

Food Service Equipment

Unit: Culinary Arts

Problem Area: Culinary Vocabulary

Lesson: Food Service Equipment

- **Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Identify the major food service work areas and related equipment.**
- 2 Describe food service equipment and its primary processing and/or preparation tasks.**

- **Resources.** The following resources may be useful in teaching this lesson:

“Cooking Oil Fire,” *Our Adventure Pages*. Accessed Aug. 15, 2010. <<http://randsco.com/index.php/2007/05/30/p442>>.

McGreal, Michael J. *Culinary Arts: Principles and Applications*. American Technical, 2008.

“Restaurant Equipment,” *Restaurantequipment.com*. Accessed Aug. 15, 2010. <<http://www.restaurantequipment.com/>>.

“What Is the OSHA Standard for Control of Hazardous Energy Sources?,” OSHA. Accessed Aug. 15, 2010. <http://www.osha.gov/OshDoc/data_General_Facts/factsheet-lockout-tagout.pdf>.



■ **Equipment, Tools, Supplies, and Facilities**

- ✓ Overhead or PowerPoint projector
- ✓ Visual(s) from accompanying master(s)
- ✓ Copies of sample test, lab sheet(s), and/or other items designed for duplication
- ✓ Materials listed on duplicated items
- ✓ Computers with printers and Internet access
- ✓ Classroom resource and reference materials

■ **Key Terms.** The following terms are presented in this lesson (shown in bold italics):

- ▶ cold storage
- ▶ dollies
- ▶ dry storage
- ▶ FIFO
- ▶ garde-manger
- ▶ hot storage
- ▶ labeling equipment
- ▶ measurement equipment
- ▶ nonporous
- ▶ nontoxic
- ▶ National Sanitation Foundation (NSF)
- ▶ preparation area
- ▶ receiving area
- ▶ sanitation
- ▶ storage area
- ▶ temperature danger zone
- ▶ thermometers
- ▶ workstations

■ **Interest Approach.** Use an interest approach that will prepare the students for the lesson. Teachers often develop approaches for their unique class and student situations. A possible approach is included here.

Explain to your students that restaurant work is complex. Employees need to have great culinary skills and must be knowledgeable about the equipment. An industrial kitchen has many pieces of equipment that the average household kitchen does not have. Ask if they have ever walked into an industrial kitchen. It can be very intimidating because the equipment, tools, and supplies are all sturdy, large, and heavy.

Ask students to name any pieces of industrial food service equipment they have heard about or have used. If some of the students are employed in an industrial

kitchen, ask them to share their first experiences with commercial dishwashers, convection ovens, walk-in coolers, and floor-mounted mixers.

CONTENT SUMMARY AND TEACHING STRATEGIES

Objective 1: Identify the major food service work areas and related equipment.

Anticipated Problem: What are the major food service work areas and related equipment?

I. Work areas and related equipment

- A. A well-designed food service kitchen is efficient (allows for appropriate work flow) and is easy to clean (e.g., stainless steel, glazed, and quarry tile). The following work areas are essential for any institution serving food to the public. The **receiving area** is the location where all goods enter the food service facility. At this location, food products ordered by the controller are monitored and inspected by the receiver and either accepted or rejected. Food items are checked against the invoice for quantity, weight, item type and style, freshness and/or quality, temperature, and damage. To properly receive food and other supply items into the food service, the facility requires certain equipment to be available in this area.
1. **Thermometers** are devices that measure food temperatures (surface and internal). Temperature checks ensure that the food items are safe to serve to customers. Perishable food items must be kept out of the temperature danger zone. The **temperature danger zone** is the range between 41° and 140°F. Frozen foods should be at 0°F or below, and fresh refrigerator foods should be at 41°F or a little below. When food items do not meet these temperature specifications, the items are rejected and are sent back to the distributor.
 2. **Measurement equipment** is equipment used to check the temperature and weight of food items and to ensure that each item meets the facility's specifications. Scales are used to measure the weight of foods. Many scale types are used in food services, such as:
 - a. Platform scales are used to check the weight of heavy items. If the food item does not meet the weight specified on the order, the item is rejected.
 - b. Portion, digital, and baker's scales are used for smaller items throughout the food service establishment.
 3. Other equipment used in the receiving area
 - a. **Labeling equipment** is equipment such as pre-printed labels and markers used to identify food items (especially when the items would not remain in

their original containers) and to record the date received. The recording of the date the item is received helps to ensure that older foods (those with an earlier date) are arranged on the shelf to be used first, as in accordance with **FIFO**—first in, first out. The employee responsible for checking in the food item may have his or her initials or employee number included on the label.

- b. Box cutters are used to open the cases of food to check for order accuracy and damage.
 - c. **Dollies** are hand trucks, platform carts, or utility carts used to transport heavy boxes and bags to their proper storage area or from one area to another.
- B. The **storage area** is a designated location where foodstuffs are kept until they are needed. The food items must be kept in a safe and monitored environment. Not all food items can be stored the same way. Three types of food storage exist to ensure the food items will be of the highest quality when served to the customer: dry, cold, and hot storage.
1. **Dry storage** is the designated location for nonperishable (do not require refrigeration or freezing) foods; these items are often stored in the most appropriate workstation. Nonperishable food items have a long shelf life and include canned goods, dry beans, pasta, flours, and sugars. In large establishments, even dry storage is kept slightly refrigerated at 65°F. Dry storage is often a small walk-in style room with equipment that allows for orderly storage (e.g., various tomato products are grouped in a common area) and includes:
 - a. Shelving units
 - b. Storage containers (rolling and stationary)
 - c. Bins (rolling and stationary)
 - d. Scoops
 - e. Slotted/slatted storage racks
 2. **Cold storage** is a containment area that keeps perishable food fresh and safe; it is crucial for keeping potentially hazardous foods safe. Refrigerators, walk-in coolers, and freezers are cold storage locations equipped with slotted/slatted shelving for continuous air circulation as well as temperature and humidity (moisture content of the air) controls. A safe refrigerator and cooler storage temperature is 41°F or lower. The freezer storage temperature is required to be 0°F or below. Cold storage equipment comes in different equipment styles and, although the purpose is the same, the equipment is chosen to suit the establishment's needs and the needs of the workstation. Examples of refrigeration and freezer equipment units are:
 - a. Walk-in
 - b. Reach-in
 - c. Roll-in
 - d. Under-counter
 3. **Hot storage** is equipment used to maintain (hold) food temperatures at 140°F or above, as recommended. Food must be held at a minimum of 140°F to

ensure it is safe for service to customers. Restaurants use several styles of hot storage equipment, including:

- a. Bain-maries (Bāne-maries)
 - b. Roasters
 - c. Steam tables
 - d. Proofing cabinets
 - e. Overhead warmers or heat lamps
 - f. Chafing dishes
4. Catering establishments use hot and cold storage equipment to ensure food stays at safe temperatures during transport to a catered event. Caterers use utility carts and dollies to move the large carriers from place to place.
- C. The **preparation area** is all locations where food is processed and all locations where food is cooked. The equipment used in these areas is varied and is located according to task. The various processing and preparation areas are further broken down into locations or centers called workstations. In **workstations**, employees perform specific food processing and production tasks (e.g., sauces, broiler, roast, and seafood). Workers are trained for the specific tasks and are trained to safely operate the equipment used in the station. Training ensures standards of quality and efficiency are met. Numerous studies show that a water supply in each major workstation saves time and energy. In the various processing and preparation workstations, equipment is used to process or prepare food for use in recipes or for use at other workstations.
1. Processing workstations: Well-maintained safety and sanitation equipment is essential to the creation of a successful food service establishment. For a restaurant to be successful, the managers must ensure the safety of the employees and the customers. If a restaurant's sanitation practices fail, it usually means the inevitable failure of the establishment. State codes and local health departments enforce food services to comply with safety and sanitation guidelines. All equipment used in restaurants must be safe and sanitary. The workstation equipment that assists employees in meeting federal, state, and local safety and sanitation guidelines includes:
- a. The **National Sanitation Foundation (NSF)** sets standards of fabrication and inspection of restaurant equipment. The equipment must be able to withstand heavy use in commercial kitchens, including worktables, cutting boards, knives, pots, and pans. All equipment used in a restaurant must be NSF approved and must carry a blue NSF seal. The seal indicates that the equipment meets the following specifications:
 - (1) Easily cleanable
 - (2) Smooth surface, **nonporous** (does not hold or absorb debris), **nontoxic** (does not chemically react to foods), and corrosion resistant
 - (3) Smooth and rounded internal and external corners
 - (4) Easily dismantled
 - (5) Easily freed of debris and liquids

- b. Commercial sinks come in many sizes and styles, depending on the intended use. Commercial sinks assist employees in proper sanitation. **Sanitation** is the process of reducing bacteria to safe levels on all surfaces, including processing areas and production areas (e.g., worktables, cutting boards, flatware, knives, pots, and pans). All sinks should be cleaned and sanitized before use. Sinks types (food preparation, ware, and hand) and their uses are:
- (1) Two-compartment sinks are used in preparation areas.
 - (2) Three-compartment sinks are used to wash and sanitize wares. In a three-compartment sink, the first compartment is for washing, the second is for rinsing, and the third is for sanitizing.
 - (3) Four-compartment sinks have a compartment for spraying and removing debris before washing.
 - (4) Hand sinks are for hand washing only. Kitchen areas should have hand sinks located throughout the workstations.
- c. Commercial dishwashers are used to make washing wares quick, efficient, and safe. Racks are used to load dishes that then go through the dishwasher. Commercial dishwashers perform the duties of prewash, wash, rinse, sanitize, and dry. This makes the labor-intensive job of ware washing less time consuming.
- d. Garbage disposals are used to eliminate food waste that is rinsed from wares. The garbage disposal grinds food items and washes the waste into the sewage system. Most of the food waste should be placed in garbage cans, but the amount left on the wares can be sprayed off and run through the disposal. A disposal must be clear of items that may have accidentally been dropped or flushed there (e.g., paper, flatware, and shellfish shells) before it is started because foreign items can damage the disposal and may be dangerous for the disposal operator.
- e. Fire extinguishers and fire suppression systems are mandatory in food service establishments. Fire suppression systems are sprinkler systems installed in the cooking area of a kitchen. This system will activate when there is extreme heat and smoke. The system will spray an extinguishing chemical to smother the fire. These systems are usually located in the ventilation hood of the hot food cooking area. Hand-held fire extinguishers are also placed in several posts throughout the kitchen. Different classes of extinguishers are suited to different fire types. Use of the wrong extinguisher on a fire can be hazardous and even fatal.
- (1) Class A extinguishers are used to suppress common combustible items (e.g., wood, paper, trash, and cloth). These are often dry chemical systems that use sodium bicarbonate (baking soda) as the extinguishing agent. A multipurpose extinguisher is ABC rated. Ammonium phosphate (a salt) is the extinguishing agent.
 - (2) Class B extinguishers are used on flammable liquids, and a dry chemical (sodium bicarbonate) is the extinguishing agent.

- (3) Class C extinguishers are used on electrical fires, and a dry chemical type (sodium bicarbonate) is the extinguishing agent.
 - (4) Class K extinguishers are a recent addition to the arsenal of hand-held extinguishers and were developed specifically for deep fat fryer fires. Many are a type known as a wet chemical variety that contain a potassium acetate based, low PH agent originally developed for use in pre-engineered cooking equipment fire extinguished systems (overhead fire suppression systems). Because of its higher heating rates and the industry trend toward the use of more unsaturated fats, Class K types are rated for use with commercial “combustible cooking media” (grease and oil) fire hazards in the kitchen. Class K is also available in a dry chemical version that uses potassium bicarbonate as the extinguishing agent. For small grease fires in saucepans or pots, the application of the pan or pot cover will extinguish small flames.
2. Cold food workstations: In the cold food workstations, there are various types of equipment based on the restaurant’s menu, style, and size and based on employee skills. Equipment in the cold food or **garde-manger** (French: a storage-place that is cool and well-aired; the name of the chef who supervises the cold food workstations) stations is used to prepare quantities of cold food quickly and efficiently. All cold buffet foods are prepared here. In addition, the preparation of raw foodstuffs (e.g., boning and trimming of meats) and the drawing of a trussing poultry occur here. These workers also prepare garnishes, salads, salad dressings, mayonnaise, cold meat and cheese trays, etc. Refrigerated air is drying, so food items that will not be used in a few hours should be wrapped tightly. Equipment used in the cold food workstations includes:
 - a. Various refrigerated storage
 - b. Food slicers
 - c. Mixers
 - d. Food processors
 - e. Mandolins
 - f. Blenders
 - g. Juicers
 - h. Worktables, cutting boards, knives, and scales
 3. Hot food workstations: In the hot food workstations, there are various types of cooking equipment based on the restaurant’s menu, style, and size as well as employee skills. A French menu would require numerous hot food workstations (leisurely dining), and a coffee shop menu would require only a few workstations because the customer demands are vastly different. Equipment is used to cook a quantity of food quickly and efficiently. Food service employees must be trained and tested on the safe operation of all hot food equipment. It is also imperative that employees thoroughly read the user’s manual for the equipment prior to operation. Equipment used in these workstations includes:
 - a. Ranges

- b. Ovens (e.g., standard, convection, and microwave)
 - c. Broilers
 - d. Fryers (including broasters)
 - e. Grills
 - f. Kettles (steam-jacketed and trunnion)
 - g. Tilted skillets (tilt braziers)
 - h. Steamers
 - i. Griddles
 - j. Mixers
 - k. Worktables, cutting boards, knives, and scales
 - l. Pots, pans, and overhead storage racks
4. Beverage workstations: Beverage equipment is used to prepare, keep (cold), hold (hot), and/or serve beverages. Examples are:
- a. Coffee brewing system
 - b. Carbonated beverage system
 - c. Thermal serving system
 - d. Alcohol beverage station (for restaurants with a bar area)

Teaching Strategy: *Distribute copies of LS–A as a student note-taking guide to be used during a class discussion and lecture of food service work areas and related equipment. Also, consider using your own commercial kitchen as a “live” VM, or use online restaurant equipment distributor Web sites to provide additional images of the various food service workstations and areas. As safety and sanitation issues are a constant concern to all food service establishments, share the Cooking Oil Fire kitchen safety Web site listed in the Resources section. Have students research and share other restaurant safety videos available online.*

Objective 2: Describe food service equipment and its primary processing and/or preparation tasks.

Anticipated Problem: What specific tasks does each piece of equipment perform?

- II. Primary food service equipment tasks
 - A. Receiving area equipment and tasks
 - 1. Thermometers should regularly be checked for accuracy.
 - a. Infrared types measure the surface temperature of items.
 - b. Probe types measure the internal temperature of food items and may have digital, gauge, or mechanical readouts.
 - c. Task: Have your students measure surface and internal food temperatures.
 - 2. Scales should regularly be checked for accuracy of measurement.
 - a. Platform types for receiving sit on the floor and weigh heavy cases or other heavy items.

- b. Counter model platform types weigh heavy items and small cases.
 - c. Portion types are used to measure pieces of meat or smaller individual items.
 - d. Balance or baker types are used in the restaurant to measure ingredients and portions of many food products.
 - e. Task: Have students weigh food items; pretend the items are entering the food service.
 - f. Advantages: Scales result in an accurate product quantity; accurate recipe production (especially pastries); and accurate portion control.
3. Dollies, hand trucks, and carts
- a. Task: These devices can be used to transport heavy food items from one place to another.
 - b. Advantage: These devices save employees from having to lift certain items.
4. Labeling equipment
- a. Task: Labeling equipment ensures information is recorded about food items entering the food service.
 - b. Advantage: Labeling equipment records each food item name, date of delivery, and time as well as the person responsible for accepting the delivery. It facilitates the FIFO process.
- B. Storage area equipment and tasks
1. Dry storage areas commonly utilize slotted/slatted shelving units. Other dry storage units are:
- a. Can-rack shelving units allow new canned goods to be loaded from the top while the oldest canned goods are rotated to the bottom for easy access.
 - b. Storage racks and cages have doors that may be locked when not in use.
 - c. Storage bins may be stationary or rolling-type and are designed to hold large amounts of dry items, such as flour and sugar.
 - (1) Task: These store dry, non-perishable food items.
 - (2) Advantage: They aid in orderly storage.
2. Cold storage often separates dairy, meats, produce, and fish because of odor transfer and variable optimal temperature guidelines.
- a. Reach-in refrigerators or freezers are designed to keep perishable foods safe and are often located in each cold food workstation.
 - (1) Commercial refrigeration units operate like household types and keep food items at or below 41°F. Workers open the doors and place food items on the shelf.
 - (2) Commercial freezers are designed to keep frozen food frozen at 0°F or below and are designed to accept frozen foods. Any non-frozen food items should be allowed to cool to 41°F before storing in the freezer. Overcrowding a freezer with non-frozen foods may raise the internal temperature of the unit and may be hazardous to other foods.
 - b. Walk-in refrigerators, coolers, or freezers are small rooms lined with slotted/slatted shelves and refrigeration or freezer capability. Many open-wire

shelves (coated and uncoated) are available for cold food storage. Larger restaurants obviously require larger refrigeration units.

- c. Roll-in refrigerators or freezers are small refrigerated rooms that have no shelving and a small ramp in the front of the door for racks to be wheeled in and stored.
 - d. Under-counter refrigerators or freezers are made for easy access to cold storage. The units are placed in specific work areas to hold small amounts of food for ease and efficient food production. Some restaurants have refrigeration drawers in specific workstations. For example, ice cream and gelato shops, garde-manger cold service areas, and bars may use various under-counter refrigeration and frozen storage units.
 - (1) Task: They offer safe storage of perishable and potentially hazardous foods.
 - (2) Advantage: The sheer variety of refrigerator and freezer options makes it possible to select equipment suited to the establishment's menu and workstation locations.
3. Hot storage units (warmers)
- a. Bain-maries are deep pots filled with hot water into which other pots holding food items are placed. Sometimes a sink is filled with boiling water (to serve as a large bain-marie) and pots of food are placed there to ensure that no further cooking of the food takes place prior to service.
 - b. Steam tables are often used for cafeteria and buffet lines. Hotel pans are placed in the steam table compartments over the hot water to hold food at or above 140°F. Hotel pans come in a variety of sizes to suit the needs of the restaurant and often have high domed lids to keep in the heat.
 - c. Heated carts transport heated food to the place of service. They are used to ensure plated foods and pans of food remain hot while waiting to be served. Hospitals, airlines, and banquet rooms use heated carts extensively. Proof cabinets are a similar type of heated cabinet with a water cavity (to create steam) for the final out-of-oven rising of breads and pastries.
 - d. Overhead warmers (pass-throughs or infrared lamps) are used to ensure plated and prepared food items remain hot while waiting to be served. An electric element in the lamp fixture emits dry heat and may be adjusted to ensure that no additional cooking takes place.
 - e. Chafing dishes allow hot foods to be stored above hot water or directly on a heat source for service. They are used for catered events and in restaurants to keep cooked foods hot. Most use a portable canned fuel heat source.
 - f. Insulated carriers are used to transport food items from one place to another, while maintaining a safe temperature. These carriers are made of heavy polyurethane that ensures hot foods stay hot and cold foods stay cold.
 - (1) Task: The carriers hold (maintain) hot foods at a safe temperature—at or above 140°F—prior to customer service. Most units have a

separate temperature gauge, but probe-type thermometers are suggested for use.

- (2) Advantage: They are designed to keep food warm/hot with minimal loss of color, texture, and quality.

C. Processing and preparation equipment: general, cold, and hot

1. Cutting boards come in many types (e.g., wood and plastic). For example, polyethylene hard plastic is typical in food service establishments.
 - a. Tasks: Cutting boards protect table surfaces and knife blades when cutting, slicing, and chopping food items.
 - b. Advantage: Boards may be color coded to prevent cross contamination. For instance, a common way to code cutting boards is:
 - (1) Beige—raw fish and shellfish
 - (2) Red—raw meats
 - (3) Blue—cooked foods
 - (4) White—dairy products
 - (5) Green—fruits and vegetables
 - (6) Yellow—raw poultry
2. Bench (vertical) mixers range in size from 5 to 20 quarts. Mixers also come in handheld and floor models. To fit the bowl under the beaters, the bowl is lifted by a crank or by a motor mechanism. Most have three or four mixing speeds and utilize three basic attachments or agitators:
 - a. The paddle is a flat blade for general mixing tasks (e.g., mashing or creaming).
 - b. The wire whip is evenly spaced wires in a conical shape for whipping eggs, egg whites, heavy cream, etc.
 - c. The dough hook is an arm-shaped attachment used for mixing and kneading yeast dough.
 - (1) Task: It makes mixing work more efficient and effective.
 - (2) Advantage: It saves employee time and labor. Also, more standard products are created.
3. Food processors
 - a. Tasks: They chop, slice, dice, shred, and puree raw and cooked food items.
 - b. Advantage: They save employee time and labor.
4. Slicers have a circular spinning blade that is adjustable for thickness. A carriage with an arm is used to move and push the food item against the blade to ensure uniform slices, especially for portion control. Slicers require upper and lower blade guards and are still dangerous to operate and to clean. Employees must be trained and tested on the operation of the equipment; they must have a thorough comprehension of the operator's manual prior to use.
 - a. Task: They slice meats and cheeses.
 - b. Advantage: They aid in portion control; they save employee time and labor.

5. Worktables are essential equipment in all the kitchen's workstations. They come in an assortment of sizes, heights, and styles and are usually made from high-quality stainless steel.
 - a. Task: They allow tasks (e.g., sandwich making) to be set up for efficient workflow and speed of assembly. For example, the food enters the station at the left, and finished food is removed at the right.
 - b. Advantage: The stainless steel surface is easy to clean.
 6. Blenders
 - a. Task: They are used for blending, mixing, and pureeing raw and cooked food items. Industrial blenders are used to crush ice, to blend iced beverages, to puree soups, and to prepare mayonnaise and hollandaise sauces.
 - b. Advantage: They save employee time and energy.
 7. Juicers
 - a. Task: They turn solid food items into juice by a mechanical operation that separates the pulp, the seeds, and the skin from the juice.
 - b. Advantage: They save employees time and energy; they produce a more uniform juice product than hand juicing.
- D. Hot station cooking equipment and tasks
1. Food is cooked to make it more palatable and attractive. Cooking changes the taste, color, and texture of food. The heat source is electricity, gas, or wood.
 - a. Convection ovens have a fan inside the cabinet to circulate the heat around the food. Most food cooks about 30 percent faster than in a conventional oven. Preheating a convection oven (five-minute average) is also faster than a conventional (20-minute average) oven. Food trays in convection ovens can be closer together than in conventional ovens. A "cook and hold" option on some convection ovens allows the chef to insert a thermometer probe into a roast or ham. When the internal temperature is met, the oven holds but does not continue to cook the meat. This means a chef could set a cook and hold oven before leaving in the evening to serve prime rib at lunch the next day.
 - b. Deck and stack ovens are similar in that multiple ovens (baking shelves) are stacked on top of one another; each has its own door and individual temperature controls.
 - c. Microwave ovens cause water, fat, and sugar molecules in food to vibrate and cook foods faster—a type of chain reaction heating of the food item without heating the air. The vibrations continue for a short time after removal from the oven, so a stand time is often indicated as part of the cooking time. In conventional cooking, heat is transferred to the food by air or by a hot pan. In a microwave, the waves travel in straight lines so ovens are not filled to capacity; foods cook best in the center and least efficiently in the corners. The original purpose of a microwave was to defrost and reheat food items. These are still the best tasks they perform. Commercial

- ovens use at or more than 2000 watts as compared to home models that average 600 to 800 watts.
- d. Flash bake ovens use infrared light waves to cook foods quickly. These ovens do an exceptional job of retaining the moisture in foods.
 - e. Wood burning ovens are made of masonry or brick on the inside to hold the heat of the wood. This oven gives foods a smoky flavor. Foods are placed inside and are removed with a peel (a tapered paddle with a long handle). There are several peel types, including wooden styles and banjo metal styles used for turning and retrieving foods.
 - f. Conventional ovens are usually located under the range top and typically are a standard two-shelf model. A turkey or large beef cut may be roasted when only one shelf is used.
2. Deep fryers fry foods in hot, deep fat. Floor mounted and counter mounted (or portable) models are selected based on the depth of use of deep frying. Food is placed in wire mesh baskets, lowered into the hot fat, and removed to drain when cooking is complete. Most fryers have thermostats and timers.
 3. Ranges have burners and ovens underneath the burners (or a flat grill surface). Ranges cook food items on open burners (gas or electric) to brown foods. Ranges have four to eight burners with individual controls and thermostats for burners and ovens.
 4. Grills and griddles are terms often used interchangeably. However, grills are usually associated with cooking meats outside, and griddles are usually associated with cooking pancakes. Grills and griddles are flat or grooved/grated stainless steel surfaces with burners underneath used to cook food by placing it on a grate over an open heat source. Most grills and griddles are not washed because this would cause foods to stick to the surface. They are wiped. Then caked-on food is removed with a pumice stone—a soft volcanic rock that cleans without scratching. Most have a backsplash to prevent splatters and have grease troughs.
 5. Kettles (steam-jacketed and trunnion) are used to cook a large quantity of food using steam that runs inside the walls of the kettle. Both the floor (steam-jacketed) and the trunnion (table top mounted between two pivots) models have a gear-driven mechanism that allows the kettle to tilt and pour the food into serving containers.
 6. Broilers apply direct heat to food from above, from below, or from the sides. Heat sources are electricity, gas, charcoal, or heated rock. Specialty establishments use charcoal or wood fire ovens to broil meats and vegetables. Some ovens use a broiler pan—a perforated pan set inside another sided pan—to hold the meat away from drippings. Some infrared lamps are also used to broil meats; infrared is a very fast cooking source.
 7. Tilt brazier pans can be used as steamers, griddles, frying pans, and ovens. They cook with oil or water that can be poured off when cooking is complete. The brazier's special features are a pouring lip and a cover that swings up to allow the pan to be tilted by turning a wheel. These are common in large kitch-

ens and are used to produce large quantities of pot roast or braised chicken dishes.

8. Steamers use live steam to cook food. Steam can be free steam or under pressure. Free steam is about the same temperature as boiling water. In contrast, steam under pressure is able to produce steam temperatures above boiling. Steam is a good choice among food service professionals because it cooks foods quickly and without fat or oil. Steamers reduce the loss of vitamins and minerals from foods (mostly produce), and foods do not stick as when cooked over direct heat surfaces. Meats cook especially well when perforated insert pans are fitted into a brazier, so the food does not sit “in its own juices.” In this fashion, the steam is allowed to circulate underneath the food product.
 - a. Task: Ovens and other hot food cooking equipment relies on well-insulated cabinets and surfaces that cook by direct heat and by circulating heated air, steam, or hot fat around foods.
 - b. Advantage: Each type has a specific purpose. The menu dictates the hot food cooking equipment necessary for each food service establishment.

Teaching Strategy: Use LS–B as a tool to help ensure proper equipment identification. As an alternative, use LS–B as a quick quiz following a lecture and demonstration. Use the Web sites recommended in the Resource section to illustrate additional equipment used in your kitchen or other commercial kitchens. Use VM–A to review the color-coded cutting board system. Assign LS–C to have students visit, interview, and collect various types of food service equipment needs in order to find the cost to equip various types of establishments.

- **Review/Summary.** Use the student learning objectives to summarize the lesson. Have students explain the content associated with each objective. Student responses can be used in determining which objectives need to be reviewed or taught from a different angle. Questions at the ends of chapters in the textbook may also be used.
- **Application.** Use the included visual master(s) and lab sheet(s) to apply the information presented in the lesson.
- **Evaluation.** Evaluation should focus on student achievement of the objectives for the lesson. Various techniques can be used, such as student performance on the application activities. A sample written test is provided.

■ Answers to Sample Test:

Part One: Matching

1. a
2. g
3. d

4. e
5. f
6. c
7. i
8. j
9. h
10. b

Part Two: Short Answer

1. Three types of measuring equipment used in the receiving area are:
 - a. Thermometers
 - b. Scales
 - c. Labeling equipment
2. The two NSF guidelines for food contact surfaces are:
 - a. Nontoxic
 - b. Nonporous

Part Three: Completion

1. clean
2. internal
3. dollies (or hand trucks or utility carts)
4. K
5. odor transfer
6. cutting boards
7. cleaned, sanitized
8. hand washing
9. convection oven
10. above boiling

Food Service Equipment

► Part One: Matching

Instructions: Match the term with the correct definition.

- | | |
|---|---------------------|
| a. dry storage | f. sanitation |
| b. cold storage | g. garde-manger |
| c. hot storage | h. preparation area |
| d. National Sanitation Foundation (NSF) | i. receiving area |
| e. temperature danger zone | j. FIFO |

- ____ 1. Designated location for nonperishable foods
- ____ 2. A storage-place that is cool and well-aired; the name of the chef who supervises the cold food workstations
- ____ 3. An organization that sets standards of fabrication and inspection of restaurant equipment
- ____ 4. The temperature range between 41° and 140°F
- ____ 5. The process of reducing bacteria to safe levels on all surfaces
- ____ 6. Equipment used to maintain (hold) the food temperatures at 140°F or above
- ____ 7. The location where all goods enter the food service facility
- ____ 8. First in, first out
- ____ 9. All locations where food is processed and cooked
- ____ 10. A containment area that keeps perishable food fresh and safe



► Part Two: Short Answer

Instructions: Answer the following.

1. List three types of equipment used in the receiving area.

2. Identify the two NSF guidelines for food contact surfaces.

► Part Three: Completion

Instructions: Provide the word or words to complete the following statements.

1. A well-designed food service kitchen is efficient and is easy to _____.
2. Infrared thermometers measure the surface temperature of items and probe types measure the _____ temperature of food items.
3. To transport heavy boxes to the proper storage place, use _____.
4. A Class _____ fire extinguisher is used to put out deep fryer fires.
5. Cold storage often separates dairy, meat, produce, and fish because of _____ and variable optimal temperature guidelines.
6. To protect table surfaces and knife blades when cutting, slicing, and chopping food items, use _____.
7. All sinks should be _____ and _____ before use.
8. To save employee time and energy, install a _____ sink in each workstation.
9. The type of hot food equipment with a fan inside the cabinet to circulate the heat around the food is a _____.
10. Steamers use free steam or steam under pressure to cook food. Free steam is about the same temperature as boiling water, and steam under pressure is able to produce steam temperatures _____.

COLOR-CODED CUTTING BOARDS

Color-coded cutting boards prevent cross-contamination.



Beige—raw fish and shellfish



Red—raw meats



Blue—cooked foods



White—dairy products



Green—fruits and vegetables



Yellow—raw poultry

Food Service Equipment Categories

Purpose

The purpose of this activity is to increase your familiarity with food service work areas and related equipment.

Objective

Define and explain the categories of food service equipment.

Materials

- ◆ lab sheet
- ◆ writing utensil

Procedure

As the instructor reviews the major areas of food service and the related equipment used in that area, take notes using the following outline:

1. Receiving area
 - a.
 - b.
 - c.



2. Storage areas

a.

b.

c.

3. Processing and preparation areas

a.

b.

c.

d.

Food Service Equipment Categories

1. Receiving
 - a. Thermometers
 - b. Scales
 - c. Labeling equipment—FIFO
2. Storage
 - a. Dry—shelving units, storage containers, bins, and racks
 - b. Cold—refrigerator, cooler, and freezer equipment in walk-in, reach-in, roll-in, and under-counter styles
 - c. Hot—Bain-maries, roasters, steam tables, proofing cabinets, overhead warmer, chafing dishes, insulated carriers
3. Processing and preparation areas
 - a. Safety and sanitation
 - (1) NSF equipment—National Sanitation Foundation approved; blue seal (e.g., worktables, cutting boards, knives, and scales)
 - (2) Sinks—Two-compartment, three-compartment, four-compartment, and hand sinks
 - (3) Commercial dishwasher—pre-wash, wash, rinse, sanitize, and dry
 - (4) Garbage disposal—free of foreign objects
 - (5) Fire extinguishers and fire suppression systems—Class A combustibles, Class C electrical, and Class K grease
 - b. Cold food (garde-manger) preparation—meat slicer, mixer, food processor, mandolin, blender, juicer, worktables, cutting boards, knives, scales, etc.
 - c. Hot food preparation—ranges, ovens, broilers, fryers, grills, kettles, tilted skillets, steamers, griddles, mixers, worktables, cutting boards, knives, scales, pots, pans, and overhead racks
 - d. Beverage preparation: coffee brewing system, carbonated beverage system, thermal serving system, and alcohol beverage station

Food Service Equipment Identification

Purpose

The purpose of this activity is to expand your knowledge of various types of food service equipment.

Objective

Properly identify food service equipment.

Materials

- ◆ lab sheet
- ◆ writing utensil

Procedure

Identify and label the food service equipment pictured on the following pages.





1. _____

Task: _____



2. _____

Task: _____



3. _____

Task: _____



4. _____

Task: _____



5. _____

Task: _____



6. _____

Task: _____



7. _____

Task: _____



8. _____

Task: _____



9. _____

Task: _____



10. _____

Task: _____



11. _____

Task: _____



12. _____

Task: _____



13. _____

Task: _____



14. _____

Task: _____



15. _____

Task: _____



16. _____

Task: _____

Food Service Equipment Identification

1. Rolling storage cart
2. Rolling storage bins
3. Work table
4. Reach-in freezer
5. Reach-in refrigerator
6. Convection microwave oven
7. Proofer/warmer
8. Garbage disposal
9. Three-compartment sink
10. Bench mixer
11. Convection oven
12. Combination convection-steamer oven
13. Trunion kettle
14. Low-boy refrigerator
15. Deep fryer
16. Grill

Calculate the Cost of a Commercial Kitchen

Purpose

The purpose of this activity is to acquaint you with the basic commercial equipment needed to start a restaurant and the cost involved.

Objectives

1. Conduct an interview with a food service owner or manager.
2. Identify the basic commercial kitchen equipment needed to open a specific type of food service establishment.
3. Calculate the cost to purchase the basic commercial kitchen equipment.

Materials

- ◆ lab sheet
- ◆ commercial restaurant equipment distributor catalogs
- ◆ art supplies (e.g., paper, glue, and markers)
- ◆ paper
- ◆ writing utensil

Procedure

1. Work with one or two other students.
2. Select a type of food service establishment that you would like to visit.
 - a. Coffee shop
 - b. Fast food restaurant



- c. Hospital
 - d. Nursing home
 - e. Day care center or preschool
 - f. Family restaurant
 - g. Bistro
 - h. Luxury restaurant
 - i. Hotel banquet services
 - j. Catering firm
 - k. Resort food service
 - l. Other: _____
3. Your first task is to contact a food service manager to schedule an appointment for an interview and a tour of his or her kitchen.
 4. Prepare the interview questions for the manager.
 5. Arrive on time for the interview. Introduce yourselves, and provide a brief overview of the project you are working to complete. Conduct the interview with a restaurant owner or manager. Collect responses to a minimum of the following questions:
 - a. How long have you worked at this restaurant?
 - b. When did this restaurant open?
 - c. How would you describe the food that is served here?
 - d. How does the type of food served affect the type of equipment you must purchase?
How does the equipment affect menu changes?
 - e. How many workers prepare the food items? What are their titles?
 - f. What are the characteristics you look for in purchasing commercial kitchen equipment?
 - g. What, in your opinion, is the basic commercial kitchen equipment needed to start a restaurant?
 - h. What additional comments about commercial kitchen equipment might help us write this report?
 - i. Other question:
 - j. Other question:
 6. Following the interview, compile a list of commercial equipment needed to start a restaurant kitchen. Review your class notes to make sure no major work area or equipment is missing from your list.
 7. Next, use Web sites and print material to identify prices for each piece of equipment on your list. You will also need pictures of your equipment to make a visual aid for your presentation (in PowerPoint or poster form).

8. The “Cost of a Commercial Kitchen” research report should have the following components:
 - a. A cover page listing the name of the kitchen manager, the date and time of the interview, and the interviewers
 - b. A summary of the questions and answers collected at the food service visit and interview
 - c. A word-processed listing of prices for each piece of equipment
 - d. A total cost for all of the commercial kitchen equipment
 - e. A visual aid that illustrates the pieces of equipment listed on your cost sheet
 - f. An opinion paper to express the team’s opinion about your findings
9. Present your costing project information to the class.
10. Turn in your completed “Cost of a Commercial Kitchen” project to your instructor.