



CHAPTER 4

Managing Inventory and Production

OVERVIEW

This chapter begins with an overview of the procedures used to properly store food and beverage products until they are ready for use. The careful control of products while in storage is important to help minimize product loss due to waste, spoilage, and theft. The chapter then addresses the steps that managers must take to ensure product inventories are kept secure. When stored products are needed by production staff, these products must be properly issued and their issue amounts carefully recorded to assist in future cost calculation and purchasing efforts. Finally, managers must ensure that the procedures used for producing food and beverage items for their guests result in the desired product quality and proper cost control. This chapter directly addresses these important procedures.

Chapter Outline

- Product Storage
- Inventory Control
- Product Issuing and Restocking
- Managing Food Production
- Managing Beverage Production
- Technology Tools
- Apply What You Have Learned
- Key Terms and Concepts
- Test Your Skills

LEARNING OUTCOMES

At the conclusion of this chapter, you will be able to:

- Implement an effective product storage and inventory system.
- Control the issuing of products from storage.
- Manage the food and beverage production process.

PRODUCT STORAGE

In Chapter 3, you learned the procedures you will use to properly purchase and receive foodservice products. In most cases, after purchased items have been received, they must be immediately placed into storage. Food and beverage product quality rarely improves with increased storage time. In fact, the quality of most products you buy will be at its peak when the product you ordered is delivered to you. From then on, these products will often decline in freshness, quality, and nutritional value.

It is important to understand that all of the stored food and beverage products that make up your **inventory** are the same as money to you. In fact, you should think of items placed in storage in exactly that same way. The apple in a produce walk-in is not just an apple. It represents, at a selling price of \$2.00, that amount in revenue to the airport foodservice director, who hopes to sell a crisp, fresh apple to a weary traveler. If the apple disappears, revenue of \$2.00 will disappear also. When you think of inventory items in terms of their sales value, it becomes clear why food and beverage products must be stored and maintained carefully.

STORING FOOD PRODUCTS

The ideal situation for you and your operation would be for you to store only the food you will use between the time of a vendor's delivery and the time of that vendor's next delivery. This is true because storage costs money, in terms of providing both the storage space for inventory items and the money that is tied up in inventory items and thus unavailable for use elsewhere. It is always best, whenever possible, to order only the products that are absolutely needed by the operation. In that way, the vendor's storeroom actually becomes your storeroom. The vendor then absorbs the costs of storing your needed products. In all cases, however, you must have an adequate supply of products on hand to service your guests. They are your main concern. If you are doing your job well, you will have many guests and will need many items in storage!

After receiving staff has properly accepted the food products you have purchased, the next step in the control of food costs is that of storing those items. The storage process, in most foodservice establishments, consists of three main tasks:

1. Placing products in storage
2. Maintaining food and beverage storage areas
3. Maintaining product security

PLACING PRODUCTS IN STORAGE

Food products are highly perishable items. As such, they must be moved quickly from your receiving area to the area selected for storage. This is especially true for refrigerated and frozen items. An item such as ice cream, for example, can deteriorate substantially in quality if it remains at room temperature for only a few minutes. Most often, in foodservice, this high perishability means that the same individual responsible for receiving the items is the one responsible for their storage.

Consider the situation of Kathryn, the receiving clerk at Fairview Estates, an extended care facility with 400 residents. She has just taken delivery of seven loaves of bread. They were delivered in accordance with the purchase order her manager prepared. The bread must now be put in storage. When Kathryn stores these items, she must know whether management requires her to use the LIFO (last in, first out) or FIFO (first in, first out) method of product rotation.

LIFO System

When using the **LIFO** storage system, the storeroom manager intends to use the most recently delivered product (last in) before he or she uses any part of that same

product previously on hand. If Kathryn decides, for example, to use the just delivered bread prior to using other bread already in storage, she would be utilizing the LIFO system. In all cases, you must strive to maintain a consistent product standard. In the case of some bread, pastry, fruit, and vegetable items, the storeroom clerk could be instructed to utilize the LIFO system. With LIFO, you will need to take great care to order only the quantity of product needed between deliveries. If too much product is ordered, loss rates will be very high. For most of the items you will buy, however, the best storage system to use is the FIFO system.

FIFO System

Using a **FIFO** (first in, first out) storage system means that you intend to rotate your stock in such a way that product already on hand is sold prior to the sale of more recently delivered product. With FIFO, oldest products (first in) are used before newer products. When the FIFO system is used, the storeroom clerk must take great care to place new stock behind, underneath, or at the bottom of old stock. It is often the tendency of employees not to do this. Consider, for example, the storeroom clerk who must put away six cases of tomato sauce. The cases weigh about 40 pounds each. The FIFO method dictates that these six cases be placed *under* the five cases already stacked in the storeroom. Will the clerk place the six newly delivered cases underneath the five older cases? In many instances, the answer is no. Unless management strictly enforces the FIFO rule, employees may be tempted to use the faster and easier, but improper, way of storing newly delivered products on top of those already in storage. Figure 4.1 demonstrates the difference between LIFO and FIFO when dealing with storing cases of food products.

FIFO is the preferred storage technique for most perishable and nonperishable items. Failure to implement a FIFO system of storage management can result in excessive product loss due to spoilage, shrinkage, and deterioration of product quality.

Decisions about storing food items according to the LIFO or FIFO method are management decisions. Once these decisions have been made, they should be communicated to storeroom staff and monitored on a regular basis to ensure compliance. To assist them in their efforts, some foodservice managers require the storeroom clerk to mark or tag each delivered item with the date of delivery. These markings provide a visual aid in determining which products should be used first. This is especially critical in the area of highly perishable and greater-cost items such as fresh meats and seafood. Special meat and seafood date tags should be available from your vendor. These tags contain a space for writing in the item’s name, quantity, and delivery date. The use of these tags or an alternative date tracking system is strongly recommended. If the supplier has computerized his or her delivery, the box or case may already bear a bar code strip identifying both the product and the delivery date. When this is not the case, however, the storeroom clerk should perform this function.

FIGURE 4.1 FIFO and LIFO Storage Systems

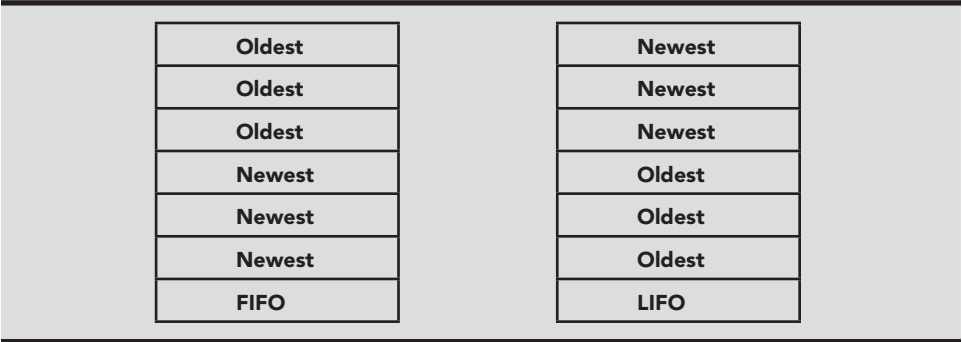


FIGURE 4.2 FIFO Stocking System

Tomato sauce	2/10	Beets	2/10	Egg noodles	2/18
Tomato sauce	2/18	Beets	2/10	Egg noodles	2/18
Tomato sauce	2/18	Beets	2/18	Egg noodles	2/22
Tomato sauce	2/22	Beets	2/22	Egg noodles	2/22

FIGURE 4.3 Product Storage Label

	DATE	HOUR
PULL		
THAW		
DISC.		
MONDAY		

Figure 4.2 shows products in a dry-storage area when management requires that the storeroom clerk mark each stored item with its date of delivery.

Some operators prefer to go even further when labeling products in storage. These operators date the item and then also indicate the day (or hour) in which the product should be pulled from storage, thawed, or even discarded (disc.).

Figure 4.3 is an example of a typical storage label utilized for this process.

FUN ON THE WEB!

Daydots is a line of labeling products developed especially for the restaurant industry. To learn more about how these storage labels can help your operation ensure product quality and save money, type “daydot foodservice labels” in your favorite search engine.

MAINTAINING FOOD STORAGE AREAS

To maintain the quality and security of delivered food items, they should be immediately placed into one of three storage areas:

1. Dry storage
2. Refrigerated storage
3. Frozen storage

Dry Storage

Dry storage areas should be maintained at a temperature ranging between 65°F and 75°F (18°C and 24°C). Temperatures below that range can be harmful to food products. More often, however, dry-storage temperatures get very high, exceeding by far the upper limit of temperature acceptability. This is because storage areas are frequently in poorly ventilated and closed-in areas of an operation. Excessively high or low temperatures will damage dry-storage products.

Shelving in dry-storage areas must be easily cleaned and sturdy enough to hold the weight of dry products. Slotted shelving is preferred over solid shelving when

100 Chapter 4 Managing Inventory and Production

storing food because slotted shelving allows for better air circulation around stored products. All shelving should be placed at least six inches above the ground to allow for proper cleaning beneath the shelving and to ensure proper ventilation. Dry-goods products should never be stored directly on the floor. Dry goods may not be stored:

- In locker rooms
- In toilet rooms
- In dressing rooms
- In garbage rooms
- In mechanical rooms
- Under sewer lines that are not shielded to intercept potential drips
- Under leaking water lines, including leaking automatic fire sprinkler heads, or under lines on which water has condensed
- Under open stairwells

When placed into storage, all can and case labels should face out for easy identification. Bulk items such as flour or sugar should be stored in wheeled bins whenever possible so that heavy lifting and the potential for employee injuries related to lifting can be avoided. Most importantly, dry-storage space must be sufficient in size to handle your operation's needs. Cramped and cluttered dry-storage areas tend to increase costs because inventory cannot be easily rotated, maintained, located, or counted. Hallways leading to storage areas should always be kept cleared and free of excess storage materials and empty boxes. This helps both in accessing the storage area and in reducing the number of potential hiding places for insects and rodents.

Refrigerated Storage

Potentially hazardous foods are those that must be carefully handled for time and temperature control to keep them safe. Refrigerator temperatures used to store potentially hazardous foods should be maintained at 41°F (5°C) or less. In most cases, the lower areas tend to be coldest in refrigerators because warm air rises and cold air falls. In fact, the refrigerator itself may vary as much as four degrees (°F) between its coldest spot (near the bottom) and its warmest spot (near the top).

Walk-in refrigerators should have easily cleaned shelving units that are at least six inches off the floor and are slotted to allow for good air circulation. They should be properly cleaned on a regular basis. Refrigerators should be opened and closed quickly when used, both to lower operational costs and to ensure that the items in the refrigerator stay at their peak of quality. Condensation drainage systems in refrigerators should be checked at least weekly to ensure that they are kept clean and are functioning properly.

Freezer Storage

Freezer temperatures should be maintained at 0°F (−18°C) or less. Newly delivered products should be carefully checked with a thermometer when received to ensure that they are frozen and have been delivered at the proper temperature. In addition, these items should be carefully inspected to ensure that they have not been thawed and refrozen. This is because refrigerators and frozen-food holding units remove significant amounts of stored product moisture, causing shrinkage and **freezer burn** in meats and produce. Freezer burn refers to deterioration in product quality resulting from poorly wrapped or stored items kept at freezing temperatures.

Unless they are built in, frozen-food holding units as well as refrigerators should be high enough off the ground to allow for easy cleaning around and under them to prevent cockroaches and other insects from living beneath them. Stand-alone units should be placed 6 to 10 inches away from walls to allow for the free circulation of air around, and efficient operation of, the units.

Frozen-food holding units must be regularly maintained, a process that includes cleaning inside and out, as well as constant temperature monitoring to detect possible improper operation. A thermometer permanently placed in the unit or one easily read from outside the unit is best. It is also a good idea to periodically check that gaskets on freezers, as well as on refrigerators, tightly seal the food cabinet. This will not only reduce operating costs but will also maintain food quality for a longer period of time.

FUN ON THE WEB!

The US Food and Drug Administration (FDA) produces and regularly updates a food code containing information about the proper handling of foods stored and prepared for sale in foodservice operations. The 2009 *Food Code* is the first full edition to publish since the 2005 edition. To review the most recent food code recommendations produced by the FDA, go to: <http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode>.

MAINTAINING BEVERAGE STORAGE AREAS

Although the storage life for most beverage products is relatively long, alcoholic beverages, especially wine, must be stored carefully. Beverage storage rooms should be easily secured from unauthorized entrance because beverages are often expensive items and are a favorite target for both employee and guest theft.

Many beverage managers use a **two-key system** to control access to beverage storage areas. In this system, one key (or, in the case of electronic locks, one pre-programmed key or key code) is in the possession of the individual responsible for the beverage area. The other key, used when the beverage manager is not readily available, is kept in a sealed envelope in the safe or other secured area of the operation. Should this key be needed, management will be aware of its use because the envelope will have been opened.

Recodable electronic locks include features that allow management to issue multiple keys or codes and to identify precisely the time an issued key was used to access the lock and to whom that key or code was issued. For beverage storage areas, the use of recodable electronic locks is highly recommended.

FUN ON THE WEB!

The recodable electronic lock was introduced by VingCard in 1979. Today, its locks are popular in hotels, where guest room security is extremely important, as well as in many other situations (such as liquor and wine storage areas), where traceable access and high levels of security are critical. To view its current product offerings, visit the Ving Card Elsafe company website.

BEER STORAGE

Beer in kegs should be stored at refrigeration temperatures of 36°F to 38°F (2°C to 3°C). Keg beer is unpasteurized and, thus, must be handled carefully to avoid spoilage. Pasteurized beer in either cans or bottles should be stored in a cool, dark room at 50°F to 70°F (10°C to 21°C) and does not require refrigeration.

Storage areas should be kept clean and dust free. Canned beer, especially, should be covered when stored to eliminate the chance of dust or dirt settling on the rims of the cans. Product rotation is critical if beer is to be served at its maximum freshness, and it is important that you and your storage areas team devise a system to ensure that this happens. The best method is to date each case or six-pack as it is delivered. In this manner, you can, at a glance, determine whether proper FIFO product rotation is occurring.

102 Chapter 4 Managing Inventory and Production

WINE STORAGE

Wine storage is the most complex and time-consuming activity required of beverage storage personnel. Depending on the type and sales volume of the restaurant, extremely large quantities of wine may be stored. Regardless of the amount of wine to be stored, however, the principles of proper wine storage must be followed if the quality of the wine is to be maintained and product losses are to be kept at a minimum. Despite the mystery too often associated with wine storage, in most cases you will find that proper wine storage can be achieved if you monitor the following areas:

1. Temperature
2. Light
3. Cork condition

Temperature

A great deal of debate has centered on the proper temperature at which to store wine. But, generally speaking, most experts would agree that wines should be stored at a **cellar temperature** or approximately 50°F to 57°F (10°C to 14°C). White wines, however, are often stored at refrigerator temperatures. If you find that your wines must be stored at higher temperatures than these, the wine storage area should be as cool as can reasonably be achieved, and it is important to remember that, although many wines may improve with age, it improves only if it is properly stored. Excessive heat is always an enemy of effective wine storage.

Light

Just as wine must be protected from excess heat, it must be protected from direct sunlight. In olden times, this was achieved by storing wines in underground cellars or caves. In your own foodservice establishment, this means using a storage area where sunlight cannot penetrate and where the wine will not be subject to excessive fluorescent or incandescent lighting. The general rule for wine storage is that wine bottles should be exposed only to the minimum amount of light needed.

Cork Condition

It is the wine's cork that protects it from oxygen, its greatest enemy, and from the effects of oxidation. **Oxidation** occurs when oxygen comes in direct contact with bottled wine. You and your guests can detect a wine that has been overly oxidized because it smells somewhat like vinegar. Oxidation deteriorates the quality of bottled wines. Keeping oxygen out of the wine is a prime consideration of the vintner, and it should be important to you as well.

While some wine makers now seal their bottles with screw-type caps, cork continues to be the bottle sealer of choice for most wine producers. Quality wines demand quality corks. Traditionally, the best wines are fitted with corks that will last many years if they are not allowed to dry out. This is the reason wine should be stored so that the cork remains in contact with the wine and, thus, it stays moist. In an effort to accomplish this, most foodservice managers store wines on their sides.

Corks should be inspected at the time wine is received and periodically thereafter to ensure that there are no leaks resulting in oxidation and, thus, damaged products. If a leak is discovered at delivery, the wine should be refused. If the leak occurs during storage, the wine should be examined for quality and then either consumed or discarded, as appropriate.

In general, you can effectively manage the storage of wines if you think about how you should treat the cork that is protecting the wine. Always keep the cork (and thus the wine):

1. Cool
2. Moist
3. In the dark

LIQUOR STORAGE

Spirits should be stored between 70°F and 80°F (21°C to 27°C) in a locked or highly secure and dry storage area. Since these products do not generally require refrigeration, they may be stored along with food products, if necessary. An organized, well-maintained area for storing spirits will also ensure that purchasing decisions will be simplified because no product is likely to be overlooked or lost in inventory.

MAINTAINING PRODUCT SECURITY

Inventoried items are the same as money to you. In fact, you should think of inventory items in exactly that way. As already noted, the apple in a produce walk-in is not just an apple. It represents, at a selling price of \$2.00, that amount in revenue to the airport foodservice director, who hopes to sell a crisp, fresh apple to a weary traveler. If the apple disappears, revenue of \$2.00 will disappear also. When you think of inventory items in terms of their sales value, it becomes clear why product security is of the utmost importance.

All foodservice establishments will experience some amount of theft, in its strictest sense. The reason is very simple. Some employee theft is impossible to detect. Even the most sophisticated, computerized control system is not able to determine if an employee or vendor's employee walked into the produce walk-in and ate one green grape. Similarly, an employee who takes home two small sugar packets per night will likely go undetected for a great length of time. In neither of these cases, however, is the amount of loss significant, and certainly not enough to install security cameras in the walk-in or to search employees as they leave for home at the end of their shifts. What you do want to do, however, is to make it difficult to remove significant amounts of food or beverage items from storage without authorization, so that you can know when those items have been removed. Good cost control systems must be in place if you are to achieve this goal.

It is amazing how large the impact of theft can be on profitability. Consider the following example. Jesse is the receiving clerk at the Irish Voice sports bar. On a daily basis, Jesse takes home \$2.00 worth of food products. How much, then, does Jesse cost the bar in one year? The answer is a surprising \$14,600 in sales revenue! If Jesse or others pilfer \$2.00 per day for 365 days, the total theft amount is \$730 ($365 \text{ days} \times \$2.00 \text{ per day} = \$730$). If the bar makes an after-tax profit of 5 percent on each dollar of food products sold, to recover the lost \$730, the operation must sell $\$1.00/0.05 \times \$730 = \$14,600$!

To recover the dollar amount of Jesse's theft, the sports bar must sell \$14,600 of food per year and make five cents per dollar sold on these sales. In the case of a smaller bar, \$14,600 may well represent several days' sales revenue. Clearly, small thefts can add up to large dollar losses!

INVENTORY CONTROL

You should attempt to carefully control access to the location of your stored products. In some areas, this may be done by a process as simple as keeping the dry-storage area locked and requiring employees to "get the keys" from a manager or supervisor when products are needed. In other situations, cameras may be mounted in both storage areas and employee exit areas. Sometimes the physical layout of the foodservice operation may prevent management from being able to effectively lock and secure all storage areas, but too-easy access is sure to cause theft problems. This is not because employees are basically dishonest. Most are not. Theft problems develop because of the few employees who feel either that management will not miss a few of whatever is being stolen or that they "deserve" to take a few things because they work so hard.

104 Chapter 4 Managing Inventory and Production

It is your responsibility to see to it that your product inventories remain secure. As a general rule, if storerooms are to be locked, only one individual should have access to them during any shift. In reality, however, it is difficult to keep all inventory items under lock and key. Some items must be received and immediately sent to the kitchen for processing or use. As a result, most managers find that it is impossible to operate under a system where all food products are locked away from all employees. Storage areas should, however, not be accessible to guests or vendor employees. If proper control procedures are in place, employees will know that you can determine if theft has occurred. Without such control, employees might think that theft will go undetected. This must, and can, be avoided.

Proper inventory management seeks to provide appropriate **working stock**, which is the amount of an ingredient you anticipate using before purchasing that item again, and a minimal **safety stock**, the extra amount of that ingredient you decide to keep on hand to meet higher-than-anticipated demand. Demand for a given menu item can fluctuate greatly between supplier deliveries, even when the delivery occurs daily. With too little inventory on hand, you might run out of products and, therefore, reduce guest satisfaction and increase employee frustration. When too much inventory is on hand, waste, theft, and spoilage can become excessive. The ability to effectively manage the inventory process is one of the best skills a foodservice manager can acquire.

DETERMINING PROPER INVENTORY LEVELS

The actual amount of products you should keep in your inventory will vary based on a number of factors. These include:

1. Storage capacity
2. Item perishability
3. Vendor delivery schedule
4. Potential savings from increased purchase size
5. Operating calendar
6. Relative importance of stock outages
7. Value of inventory dollars

STORAGE CAPACITY

Inventory items must be purchased in quantities that can be adequately stored and secured. Many times, kitchens may lack adequate storage facilities. This may mean more frequent deliveries and holding less of each product on hand than would otherwise be desired. When storage space is too great, however, the tendency by some managers is to fill the space. It is important that this not be done, because increased inventory of items generally leads to greater spoilage and loss due to theft. Moreover, large quantities of goods on the shelf tend to send a message to employees that there is “plenty” of everything. This may result in the careless use of valuable and expensive products. It is also unwise to overload refrigerators or freezers because these units will then operate less efficiently and stored items may lose their quality and may also be difficult to locate.

ITEM PERISHABILITY

If all food products retained the same level of freshness, flavor, and quality while in storage, you would have little difficulty in maintaining proper product inventory levels. The shelf life of food products, however, varies greatly.

Figure 4.4 lists the difference in shelf life of some common foodservice items when properly stored in a dry storeroom or a refrigerator. Figure 4.5 lists the typical shelf life of some common foodservice items when properly stored in a refrigerator or freezer.

FIGURE 4.4 Shelf Life of Selected Products

Item	Storage Area	Shelf Life
Canned vegetables	Dry storeroom	12 months
Flour	Dry storeroom	3 months
Potatoes	Dry storeroom	14–21 days
Sugar	Dry storeroom	3 months
Bacon	Refrigerator	30 days
Butter	Refrigerator	14 days
Ground beef	Refrigerator	2–3 days
Lettuce	Refrigerator	3–5 days
Milk	Refrigerator	5–7 days
Steaks (fresh)	Refrigerator	14 days
Tomatoes	Refrigerator	5–7 days

FIGURE 4.5 Recommended Refrigeration and Freezer Storage Period Maximums

Cold Storage Chart		
These short, but safe, time limits will help keep potentially hazardous foods from spoiling or becoming dangerous to eat. Because proper freezing keeps potentially hazardous foods safe indefinitely, recommended storage times are for quality only.		
Product	Refrigerator: 41°F (5°C) or less	Freezer 0°F: (–18°C) or less
Eggs		
Fresh, in shell	3 to 5 weeks	Do not freeze
Raw yolks & whites	2 to 4 days	1 year
Hard cooked	1 week	Does not freeze well
Liquid pasteurized eggs, egg substitutes		
Opened	3 days	Does not freeze well
Unopened	10 days	1 year
Mayonnaise		
Commercial, refrigerate after opening	2 months	Do not freeze
Frozen dinners & entrées		
Keep frozen until ready to heat	—	3 to 4 months
Deli & vacuum-packed products		
Store-prepared (or homemade) egg, chicken, ham, tuna, & macaroni salads	3 to 5 days	Does not freeze well
Hot dogs & luncheon meats		
Hot dogs		
Opened package	1 week	1 to 2 months
Unopened package	2 weeks	1 to 2 months
Luncheon meat		
Opened package	3 to 5 days	1 to 2 months
Unopened package	2 weeks	1 to 2 months
Bacon & Sausage		
Bacon	7 days	1 month
Sausage, raw—from chicken, turkey, pork, beef	1 to 2 days	1 to 2 months
Smoked breakfast links, patties	7 days	1 to 2 months

106 Chapter 4 Managing Inventory and Production

Product	Refrigerator: 41°F (5°C) or less	Freezer 0°F: (–18°C) or less
Hard sausage—pepperoni, jerky sticks	2 to 3 weeks	1 to 2 months
Summer sausage labeled “Keep Refrigerated”		
Opened	3 weeks	1 to 2 months
Unopened	3 months	1 to 2 months
Ham, corned beef		
Corned beef, in pouch with pickling juices	5 to 7 days	Drained, 1 month
Ham, canned labeled “Keep Refrigerated”		
Opened	3 to 5 days	1 to 2 months
Unopened	6 to 9 months	Do not freeze
Ham, fully cooked		
vacuum sealed at plant, undated, unopened	2 weeks	1 to 2 months
Ham, fully cooked vacuum sealed at plant, dated, unopened	“Use-by” date on package	1 to 2 months
Ham, fully cooked		
Whole	7 days	1 to 2 months
Half	3 to 5 days	1 to 2 months
Slices	3 to 4 days	1 to 2 months
Hamburger, ground, & stew meat		
Hamburger & stew meat	1 to 2 days	3 to 4 months
Ground turkey, veal, pork, lamb, & mixtures of them	1 to 2 days	3 to 4 months
Fresh beef, veal, lamb, pork		
Steaks	3 to 5 days	6 to 12 months
Chops	3 to 5 days	4 to 6 months
Roasts	3 to 5 days	4 to 12 months
Variety meats—tongue, liver, heart, kidneys, chitterlings	1 to 2 days	3 to 4 months
Prestuffed, uncooked pork chops, lamb chops, or chicken breasts stuffed with dressing	1 day	Does not freeze well
Soups & stews		
Vegetable or meat added	3 to 4 days	2 to 3 months
Cooked meat leftovers		
Cooked meat & meat casseroles	3 to 4 days	2 to 3 months
Gravy & meat broth	1 to 2 days	2 to 3 months
Fresh poultry		
Chicken or turkey, whole	1 to 2 days	1 year
Chicken or turkey, pieces	1 to 2 days	9 months
Giblets	1 to 2 days	3 to 4 months
Cooked poultry leftovers		
Fried chicken	3 to 4 days	4 months
Cooked poultry casseroles	3 to 4 days	4 to 6 months
Pieces, plain	3 to 4 days	4 months
Pieces covered with broth, gravy	1 to 2 days	6 months
Chicken nuggets, patties	1 to 2 days	1 to 3 months
Pizza, cooked	3 to 4 days	1 to 2 months
Stuffing, cooked	3 to 4 days	1 month

Because food items have varying shelf lives, you must balance the need for a particular product with the optimal shelf life of that product. Serving items that are “too old” is a sure way to produce guest complaints. In fact, one of the quickest ways to determine the overall effectiveness of a foodservice manager is to *walk the boxes*. This means to take a tour of a facility’s storage areas. If many products, particularly in the refrigerated areas, are moldy, soft, overripe, or rotten, it is a good indication of a foodservice operation that does not have an understanding of proper inventory levels based on the shelf lives of the items kept in inventory. It is also a sign that menu item sales forecasting methods (see Chapter 3) are either not in place or are not working well.

VENDOR DELIVERY SCHEDULE

It is the fortunate foodservice operator who lives in a large city with many vendors, some of whom may offer the same services and all of whom would like to have the operator’s business. In many cases, however, you will not have the luxury of daily delivery. Your operation may be too small to warrant such frequent stops by a vendor, or your operation may be in such a remote location that daily delivery is not possible. Consider, for a moment, the difficulty you would face if you were the manager of a foodservice operation located on an offshore oil rig operating in the Gulf of Mexico. Clearly, in a case like that, a vendor willing to provide daily doughnut delivery is going to be hard to find! In all cases, it is important to remember that the cost to the vendor for frequent deliveries will be reflected in the prices the vendor charges to you.

POTENTIAL SAVINGS FROM INCREASED PURCHASE SIZE

Sometimes you will find that you can realize substantial savings by purchasing needed items in large quantities. This certainly makes sense if the total savings actually outweigh the added costs of receiving and storing the larger quantity. Remember, however, that there are costs associated with extraordinarily large purchases. These might include storage costs, spoilage, deterioration, insect or rodent infestation, or theft.

As a general rule, you should determine your ideal product inventory levels and then maintain your stock within those ranges. Only when the advantages of placing an extraordinarily large order are very clear should such a purchase be undertaken.

OPERATING CALENDAR

When an operation is involved in serving meals seven days a week to a relatively stable number of guests, the operating calendar makes little difference to inventory-level decision making. If, however, the operation opens on Monday and closes on Friday for two days, as is the case in many school foodservice accounts, the operating calendar plays a large part in determining desired inventory levels. In general, it can be said that an operator who is closing down, either for a weekend or for a season (as in the operation of a summer camp or seasonal hotel), should attempt to greatly reduce overall perishable inventory levels as the closing period approaches.

RELATIVE IMPORTANCE OF STOCK OUTAGES

In many foodservice operations, not having enough of a single food ingredient or menu item is simply not that important. In other operations, the shortage of even one menu item might spell disaster. For example, it might be all right for the local French restaurant to run out of one of the specials on Saturday night, but it is not difficult to imagine the problem of the McDonald’s restaurant manager who runs out of French fries on that same Saturday night!

For the small operator, a mistake in the inventory level of a minor ingredient that results in an outage can often be corrected by a quick run to the grocery store. For the larger facility, such an outage may well represent a substantial loss of sales or guest goodwill. In the restaurant industry, when an item is no longer available

108 Chapter 4 Managing Inventory and Production

on the menu, you “86” the item, a reference to restaurant slang originating in the early 1920s (86 rhymed with *nix*, a Cockney term meaning “to eliminate”). If you, as a manager, “86” too many items on any given night, the reputation of your restaurant is likely to suffer.

A strong awareness and knowledge of how critical outage factors are will help you determine appropriate product inventory levels. A final word of caution is, however, necessary. The foodservice operator who is determined never to run out of anything must be careful not to set inventory levels so high as to actually end up costing the operation more than if more realistic levels were maintained.

VALUE OF INVENTORY DOLLARS

In some cases, operators elect to remove dollars from their bank accounts and convert them to product inventory. When this is done, the operator is making the decision to value product more than dollars. If the dollars used to purchase inventory must be borrowed from the bank, rather than being available from operating revenue, a greater cost to hold the inventory is incurred because interest must be paid on the borrowed funds. In addition, a foodservice company of many units that invests too much of its money in inventory may find that funds for acquisition, renovation, or marketing the company are reduced. In contrast, a state institution that is given its entire annual budget at the start of its **fiscal year** (a year that is 12 months long but does not necessarily begin on January 1) may find it advantageous to use its purchasing power to acquire large amounts of inventory at the beginning of the year and at very low prices.

DETERMINING AMOUNTS IN FOOD INVENTORY

It is important for you to continually monitor the amount of products you have in inventory. Inventory levels may be determined by counting the item, as in the case of cans, or by weighing items, as in the case of meats. Volume (e.g., gallons, quarts, and the like) is another method of establishing product amounts. If an item is purchased by the pound, it is generally weighed to determine the amount on hand. If it is purchased by the piece or case, the appropriate unit to determine the item amount may be either pieces or cases. If, for example, canned pears are purchased by the case, with six cans per case, management might decide to count the items in terms of either cases or cans. That is, three cases of the canned pears might be considered as three items (when counted by the case) or as 18 items (when counted by the can). Properly used, either method will correctly establish the amount of product you have on hand and is acceptable.

FUN ON THE WEB!

Counting food and beverage inventories has historically been a very time-consuming task. However, advances in inventory-counting systems are occurring regularly. To see examples of various products designed to help restaurant managers control their inventory costs and speed up their inventory taking, enter “restaurant inventory management systems” in your favorite search engine and review the results.

DETERMINING AMOUNTS IN BEVERAGE INVENTORY

Determining amounts in inventory for liquor products is most often more difficult than determining these same levels for food. Food items, as well as beers and wines, can most often be counted for inventory purposes. Opened containers of

spirits, however, must be valued also. It is the process of determining the amounts of product in these opened liquor containers that will present a challenge to you. Two inventory methods are commonly used to accomplish this goal:

1. Weight
2. Visual estimate

LIQUOR INVENTORY BY WEIGHT

The weight method of determining spirits inventories uses a scale or smart-device photograph of a liquor bottle's contents to "weigh" open bottles and determine their remaining contents. The product weight, in ounces, is then multiplied by the product cost per ounce to arrive at the value of the opened container's contents. This system is effective only if you remember to subtract the weight of the empty bottle itself from the total product's weight or if that feature is built into the smart-device app being used.

VISUAL ESTIMATE

Counting full bottles of spirits by sight is easy, but determining the quantities and values of partial bottles visually is more difficult. You can do it rather quickly and fairly accurately, however, if you estimate the amount remaining in open bottles by using the **tenths system**. This system requires that the inventory taker assign a value of 10/10 to a full bottle, 5/10 to a half bottle, and so on. Then, when inventory is taken, the partial bottle is visually examined and the appropriate "tenth" is assigned, based on the amount left in the bottles. Some operators use rulers to assist in this effort, since bottle shapes and sizes vary.

Although this system results only in an approximation of the actual amount in a bottle, many managers feel the tenths system is accurate enough for their purposes. It does have the advantage of being a rather quick method of determining inventory levels of open bottles.

In general, it is important to take liquor inventories at a time when the operation is closed so that product quantities on hand do not change when the inventory is being taken. It is also important that product contained in the lines of mechanical drink-dispensing systems be counted if the quantity of product in these lines is deemed to be significant.

FUN ON THE WEB!

Today's beverage managers benefit from the development of advanced technology systems that assist them in determining their liquor inventory levels. "Partender" is one good example of a company that uses Apple iOS (for iPhone, iPod Touch, and iPad) and Android apps to help managers use smart devices to quickly and accurately determine liquor inventory levels and values. Go to the company website to learn more about the ways advanced technology such as Partender's is being utilized to assist managers in completing their liquor and other product inventory tasks.

DETERMINING INVENTORY VALUES

Proper inventory control requires that you monitor both the amount and value of items in your inventory. Valuing, or establishing a dollar value for an inventory item, is performed using the following item inventory value formula:

$$\text{Item amount} \times \text{Item value} = \text{Item inventory value}$$

110 Chapter 4 Managing Inventory and Production

An item's actual value can often be more complicated to determine than its amount. This is because the price you pay for an item may vary slightly each time you buy it. For example, assume that you bought curly endive for \$2.20 per pound on Monday, but the same item cost you \$2.50 per pound on Wednesday. On Friday, you see that you have one pound of the curly endive in your refrigerated walk-in. Is the value of the item \$2.20 or \$2.50?

Item value must be determined by using either the LIFO or the FIFO method. When the LIFO method is in use, the item's value is said to be the price paid for the least recent (oldest) addition to item amount. If the FIFO method is in use, the item value is said to be the price paid for the most recent (newest) product on hand. In the hospitality industry, most operators value inventory at its most recently known value; thus, FIFO is the more commonly used inventory valuation method.

Inventory value is determined using a form similar to the **inventory valuation sheet** shown in Figure 4.6. This inventory valuation sheet has a place for all inventory items, the quantity on hand, and the unit value of each item. There is also a place for the date the inventory was taken, a spot for the name of the person who counted the product, and another space for the person who extends (calculates) the monetary value of the inventory. It is recommended that these two be different individuals to reduce the risk of inventory valuation fraud.

FIGURE 4.6 Inventory Valuation Sheet

[illegible]

The inventory valuation sheet should be completed each time the inventory is counted. It can be manually prepared or produced as part of an inventory evaluation software program. Regardless of the form used, the item's inventory value is determined using the inventory value formula. Thus, if we have five cases of fresh beets in our inventory and each case has a value of \$20.00, the inventory value of our beets is:

$$\begin{array}{c} \text{Item amount} \times \text{Item value} = \text{Item inventory value} \\ \text{or} \\ 5 \text{ cases} \times \$20.00 \text{ per case} = \$100.00 \end{array}$$

The process of determining inventory value requires that you or a member of your staff count all food products on hand and multiply the value of the item by the number of units on hand. The process becomes more difficult when one realizes that the average foodservice operation has hundreds of items in inventory. Thus, "taking the inventory" can be a very time-consuming task. A **physical inventory**, one in which the food and beverage products are actually counted, must, however, be taken to determine your actual product usage. Some operators take this inventory monthly, others weekly or even daily to determine their inventory amounts on hand and as an aid to calculating their actual food and beverage usage and their product cost percentages (see Chapter 5).

HERE'S HOW IT'S DONE **4.1**

Determining the total value of your inventory items is an easy process. It simply requires that you multiply the number of units you have in inventory times the value of each unit. Then you sum each of the individual product values. In the foodservice industry, there are a variety of different units you will buy. Some examples include gallons, cases, pounds, bags, bottles (abbreviated btl.), boxes, and crates. Regardless of the unit in which an item is purchased, however, managers always use the same formula to establish the individual item's inventory value:

$$\text{Item amount} \times \text{Item value} = \text{Item inventory value}$$

When using this formula, the item amount is equal to the amount held in inventory. The item value is equal to the item's unit cost. Thus, the amount in inventory multiplied by the item's unit cost equals its inventory value. To illustrate, assume an inventory item is purchased in

gallons. If 1.5 gallons are currently in inventory and if each gallon cost your operation \$18.00, the calculation is:

$$\begin{array}{c} 1.5 \text{ gallon in inventory} \times \$18.00 \text{ cost per gallon} = \\ \$27.00 \text{ inventory value} \end{array}$$

As you can see from the following chart, regardless of the unit size used to count the amount in inventory, the process used to calculate item values is exactly the same.

After the value of each individual inventory item is calculated, it is easy to use addition to determine the value of your operation's total inventory.

As you will learn in Chapter 5, knowing the value of your inventory at the beginning and at the end of an accounting period is essential when you want to accurately calculate your operation's overall food cost for that accounting period.

Now, you know just how to do it!

Inventory Item	Amount on Hand	Item Value	Total Item Value
2-oz. coffee packets	1.5 cases	\$18.00/case	\$ 27.00
Pure maple syrup	1.5 gal.	\$18.00/gal.	\$ 27.00
Roquefort cheese	1.5 lb.	\$18.00/lb.	\$ 27.00
Sugar packets	1.5 boxes	\$18.00/box	\$ 27.00
Balsamic vinegar	1.5 bottles	\$18.00/bottle	\$ 27.00
Baking powder	1.5 cans	\$18.00/can	\$ 27.00
Asparagus (fresh)	1.5 crates	\$18.00/crate	\$ 27.00
Total Inventory Value			\$189.00

PRODUCT ISSUING AND RESTOCKING

Issuing is the formal process of removing needed beverage, food, and supply products from inventory. In smaller properties issuing may be as simple as entering the locked storeroom, selecting the product, and locking the door behind you. In a more complex operation, especially one that serves alcoholic beverages, this method is inadequate to achieve appropriate control.

The issuing of products should occur only after the product has been requisitioned. A **requisition** is a formal request to have products issued from storage. The act of requisitioning products from the storage area need not be unduly complex. Sometimes foodservice managers create difficulties for their workers by developing a requisition system that is far too time-consuming and complicated. The difficulty in such an approach usually arises because management hopes to equate products issued with products sold without taking a physical inventory. In reality, this process is difficult, if not impossible, to carry out.

Consider, for example, that you manage the bar area of Scotto's Supper Club. Scotto's is a high-volume steakhouse with an upscale clientele. If, on a given night, you attempt to match liquor issued to liquor sold, you would need to assume that all liquor issued on a given day is sold on the same day and that no liquor issued on a prior day was sold on the given day. This will, generally, not be the case. In the kitchen, some items issued today, for example ice cream, may be sold over several days; thus, in the same way as for liquor, food products issued will not relate exactly to products sold. It is simply good management to view an issuing system as one of providing basic product security and to view a total inventory control/cost system as a separate entity entirely. Given that approach, let us examine how an issuing system can be designed to help protect the security of food and beverage products.

Employees should always requisition food and beverage items based on management-approved estimates of future sales and product production schedules. Although special care must be taken to ensure that employees use the products for their intended purpose, maintaining product security can be achieved with relative ease if a few principles are observed:

1. Food, beverages, and supplies should be requisitioned only as needed based on approved production schedules.
2. Needed items should be issued only with management approval.
3. If a written record of issues is to be kept, each person removing food, beverages, or supplies from the storage area must sign, acknowledging receipt of the products.
4. Products that do not ultimately get used should be returned to the storage area, and their return should be recorded.

Some larger foodservice operators employ a full-time storeroom person to operate their requisition program. This process can sometimes be helpful because requisition schedules for tomorrow's food, for instance, can be submitted today, thus allowing storeroom personnel the time to gather the items from inventory prior to delivering them to the kitchen. Occasionally, products are even weighed and measured for kitchen personnel, according to the standardized recipes to be prepared. When this system is in place, the storeroom is often called an **ingredient room**.

Figure 4.7 illustrates the kind of food and supplies requisition form you might use at Scotto's Supper Club.

Note that the requested amounts and issued amounts may vary somewhat. In the case of rice, it is relatively easy to issue exactly the amount requisitioned because the rice can be weighed. In the cases of broccoli and rib roast, however, the nature of the product itself may make it impossible to exactly match the amount issued with the amount requisitioned. In other cases, the storeroom may be out of a requested item completely.

Note also that the total cost of issues is arrived at by computing the value of the issued amount, not the requisitioned amount. This is so because it is the value

FIGURE 4.7 Storeroom Requisition

Unit Name: <u>Scotto's Supper Club</u>		Requisition #: <u>0221</u>			
		Date: <u>1/15</u>			
Item	Storage Unit	Requested Amount	Issued Amount	Unit Cost	Total Cost
Rice	1 lb.	5 lb.	5.0 lb.	\$0.25/lb.	\$ 1.25
Broccoli	1 lb.	30 lb.	28.5 lb.	\$0.90/lb.	\$ 25.65
Rib roast	1 lb.	100 lb.	103.5 lb.	\$8.40/lb.	\$869.40
Total					\$896.30

To: Kitchen <u>X</u>	Requisition Approved By: <u>S.A.R.</u>
Bar _____	Requisition Filled By: <u>T.A.P.</u>

of the issued amount that has actually been removed from inventory and, thus, will ultimately be considered when determining amounts to purchase in the future and the cost of the products you sold.

It is important that a copy of the storeroom requisition form be sent to the person responsible for purchasing after it has been prepared so that this individual will know about the movement of products in and out of the storage areas and thus the amount of product that remains in inventory.

SPECIAL CONCERNS FOR ISSUING BEVERAGES

The basic principles of product issuing that apply to food and supplies also apply to beverages. There are, however, special concerns that must be addressed when issuing beverage products from liquor storerooms and wine cellars:

1. Liquor storeroom issues
2. Wine cellar issues

LIQUOR STOREROOM ISSUES

Although various systems could be used for issuing liquor, many managers favor the **empty for full system** of liquor replacement. In this system, each bartender is required to hold empty liquor bottles in the bar or a closely adjacent area. At the conclusion of the shift, or at the start of the next shift, each empty liquor bottle is replaced with a full one. The empty bottles are then either broken or disposed of, as local beverage law requires.

It is important to note that all liquor bottles issued from the liquor storage area should be visibly marked in a manner that is not easily duplicated. This allows management to ensure, at a glance, that all liquor to be sold is the property of the foodservice operation, and not that of a bartender who has produced his or her own bottle for the purpose of going into an illicit partnership with the operation. In a “partnership” of this type, the operation supplies the guest while the bartender provides the liquor and then pockets the product sales and profit! Although bottle marking will not completely

114 Chapter 4 Managing Inventory and Production

FIGURE 4.8 Wine Cellar Issues

Product	Vintage	Number of Bottles	Check #	Removed By
1. Bolla Soave	2004	2	60485 L	T.A.
2. Glen Ellen Cabernet Sauvignon	2003	1	60486 L	S.J.
3. Barton & Guestier Medoc	1999	1	Manager "comp"	S.A.R.
4. Copperridge Cabernet	Current stock	1	Kitchen	S.A.R.
5. Bolla Soave	2006	1	60500 M	S.J.
6. Copperridge Cabernet	Current stock	1	Bar stock	S.A.R.
7.				
8.				
9.				
10.				
11.				
12.				

Remarks: #4 Requested by Chef 1/15

#6 House Wine Sent to Bar Area 1/15

prevent dishonest bartenders from bringing in their own liquor, it will force them to pour their product into the operation's marked bottles and to dispose of their own empties, which makes revenue-related theft of this type quite difficult.

WINE CELLAR ISSUES

The issuing of wine from a wine cellar is a special case of product issuing because these sales cannot be predicted as accurately as sales of other alcoholic beverage products. That is, you may know that a given percentage of your guests are likely to select wine, but you are not likely to know the specific wines they will select. This is especially true in an operation where a large number of wines are contained on a wine list. If the wine storage area contains products valuable enough to remain locked, it is reasonable to assume that each bottled wine issued should be noted. You can use a form such as the one shown in Figure 4.8 to record your operation's wine-issuing activity.

A form of this type may be used to identify wine sold to guests, wine transferred to a bar area to fill guests' wine-by-the-glass orders, or for use in the kitchen. If the wine is to be sent to a guest as *complimentary*, or **comp**, that can be noted as well, along with the initials of the management personnel authorizing the comp. In the case of the wine cellar issue, the form itself should remain in the wine cellar for use by the wine-purchasing agent, and a copy should, on a daily basis, be sent to management for review.

RESTOCKING INVENTORY

Regardless of the methods used by employees to requisition food and beverage products or the systems management uses to issue these products, inventory levels in an operation will be reduced as sales are made. It will be your responsibility

to monitor reductions in product inventories and purchase additional products as needed. Restocking your inventory is critical if product shortages are to be avoided and if products needed for menu item preparation are to be available.

Nothing is quite as traumatic for the foodservice manager as being in the middle of a busy meal period and finding that the operation is out of a necessary ingredient or frequently requested menu item. For most managers, however, it would be very time-consuming to monitor the amount of each ingredient, food product, and all supplies in inventory on a daily basis. The average foodservice operation stocks hundreds of ingredients and items, each of which may or may not be used every day. The task could be overwhelming.

Imagine, for example, the difficulty associated with monitoring, on a daily basis, the use of each sugar packet in a high-volume restaurant. Taking a daily inventory of the use of such a product would be akin to spending \$10 to watch a penny! The effective foodservice manager knows that proper control involves spending time and effort where it is most needed and can do the most good. It is for this reason that many operators practice the ABC method of inventory control. To understand the principles utilized by the ABC inventory control system, however, you first must fully understand the concepts of physical inventory and perpetual inventory.

PHYSICAL AND PERPETUAL INVENTORIES

A physical inventory system is one in which an actual physical count and valuation of all inventory on hand is taken at the close of an accounting period. A **perpetual inventory** system is one in which the entire inventory is counted and recorded, and then additions to and deletions from total inventory are recorded as they occur.

Both physical and perpetual inventories have advantages and disadvantages for the foodservice operator. The physical inventory, properly taken, is the most accurate of all because each item is actually counted and then valued. It is the physical inventory, taken at the end of the accounting period (the ending inventory), that is used in conjunction with the beginning inventory (the ending inventory value from the prior accounting period) to compute an operation's cost of food or beverages sold (see Chapter 5).

Despite its accuracy, however, the physical inventory suffers from a significant disadvantage: It is extremely time-consuming. Even with the use of software programs that can extend inventory (multiply number of units on hand by each unit's value) or handheld bar code scanners that assist in the process, counting each food and beverage item in storage can be a cumbersome and time-consuming task. This is so even for the well-trained individuals who will carefully count and weigh the inventoried items.

Perpetual inventory seeks to eliminate the need for frequent counting by adding to the inventory when appropriate (via receiving slips) and subtracting from inventory when appropriate (via requisitions or issues). Perpetual inventory is especially popular in monitoring liquor and wine inventories, where each product may have its own inventory sheet or, in some cases, a bin card.

A **bin card** is simply an index card (or line on a spreadsheet) that details additions to and deletions from a given product's inventory level. When using hard copy or electronic bin cards to monitor inventory levels managers need only review the cards, rather than take a physical inventory, to determine how much product is on hand at any point in time. Figure 4.9 illustrates the use of such a card. The accurate use of a bin card, or any other perpetual inventory system, requires that every addition to, and subtraction from, the products in inventory be carefully recorded.

As bar-code-reading hardware and software programs become more popular, additions and deletions to and from inventory are increasingly recorded electronically. In the ideal situation, perpetual inventory systems, regardless of

116 Chapter 4 Managing Inventory and Production

FIGURE 4.9 Bin Card

Product Name: <u>Canadian Club</u>		Bottle Size: <u>750 ml</u>	
Balance Brought Forward: <u>24</u>		Date: <u>1/31</u>	
Date	In	Out	Total on Hand
2/1	4		28
2/2		6	22
2/3		5	17
2/4	12		29

the form they take, must be verified, on a regular basis, by an actual physical inventory.

Some managers prefer to use the same form for recording both the quantity and the price of an inventory item. This can be done by using a perpetual inventory card. **Perpetual inventory cards** are simply bin cards, similar to the one in Figure 4.9, that also includes the product's price. A new perpetual inventory card or spreadsheet line is created each time the product's purchase price changes, with the quantity of product on hand entered on the new card. This system allows for continual tracking of quantity of items on hand, as well as their prices.

Today, managers increasingly use computer spreadsheets and specialized inventory software to maintain perpetual inventories. In addition, some POS systems include inventory management components.

The accurate use of a perpetual inventory system requires that each change in product quantity be noted. However, employees, when in a hurry, may simply forget to update the perpetual system as they add or remove inventory items. Mistakes such as these will reduce the accuracy of the perpetual inventory. For this reason, it is not wise to depend solely on a perpetual inventory system for accurate cost calculations. There are, however, several advantages to the perpetual inventory system, among them the ability of the purchasing agent to quickly note quantity of product on hand without resorting to a daily physical inventory count.

The question of which of the two systems is best arises when making the decision about whether to use a physical or perpetual inventory system. Experienced managers know that neither is best, so they use the best of both systems.

ABC INVENTORY CONTROL

Utilizing the best features of physical and perpetual inventory systems is exactly what the ABC inventory system was designed to do. It separates inventory items into three main categories:

Category A items are those that require tight control and the most accurate record keeping. These are typically high-value items, and though few in number, they can make up 70 to 80 percent of the total inventory value.

Category B items are those that make up 10 to 15 percent of the inventory value and require only routine control and record keeping.

Category C items make up only 5 to 10 percent of the inventory value. These items require only the simplest of inventory control systems.

Returning to the hypothetical example of Scotto's Supper Club, assume that the following 10 items are routinely held in your inventory:

1. Precut New York strip steak
2. Prepared horseradish
3. Eight-ounce chicken breasts (fresh)

4. Garlic salt
5. Onion rings
6. Crushed red pepper
7. Dried parsley
8. Lime juice
9. Fresh tomatoes
10. Rosemary sprigs

As can be seen, even with this short list, you have a variety of items in inventory. Some of these items, like the New York strip steak itself, are very valuable, highly perishable, and critical for the execution of your menu. Others, like the crushed red pepper, are much less costly, not highly perishable, and may less dramatically affect the operation if you ran out between deliveries. Clearly, these two items should not be treated the same for inventory purposes. The simple fact is that they are not equally critical to the operation's success. The ABC system helps you distinguish between those items that deserve special, perhaps daily, attention, and those items that you can safely spend less time managing.

To develop the A, B, and C categories, follow these steps:

1. Calculate monthly usage in units (e.g., pounds, gallons, cases, and the like) for each inventory item.
2. Multiply total item usage times its purchase price (unit value) to arrive at the total monthly amount of product usage.
3. Rank items from highest dollar usage to lowest.

In a typical ABC analysis, approximately 20 percent of the items held in inventory will account for about 70 to 80 percent of the total monthly product cost. These represent the A product category. It is not necessary that the line separating A, B, and C products be drawn the same for every operation. Many operators use the following guide, but it can be adapted as you see fit:

- Category A—Top 20% of items
- Category B—Next 30% of items
- Category C—Next 50% of items

It is important to note that, although the percentage of items in category A is small, the percentage of total monthly product cost these items represent is large. Alternatively, the number of items in category C is large, but the total dollar value of product cost these items account for is rather small. It is important to note that the ABC inventory system is concerned with the monetary value of products, not the number of items. Returning to the Scotto's example may help make this distinction of the ABC system clear. One item on your menu is New York Strip Steak with Onion Ring. The preparation of this item is simple. Your cook sprinkles the steak with seasoning salt and cooks it to the guest's specification. The steak is then garnished with one large, deep-fried onion ring (which you buy frozen). In this example, these inventory items would likely be grouped as follows:

Scotto's Strip Steak	
Ingredient	Inventory Category
New York strip steak	A
Onion ring	B
Garlic salt	C

Figure 4.10 shows the complete result of performing an ABC analysis on the 10 ingredients items listed previously and then ranking those items in terms of their inventory value.

118 Chapter 4 Managing Inventory and Production

FIGURE 4.10 ABC Inventory Analysis on Selected Inventory Items

Item	Monthly Usage	Purchase Price	Monthly Usage \$	Category
Precut New York strip steak	300 lb.	\$ 7.50/lb.	\$2,250.00	A
8-oz chicken breasts (fresh)	450 lb.	\$ 2.10/lb.	\$ 945.00	A
Fresh tomatoes	115 lb.	\$ 0.95/lb.	\$ 109.25	B
Onion rings	30 lb.	\$ 2.20/lb.	\$ 66.00	B
Rosemary sprigs	10 lb.	\$ 4.50/lb.	\$ 45.00	B
Prepared horseradish	4 lb.	\$ 2.85/lb.	\$ 11.40	C
Lime juice	2 qt.	\$ 4.10/qt.	\$ 8.20	C
Garlic salt	2 lb.	\$ 2.95/lb.	\$ 5.90	C
Crushed red pepper	1 oz.	\$16.00/lb.	\$ 1.00	C
Dried parsley	4 oz.	\$ 4.00/lb.	\$ 1.00	C

FIGURE 4.11 Guide to Managing ABC Inventory Items

Category	Inventory Management Techniques
A	1. Order only on an as-needed basis. 2. Conduct perpetual inventory on a daily or, at least, weekly basis. 3. Have clear idea of purchase point and estimated delivery time. 4. Conduct monthly physical inventory.
B	1. Maintain normal control systems; order predetermined inventory (par) levels. 2. Monitor more closely if sale of this item is tied to sale of an item in category A. 3. Review status quarterly for movement to category A or C. 4. Conduct monthly physical inventory.
C	1. Order in large quantity to take advantage of discounts if item is not perishable. 2. Stock constant levels of product. 3. Conduct monthly physical inventory.

The ABC inventory system specifically directs your attention to the areas where it is most needed. Controlling product costs, especially for category A items, is extremely important. Figure 4.11 details the differences in how you would manage items in the A, B, and C inventory categories.

The ABC system focuses management's attention on the essential few items in inventory, while focusing less attention on the many low-cost, slower-moving items. Again, it is important to note that management's time is best spent on the items of most importance. In the case of inventory management, these are the category A and, to a lesser degree, category B items.

The ABC system can also be used to arrange storerooms or to determine which items should be stored in the most secure areas. Regardless of the inventory management system used, however, whether it is the physical, perpetual, or ABC inventory, management must be strict in monitoring both withdrawals from inventory and the process by which inventory is restocked.

PURCHASE POINTS

When your inventories are properly controlled and issues from inventories are carefully recorded, you will be in an excellent position to determine when your inventories should be restocked. You can do so by creating a purchase point for

each item you hold in inventory. A **purchase point** is the point at which an item should be reordered and its inventory level replenished. An item's purchase point can be identified by one of two methods:

1. As needed (just-in-time)
2. Par level

AS NEEDED

When you elect to use the **as-needed**, or **just-in-time**, method of determining an item's purchase point, you are basically purchasing food based on your prediction of unit sales and the sum of the ingredients (from standardized recipes) necessary to produce those sales. Then, no more than the absolute minimum of needed inventory level is purchased from your vendors. When this system is used, a buyer compiles a list of needed ingredients and submits it to management for approval to purchase. For example, in a hotel foodservice operation, the demand for 500 servings of a raspberries and cream torte dessert, to be served to a group in the hotel next week, would cause the responsible person to check the standardized recipe for this item (see Chapter 3) and determine the amount of raspberries and other key ingredients that should be ordered. Then that amount, and no more, would be ordered from the appropriate vendors.

PAR LEVEL

Foodservice operators may set predetermined purchase points, called **par levels**, for some inventory items. The par level is the amount of an item that should be held in inventory at all times. In the case of the raspberries and cream torte dessert referred to previously, it is likely that making the torte will require a few tablespoons of vanilla extract. It does not make sense, however, to order vanilla extract by the needed tablespoon. In fact, you are likely to find that you are restricted in the quantity of it you can buy due to the vendor's delivery minimum—namely, one bottle or one case. In instances such as this, or when demand for a product is relatively constant, you may decide that the use of an as-needed ordering system will not work as well as will identifying par levels for some items you sell.

When determining par levels, you actually establish both minimum and maximum amounts to be held in inventory. Many foodservice managers establish a minimum par level by computing working stock and then adding 25 to 50 percent more for safety stock. Then, an appropriate purchase point, or point at which additional stock is purchased, is determined. If, for example, you have decided that the inventory level for coffee should be based on a par system, the decision may be made that the minimum amount (based on your coffee usage) of coffee that should be on hand at all times is four cases. This would be the minimum par level. To ensure you never ran out of coffee, however, assume that you set the maximum par level of 10 cases. Although the inventory level in this situation would vary from a low of 4 cases to a high of 10 cases, you would be assured that you would never have too little or too much of this particular menu item.

When cases of coffee were to be ordered under this system, you would always attempt to keep the number of cases on hand between the minimum par level (4 cases) and the maximum par level (10 cases). The purchase point in this example might be 6 cases; that is, when your operation had 6 cases of coffee on hand, an order would be placed with the coffee vendor. The intention would be to get the total stock of coffee up to 10 cases before your supply got below 4 cases. Delivery might take one or two days, so 6 cases might be an appropriate purchase point.

Whether you use an as-needed system, a par-level system, or, as in the case of many operators, a combination of both systems, each ingredient or menu item should have a preset and management-designated inventory level or amount. As a rule, highly perishable items should be ordered on an as-needed basis, whereas items with a longer shelf life can often have their inventory levels set using a par-level system. The answer to the question, "How much of each ingredient should I have on hand at any point in time?" must come from you and from your estimate of future sales.

120 Chapter 4 Managing Inventory and Production

Restocking inventory requires the use of the purchase order (PO) described in Chapter 3. Before you can place an order, however, you will need to find out what you need! The process is much like going through your own home and making a shopping list before you go to the grocery store. Some managers say that they intuitively “know” what they need without looking at their storage areas, inventory valuation sheets, or records of requisitions and issues. If you have ever gone grocery shopping without a list, however, you know that you can easily miss a few items. For that reason, making a detailed assessment of your current inventory prior to placing orders is always a good idea.

A good way to make sure that you have checked all your in-storage items is to use a **daily inventory sheet** (Figure 4.12). A daily inventory sheet will have the items listed in your storage areas, their unit of purchase, and their par values preprinted on the sheet. In addition, the form will have the following columns: On Hand, Special Order, and Order Amount.

Having a preprinted list of all your items in storage and units of purchase is important so that you will not have to write down the items every time you take the inventory. The list should be arranged in the same order that you store the items so that you can quickly and easily locate your products. The par value should be listed so that you know how much inventory you should have in storage at any given time.

To use the daily inventory sheet, you would physically walk through your storage areas to determine which items (and amounts) you should order. Under the On Hand column, you would list how many of each item you have on hand—that is, sitting on the shelf. You also need to list any “special order” amounts needed above the par level. An example of this would be extra cases of perishables, such as strawberries, ordered for a banquet. Then, you must calculate the order amount as follows:

$$\text{Par value} - \text{On hand} + \text{Special order} = \text{Order amount}$$

In Figure 4.12, the order amount for hot wings would be calculated as follows:

Order Amount for Hot Wings

6 cases par value – 2 cases on hand + 3 cases special order = 7 cases to be ordered

FIGURE 4.12 Daily Inventory Sheet

[illegible]

For example, if you have less than a whole purchase unit on hand, such as $\frac{1}{2}$ case of baby-back ribs as in Figure 4.12, then you may need to round the order amount up to a full case as follows:

Order Amount for Baby-back Ribs	
3 cases par value – 1.5 cases on hand + 1 case special order = 2.5 cases to be ordered :	
(rounded up to 3 cases)	

Although the form in Figure 4.12 is called the daily inventory sheet, this does not mean that you have to check your inventory or prepare purchase orders on a daily basis. Rather, you should always make your “grocery lists” on, or as close as reasonably possible to, your normal ordering days.

MANAGING FOOD PRODUCTION

When you have ordered and received the food and beverage products you forecast will be purchased by your guests, your concern turns toward the most important function of all, controlling the food and beverage production process. If any single activity stands at the heart of foodservice management and cost control, this is it. To study this process, assume again that you are the manager of Scotto’s Supper Club. As you prepare for another week of business, you review your sales history, sales forecasts, purchase orders, and menu specials. You do these things to begin taking the first step in controlling your food production costs.

CONTROLLING FOOD PRODUCTION COSTS

Often, those individuals who manage restaurants do so because they relish managing the **back of the house**, or kitchen production area, of their food facilities. Managing food production to produce tasty, attractive, nutritious, and cost-effective menu items is one of the most challenging and enjoyable aspects of foodservice management. Managing the food production process means controlling five key areas:

1. Waste
2. Overcooking
3. Overportioning
4. Improper carryover utilization
5. Inappropriate make-or-buy decisions

WASTE

Food losses through simple product waste will cause excessive food costs. This waste may be easy to observe, such as when an employee does not use a rubber spatula to get all of the salad dressing out of a 1-gallon jar, or as difficult to detect as the shoddy work of the salad preparation person who trims the lettuce just a bit more than management would prefer, resulting in a reduced amount of usable lettuce available to make salads and in higher salad costs.

Management must demonstrate its concern for the value of products on a daily basis. Each employee should be made to realize that wasting food directly affects the profitability of the operation and, thus, his or her own economic well-being. In general, food waste is most often the result of poor training or management’s inattentiveness to detail. Unfortunately, some managers and employees feel that small amounts of food waste are unimportant. Your primary goal in reducing

122 Chapter 4 Managing Inventory and Production

waste in the food production area should be to maximize product utilization and minimize the dangerous “it’s only a few pennies’ worth so it doesn’t matter” syndrome.

OVERCOOKING

Cooking is simply the process of exposing food to heat. Excessive cooking, however, most often results in reduced product volume, whether the item cooked is roast beef or vegetable soup. This is so because many foods have high moisture contents and heating usually results in moisture loss. To minimize this loss, cooking times and methods listed on standardized recipes must be carefully calculated and meticulously followed.

It is important to recognize that, in many ways, excess heat is the enemy of both well-prepared foods and a manager’s cost control efforts. Too much time on the steam table line or in the holding oven extracts moisture from products, reduces product quality, and results in fewer portions that are available for sale and service. The result is increased food cost. To illustrate, note that Figure 4.13 details the change in **portion cost**, which is the cost of producing one serving of a menu item, when the ending weight of a roast prime rib of beef is reduced due to overcooking.

If we assume that a properly cooked pan of roast prime rib of beef yields 50 servable pounds at a cost of \$8.00 per pound, the total product cost would equal \$400.00 (50 lb. $\times$ \$8/lb. = \$400).

When properly cooked, the roast beef would yield 100 eight-ounce portions, for a cost of \$4.00 per portion. As you can see in Figure 4.13, however, increased cooking time or an excessive final product temperature will result in moisture loss, cause product shrinkage, and increase the item’s portion cost.

Although the difference between a portion cost of \$4.00 and \$4.71 might seem small, it is the small numbers that can really add up and increase costs. Thus, it is the control of this type of production issue that separates the good foodservice manager from the outstanding one.

To control product loss due to overcooking, you must strictly enforce standardized recipe cooking times. This is especially true for items with high moisture content, such as meats, soups, stews, and baked goods. Moreover, extended cooking times can result in total product loss if properly prepared items are placed in an oven, fryer, steam equipment, or broiler and then forgotten until it is too late! It is, therefore, advisable to supply kitchen production personnel with small, easily cleanable timers and thermometers for which they are responsible. These can help substantially in reducing product losses due to overcooking.

FIGURE 4.13 Effect of Overcooking on Portion Cost

Portion Cost of 50 Pounds (800 Ounces) of Roast Prime Rib of Beef			
50 lb. cost = \$400			
Preparation State	Ending Weight (oz.)	Number of 8-Ounce Portions	Portion Cost
Properly prepared	800	100	\$4.00
Overcooked 15 min.	775	97	\$4.12
Overcooked 30 min.	750	94	\$4.26
Overcooked 45 min.	735	92	\$4.35
Overcooked 60 min.	720	90	\$4.44
Overcooked 75 min.	700	88	\$4.55
Overcooked 90 min.	680	85	\$4.71

HERE'S HOW IT'S DONE 4.2

Portion cost is the amount it costs an operation to produce one serving of a menu item. Portion cost is one important factor in establishing the selling prices of menu items. For that reason and for many others, the ability to calculate a portion cost correctly is an important management skill.

In some cases, the calculation of the portion cost is very easy. For example, assume a manager sells fresh apples. The manager buys apples in 10-pound bags that contain 30 apples. Each bag costs \$8.40. The manager would use division to calculate the portion cost for one apple:

$$\frac{\$8.40 \text{ cost per bag}}{30 \text{ apple portions per bag}} = \$0.28 \text{ portion cost}$$

In other situations, managers utilize the cost required to produce a standardized recipe when they calculate their portion costs. For example, assume a manager sells custard pie. The manager's standardized recipe for custard pie

produces seven pies. Each pie will be cut into eight pieces. In this case, multiplication is required to determine how many portions the recipe will produce: 7 pies $\times$ 8 slices per pie = 56 slices, or pie portions.

If the cost of producing the standardized recipe, including the pastry for the crust, eggs, sugar, salt, vanilla, milk, and nutmeg, is \$25.20, the manager would again use division and the same portion cost formula to calculate the cost of producing one slice of custard pie:

$$\frac{\$25.20 \text{ recipe cost}}{56 \text{ pie portions}} = \$0.45 \text{ portion cost}$$

Because the vast majority of items served by restaurateurs should always be produced from standardized recipes (see Chapter 3), it is easy to see why adherence to proper recipe production and proper portioning is so critical to accurately calculating and controlling an operation's portion costs.

OVERPORTIONING

No other area of food and beverage cost control has been analyzed and described as fully through articles, speeches, and even books as the control of portion size. There are two reasons for this. First, overportioning on the part of service personnel has the effect of increasing operational costs and may cause the operation to mismatch its production schedule with anticipated demand. For example, assume that 100 guests are expected and 100 products to be served to them are produced, yet overportioning causes you to be out of the product after only 80 guests have been served. The remaining 20 guests will be left clamoring for "their" portions, which, of course, no longer exist because, due to overportioning; these portions have already been served to other guests.

Also, overportioning must be avoided because guests always want to feel that they have received fair value for their money. If portions are large one day and small the next, guests may feel that they have been cheated on the second day. Consistency is a key to operational success in foodservice. Guests want to know exactly what they will get for their money.

It is not possible to state what a portion size should be because it is not advantageous to establish the same standard portion sizes for all foodservice operations. For example, the proper portion size of an entrée in a college residence hall feeding only male athletes should clearly be different from that of an extended-care facility whose typical resident might be over 75 years old. It is important for you to consider your clientele, ambiance, pricing structure, and desired quality standards prior to establishing appropriate portion sizes for your own operation. Once portion size for an item has been established, however, it is up to you to strictly enforce it.

Often, employees resist management's efforts to control portion size. When this is the case, it is a clear indication that management has failed in its mission to provide employees with a basic understanding that underlines the foodservice industry. Employees must be made to see that strict adherence to predetermined portion size is a benefit both to the guest and to the operation. Management must be sensitive, also, to the fact that it is the server who often must deal with the guest who complains about the inadequacy of portion size. Therefore, servers must be made to feel comfortable about predetermined portion sizes so that management, along with the employees, will want to maintain them.

124 Chapter 4 Managing Inventory and Production

FIGURE 4.14 Portion Cost Chart for Frozen Corn

Corn Portion Cost @ \$2.80 per 3-lb. Box		
Number of Portions per 3-lb. Box	Portion Size (oz.)	Portion Cost (cents)
16	3.0	17.5
15	3.2	18.7
14	3.4	20.0
13	3.7	21.5

In many cases, tools are available that will help employees serve the proper portion size. Whether these tools consist of scales, scoops, ladles, dishes, or spoons, employees must have an adequate number of easily accessible portion-control devices if they are to use them. One commonly used tool that assists in portion control is the food scoop. **Food scoops** are sized based on the number of servings per quart of product served. Thus, a #12 scoop will yield 12 servings per quart. A #20 scoop will yield 20 servings per quart, and so on.

It is important to understand that many portion sizes are directly tied to the purchasing function. To serve a $\frac{1}{4}$ -pound hot dog, for instance, one must purchase $\frac{1}{4}$ -pound hot dogs. In a similar vein, if one full banana is sliced for addition to breakfast cereals, the purchasing agent must have been diligent in ordering and accepting only the banana size for which management has developed a specification.

Constant checking portion size served is an essential task of management. When incorrect portion sizes are noticed, they must be promptly corrected. If not, considerable cost increases can be incurred. Returning again to our example of Scotto's Supper Club, consider that you purchase, on occasion, and in accordance with your menu plan, 3-pound boxes of frozen yellow corn to be served as your vegetable of the day. Each box costs \$2.80. With a total of 48 ounces (3 pounds $\times$ 16 ounces per pound = 48 ounces) and an established portion size of 3 ounces, you know that you should average 48 ounces/3 ounces per serving = 16 servings per box of corn. Figure 4.14 demonstrates the effect on total portion cost if one, two, or three servings are lost due to overportioning.

As Figure 4.14 shows, a small amount of overportioning on an item as inexpensive as corn costs the operation only a few cents per serving. Those few cents per serving, however, multiplied time after time, can mean the difference between a profitable operation and one that is only marginally successful. If your portion cost for corn should have been 17.5 cents ($\$2.80/16$ portions = 17.5 cents per portion), but, due to overportioning, it rises to 21.5 cents ($\$2.80/13$ portions = 21.5 cents per portion), then your food costs are 4.0 cents higher than they should be on this item. If Scotto's is open seven days a week and serves an average of 200 portions of corn per day, your total loss to overportioning for a year would be 365 days $\times$ 200 portions served per day $\times$ 0.04 loss per portion = \$2,920 total loss, an amount that would be more than enough to buy your staff proper portioning tools. It is also an amount worthy of your attention and correction.

IMPROPER CARRYOVER UTILIZATION

As discussed earlier in this text, predicting guest counts is often an inexact process. Because this is true, and because most foodservice operators want to offer the same broad menu to the evening's last diner as was offered to its first, it is inevitable that some prepared food will remain unsold at the end of the operational day. These items are called **carryovers**, or in some operations, leftovers.

In some segments of the hospitality industry, carryovers are a potential problem area; in others, it is less of a concern. Consider, for example, the operation of a gelato shop. At the end of the day, any unsold gelato is simply held in the freezer until the next day with no measurable loss of either product quantity or quality. Contrast that situation, however, with a full-service cafeteria. If closing time is

8:00 p.m., management wishes to have a full product line, or at least some of each menu item, available to the guest who walks in the door at 7:55 p.m. Obviously, in five more minutes a large number of items will become carryovers. This cannot be avoided. A manager's ability to effectively integrate carryover items on subsequent days can make the difference between profits and losses in some operations.

You have learned that in almost every case, food products are at their peak of quality when they are delivered to your restaurant. From then on, storage, preparation, and holding activities often diminish product quality. These forces are especially at work in the area of carryovers. It is for this reason that production schedules must note carryover items on a daily basis. If this is not done, these items tend to get stored and then may get "lost" in walk-in refrigerators or freezers.

You should have a clear use in mind for each menu item that may have to be carried over. For example, broiled or sautéed fish may be used to prepare seafood chowder or bisque. Today's prime rib roast may be the key ingredient in tomorrow's beef stroganoff, and so on. Menu specials, substitutions, and employee meals can be sources of utilization for products like these. This utilization process can be creative and, if you involve your staff, quite effective.

It is important to understand that carryover foods seldom can be sold for their original value. Today's beef stew made from yesterday's prime rib will not likely be sold at prime rib prices. Carryovers generally mean reduced income relative to product value, and less profits; thus, it is critical that you strive to minimize carryovers.

Carryover items that are created should be properly labeled, wrapped, and rotated so that items can be found and reused easily, resulting in both greater employee efficiency in locating carryover items and reduced energy costs because refrigerator doors will be opened for shorter periods of time. Managers will find that requiring foods to be properly labeled and stored in clear plastic containers helps greatly in this regard.

INAPPROPRIATE MAKE OR BUY DECISIONS

Many foodservice operators choose to buy some food products that are pre-prepared in some fashion. These items, called **convenience foods**, or **ready foods**, can be of great value to your operation. Often, they can save dollars spent on labor, equipment, and hard-to-secure food products. They can also add menu variety beyond the skill level of the average kitchen crew. A disadvantage, however, is that these items tend to cost more on a per-portion basis. This is to be expected because these items most often must include a charge for the labor needed to make the item, enhanced packaging and, of course, the food item itself.

Convenience items are not, of course, an all-or-nothing operational decision. Nearly all foodservice operations today use canned products, sliced bread, pre-cut produce, and the like—items that would have been considered convenience items years ago. Therefore, the question is not whether to use convenience items but, rather, it is which *convenience* items are best to use.

In general, the following guidelines are of value when determining whether to adopt the use of a convenience product:

1. Is the quality acceptable? This question must be answered from the point of view of the guest, not management alone.
2. Will the product save labor? Identifiable labor savings must be discovered if management is to agree that the convenience item will reduce overall costs.
3. Would it matter if the guest knew? If an operation has built its image on made-on-premise items, guests might react negatively if they know that an item has actually been prepared from a "boil in a bag" package or heated in a microwave oven.
4. Does the product come in an acceptable package size? If convenience items are not sold in a size that complements the operation, excessive waste can result.
5. Is the appropriate storage space available? Many convenience items must be stored in a refrigerated or frozen form. Your facility must have the needed storage capacity for these items.

Green and Growing!

A foodservice operation's cost of food is affected by a variety of factors. One such factor relates to the source reduction decisions made by the operation's suppliers. Where recycling occurs within the foodservice operation to reuse materials, source reduction is utilized by suppliers to minimize the amount of resources initially required to package, store, and ship the items they sell. The result of effective source reduction is a lessened impact on the environment and lower product costs.

Consider, for example, the difference in the producer's cost between packaging, storing, and shipping frozen orange juice concentrate (which foodservice operators will reconstitute on-site) and "ready-to-serve" juice. Not only will packaging costs be higher in the second case

(because of the greater product volume), but the item's greater weight will also mean higher transportation costs. Storage costs, too, will be greater with the ready-to-serve item, as will the cost of disposing of used product containers.

Packaging and energy costs add up, and these costs will inevitably be passed on from the manufacturer to the foodservice operation. The result is higher food costs and potentially lowered profits. Creative source reduction efforts, however, can result in fewer wasted natural resources and lower food costs. Foodservice operators should encourage these efforts by purchasing quality products from those suppliers who take their source reduction responsibilities seriously and act on them.

FOOD PRODUCTION SCHEDULES

Foodservice managers are in charge of kitchen production. How much of each item to prepare each day may be a joint decision between you and your chef or kitchen production manager, but it is you who must ultimately take the responsibility for proper production decisions. A complete food production schedule process will require you to do the following:

- Maintain sales histories.
- Forecast future sales levels.
- Purchase and store needed food and beverage supplies.
- Plan daily production schedules.
- Issue needed products to production areas.
- Manage the food and beverage production process.

Planning daily production schedules is important because you will want to have both the products and the staff needed to properly service your guests. If, for example, you forecast that 50 chocolate cakes will be needed on a given day for the college residence hall you manage, then you must have both the products and the staff necessary to produce that number of cakes. In a similar manner, if you know that 500 pounds of ground beef patties must be cooked for your burger restaurant, then the ground beef and the staff to cook it must be available.

Ideally, the process of determining how much of each menu item to prepare on a given day is based on your sales forecast and would look as follows:

$$\text{Prior-day carryover} + \text{Today's production} = \text{Today's sales forecast} \pm \text{Margin of error}$$

The margin of error amount should be small; however, projecting sales and guest counts is an imprecise science at best, so most foodservice managers will find that they should produce a small amount more than they anticipate selling each day. This minimizes the chances of running out of an important menu item. Of course, with some menu items, preparation does not begin until the sale is made. For example, in most cases, a New York strip steak will not actually be cooked until the guest orders it. An order for coconut cream pie, however, cannot be filled in the same manner because the pies must be made ahead. It is because of items like coconut cream pie that production sheets are necessary. Figure 4.15 demonstrates the production sheet in use at Scotto's.

FIGURE 4.15 Production Schedule Sheet

Unit Name: <u>Scotto's Supper Club</u>						Date: <u>1/15</u>	
Menu Item	Sales Forecast	Planned Overage	Prior-Day Carryover	New Production	Total Available	Number Sold	Carryover
1. Prime Rib	85	5	15	75	90		
2. Broccoli	160	10	0	170	170		
3. Coconut Cream Pie	41	0	70	0	70		
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							

Special Instructions: Thaw turkeys for Sunday preparation

Production Manager: S. Anthony

From Figure 4.15, you can see that you had 15 servings of prime rib left over from the prior day's operation. You would know that by looking at the carryover column of the *prior* day's production sheet or by taking a physical inventory. You anticipate sales of 85 servings of prime rib, and so it might seem that only 70 servings should be prepared (70 new servings plus 15 carryovers from the prior day equals 85). In fact, you would most likely prepare a number of new servings that is slightly higher than anticipated demand. The reason is simple: If you have more guests come in than anticipated or if more of the guests than you forecast actually select prime rib, you do not want to run out of the item. There is no industry-wide standard percentage that should be overproduced for a given item. The amount you plan to make will depend on a variety of factors, including your own knowledge of your guests and the importance of running out of a given item. Common overages tend to be 5 to 10 percent above normal sales forecasts. For purposes of this example, assume that five extra servings of prime rib is the amount of overproduction you feel is appropriate for this item. With estimated sales of 85 servings, you actually want to have 90 servings available.

In the case of broccoli, you make the decision not to carry over any broccoli that was not sold on the prior day. If any such product exists, it could be

128 Chapter 4 Managing Inventory and Production

used to make soup or, if there is no appropriate use for it, discarded because the quality of previously cooked broccoli is not likely to be at the same high level as that of freshly cooked broccoli. Regardless of the type of operation you manage, you will likely find that some of your menu items simply do not retain their quality well enough to be carried over for sale in their original form. These items must be discarded or utilized as an ingredient in a different dish. Again, in the case of broccoli, proposed production exceeds anticipated demand by a small margin (10 servings). In the case of the coconut cream pie, you make the decision to produce none on this particular day. This is because this item is made in large quantities, but not each day. With 70 servings available and an anticipated demand of 41, you have more than enough to sustain your operation through this day and, perhaps, the next as well, if the quality of the carried-over pies remains high.

At the end of the evening service period, you would enter the number sold in the appropriate column and make a determination on how much, if any, of each product you will carry over to the next day. Some foodservice managers preprint their production sheets listing all menu items and, thus, ensure that production levels for each major menu item are assessed on a daily basis. Others prefer to use the production sheet on an as-needed basis. When this is the case, it is used daily but only for the items to be prepared that day. Either method is acceptable, but production schedules are always critical to operational efficiency.

Consider the Cost

“How many dozen should I put in the proofer?” asked Elizabeth, the new baker at the Sands Cafeteria.

Rami El-Hussieny was the day shift operations manager and, unfortunately, he did not know how to answer Elizabeth’s question. What she wanted to know was simple enough: How many dozen rolls should be placed in the proofer in anticipation of the night’s dinner business?

The problem was that the frozen dinner roll dough used at the Sands Cafeteria needed to proof for at least two hours prior to being baked for 15 minutes. If too many rolls were proofed, they would never be needed, but they would still have to be baked and made into bread dressing or even tossed out. If too few dozen were proofed and the night was busier than anticipated, they would run out of “Fresh Baked Rolls” (one of the restaurant’s signature items), and Rami knew that the night manager would be really upset. It was a daily guess, and sometimes Rami missed the guess!

He wondered if a prebaked roll with a shelf life of three or four days would, despite not having been baked on site, be the best solution to this problem.

1. What do you think is the main cause of Rami’s difficulty?
2. Most foodservice managers would agree that fresh baked goods are very high quality and greatly enjoyed by their guests, yet many of these bake few, if any, products on-site. What are two specific reasons why higher-quality, made-on-site items are often not produced?
3. What is the relationship between product quality and product availability in this case study? Which product characteristic do you think is more important from the guest’s point of view?

MANAGING BEVERAGE PRODUCTION •

In its simplest, but also its least desired form, beverage production can consist simply of a bartender **free-pouring**, which is making a drink by pouring liquor from a bottle, but without carefully measuring the poured amount. In a situation such as this, it is very difficult to control product costs. At the other end of the control spectrum are automated beverage-dispensing systems that are extremely sophisticated control devices. The following are alternative beverage production control systems that you can use, based on the amount of control you feel is appropriate for your operation.

FREE-POUR

The lack of control resulting from free-pouring alcohol is significant. It should never be allowed in the preparation of the majority of drinks your bartenders will serve. It is appropriate in some settings, however, for example, in wine-by-the-glass sales. In this situation, the wine glass itself serves as a type of product control device. Large operations, however, may even elect to utilize an automated dispensing system for their wines by the glass. Also, it is most often necessary for a bartender to free-pour when he or she must add extremely small amounts of a product as a single ingredient in a multi-ingredient drink recipe. An example would be a bartender who must add a very small amount of dry vermouth when making a martini.

FUN ON THE WEB!

Bartenders faced with a guest order for a drink with which they are unfamiliar can quickly refer to the drink's recipe by using one of the many popular applications found on "smart" electronic devices which can access a virtually unlimited number of drink recipes. John Wiley & Sons offers the very popular *Mr. Boston* bartending guides in hard copy and in e-book formats. To learn more, go to: www.wiley.com. When you arrive, type "Mr. Boston" in the search bar.

JIGGER POUR

A **jigger** is a device (like a small cup) used to measure alcoholic beverages, typically in ounces and fraction of ounce quantities. Because jiggers are inexpensive, this control approach is also inexpensive. It is also quite portable. It is a good system to use in remote serving locations, such as a pool area, beach, guest suite, or banquet room. The disadvantage, of course, is that there is still room for employee overpouring error as well as the potential for bartender fraud (see Chapter 5).

METERED POUR SPOUT

In some situations, you may determine that a pour spout, designed to dispense a predetermined amount of liquor each time the bottle is inverted, makes good sense. Pour spouts are inserted into bottles and are available to dispense a variety of different quantities. When using a metered pour spout, the predetermined portion of product is dispensed whenever the bartender is called upon to serve that product.

FUN ON THE WEB!

Many managers find that metered pour spouts are very effective cost control tools. Metered spouts that dispense a predetermined amount of liquor ranging from $\frac{7}{8}$ ounce to $1\frac{1}{2}$ ounce are commonly available. In electronically monitored systems, every liquor shot served is pre-portioned and then recorded. At the end of each shift, managers can produce a pouring report that indicates how much money bartenders should have entered into the POS system or cash register based on the amount of liquor served. To review such systems, enter "alcoholic beverage control systems" in your favorite search engine, then review the results to see how electronically based metered systems can help managers control their liquor costs.

BEVERAGE GUN

In some large operations, beverage guns are connected directly to liquor bottles of various sizes. The gun may be activated by pushing a mechanical or electronic

130 Chapter 4 Managing Inventory and Production

button built into the gun or the POS. In either case, the bartender may find, for example, that pushing a gin and tonic button on a gun device will result in the dispensing of a predetermined amount of both gin and tonic. Although the control features built into gun systems are many, their cost, lack of portability, and possible negative guest reaction can be limiting factors in their selection.

TOTAL BAR SYSTEM

The most expensive, but also the most complete, beverage production control solution is a **total bar system**. This system combines sales information with automated product dispensing information to create a complete revenue and production management system. Depending on the level of sophistication and cost, the total bar system can perform one or all of the following tasks:

1. Record beverage sale by brand.
2. Record who made the sale.
3. Record sales dollars and/or post the sale to a guest room folio (bill) in a hotel.
4. Measure and dispense liquor for drinks.
5. Add predetermined mixes to drink.
6. Reduce liquor values from beverage inventory value totals as drink sales are made.
7. Prepare liquor requisitions.
8. Compute liquor cost by brand sold.
9. Calculate gratuity on checks.
10. Identify payment method (e.g., cash, check, credit or debit card).
11. Record guest sales by table or check number.
12. Record date and time of sales.

RESPONSIBLE ALCOHOLIC BEVERAGE SERVICE

Alcohol sales are important in many foodservice operations. People have long been fond of alcoholic beverages regardless of where they are consumed, because they add greatly to the enjoyment of food and friends. In moderate doses, **ethyl alcohol**, the type of alcohol found in beverage products, acts as a mild tranquilizer. In excessive doses, however, it can become toxic, causing impaired judgment and, in some cases, even death. Clearly, a foodservice manager whose establishment serves alcoholic beverages must take great care in the serving of alcohols beverages and the monitoring of guests' alcohol intake.

As well, most states have now enacted third-party liability legislation, which, under certain conditions, holds your business and, in some cases, you, personally responsible for the actions of your guests who consume excessive amounts of alcoholic beverages in your operation. These legislative acts are commonly called **dram shop laws**. *Dram shop* is derived from the word *dram*, which refers to a small drink, and shop where such a drink was sold. Dram shop laws shift some of the liability for acts committed by an individual under the influence of alcohol from that individual to the server or operation that supplied the intoxicating beverage.

The responsible service of alcohol requires careful control of the amount of alcohol served to each guest. The proper management of a beverage operation requires strict adherence to control procedures for several reasons:

1. Beverage operations are subject to tax audits to verify sales revenue. In some states, these audits are unannounced.

2. Beverage operations can, in some cases, be closed down on the spot for the violation of a liquor law.
3. Employees in a bar may deceptively seek to become operational “partners” by bringing in their own beverage products to sell and then keeping sales revenue.
4. Detecting the disappearance of small amounts of beverage products is extremely difficult, as, for example, the loss of 8 ounces of beer from a multigallon keg.

Cost Control Around the World

The responsible service and consumption of alcohol is of concern to hospitality managers worldwide. As result, it is an important issue to members of hospitality associations worldwide. HOTREC is the umbrella group for trade associations representing hotels, restaurants, cafés, and similar establishments in Europe. HOTREC consists of 43 national trade associations representing the hospitality sector in 26 countries, from Portugal to Estonia and from Ireland to Cyprus.

HOTREC’s principal purpose is to monitor and analyze developments in the European Union (EU) that have a direct impact on the hospitality industry. One important initiative HOTREC actively supports is the *Wine in Moderation Programme*.

The Wine in Moderation Programme is a pan-European initiative designed to promote responsibility and moderation in wine consumption. It seeks to educate the public about the social and health risks of excessive alcohol consumption and misuse. HOTREC members recognize that education is a powerful tool that can be used in efforts to encourage responsible alcohol service and consumption. You can learn more about the Wine in Moderation Programme and how managers working in every country can support its principles and its educational efforts to promote responsible drinking by entering “Wine in Moderation Programme” into your favorite search engine and then reviewing the information on the program’s website.

Technology Tools

In this chapter, you learned about cost control concepts related to product storage, inventory management, issuing, and production. There are a variety of programs that assist managers in these areas. The programs available include those that:

1. Maintain product inventory values by food category (i.e., produce, meat, dairy, etc.).
2. Create “shopping lists” through production of daily inventory and comparison with production schedules.
3. Report par stock levels, daily storeroom issues, and daily product usage.
4. Maintain perpetual inventory.
5. Compute LIFO or FIFO inventory values.
6. Maintain inventory products database by vendor, storeroom location, product type, alpha order, etc.
7. Report below-par inventory levels.
8. Report daily cost of goods issued or sold.
9. Interface with handheld bar code readers for accurate inventory count and price extension.
10. Compute inventory loss rates.
11. Develop production schedules based on weekly, daily, or monthly sales forecasts.
12. Create product requisition (issues) lists based on forecasted sales.

In some cases, these software programs are designed to be self-standing. In other cases, the programs are designed to operate in conjunction with many of the advanced POS systems currently on the market.

132 Chapter 4 Managing Inventory and Production

For these reasons and others, serving standard sized drink portions is an absolute must for the beverage operation. Although direct reference by a bartender to a standardized recipe may be necessary for only a few types of drinks, standardized recipes that detail the quantity of beverage product management has predetermined as appropriate must be strictly adhered to. That is, if management has determined that bourbon and water should be a 1-ounce portion of bourbon and a 2-ounce portion of water, then both items should be measured by a jigger or another measuring device used to dispense these predetermined amounts.

Each drink sold in a bar must have a standardized recipe or, if the preparation of the alcoholic beverage is simple, such as a glass of wine or draft beer, a standardized portion size. These standards directly affect responsible guest service, guest satisfaction, and the ultimate profitability of the operation.

Apply What You Have Learned

Assume that you are the manager of a restaurant (serving casual Italian food) that is part of a national chain. Beverage sales account for 35 percent of your total sales, with one-half of those sales coming from diners and one-half from guests drinking in the bar area.

An e-mail message from your supervisor arrives, asking your opinion about the company converting from the manual bartending system currently in use to one that is fully automated. The system essentially controls and accounts for the quantity of alcohol poured when making drinks or serving beer or wine. Your written response to the following questions is requested.

1. How would such a system likely affect the control procedures in place at your restaurant?
2. How would guests sitting in the dining room likely perceive the system?
3. How would guests sitting at the bar likely perceive the system?
4. How would the system likely be perceived by your bartenders?

Key Terms and Concepts

The following are terms and concepts discussed in the chapter that are important for you as a manager. To help you review, please define the terms below.

inventory	tenths system	par level
LIFO (last in, first out)	inventory valuation sheet	daily inventory sheet
FIFO (first in, first out)	physical inventory	back of the house
potentially hazardous foods	issuing	portion cost
freezer burn	requisition	food scoop
two-key system	ingredient room	carryover
recodable electronic locks	empty for full system	convenience foods (ready foods)
cellar temperature	comp	free-pouring
oxidation	perpetual inventory	jigger
working stock	bin card	total bar system
safety stock	perpetual inventory card	ethyl alcohol
fiscal year	purchase point	dram shop laws
	as needed (just-in-time)	

Test Your Skills

You may download the Excel spreadsheets for the Test Your Skills exercises from the student companion website at www.wiley.com/college/dopson. Complete the exercises by placing your answers in the shaded boxes and answering the questions as indicated.

1. Olan Haynes is responsible for managing the inventory at the Dobie Road Retirement Center. Olan purchases a variety of items by the case, but he prefers to inventory all of these items in other ways.

For example, he purchases beets by the case. Each case of beets contains 6 cans. But Olan wants to calculate his inventory value based on the number of cans of beets he has in inventory, not the number of cases. Use the following chart to calculate the preferred inventory unit value (e.g., dollars per can, jar, or bottle) that Olan should use for each item listed, based on the purchase unit cost of each item Olan holds in his inventory.

Inventory Item	Purchase Unit	Purchase Unit Cost	Preferred Inventory Unit	Inventory Units per Case	Preferred Inventory Unit Value \$
Beets	1 case	\$18.00	can	6	
Chicken base	1 case	\$96.12	jar	12	
Catsup	1 case	\$19.44	bottle	24	
Soy sauce	1 case	\$22.80	gallon	4	
Cocoa mix	1 case	\$21.50	bag	10	

2. Jack Stills operates the Spartan Restaurant. He is taking the end-of-month inventory in the restaurant's bar. When calculating the value of his spirits, he uses the "tenths" method of estimating product value. He has accounted for all of the spirits product held in his liquor storage area and is now calculating the value of his "behind the bar" inventory. He has completed this process for all of the products he serves except gin. Help him arrive at the ending inventory value for gin by completing the following portion of his Spirits inventory value sheet.

Product	Cost Per 750 ml Bottle	Amount on Hand (750 ml)	Product Value
Seagram's	\$11.50	2.3	
Well Gin	7.50	4.6	
Bombay	17.50	2.2	
Bombay Sapphire	19.50	2.9	
Tanqueray	16.50	1.0	
Tanqueray Ten	19.00	1.7	
Tanqueray Rangpur	19.00	2.3	
Gordon's	10.75	1.5	
White Satin	22.50	0.8	
Total Value			

134 Chapter 4 Managing Inventory and Production

3. Kyle Minoge manages the four-person ingredient room staff at the 800-bed Parkview Hospital. One tool Kyle has developed to help monitor his inventory levels on a daily basis is a requisitions and issues record that records daily all of the inventory items requested by the kitchen's production staff and issued by Kyle's storeroom staff. The record Kyle maintains also indicates the monetary value of the issues made. Help Kyle complete part of yesterday's requisitions and issues record below.

Parkview Hospital Requisitions and Issues Record						
Item	Inventory Unit	Unit Cost	Requested Amount	Issued Amount	Issued Unit	Total Cost
Flour	25-lb. bag	\$25.00	25 lb.	1	bags	
Beef base	1-lb. jar	\$ 7.15	3 lb.	3	jars	
Roast beef (top round)	lb.	\$ 6.24	50 lb.	54	pounds	
Potatoes (redskin)	40-lb. box	\$15.00	78 lb.	2	boxes	
Broccoli (frozen)	3-lb. box	\$ 2.55	61 lb.	21	boxes	

Why do you think the amount of roast beef, potatoes, and broccoli requested by the kitchen staff yesterday was different than the amount issued by Kyle's ingredient room staff?

4. Robin Christopher uses bin cards to manage the wine inventory at the Michelin-starred Riverside Restaurant. Each of the wines held in inventory has its own bin card. The bin card for Hundred Acre Cabernet, listed on the menu for \$450 per bottle, is presented below, along with its purchase and sales activity for the month of October.

Make the appropriate entries on the card for the month of October to determine how much of this wine Robin should have in inventory on each of the days listed including the end of the month.

Bin Number: 237 Hundred Acre Cabernet, Bottle Size: 750 ml			
Date	In	Out	Amount on Hand
Oct. 1			23
Oct. 3		2	
Oct. 8		1	
Oct. 10		5	
Oct. 12	12		
Oct. 14		2	
Oct. 15		2	
Oct. 17		4	
Oct. 19		5	
Oct. 21	12		
Oct. 23		2	
Oct. 25		3	
Oct. 30		3	
Oct. 31		1	

What would it mean if Robin took a physical inventory at the end of October and there was actually one bottle less in inventory than indicated on the wine's bin card? What would it mean if there was actually one bottle more than indicated on the wine's bin card?

5. Kesha Avril operates Rio Bravo. Rio Bravo is a small, fast-casual Mexican-style restaurant. Keisha would like to set up an ABC inventory system for monitoring some of her inventoried products. Keisha has listed below last month's usage for 20 key items she holds in inventory.
 - a. Calculate Monthly Usage \$, then see (b) and (c) below.

Item	Monthly Usage	Purchase Unit	Purchase Price per Unit	Monthly Usage \$
Chicken breast	1,023	pound	\$ 0.99	
Avocado	85	case	\$19.50	
Corn tortillas	230	pound	\$ 0.38	
Skirt steak	527	pound	\$ 4.15	
Green peppers	7	case	\$28.50	
Onions	2	bag	\$44.00	
Parsley	4	crate	\$18.00	
Tortilla chips	265	pound	\$ 0.88	
Chili powder	12	pound	\$ 4.60	
White cheddar cheese	28	pound	\$ 3.50	
Sofrito	42	jar	\$ 2.10	
Rice	6	bag	\$45.00	
Cumin	10	pound	\$ 6.38	
Iceberg lettuce	5	case	\$18.50	
Cilantro	6	crate	\$14.10	
Fresh tomatoes	16	lug	\$11.50	
Sour cream	21	5-lb. carton	\$ 4.25	
Pork butt	483	pound	\$ 2.78	
Flour tortillas	200	pound	\$ 0.88	
Tilapia fillets	61	pound	\$ 2.95	

- b. After calculating Monthly Usage \$, copy the table and paste below. After pasting, sort the table by Monthly Usage \$, from largest to smallest.
 - c. Assign each inventory item to an A, B, or C inventory category where the top 20 percent of the items (75 percent of the cost) are assigned to category A, the next 30 percent of the items (15 percent of the cost) are assigned to category B, and the remaining 50 percent of the items (10 percent of the cost) are assigned to category C.

136 Chapter 4 Managing Inventory and Production

Item	Monthly Usage	Purchase Unit	Purchase Price per Unit	Monthly Usage \$	Inventory Category (ABC)
Don't forget to calculate the total after you sort → Total					

6. Lesley is the purchasing manager for an organic food restaurant with a banquet room. She needs to create the food purchase orders for tomorrow. Her par-value, on-hand, and special-order requirements are as follows. Help Lesley determine the amount of each item she needs to order. (*Spreadsheet hint:* Use the ROUNDUP function with zero decimals in the Order Amount column.)

Daily Inventory Sheet						
Item	Description	Unit	Par Value	On Hand	Special Order	Order Amount
Avocados	48 ct.	case	6	2	3	
Cauliflower	12 ct.	case	5	1		
Cucumbers	Medium	case	3	0		
Grapes	Red seedless	lug	4	1		
Lettuce	Green leaf, 24 ct.	case	5	2	4	
Lettuce	Romaine, 24 ct.	case	3	0.5		
Pears	D'Anjou	case	3	1		
Peppers	Green bell, med.	case	7	2	5	
Pineapples	7 ct.	case	4	0		
Potatoes	B reds	50-lb. bag	3	0.5		
Potatoes	Peeled, large	25-lb. bag	4	1	4	
Squash	Yellow #2	30-lb. case	5	2	2	
Strawberries	Driscoll	flat	3	1.5		

7. Maxine Wilson is the executive chef at the Plainview Air Force Base. Fajita Spiced Whitefish is one of Maxine's most popular items. Using the standardized recipe information below calculate the total recipe cost and the per portion cost for Maxine's Fajita Spiced Whitefish.

Fajita Spiced Whitefish				
Yield in portions: 50 Portion size: 6 oz.				
Ingredient	Amount	Recipe Cost	Procedure	
Boneless whitefish fillet: 6 oz.	50 fillets	\$103.20	Pat whitefish fillets dry.	
Potato flakes; dry	1 lb. 8 oz.	\$ 1.58	Mix potato flakes, cornstarch, flour, and seasoning to make a breading. Coat each fillet with the breading mixture.	
Cornstarch	10 oz.	\$ 0.96		
Flour, all-purpose	4 oz.	\$ 0.25		
Fajita seasoning	10 oz.	\$ 4.18		
Salt	4 oz.	\$ 0.10		
Vegetable oil	4 cups	\$ 2.73	Heat oil in fry pan. Place breaded fillet into hot oil, presentation side down. Cook until browned, then turn to brown other side. Remove from fry pan and drain.	
	Total Recipe Cost		Portion Cost	

8. Helen Lang is the manager at the Prime Rib House restaurant. Her best-selling menu item is the 10-ounce regular cut prime rib. Helen pays \$8.97 a pound for the standing rib roasts she uses. When properly trimmed, cooked, and sliced, each 22-pound rib roast she buys will produce 25 regular cut slices weighing 10 ounces each. Tonight, Helen's production forecast calls for the cooking of two rib roasts. Calculate the portion cost of this item that Helen's operation would achieve if the following number of 10-ounce portions are actually served from the two cooked roasts.

Number of roasts	
Rib roast weight in lb.	
Total number of lb.	
Cost per lb.	
Total cost of ribs	

Rib Portions Served	Portion Cost
50	
48	
46	
44	
42	
40	

What two key areas of controlling production costs would Helen want to monitor to ensure that the two rib roasts cooked and served by her production staff have the lowest portion cost?

138 Chapter 4 Managing Inventory and Production

9. Mario Armando Perez is the kitchen manager at the Asahi Sushi House. Mario's restaurant offers five popular types of sushi roll. Mario keeps careful records of the number of each roll type sold, from which he computes each item's popularity index. For March 1, Mario estimates 150 guests will be served.

Based on his experience, and to ensure he does not run out of any item, Mario would like to have extra servings (planned overage) of selected menu items available for sale. Using planned overage, the popularity index of his menu items, and his prior day's carryover information, help Mario determine the amount of new production needed and the total available for the day.

At the end of the day, Mario also records his actual number sold in order to calculate his carryover amount for the next day. Using all of the information given, help Mario complete his kitchen production schedule for March 1.

Mario's Kitchen Production Schedule: March 1								
Menu Item	Popularity Index	Sales Forecast	Planned Overage	Prior Day Carryover	New Production	Total Available	Number Sold	Carryover
Spicy Tuna Roll	34%		5	6			52	
Salmon Special Roll	10%		5	2			12	
Spicy Shrimp Roll	30%		5	5			50	
California Roll	20%		5	2			30	
BBQ Eel Roll	6%		0	0			5	
Total to Serve	100%	150	20					

10. Overportioning alcoholic beverages most often causes a significant increase in beverage portion costs, and it will make it more difficult to ensure that an operation is practicing responsible alcoholic beverage service. As a result, overportioning when preparing and serving alcoholic beverages must be avoided.

The underportioning of liquor caused by a bartender's failure to follow a drink's standardized recipe can also be a problem for an operation. What would be the likely result for an operation that consistently underportions the amount of liquor used in the drinks that it serves?