

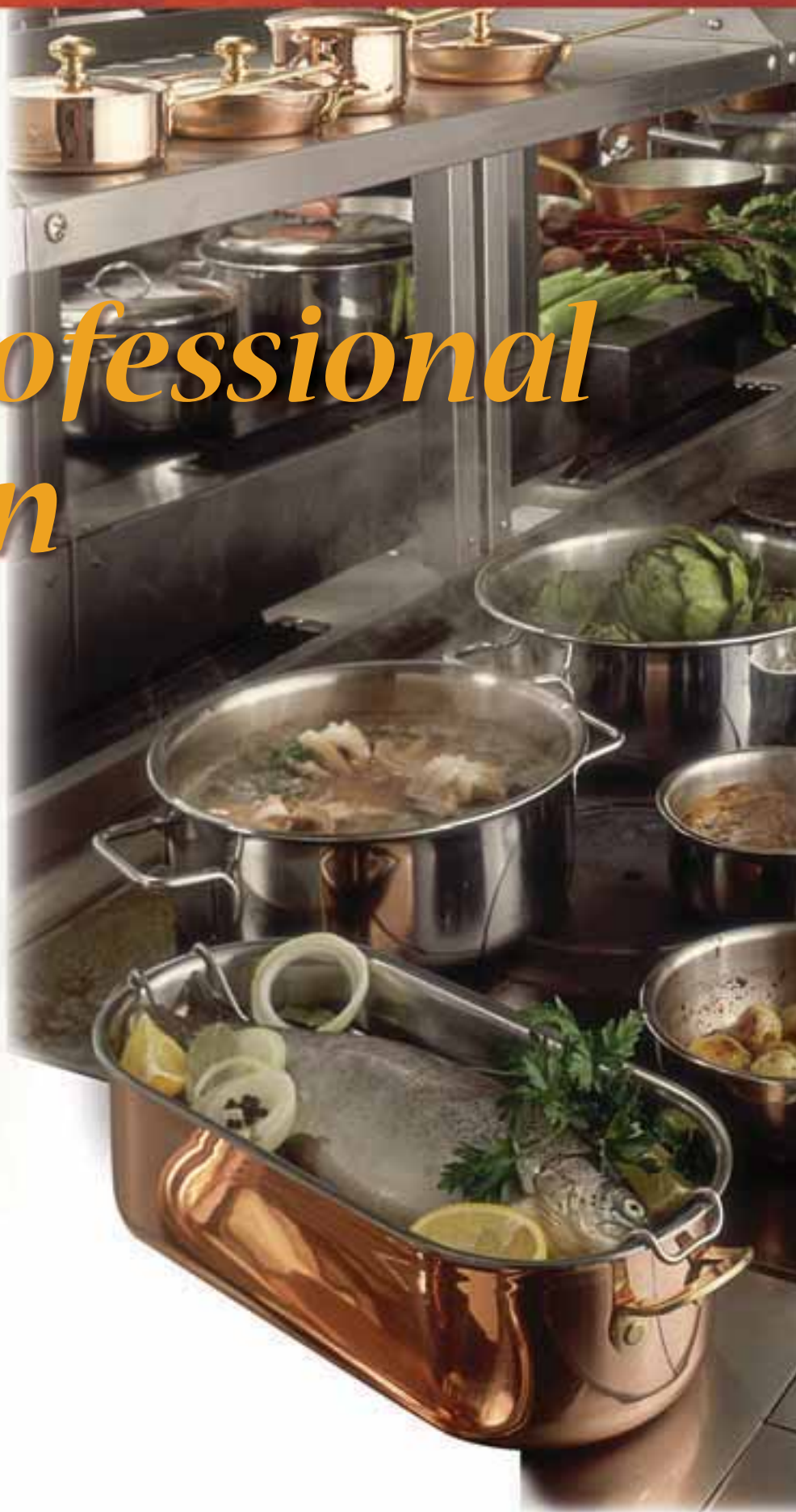
# The Professional Kitchen

## Chapter

- 9 Equipment and Technology
- 10 Knives and Smallwares
- 11 Culinary Nutrition
- 12 Creating Menus
- 13 Using Standardized Recipes
- 14 Cost Control Techniques

### EXPLORE THE PHOTO

A professional kitchen uses a variety of tools and equipment. *Can you name any of the tools and equipment you see here?*



## Standardized Recipe Creation

After completing this unit, you will know the setup and equipment used in a professional kitchen, and understand how to control costs with recipes and portion sizes. In your unit culinary project, you will research and create your own standardized recipe. Then, you will give a report on the setup, equipment, and cost measures that affect your recipe.

### My Journal

Write a journal entry about recipes you have used in the past.

- What kinds of recipes did you use?
- How did you choose them?
- Did you need any special skills to make the dishes from the recipes?



JOHNSON & WALES  
UNIVERSITY

*“Before I worry about whether I have a great food idea, I have to make sure it fits my cost structure, will interest customers, and matches my concept.”*

Will Gilson  
Chef/Owner  
Garden at the Cellar



# Equipment and Technology

## SECTIONS

- 9.1 The Commercial Kitchen
- 9.2 Receiving and Storage Equipment
- 9.3 Preparation and Cooking Equipment
- 9.4 Holding and Service Equipment

## WRITING ACTIVITY

### Topic Sentence

A topic sentence states the main idea of a paragraph. Write a topic sentence for a paragraph about cooking equipment found in a kitchen.

### Writing Tips

- 1 The sentence should present only one topic.
- 2 The sentence should not be general or vague.
- 3 The sentence should give strong direction.



### EXPLORE THE PHOTO

A foodservice employee should know how all of the equipment works. *What types of equipment might you find in a professional kitchen?*

# The Commercial Kitchen

*Efficient work flow and preparation are the keys to an organized professional kitchen.*

## Reading Guide

### Before You Read

**Predict** Before starting the section, browse the content by reading headings, bold terms, and photo captions. Do they help you predict the information in the section?

### Read to Learn

#### Key Concepts

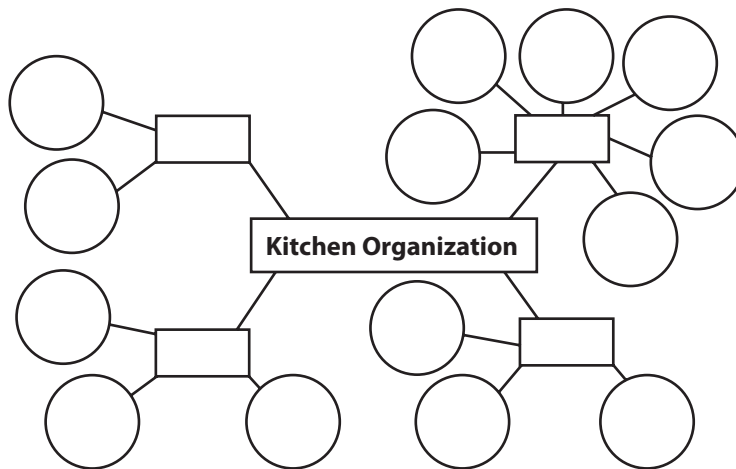
- **Explain** the roles of the different stations in a professional kitchen.


#### Main Idea

A commercial kitchen is divided into work stations. Once the work stations have been identified, the cooking line is set up. The set up will determine the workflow.

#### Graphic Organizer

Use a cluster like this one to show the sections and stations within a professional kitchen. Fill in each rectangle with the station within each station in the bubble branching off of them.



 **Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

### Content Vocabulary

- work station
- island
- work section
- mise en place
- work flow
- work simplification
- cooking line
- range of motion

### Academic Vocabulary

- efficient
- mode

### ACADEMIC STANDARDS



#### English Language Arts

**NCTE 5** Use different writing process elements to communicate effectively.



#### Mathematics

##### NCTM Measurement

Apply appropriate techniques, tools, and formulas to determine measurements.

##### NCTM Problem Solving

Build new mathematical knowledge through problem solving.



#### Science

**NSES 1** Develop an understanding of science unifying concepts and processes.



#### Social Studies

##### NCSS I A Culture

Analyze and explain the way groups, societies, and cultures address human needs and concerns.

**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

# Professional Kitchen Work Flow

Working as a foodservice professional means more than just cooking food. It involves teamwork and cooperation among kitchen staff. This creates an efficient work space. Before you begin to create all types of interesting dishes, you must become familiar with a commercial kitchen. A commercial kitchen layout is based on:

- The type of foodservice establishment.
- The amount of available space.
- The menu items to be prepared and the number of meals to be served.

## Gourmet Math

### Design to Scale

To determine which kitchen layout will work best, it is helpful to use a scale drawing. The ratio that compares a drawing to the actual object is called the scale. If the scale is given as  $\frac{1}{2}$  inches = 2 feet, then every  $\frac{1}{2}$  inch in the drawing represents 2 actual feet.

You would like to include a freezer that measures 45 inches wide and 21 inches deep on a scale drawing of a kitchen. If the drawing's scale is 1 inches = 5 feet, what are the scaled dimensions of the freezer?

#### Math Concept Using Proportions with Scale Factors

To draw items to scale, write a proportion using the scale as one ratio. In the other ratio, use  $s$  to represent the item's scale size. Solve for  $s$ .

**Starting Hint** Since the original dimensions are given in inches, convert the 5 feet in the scale into inches by multiplying it by 12. Write a proportion with two ratios of new width over old width. One of the ratios should be the scale; the other should be  $s$  over 45. Solve for  $s$ . Then, repeat the entire process for the freezer's depth.

**NCTM Measurement** Apply appropriate techniques, tools, and formulas to determine measurements.

## Stations, Sections, and Flow

The commercial kitchen is divided into work stations. A **work station** is a work area that contains the necessary tools and equipment to prepare certain types of foods. For example, onion rings are fried in a deep fryer. The work station where this takes place is called the fry station. Tongs and fry baskets would also be found at the fry station. Sometimes professional kitchens make changes to the traditional brigade system. The changes depend on the kitchen's size and arrangement.

Each work station is arranged so that kitchen employees do not have to leave their stations to perform their tasks. Work stations should have all necessary equipment, tools, work space, and power sources. They also should have their own storage facilities.

Similar work stations are grouped into larger work areas. This larger area is called a **work section**. Sometimes work stations can belong to more than one work section. For example, a fry station and a griddle station would be part of the short-order section and the hot foods section. (See **Figure 9.1**.)

### FIGURE 9.1 Kitchen Work Stations

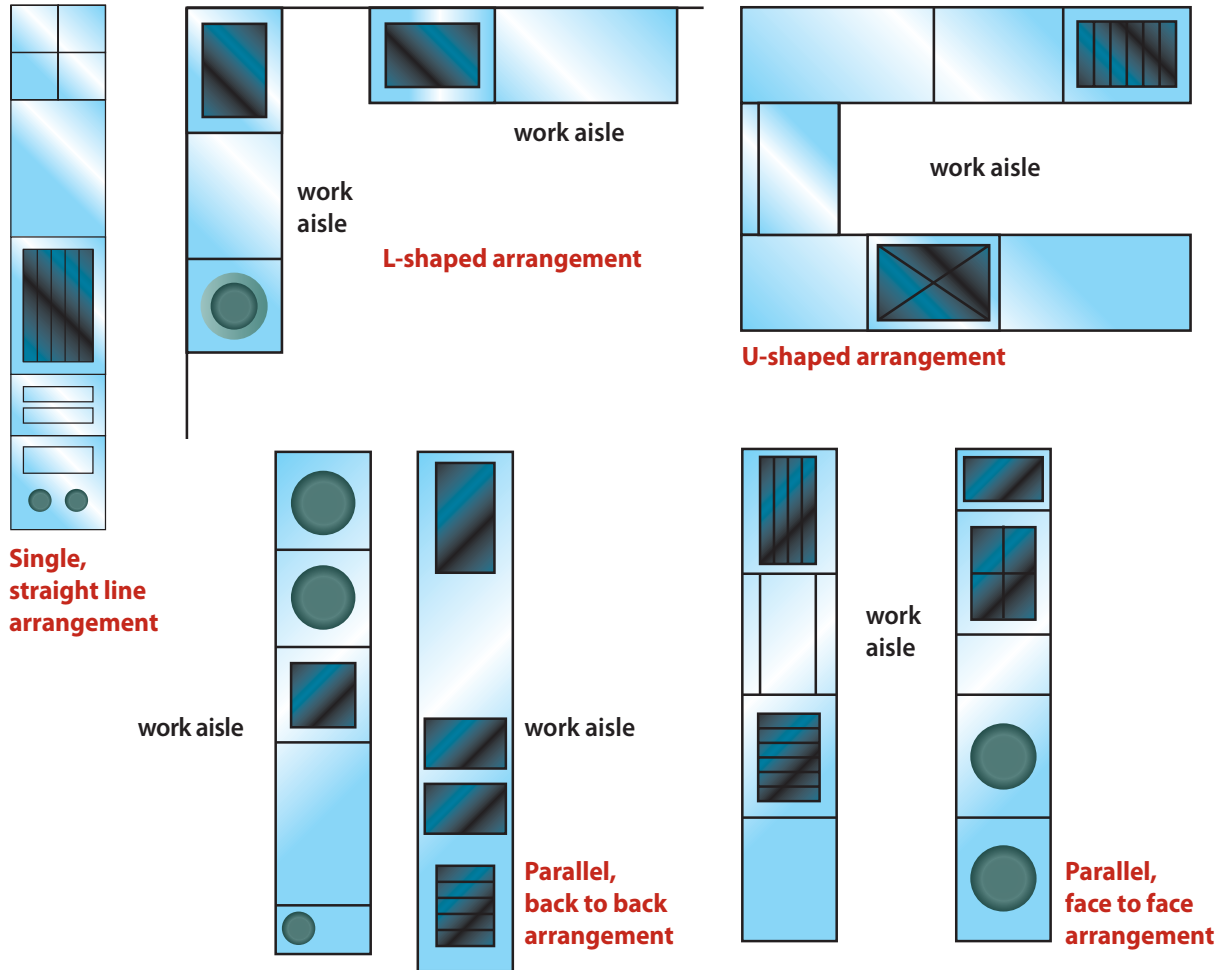
**Section Divisions** Different work stations are placed under the control of each work section. *What is the difference between a work station and work section?*

Sections	Stations
<b>Beverage Section</b>	<ul style="list-style-type: none"> <li>• Hot Beverage Station</li> <li>• Cold Beverage Station</li> </ul>
<b>Garde Manger Section</b>	<ul style="list-style-type: none"> <li>• Salad Station</li> <li>• Cold Platter Station</li> <li>• Sandwich Station</li> </ul>
<b>Short Order Section</b>	<ul style="list-style-type: none"> <li>• Broiler Station</li> <li>• Griddle Station</li> <li>• Fry Station</li> </ul>
<b>Hot Foods Section</b>	<ul style="list-style-type: none"> <li>• Broiler Station</li> <li>• Fry Station</li> <li>• Griddle Station</li> <li>• Sauté Station</li> <li>• Dry Heat Station</li> <li>• Steam Station</li> </ul>



## FIGURE 9.2 Cooking Lines

**Multiple Choice** There are several different ways to set up a cooking line. *What factors determine how a kitchen will set up its cooking line?*



The layout of the kitchen has a direct effect on the work flow. **Work flow** is the orderly movement of food and staff through the kitchen. A good work flow helps reduce preparation and serving time. In addition to a well-designed kitchen, teamwork among staff and between work stations is essential for a good work flow. Having ingredients and equipment ready to use helps simplify tasks.

### The Cooking Line

Once there are work stations and work sections, the cooking line is set up. The **cooking line** is the arrangement of the kitchen equipment. The cooking line arrangement determines what equipment and storage

areas can be placed above, below, or across from the equipment. You may also want to form an island. An **island** is a kitchen counter or equipment arrangement that can be approached from all sides. There are several different cooking line arrangements from which to choose.

**Single, Straight-Line Arrangement** A single, straight line allows equipment to be placed along a wall. This arrangement is used in larger kitchens.

**L-Shaped Arrangement** The L-shape separates equipment into two major work areas. One side of the line may be used for food preparation. The other side is used for cooking.



**Equipment Sanitation** It is important to keep equipment clean and running efficiently. *What are the consequences of not cleaning equipment properly?*

**U-Shaped Arrangement** This type of arrangement is often used by kitchens with limited space. It is also used in the dishwashing area of many commercial kitchens.

**Parallel, Back-to-Back Arrangement** Parallel, back-to-back consists of two lines of equipment, sometimes divided by a wall. This arrangement is often used on ships and in hotels.

**Parallel, Face-to-Face Arrangement** This arrangement consists of two lines of equipment facing each other, separated by a work aisle. It is used in larger kitchens where constant communication between stations is necessary.

## Mise en Place

Before you can prepare and cook the food, you have to get everything organized. *Mise en place* (*mē-zän-'pləs*) is a French term that means “to put in place.” **Mise en place** includes assembling all the necessary ingredients, equipment, tools, and serving pieces needed to prepare food in the order in which they will be used. It can also involve preheating the oven, cleaning and chopping vegetables, measuring spices, and trimming meats. For example, if grilled salmon and vegetables are on the menu, you will need to cut and portion the salmon, prepare the vegetables and herbs, and assemble the cookware ahead of time. This helps save time by allowing the chef to cook without having to stop and assemble items.

To effectively perform *mise en place*, work simplification techniques are used. **Work simplification** means to perform a task in the most **efficient**, or productive, way possible. Work simplification in the foodservice industry involves the efficient use of food, time, energy, and personnel.

## Personnel

Hiring temporary or part-time employees gives restaurants the extra help they need during peak times. It also helps lower expenses because restaurants do not have to pay too many employees during non-peak times.

## Food

Food can be prepared and cooked in a variety of ways, but not every method is efficient. For instance, you can chop an onion by hand, but using a food processor will be quicker.


## Time

Time management in the kitchen results in prompt service. Different foods have different cooking times. By reviewing recipes before cooking, you can determine how much time is needed. When you make food for a large group, arrange food or plan set-up time to efficiently work in a production **mode**, or functioning arrangement.

## Energy

Arrange your work station effectively so that you do not expend any more energy than is necessary during food preparation. Hand tools and ingredients should be within easy reach. This allows for efficient range of motion. **Range of motion** means using the fewest body movements without unnecessary stress or strain. When your equipment, tools, and ingredients are close, you eliminate unnecessary stops and starts.

An efficient range of motion saves time and energy. It may also help prevent some accidents. Having equipment and tools neatly organized and in range can help prevent dropping items or injuring yourself on equipment. It will also keep you from straining back, arm, and leg muscles.

 **Reading Check List** When designing a kitchen, what factors should be kept in mind?

## SECTION 9.1

### After You Read

### Review Key Concepts

1. **Explain** how efficient range of motion makes work easier.

### Practice Culinary Academics



#### Science

2. **Procedure** Study the process of cutting vegetables in your foods lab, starting with fetching the vegetables and ending with waste disposal. Take notes on the steps that are efficient, and those that are not.

**Analysis** Look at your notes, and analyze them. Then, try to come up with a more efficient method of cutting vegetables, and test it.

**NSES 1** Develop an understanding of science unifying concepts and processes.



#### Social Studies

3. The concept of work flow is an important concept in many industries. Research a pioneer of work flow, such as Frederick Winslow Taylor, Henry Gantt, or David Siegel. Write a biography of the person you choose. Include information on the person's contributions, the early development of his or her ideas, and any modern work flow theories that have been developed since then.

**NCSS 1 A Culture** Analyze and explain the way groups, societies, and cultures address human needs and concerns.



#### English Language Arts

4. Imagine that you are an expert employed by your school to make the foods lab more efficient. Examine the arrangement of the equipment in the foods lab, and then write a report containing your analysis. Offer recommendations for improving its efficiency.

**NCTE 5** Use different writing process elements to communicate effectively.



#### Mathematics

5. A dessert soufflé requires 10 minutes of preparation, 25 minutes to cook, and 2 minutes for plating. If a customer arrives at 6:15, and takes 49 minutes to get through dinner, when should you begin preparing his soufflé?

#### Math Concept Adding and Subtracting Time

When adding and subtracting time, calculate the minutes and hours separately. Remember that there are 60 minutes in one hour, so you may need to adjust your hour total accordingly.

**Starting Hint** Determine the time dessert should be served by adding 49 minutes to 6:15. Then, subtract the time needed for the three cooking steps to find when preparation should begin.

**NCTM Problem Solving** Build new mathematical knowledge through problem solving.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).



# Receiving and Storage Equipment

## Reading Guide

### Before You Read

**Check for Understanding** If you have questions as you are reading, that means you are checking your understanding of the material. To get the most out of the text, try to answer these questions.

### Read to Learn

#### Key Concepts

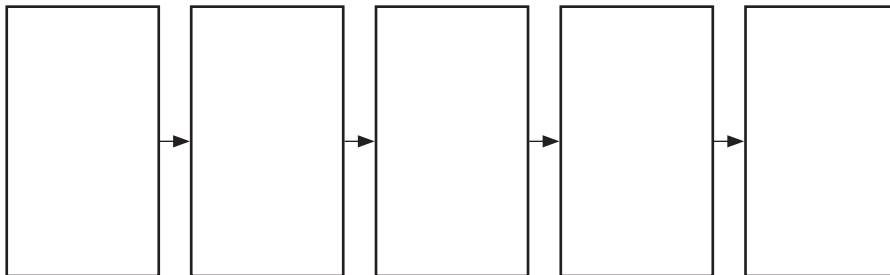
- **Categorize** the different types of professional receiving and storage equipment.


#### Main Idea

Receiving equipment helps foodservice professionals check and enter received food and supplies. Storage equipment provides space and temperature control to store food.

#### Graphic Organizer

As you read, use a sequence chart like this one to describe the five steps involved in receiving shipments of food.



 **Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

### Content Vocabulary

- purchase order
- invoice
- receiving record
- platform scale
- counter scale
- portion scale
- dolly
- lowboy

### Academic Vocabulary

- quantity
- note

*How will you store food that comes into your foodservice operation?*

### ACADEMIC STANDARDS

#### English Language Arts

**NCTE 3** Apply strategies to interpret texts.

#### Mathematics

**NCTM Problem Solving** Solve problems that arise in mathematics and in other contexts.

#### Science

**NSES B** Develop an understanding of chemical reactions.

#### Social Studies

**NCSS VIII A Science, Technology, and Society** Identify and describe both current and historical examples of the interaction and interdependence of science, technology, and society in a variety of cultural settings.

**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

# The Receiving Area

Now that you know why a commercial kitchen is designed the way it is, you are ready to examine how food flows through a commercial kitchen. All products in the food flow begin with the receiving area. After they are received, they are stored.

Receiving involves more than just getting in an order of food or supplies. Receiving means checking that the food and supplies that were ordered were received in the right **quantity**, or amount, at the right price. Food-service professionals need to know what to check for when they receive orders. Many times, problems happen when food and supplies are received. This is a big responsibility that should not be overlooked.

When you receive shipments of food, you should follow these steps:

- Check the purchase order against the actual shipment. A **purchase order** is a document asking a supplier to ship food or supplies at a predetermined price. Ensure that the order is correct and complete. **Note**, or make a record of, any missing items.
- Check the invoice to make sure it is accurate. An **invoice** is a bill from a supplier for providing goods or services. Make sure that the food prices are correct, and that you were invoiced only for the items you ordered. Note anything that is incorrect.
- Inspect the food items for quality. Reject any that do not meet quality standards.
- Complete a receiving record. A **receiving record** is a numbered record of everything that was received at a business during a particular day. The receiving record should include the quantity of each item received, the item price, the date delivered, and the supplier's name.
- Move the food items to the appropriate storage area. Each form of food, for example, frozen, fresh, packaged, canned, and dry, must be handled and stored differently.

# Receiving Equipment

The type of receiving equipment you will use is determined by the size of the foodservice operation. Most operations have scales, thermometers, and dollies.

## Scales

Receiving areas should have two types of scales: a platform scale and a counter scale. A **platform scale** has a platform to hold large or heavy items to be weighed. A **counter scale** usually has a platform, too, but it is small enough to be placed on a counter. Both can be used to weigh boxes. Some foodservice operations also have portion scales. A **portion scale** is a scale used to weigh cuts of meat.

## Thermometers

Thermometers are used in the receiving area to check the temperature of frozen and fresh foods. These thermometers use infrared technology to check the temperature of food. They do not make direct contact with food products. Frozen foods should have a minimum internal temperature of 0°F (18°C) or below. Fresh foods should be kept at 41°F (5°C) or below. Food items that do not meet these safety standards should not be accepted.

## Dollies

Dollies are used to move items from the receiving area to the storage area. A **dolly** is a small wheeled cart that can help move heavy boxes from place to place. Dollies help food-service professionals work more efficiently.

In addition, a good receiving area should have a table large enough to hold boxes for inspection. Keep a box cutter handy to open the packages and boxes.

# Food Storage

Food can be stored in refrigerators or freezers, on shelving units, or in storage bins and containers. The storage equipment you use depends on the type and amount of food to be stored, the space available, and the type of foodservice operation.

Food must be stored properly to prevent it from spoiling and causing foodborne illness. When you store food items, follow the first in, first out (FIFO) rule. This means that all food items should be used in the order in which they were received. Mark each item with the delivery date. Older items should be moved to the front of the storage area. Newer items are placed at the back.

Foods that will be stored in the freezer must be covered well in airtight wrapping to avoid freezer burn. Freezer burn, light-colored spots on frozen food where surface drying has occurred, can ruin foods. As with all food products, frozen foods should also be labeled and dated.

## Refrigerators and Freezers

Fresh and frozen foods are stored in refrigerators and freezers. Commercial refrigerators



**▲ Receiving Strategies** Receiving involves more than simply getting in an order from a supplier. *What do you think are some other considerations when receiving food?*

## Small Bites

**Glass and Aluminum Containers** Glass is not recommended for storage containers because it can shatter. Aluminum is also not recommended because it reacts chemically to acidic items, such as tomatoes.

and freezers are used to keep fresh and frozen foods, such as vegetables, fruits, dairy products, fish, and meats, at the right temperature until they are used. There are three main types of commercial refrigerators: walk-in, roll-in, or reach-in units. There are also lowboy refrigerators and freezers. A **lowboy** is a half-size refrigerator that fits under the counter in a work station.

## Equipment Selection

When a business needs to buy equipment, the first step is to identify the types of equipment that are needed for an efficient kitchen. Things to consider include type of restaurant, budget, space available, and menu items. Once the types of equipment have been identified, the features of that equipment should be decided upon. Smart business owners and managers compare prices, features, and maintenance service contracts before buying.

Equipment is expensive. Business owners must consider long-term business needs, and regulations and codes related to food storage before purchasing equipment. A purchase must provide the business with value over the long term.

## Equipment Cleaning and Maintenance

It is important to keep storage equipment clean. Clean equipment protects against bacteria growth. When you clean storage equipment, there are general guidelines that you must follow.



## Storage Equipment



**Walk-In Refrigerator** Walk-in refrigerators are basically refrigerated rooms.



**Roll-In Refrigerator** Roll-in refrigerators have a rolling rack of sheet pans that can be rolled up a ramp and into the unit.

**Reach-In Refrigerator** Reach-in refrigerators are not as large as walk-in refrigerators. Reach-in refrigerators are typically one, two- or three-door units with sliding shelves.



**Lowboy Refrigerator** Food products that will be used often are stored in a lowboy. It can fit under the counter of a service station.

# Storage Equipment *continued*

**Freezer** Freezers are units that can store foods for long periods of time. At temperatures of 0°F (18°C) or below, foods can be kept from one to six months, depending on the type of food and kind of packaging used.



**Shelving Unit** Shelving units are used to store various dry goods prior to use. There are several types of shelving units used in a commercial kitchen. Some shelves fit into corners to maximize space. Overhead shelves are located in each individual work station. There are also shelves designed to hold canned goods.

**Storage Bins and Racks** Storage bins are available in a variety of styles. Some storage bins are large, heavy plastic or polyurethane (,pā-lē-'yūr-ə-,thān) bins with lids. These storage bins are on wheels so they can be moved from one work area to another. Storage bins can also be open wire bins that hold packaged items or canned goods.



**Storage Containers** Smaller quantities of food are often placed in storage containers made of a sturdy, durable plastic. Labels identifying the contents and date of storage should always be clearly visible. Storage containers should always have well-fitting, air-tight lids.

## Equipment Safety

When you operate equipment:

- Report missing warning labels and safety attachments to your supervisor.
- Report any improperly working equipment to your supervisor.

## Refrigerators and Freezers

For cleaning and maintenance:

- Maintain a regular cleaning schedule.
- Turn off the appliance and move all food to a cold storage area.
- Wash the inside of reach-in and roll-in refrigerators and freezers with a solution of baking soda and water.

- Clean the walk-in refrigerator as instructed by your supervisor.
- Turn on the appliance and refill it with food.

## Shelving Units and Storage Bins

When you clean storage equipment:

- Use hot, soapy water to thoroughly clean shelves and storage bins.
- Rinse with clean water and then sanitize.
- Dry the storage unit thoroughly.
- Put back foods only when the units are completely dry.

 **Reading Check** Summarize What is the FIFO process?

## SECTION 9.2

### After You Read

### Review Key Concepts

1. **Categorize** the different types of refrigerators and freezers.

### Practice Culinary Academics



#### Science

2. **Procedure** Cook tomato sauce in an aluminum pot. At the same time, cook tomato sauce in a non-aluminum pot. Observe the differences between the two samples. How do the two samples look? Do they have a different odor? How have the pots been affected?

**Analysis** Create a chart to show the results of your observations. Write a summary to draw conclusions on your findings.

**NSES B** Develop an understanding of chemical reactions.



#### English Language Arts

3. Find and examine a sample invoice for any type of business. Review all of the abbreviations and information on the form. Discuss the information as a class until you have a basic understanding of how to read and interpret an invoice.

**NCTE 3** Apply strategies to interpret texts.



#### Social Studies

4. Investigate the origins of the first in, first out process. How do you think that this concept came to be used by several different industries, and why? Write a short report to show your answer. Cite your sources.

**NCSS VIII A Science, Technology, and Society** Identify and describe both current and historical examples of the interaction and interdependence of science, technology, and society in a variety of cultural settings.



#### Mathematics

5. You purchase a walk-in refrigerator for your restaurant for \$2,100, and expect it to have a useful life of 7 years. What is its book value after 2 years if you use straight-line depreciation?

#### Math Concept Straight-Line Depreciation

Depreciation is an accounting concept that tracks the decline in value of an asset over time. In straight-line depreciation, the book value of the asset decreases an equal amount each year over its useful life.

**Starting Hint** Divide \$2,100 by the number of years in the refrigerator's useful life. In 2 years, the book value will be \$2,100 minus 2 times the yearly depreciation amount.

**NCTM Problem Solving** Solve problems that arise in mathematics and in other contexts.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).



# Preparation and Cooking Equipment

## Reading Guide

### Before You Read

**Create an Outline** Use the section's heading titles to create an outline. Make the titles into Level 1 main ideas. Add supporting information to create Level 2, 3, and 4 details. Use the outline to predict what you are about to learn.

### Read to Learn

#### Key Concepts

- **Explain** the maintenance and sanitation for preparation equipment.
- **Compare** the different heat sources used in cooking.
- **Categorize** the uses of different types of clean-up equipment.

#### Main Idea

Food preparation equipment is equipment used to process or prepare food. Food preparation equipment may be used in cooking or as part of cleanup.

#### Graphic Organizer

Use a step-by-step chart like the one below to show the seven steps you would take when cleaning a slicer.

**Cleaning a Slicer**

First
Then
Then
Then
Then
Then
Last

### Content Vocabulary

- conduction
- convection
- induction
- radiation
- microwave
- pilot light
- recondition

### Academic Vocabulary

- volume
- refer



**Graphic Organizer**  
Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

*Many different types of equipment are used to create delicious dishes.*

### ACADEMIC STANDARDS



**Mathematics**  
**NCTM Data Analysis and Probability** Select and use appropriate statistical methods to analyze data.



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

**NCSS VIII A Science, Technology, and Society** Identify and describe both current and historical examples of the interaction of technology and society in a variety of cultural settings.

**NCTE** National Council of Teachers of English

**NCTM** National Council of Teachers of Mathematics

**NSES** National Science Education Standards

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# Preparation Equipment

Have you ever thought about how much equipment it takes to prepare and cook food for a simple meal at home? Now, imagine what you would need to prepare and cook food in a school cafeteria where hundreds of students eat every day. The preparation is time consuming, and special equipment is necessary to do the job well.

The equipment used to prepare food can cut preparation time. Preparation equipment can be used to mix, chop, grind, grate, and slice a large **volume**, or amount, of food. This equipment processes food and prepares it for cooking. Mixers, food processors, and slicers are common pieces of preparation equipment used in a commercial kitchen.

## Preparation Equipment Sanitation

You must follow safety precautions when you clean professional equipment. Never place your hand or another object in a machine when it is running. Always turn it off first and unplug it. **Refer** to, or reread briefly, the instruction manual before you clean any equipment.

These are general guidelines to clean preparation equipment. However, these guidelines do not replace instruction manuals or the guidance of your supervisor.

### Mixer and Food Processor

To clean a mixer or food processor, refer to the instruction manual and follow these general steps:

- Make sure that the equipment has been turned off and unplugged.
- Remove the attachment and the bowl. Wash them in hot, soapy water. Rinse and sanitize each piece. Let them air-dry.
- Store attachments in an appropriate location.
- Wipe the machine clean with a damp cloth.

### Slicer

When you clean a slicer, always follow safety precautions. The slicer is a dangerous piece of equipment. Refer to the instruction manual and follow these general steps:

- Be sure the machine is turned off and unplugged.
- Set the blade control indicator to zero.
- Follow the instruction manual to take the slicer apart.
- Wash the food carriage and blade in hot, soapy water. Use extra caution when cleaning the sharp blade. Rinse all pieces and let them air dry.
- Wipe off the rest of the machine with a damp, soapy cloth.
- Wipe the machine with a damp cloth, sanitize it, and dry it. Reassemble the slicer. Immediately put the blade guard back in place.
- Oil the slicer with nonedible oil as directed in the instruction manual.



### Reading Check

**List** Name three common pieces of food preparation equipment.

## Cooking Equipment

Today's commercial kitchen uses a wide variety of equipment to cook food quickly and efficiently. Ranges, broilers, and ovens are just a few pieces of cooking equipment you will find in a commercial kitchen. Before you operate this equipment, you need to learn what it looks like and how it operates.

### Heat Sources

Food is cooked by heat that is generated through a number of sources: gas, electricity, radiation, microwaves, and light. Cooking equipment can use any one of these sources, or sometimes a number of these sources at one time to generate heat that will cook food properly.

# Preparation Equipment

**Slicer** A slicer has a 10-inch or 12-inch circular blade that rotates at high speed. It can be either automatic or manual. Slicers are used to slice foods into uniform sizes.



**Bench Mixer** A bench mixer has a removable stainless steel bowl and dough hook, paddle, and whip attachments. Counter models are available in 5-, 12-, and 20-quart sizes. Floor models come in 30-, 40-, 60-, 80-, and 140-quart sizes. The bench mixer is used to mix or whip doughs and batters. It can be used to slice, chop, shred, or grate foods by using different attachments.

**Food Processor** A food processor has a removable bowl and an S-shaped blade. Food processors are used to grind, purée, emulsify, crush, and knead foods. Special disks can be added to slice, julienne, and shred foods.





**Table-Mounted Can Opener** Professional kitchens use heavy-duty can openers that are mounted on the edge of a table. Clean and sanitize can openers daily to prevent contamination. Replace worn blades immediately, as they can shed metal shavings into food.



**Blender** Blenders have stainless steel blades that can be used to blend and mix a variety of ingredients. They can also crush ice. Commercial blenders have removable thermoplastic or stainless steel containers.



**Commercial Juicer** Commercial juicers separate the pulp from the juice automatically. They have stainless steel blades and removable bowls.



**Work Tables** Stainless steel and butcher block work tables are used in food production areas. Stainless steel tables are commonly used for food preparation. Butcher block tables are used more often at the bake station.

## Gas

Gas is a natural heat source that produces intense heat with a flame. It cooks food evenly. Ranges, ovens, and broilers can be gas operated. Gas can cook through conduction or convection. **Conduction** heats food by direct contact between a hot surface and the food, such as cooking in a pan. **Convection** heats food by the circulation of heated molecules of hot liquid or air.

## Electricity

Like gas, electricity cooks food with intense heat, but depending on the type of metal the pot is made from, food may not cook evenly. Electricity can also cook through conduction or convection.

## Induction

**Induction** uses electricity to heat cookware by magnetic energy generated by coils under the stovetop. Pots and pans must be magnetic for induction cooking to take place. Stainless steel and cast iron pots and pans work best.

## Radiation

**Radiation** cooks food by transferring energy from the cooking equipment to the food. The energy waves do not contain heat. Instead, these waves change to heat when they make contact with the food.

## Microwave

Another heat source used is a type of radiation called microwaves. A **microwave** is an invisible wave of energy that causes water molecules to rub against each other and produce the heat that cooks food. Microwave ovens are an example of equipment that uses this heat source.

## Light

Infrared lamps and FlashBake ovens use light waves as a heat source. The light waves do not contain heat, but heat is generated when

## A TASTE OF HISTORY

1691

Crème brûlée first appears in a French cookbook

1692

Salem witch trials begin

### Heating Things Up

A salamander is a lizard-like amphibian with smooth skin. Legends have claimed that this small creature was able to endure great heat and could even live in fire. Keeping this in mind, it is clear why a small overhead broiler used in commercial kitchens is also called a salamander. A salamander gives off high heat, and is used to quick-brown foods, melt cheese, and caramelize sugar for crème brûlée.

### History Application

Think of a kitchen tool or appliance that, because of its use or characteristics, like the salamander, can be compared to an animal. Make up a name for the particular tool and write a paragraph detailing its use and the connection it has to that animal. Also, include a drawing of the tool.

**NCSS VIII A Science, Technology, and Society** Identify and describe both current and historical examples of the interaction of technology and society in a variety of cultural settings.

the energy contacts the food. Infrared lamps are used to keep food hot until it is ordered by customers. FlashBake ovens are used to prepare small or individual servings quickly.

## Cooking Equipment Sanitation

When you clean cooking equipment, always follow the instruction manual for disassembling and reassembling equipment safely. The equipment manufacturer can do general maintenance and repairs on this equipment. These are some general guidelines for cleaning certain types of equipment.

### Flat-Top Range

To clean a flat-top range, loosen any burned food with a scraper. Then, clean the rangetop with a damp, soapy cloth. Rinse it and wipe it dry.

# Cooking Equipment

**Deep-Fat Fryer** A deep-fat fryer cooks food at a constant temperature, which is controlled by a thermostat. Automatic or computerized fryers lower and raise food baskets in and out of hot fat at a preset time. Filtering allows the oil to be reused. Fryers are vital pieces of equipment in quick-service operations.



**Open-Burner Range** An open-burner range has four to six burner units, each with individual controls. Each burner has its own heat source. This allows for more efficient use of heat than with a flat-top range.



**Griddle** Griddles can be flat or ridged. They can be a part of the range top, or a separate unit. Food is cooked directly on the surface of the griddle.



**Flat-Top Range** Also known as a French-top range, the burners of a flat-top range are arranged under a solid top that produces even heat over a large surface area. Flat-top ranges cannot be used as a griddle.

# Cooking Equipment

*continued*

**Microwave Oven** A microwave oven uses invisible waves of energy called microwaves to heat, reheat, defrost, and cook foods.



**Broiler** Broilers cook food quickly from start to finish using intense, direct heat located above the food. They can be combined with a conventional oven as shown here, or stand alone as a separate unit.

**Tilting Skillet** The tilting skillet is the most flexible piece of equipment in a commercial kitchen. It is a large, flat cooking surface with sides to hold liquids. The skillet can be tilted to pour out liquid. It can be used as a griddle, fry pan, brazing pan, stockpot, bain marie, or steamer.



**Steamer** A steamer cooks food quickly and nutritiously because it places the food in direct contact with hot water vapor.



**Pressure Steamer** A steam pressure cooker works like a regular steamer except that the steam is under pressure. A pressurized door and a steam valve control the desired amount of pressurized steam.



**Steam-Jacketed Kettle** A steam-jacketed kettle also uses steam to cook foods quickly, but the steam does not come into direct contact with food. The steam is pumped between two stainless steel containers. The steam heats the inner kettle and cooks food quickly and evenly.

**Trunnion Kettle** A trunnion (<sup>1</sup>trən-yən) kettle is a type of steam-jacketed kettle that can be tilted to empty contents by turning a wheel or pulling a lever.



**Combination Steamer/Oven** This steamer/oven uses a combination of cooking methods. It can use a fan to circulate air around the food like a convection oven. It can also use steam to cook food. Finally, it can combine convection and steam cooking. Combination steamer/ovens are used to bake, poach, grill, roast, braise, and steam foods.

# Cooking Equipment

*continued*

**Deck Oven** A deck oven is also known as a stack oven. Electric deck ovens have separate baking controls for the lower deck and for the upper deck. Deck ovens are used for baking, roasting, and braising.



**Convection Oven** A convection oven has a fan that circulates the oven's heated air. This fan allows you to cook foods in about 30% less time and at temperatures approximately 50° lower than a conventional oven. Convection ovens are used for baking, roasting, and braising.

**Salamander** A salamander is a small gas or electric broiler that is often attached to an open-burner range. Its heat source is also located above the food. Unlike a standard broiler, a salamander is used for browning, glazing, and melting foods.



**FlashBake Oven** A FlashBake, or infrared, oven uses both infrared and visible light waves above and below the food. Because the heat is so intense, foods cook very quickly without losing flavor and moisture. The FlashBake is used to bake smaller portions of food. It needs no preheating or venting.

## Open-Burner Range

To clean an open burner, remove the grids and the drip pan. Soak them in hot, soapy water. While they are soaking, wash, rinse, and dry the rest of the range. Then, wash, rinse, dry, and replace the grids and drip pan. Gas ranges have pilot lights. A **pilot light** is a continuously burning flame that lights the burner when you turn on the range. Check to see that all the pilot lights are burning after you have cleaned the range. The flame should be blue, not yellow. Always tell a supervisor if you suspect a range has a gas leak.

## Griddle

To clean a griddle, polish the top with a special griddle cloth or stone. Polish in the same direction as the grain of the metal. Using a circular motion will scratch the surface of the griddle. Wash the remaining area with warm, soapy water. Rinse and dry. Then, recondition the top by coating it with a thin layer of oil. To **recondition** a griddle means to coat in oil so that foods will not stick to it. Heat the griddle to 400°F (204°C) and wipe it clean. Repeat until the griddle is smooth and shiny.

## Broiler

To clean a broiler, take out the grids and soak them in hot, soapy water. Remove caked-on food with a wire brush. Rinse, dry, and lightly oil. Scrape grease and burned food from the inside of the broiler. Wash the drip pans and put them back in place. Empty the grease trap, wash it, and replace it.

## Conventional and Convection Ovens

When you clean an oven, make sure the oven has cooled completely first. Take out the shelves and wash them in hot, soapy water. Then, rinse them and let them air dry. Wash the inside of the oven with warm, soapy water and dry it with a soft cloth. Wipe the outside of the oven with warm, soapy water. Rinse it with a soft, wet cloth and polish it with another soft cloth.

## Safety Check

### ✓ Maintenance and Care

Maintenance and care for tools, utensils, and equipment is very important to the quality and safety of food. Repair and replacement needs should be reported to your supervisor. Warranties should be kept in a safe place, along with instruction manuals.

**CRITICAL THINKING** *How does the maintenance and care of tools, utensils, and equipment affect the quality and safety of food?*

## Microwave Oven

Let the microwave oven cool completely before you clean it. Wipe the inside and outside of the oven with a damp cloth and warm, soapy water. Then, rinse and wipe dry. Make sure the microwave oven door seals tightly. If the door is loose or damaged, do not use the oven.

 **Reading Check** **Identify** Name five sources of heat for cooking food.

## Clean-Up Equipment

Foodservice operations have a constant flow of customers everyday. Customers expect operations to be clean and efficient as well as having good food.

## Commercial Sinks

Foodservice operations use several different types of commercial sinks. The most common type is the three-compartment sink. It is used to rinse, wash, and sanitize dishes.

## Garbage Disposal

Garbage disposals are mounted on sink drains. They are used to eliminate scraps of food leftover from preparation or scraped from plates. However, a garbage disposal does not replace the need for a garbage can.



**Single-Tank Dishwasher** Single-tank dishwashers are used by some restaurants. *What are the main features of a single-tank dishwasher?*

## Commercial Dishwashers

A multi-tank, or carousel, dishwasher is common in large operations. Dishes are placed directly into racks on the conveyor belt. Hand-scraped, dirty dishes are rinsed and then manually loaded at one end of the machine, where they travel in a circle through areas that prewash, wash, rinse, sanitize, and dry them.

A single-tank dishwasher has only one compartment. Dishes that have been scraped by hand and rinsed can be loaded into its raised doors. As the doors are lowered, the washing cycle begins. Single-tank dishwashers are used to wash small loads of dishes.



### Reading Check

**Name** List the main types of clean-up equipment used in professional kitchens.

## SECTION 9.3



### After You Read

#### Review Key Concepts

1. **Explain** how to clean a mixer or food processor.
2. **Describe** cooking with radiation.
3. **Compare** commercial sinks and commercial dishwashers.

#### Practice Culinary Academics



#### Social Studies

4. Read the A Taste of History feature about salamanders. There are many types of cooking equipment used through history around the world. Research one type of cooking equipment used in a different region of the world. Create a visual report on the equipment and how it is used. What dishes are prepared with this equipment? Explain how the culture of the region contributed to the development of this equipment.

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



#### Mathematics

5. You have determined that a certain cake will bake in 20 minutes in your deck oven, 7 minutes in a FlashBake oven, and 14 minutes in your convection oven. What is the median baking time?

#### Math Concept

**Finding the Median** The statistical term median refers to the middle number in an ordered set of numbers. If you have an even number of numbers, take the mean (average) of the two middle numbers.

**Starting Hint** Place the baking times in order from lowest to highest. The median will be the middle time in this list. Since you have an odd number of times, you do not need to worry about averaging.

**NCTM Data Analysis and Probability** Select and use appropriate statistical methods to analyze data.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).



# Holding and Service Equipment

## Reading Guide

### Before You Read

**Two-Column Notes** Two-column notes are a useful way to study and organize what you have read. Divide a piece of paper into two columns. In the left column, write down main ideas. In the right column, list supporting ideas.

### Read to Learn

#### Key Concepts

- **Identify** the uses of hot food holding equipment.
- **Evaluate** the uses of service equipment.


#### Main Idea

Holding equipment holds hot foods and maintains their temperature. Service equipment consists of all types of equipment for serving food to customers.

#### Graphic Organizer

As you read, use this table to organize a list of holding equipment and a list of service equipment.

Holding Equipment	Service Equipment

 **Graphic Organizer** Go to this book's Online Learning Center at [glencoe.com](http://glencoe.com) for a printable graphic organizer.

*Food must stay safe on its journey from the kitchen to the customer.*

### ACADEMIC STANDARDS



#### English Language Arts

**NCTE 5** Use different writing process elements to communicate effectively.



#### Mathematics

**NCTM Number and Operations** Understand numbers, ways of representing numbers, relationships among numbers, and number systems.



#### Science

**NSES F** Develop an understanding of personal and community health.

**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

# Holding Equipment

Many times, foodservice operations cater meals or serve them buffet style. Keeping pre-prepared food hot requires special equipment designed to keep foods either hot or cold.

Steam tables, a bain marie, overhead warmers, and proofing/holding cabinets are used to hold hot foods. A **steam table**, or food warmer, keeps prepared foods warm in serving lines. A **bain marie** (*ban-mə-'rē*), or water bath, is used to keep foods such as sauces and soups warm. A **proofing/holding cabinet** is an enclosed, air-tight metal container with wheels that can hold sheet pans of food. The purpose of this equipment is to keep foods at a temperature of at least 135°F (57°C) until the food is served. The high temperature prevents bacteria from growing.

When food is being kept warm at high temperatures, the texture and color are likely to change. To prevent this, you should **replenish**, or restock, foods frequently.



## Reading Check

**Explain** When would a steam table be used instead of a bain marie?

# Service Equipment

Foodservice operations need to have a variety of service equipment. Service equipment can be used in the dining room, at a buffet, or at a catered **function**, or event. Service equipment includes anything used to serve the customer, including hotel pans. (See **Figure 9.3** and **Figure 9.4**.)



## Reading Check

**List** Name at least five pieces of service equipment.

**FIGURE 9.3 Hotel Pan Capacity**

**Storage Variety** Hotel pans come in a number of different sizes. *What are the advantages of using hotel pans to cook and serve food?*

Hotel Pan Size	Approximate Capacity	Hotel Pan Size	Approximate Capacity
Full Size 20 ¾ in. × 12 ¾ in.	• 2 ½ in. deep = 8.3 qts.	One-Third Size 6 ⅞ in. × 12 ¾ in.	• 2 ½ in. deep = 2.6 qts.
	• 4 in. deep = 13 qts.		• 4 in. deep = 4.1 qts.
	• 6 in. deep = 20 quarts		• 6 in. deep = 6.1 qts.
Half-Size Long 20 ¾ in. × 6 ⅞ in.	• 2 ½ in. deep = 3.7 qts.	One-Fourth Size 6 ⅞ in. × 10 ⅜ in.	• 2 ½ in. deep = 1.8 qts.
	• 4 in. deep = 5.7 qts.		• 4 in. deep = 3 qts.
	• 6 in. deep = 8.7 qts.		• 6 in. deep = 4.5 qts.
Two-Third Size 13 ¾ in. × 12 ¾ in.	• 2 ½ in. deep = 5.6 qts.	One-Sixth Size 6 ⅞ in. × 6 ¼ in.	• 2 ½ in. deep = 1.2 qts.
	• 4 in. deep = 9.3 qts.		• 4 in. deep = 1.8 qts.
	• 6 in. deep = 14 qts.		• 6 in. deep = 2.7 qts.
Half Size 10 ⅞ in. × 12 ¾ in.	• 2 ½ in. deep = 4 qts.	One-Ninth Size 6 ⅞ in. × 4 ¼ in.	• 2 ½ in. deep = .6 qts.
	• 4 in. deep = 6.7 qts.		• 4 in. deep = 1.1 qts.
	• 6 in. deep = 10 qts.		

# Holding Equipment

**Steam Table** Foods are placed in hotel pans and placed into steam tables filled with steaming hot water. The pans are covered with either flat or domed lids. The temperature of the water is kept hot enough to keep foods warm while they are being served.



**Bain Marie** Foods are placed in bain-marie inserts, which are then placed into a bain-marie that is filled with hot water. A bain-marie also can be used to melt ingredients that will be used in other dishes. A bain-marie can also be used to bake certain products.

**Overhead Warmers** Overhead warmers are used in the service area to keep foods hot until they are picked up by the serving staff and delivered to the customer. Food should be kept under an overhead warmer for a short time. The heat can cause foods to dry out quickly.



**Proofing/Holding Cabinet** Temperature and humidity levels are controlled inside the cabinet. The internal climate of proofing/holding cabinets is ideal for proofing yeast-dough products. They are also used to keep food at 135°F (57°C) or above during service.

## Service Equipment

**Insulated Carriers** Insulated carriers are large boxes that can hold hotel pans and sheet pans filled with cooked food. Insulated carriers keep hot foods hot and cold foods cold. Some insulated carriers have wheels. If the carrier has a spigot, warm or cold beverages can be stored inside.



**Chafing Dishes** Chafing dishes are typically stainless steel pans used to keep food hot during service. Hotel pans of food can be inserted into the chafing dish. Chafing dishes are available in a variety of sizes.

**Canned Fuel** Canned fuel is used to keep food warm in chafing dishes. These small containers of solid fuel are ignited and placed beneath the chafing dish.



**Coffee Systems** Coffee systems can brew coffee and keep it warm during serving time. A variety of models are available. Coffee systems consist of a water tank, thermostat, warming plate, and coffee server. Systems with a hot water spigot can also be used to make hot chocolate.



**Scoops** Scoops are used to measure equal amounts of food. They have a lever to mechanically release the food and are numbered according to size. The number indicates how many level scoops it takes to fill a quart. The higher the number, the smaller the amount of food the scoop holds.



**Airpot Brewing Systems** Airpot brewers are used to make hot beverages such as coffee. Airpots are tall, stainless steel containers with plastic lids and pump dispensers. They keep liquids hot for up to 10 hours.

**Utility Carts** Utility carts are made of heavy-duty plastic or stainless steel. They are on wheels that allow them to be moved easily. Utility carts also have handles that allow them to be pulled or pushed. They are used to display or hold food, to bus tables, or to move heavy items from one location to another.

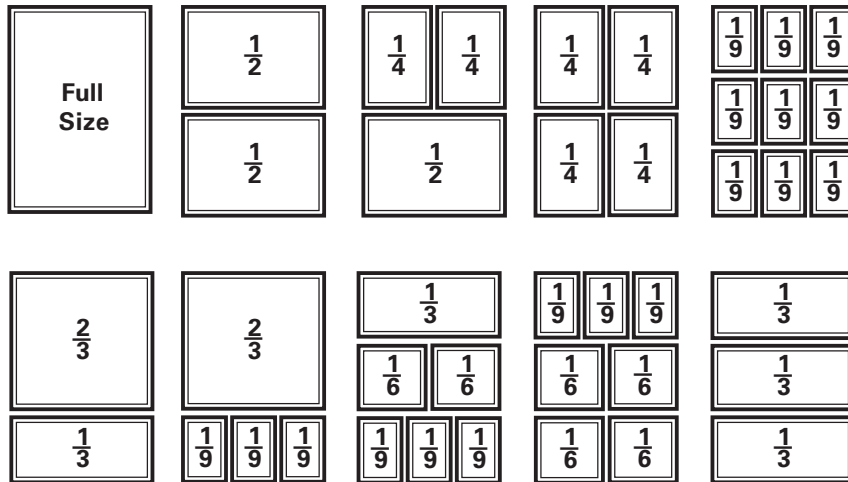


**Hotel Pans** Hotel pans are stainless steel containers that are used to cook, serve, and store food. They come in many different sizes. Hotel pans fit in steam tables and other holding equipment.

## FIGURE 9.4 Hotel Pan Configurations

**The Right Fit** These are some of the most common configurations of hotel pans.

*What other combinations can you suggest?*



## SECTION 9.4

### After You Read

#### Review Key Concepts

1. **Describe** the use of proofing/holding cabinets.
2. **Explain** how to use a scoop.

#### Practice Culinary Academics



#### Science

3. **Procedure** Cook soup in your foods lab. Once the soup is done, turn off the heat, and remove it from the stove burner. Use a thermometer to measure its temperature, both in Fahrenheit and Celsius. Take the temperature of the soup every five minutes. Record the temperature.

**Analysis** Use your temperature recordings to draw conclusions about why proper holding is important. Write a brief summary, using your measured temperatures as proof.

**NSES F** Develop an understanding of personal and community health.



#### English Language Arts

4. Imagine that you are conducting training at a foodservice establishment on holding foods for service. Create a guide to all the equipment.

Describe each piece of equipment and explain when each should be used. You may illustrate your guide if you wish.

**NCTE 5** Use different writing process elements to communicate effectively.



#### Mathematics

5. Locate the full-size hotel pans in Figure 9.4 (Hotel Pan Configurations). What is the ratio of capacity to depth for the 4-inch deep pan? What about the 6-inch deep pan? Are the two ratios equal?

**Math Concept Use Cross Products to Compare Ratios** Remember, a ratio is a comparison of two numbers that is written as a fraction. Two ratios are equal (or proportional) if their cross-products are equal.

**Starting Hint** Write each ratio as a fraction with capacity as the numerator and depth as the denominator. Cross-multiply the denominator of one fraction by the numerator of the other, and vice versa. Are the products equal?

**NCTM Number and Operations** Understand numbers, ways of representing numbers, relationships among numbers, and number systems.



Check your answers at this book's Online Learning Center at [glencoe.com](http://glencoe.com).

**Chapter Summary**

Effective work flow allows the orderly movement of food through the kitchen. An efficient kitchen will include well-organized work stations and work sections. Storage equipment should be used to keep foods fresh and organized until they are ready for use. Preparation equipment is used to perform a variety of tasks including shredding,

grating, grinding, and slicing. Cooking equipment includes ranges, ovens, and steamers. Equipment used for clean-up includes commercial sinks and dishwashers. Holding equipment keeps foods hot until they are used. Service equipment is used to serve customers in the dining room, at the buffet, or at a catered function.

**Content and Academic Vocabulary Review**

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

**Content Vocabulary**

- work station (p. 220)
- work section (p. 220)
- work flow (p. 221)
- cooking line (p. 221)
- island (p. 221)
- mise en place (p. 222)
- work simplification (p. 222)
- range of motion (p. 223)
- purchase order (p. 225)
- invoice (p. 225)
- receiving record (p. 225)
- platform scale (p. 225)

- counter scale (p. 225)
- portion scale (p. 225)
- dolly (p. 225)
- lowboy (p. 226)
- conduction (p. 234)
- convection (p. 234)
- induction (p. 234)
- radiation (p. 234)
- microwave (p. 234)
- pilot light (p. 239)
- recondition (p. 239)
- steam table (p. 242)
- bain marie (p. 242)

- proofing/holding cabinet (p. 242)

**Academic Vocabulary**

- efficient (p. 222)
- mode (p. 222)
- quantity (p. 225)
- note (p. 225)
- volume (p. 231)
- refer (p. 231)
- replenish (p. 242)
- function (p. 242)

**Review Key Concepts**

2. **Explain** the roles of the different stations in a professional kitchen.
3. **Categorize** the different types of professional receiving and storage equipment.
4. **Explain** the maintenance and sanitation for preparation equipment.
5. **Compare** the different heat sources used in cooking.
6. **Categorize** the uses of different types of clean-up equipment.
7. **Identify** the uses of hot food holding equipment.
8. **Evaluate** the uses of service equipment.

**Critical Thinking**

9. **Explain** how the layout of a commercial kitchen affects work flow.
10. **Imagine** that the manager of your foodservice operation does not follow FIFO because of the small amount of business the establishment handles. Why is it important to follow FIFO anyway regardless of business size?

## Academic Skills

**English Language Arts**

- 11. Consumer Research** Conduct research on three different brands of microwave ovens. You may follow your teacher's instructions to look on the Internet or in consumer and trade magazines to gather information about products. Write an evaluation that compares the brands that you researched, then write a recommendation as to which would be best for a commercial kitchen.

**NCTE 7** Conduct research and gather, evaluate, and synthesize data to communicate discoveries.

**Social Studies**

- 12. Technology in the Kitchen** In this chapter, you have learned about the different types of equipment found in a professional kitchen. You have also learned about work flow and efficient kitchen setup. New technology is constantly being invented to change the flow of kitchen procedure. Research new kitchen technologies and do a report on one new technology and how it might effect workflow in a professional kitchen. Include visuals in your report.

**NCSS VIII B Science, Technology, and Society** Make judgments about how science and technology have transformed the physical world and human society and our understanding of time, space, place, and human-environment interactions.

**Mathematics**

- 13. Compare Refrigerator Sizes** You need to purchase a new refrigerator for your foodservice business. A reach-in refrigerator measures 68 inches in height, 25 inches wide, and 25 inches deep on the outside. A lowboy refrigerator's exterior dimensions are 44 inches tall, 55 inches wide, and 25 inches deep. For both refrigerators, the sides, front doors, and top are 2.5 inches thick, while the bottom is 5.5 inches thick. What is the ratio of the capacity of the lowboy to the capacity of the reach-in?

**Math Concept Capacity** Capacity measures the volume of interior space. It is calculated like volume, but the term capacity is only used for hollow objects. Remember, the volume of a rectangular object equals width  $\times$  depth  $\times$  height.

**Starting Hint** Find the interior width of the reach-in by subtracting 2.5 inches for the left wall and 2.5 inches for the right wall from the exterior width (interior width =  $25 - 2.5 - 2.5 = 20$  inches). Repeat for the depth and height to find the interior dimensions, and multiply all three interior dimensions to find the capacity. Repeat for the other refrigerator, and place the two capacities in a ratio.

**NCTM Geometry** Use visualization, spatial reasoning, and geometric modeling to solve problems.

## Certification Prep

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

- 14.** Which piece of receiving equipment would be used to ensure that food products meet safety standards?
- thermometers
  - chafing dishes
  - work tables
  - scales
- 15.** Which pieces of preparation equipment use attachments?
- roll-in refrigerator and lowboy refrigerator
  - mixer and food processor
  - table-mounted can opener and commercial juicer
  - slicer and mixer

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

**Test-Taking Tip**

Come up with the answer in your head before looking at the possible answers. You will be more confident in your answer, and avoid being tricked.



## Real-World Skills and Applications

## Interpersonal and Collaborative Skills

- 16. Coordinate Jobs** As a class, choose a simple meal to prepare. Your teacher will assign you to work stations. As a group, coordinate responsibilities with those of the other work stations before beginning preparation. Then, prepare your meal, working together while manning each separate work station.

## Critical Thinking Skills

- 17. Make a List** List the characteristics of a well-designed professional foodservice kitchen and give reasons for each characteristic you choose. What makes that a feature of a well-designed kitchen? What benefit does that characteristic provide? Discuss your answers as a class.

## Technology Applications

- 18. Design a Kitchen** Use a graphic design or desktop publishing program to design the cooking line of a professional kitchen. Decide which setup you will use according to the information in this chapter, and then use the program to place and label the cooking equipment.

## Financial Literacy

- 19. Calculate Depreciation** Depreciation is a loss of value of a piece of equipment. Foodservice equipment has a useful life of seven years. Useful life means the length of time it can depreciate before it has no value. If a stove costs \$5,000 when it is purchased new, how much value will it lose each year?

## Culinary Lab

## Commercial Kitchen Design

- 20. Design a Kitchen** Use a sample menu to design a commercial kitchen. Consider the equipment needed to prepare the menu and the flow of work during the preparation process.
- A. Create your menu.** Create a simple breakfast menu with three dishes. Determine the type of tasks that will need to be performed, the type of equipment needed, and the work stations needed to complete the dishes on the menu.
- B. Choose your equipment.** Select the appropriate commercial equipment from the features in this chapter.
- C. Make your sketch.** Create a sketch of the kitchen, showing work stations and the cooking line. You may use the cooking line you created for question number 18.
- D. Label equipment.** Label each piece of equipment on your sketch.
- E. Adjust your design.** Review your design and make any adjustments needed. Check that it is complete.

Use the culinary skills you have learned in this chapter.

## Create Your Evaluation

Evaluate each restaurant design by answering the following questions and explaining your answers:

- Was the right amount of equipment selected?
- Did the designer allow enough work space?
- How did the cooking line affect work flow?