Outline** the stages in mixing and kneading yeast dough.
3. **List** the factors that determine oven temperature and baking time.
4. **Illustrate** how to properly pack a yeast bread.

Practice Culinary Academics



Mathematics

5. Ryan has just finished baking two baguettes. One of them is 55 centimeters long; the other is 61 centimeters in length. What is the length of each baguette in millimeters? In meters? In kilometers?

Math Concept Metric Length Equivalents

The metric system of measurement is based on powers of 10. One millimeter is 1/1000 of a meter, or 0.001 meters. One centimeter is 1/100 of a meter, or 0.01 meter. One kilometer is 1,000 meters.

Starting Hint One millimeter is 1/10 smaller than one centimeter, so multiply centimeters by 10 to find millimeters. Divide centimeters by 100 to find meters. Divide that meter amount by 1,000 to find kilometers.

NCTM Measurement Understand measurable attributes of objects and the units, systems, and processes of measurement.



Check your answers at this book's Online Learning Center at glencoe.com.

Chapter Summary

Yeast breads are made from dough, a mixture of flour, water, salt, yeast and other ingredients. Yeast dough products are classified according to the type of dough used to produce them.

Regular yeast dough is first kneaded thoroughly, by machine or by hand, and then fermented. Lack of interaction between ingredients can cause failure.

Content and Academic Vocabulary Review

1. Use each of these vocabulary words in a sentence.

Content Vocabulary

- leavens (p. 706)
- peel (p. 706)
- starter (p. 706)
- hard lean dough (p. 708)
- crust (p. 708)
- chemical dough conditioners (p. 708)
- soft medium dough (p. 709)
- sweet rich dough (p. 709)
- rolled-in fat yeast dough (p. 709)
- gipfels (p. 710)
- Danish pastry dough (p. 711)
- straight-dough method (p. 713)
- modified straight-dough method (p. 713)
- sponge method (p. 713)
- preferment (p. 713)
- let down (p. 715)
- continuous breadmaking (p. 715)
- punch (p. 716)
- rounded (p. 717)
- bench box (p. 718)
- bench rest (p. 718)
- shape (p. 718)
- seams (p. 718)
- pan loaf (p. 718)
- free-form loaf (p. 718)
- pan (p. 718)
- proof (p. 719)
- wash (p. 719)
- slash (p. 721)
- dock (p. 722)
- oven spring (p. 722)

Academic Vocabulary

- tempted (p. 709)
- notable (p. 709)
- critical (p. 714)
- correspond (p. 714)

Review Key Concepts

2. **List** yeast dough ingredients and their functions.
3. **Distinguish** between the three different types of yeast doughs.
4. **Summarize** the characteristics and uses of rolled-in fat yeast doughs.
5. **Describe** the mixing methods for yeast doughs.
6. **Outline** the stages in properly preparing yeast doughs.
7. **Demonstrate** the baking of quality yeast breads.
8. **Illustrate** how to cool and store yeast breads.

Critical Thinking

9. **Imagine** you have a customer who is following a low-fat diet. Which would you recommend: Italian bread, Parkerhouse rolls, or croissants? Why?
10. **Examine** seasonings. You have a basic formula for white yeast bread. What could you do to make the final product more flavorful?

Academic Skills

**English Language Arts**

- 11. Bread in Many Languages** Find the names of different types of yeast breads from around the world. What are the names of the different bread products and what do they mean in the language of origin? Write a list of the names, their countries of origin, and their meanings in their native languages. Compare lists as a class.

NCTE 9 Develop an understanding diversity in language use across cultures.

**Social Studies**

- 12. Breads Around the World** Study yeast breads from various countries. What are the similarities and what are the differences? Can you think of possible factors that may have contributed to these similarities and differences? What aspects of the culture contributed to the features of the yeast breads of that culture? Create a five-minute presentation that discusses three different examples of yeast breads, and how and why they differ.

NCSS IV E Individual Development and Identity Examine the interaction of ethnic, national, or cultural influences in specific situations or events.

**Mathematics**

- 13. Donut Deal** Bob recently began advertising his bakery in a local newspaper. The ad included a coupon for 25¢ off each donut purchased. On the first day of the new promotion, Bob sold 265 donuts, bringing in \$238. However, Bob realized that his cashier was throwing away the coupons redeemed, and he does not know how many were used. If a regular donut sells for \$0.95, and a discounted donut (with coupon) sells for \$0.70, how many discounted donuts were sold?

Math Concept Distributive Property of Multiplication Multiplying a sum (or a difference) by a number is the equivalent of multiplying each addend by that same number, and then adding the two products. For example, $7(4 + 2)$ is the same as $(7 \times 4) + (7 \times 2)$.

Starting Hint The problem can be solved with an algebraic equation. Let d stand for the number of discounted donuts sold. Then $(265 - d)$ must equal the number of regular-price donuts sold. Multiply the price of each type of donut by the quantity of each type of donut to find total revenue: $(\$0.95)(265 - d) + (\$0.70)(d) = \$238$. Solve for d .

NCTM Algebra Represent and analyze mathematical situations and structures using algebraic symbols.

Certification Prep

Directions Read the questions. Then, read the answer choices and choose the best possible answer for each.

- 14.** What is the ideal temperature range for yeast fermentation?
- 78°–82°F
 - 80°–90°F
 - 85°–95°F
 - 176°–220°F
- 15.** What is a lean dough product often eaten at breakfast?
- croissant
 - sourdough
 - bagel
 - cinnamon buns

Sharpen your test-taking skills to improve your kitchen certification program score.

Test-Taking Tip

Use familiar word parts, such as suffixes and prefixes, to help you remember new definitions.

Real-World Skills and Applications

Interpersonal and Collaborative Skills

- 16. Promote a Yeast Bread** Follow your teacher's instructions to break into teams. Imagine that your team is an ad agency developing a print ad for a particular yeast bread product. Describe the product, its qualities, its nutritional benefit, and suggested uses in your ad. Use photographs or illustrations in your ad, if possible. Share your team's ad with the class. As a class, rate each ad's effectiveness.

Self-Management Skills

- 17. Trim the Fat** Your doctor has recommended that you lower your fat intake. Examine your yeast bread product consumption and recommend ways you can change the types of bread products you eat to lower your fat intake. Make a list of the substitutions. List specific ingredients in the products that may increase fat intake.

Technology Applications

- 18. Internet Research** With your teacher's permission, use the Internet to research one yeast bread product. Learn about the ingredients of that product and how it is made, as well as the texture, appearance, and flavor of the final product. Share your findings with the class through a five-minute oral presentation. Use slides, photographs, or illustrations with your presentation, if possible.

Financial Literacy

- 19. Purchase Yeast** Samara bought 8 ounces of instant yeast for \$3. She used about $\frac{3}{4}$ of it before it had to be thrown away. Anita bought an 8-ounce bag of active dry yeast for \$5 and was able to use it all because it kept longer. Compare each person's usage. Who made the more cost-effective choice?

Culinary Lab



Use the culinary skills you have learned in this chapter.

Bake Soft Rolls

- 20. Baking as a Team** In this lab exercise, you will work in teams to prepare soft rolls.
- Examine your formula.** In teams, review the formula for soft rolls on page 720. Note the necessary ingredients and equipment.
 - Make dough.** Prepare the dough.
 - Observe the process.** Make observations about the type of yeast used, the optimal temperature for the yeast, the texture and feel of the dough, which mixing method was used, what bread-baking stages were followed, how the team tested for doneness, and what the characteristics of the end product were.
 - Serve the rolls.** Serve the rolls and have a contest to determine which team's soft rolls were the best.

Create Your Evaluation

Evaluate each team's bread by creating a scoring sheet and giving each team a score in the following categories: Shape, Volume, Crumb, Crust, Color, Tenderness, and Taste. Rate each category on a scale of one to four. 1 = Poor; 2 = Fair; 3 = Good; and 4 = Great.