CHAPTER 8

Inventories and the Cost of Goods Sold

After studying this chapter, you should be able to:

Learning Objectives

LO8-1 In a perpetual inventory system, determine the cost of goods sold using (a) specific identification, (b) average cost, (c) FIFO, and (d) LIFO. Discuss the advantages and shortcomings of each method.

LO8-2 Explain the need for taking a physical inventory.

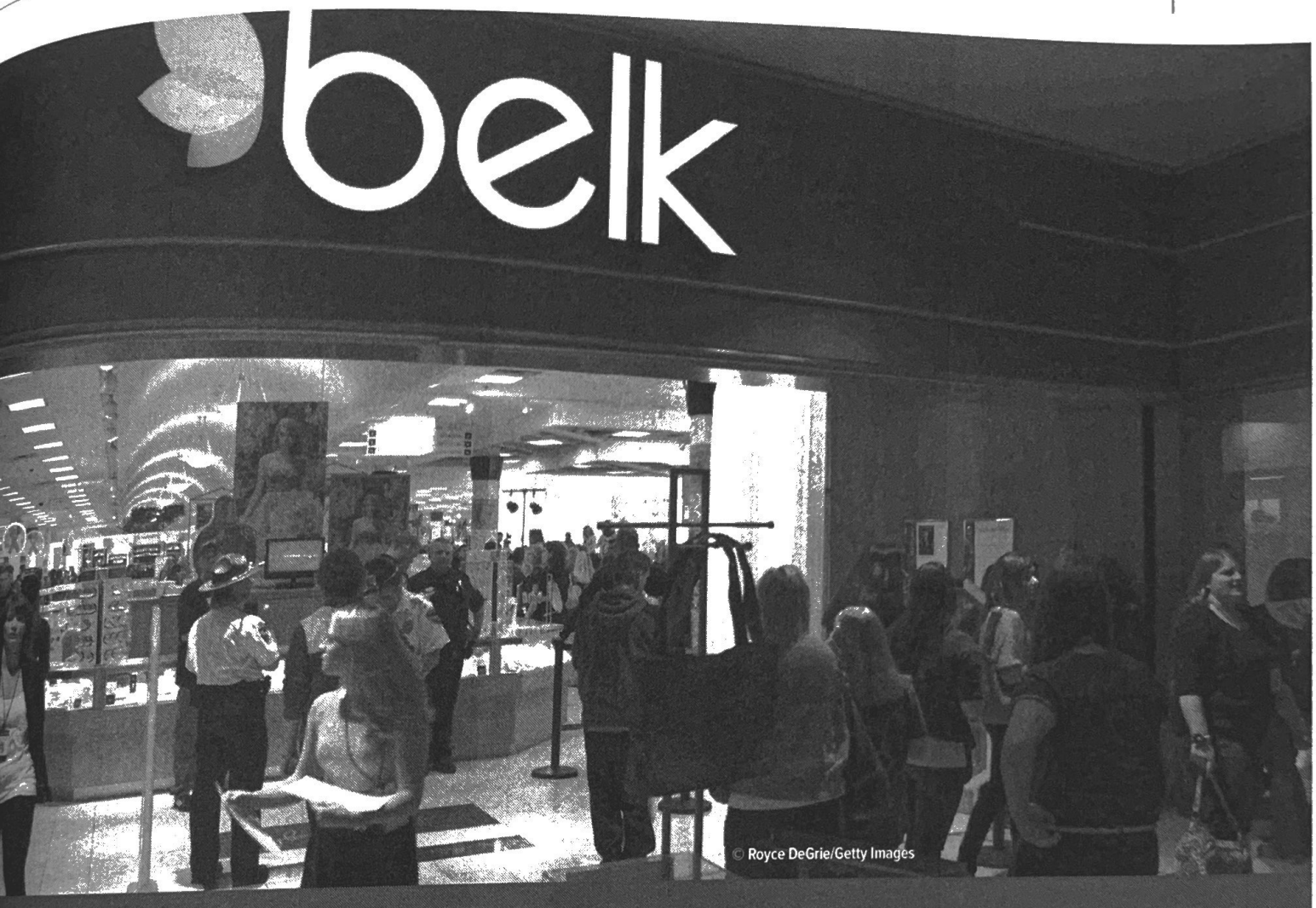
LO8-3 Explain shrinkage losses and other year-end adjustments to inventory.

LO8-4 In a periodic inventory system, determine the ending inventory and the cost of goods sold using (a) specific identification, (b) average cost, (c) FIFO, and (d) LIFO.

LO8-5 Explain the effects on the income statement of errors in inventory valuation.

LO8-6 Estimate the cost of goods sold and ending inventory by the gross profit method and by the retail method.

LO8-7 Compute inventory turnover and explain its uses.



BELK, INC.

Having the right merchandise available at the right time, in the right places, and in the needed quantities is critically important for all companies that sell products to their customers. These businesses include chain stores, such as grocery stores, drug stores, and department stores.

Consider the case of Belk, Inc. Belk is the largest family-owned mainline department store business in the United States with over 300 stores in 16 states, primarily in the southern United States. The company and its successors have been in the department store business since 1888.

Merchandise inventory represents those items available for sale to customers of companies like Belk. To be successful, the company must carefully manage its inventory to have available the items customers want, in the right quantities, sizes, and other characteristics. Managing and accounting for inventory is of great importance, and merchandise inventory is often one of the largest assets in the statement of financial position of merchandising companies.

Over a recent five-year period, to support sales of between $3.3 and 4.0 billion, Belk consistently held between $775 million and slightly over $1 billion in merchandise inventory in its stores, warehouses, and other sites. Accounting for the movement of inventory into and out of a company like Belk represents a significant challenge. Not only is inventory one of the largest assets on the balance sheet, as goods are sold and inventory moves into the income statement as cost of goods sold, several significant accounting and financial reporting issues emerge that we learn about in this chapter. ■

Buying, storing, displaying, selling, and accounting for merchandise inventory presents one of the greatest challenges for companies that sell products. These companies must maintain not only a record of inventory items for sale but also the prices at which these items are purchased and sold, both of which change over time. This adds a significant complication to accounting for inventory and the expense included in the income statement when inventory is sold to customers. You learn how to account for inventory and its cost in this chapter.

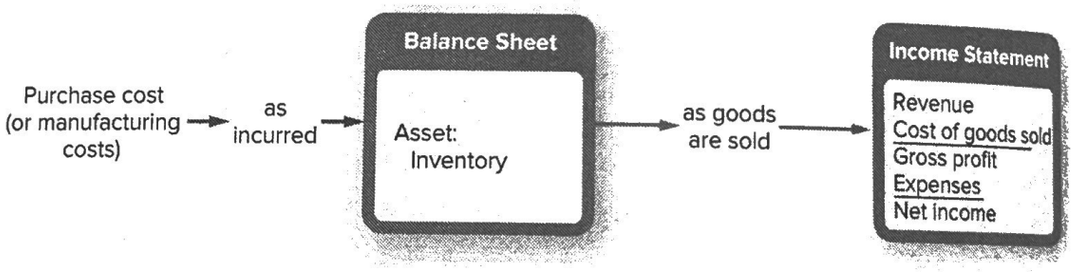
INVENTORY DEFINED

In a merchandising company, inventory consists of all goods owned and held for sale to customers. Inventory is expected to be converted into cash within the company's *operating cycle.*[1] In the balance sheet, inventory is listed immediately after accounts receivable, because it is just one step further removed from conversion into cash than customer receivables.

The Flow of Inventory Costs

Inventory is a nonfinancial asset and usually is shown in the balance sheet at its cost.[2] As items are sold from inventory, their costs are removed from the balance sheet and transferred to the cost of goods sold, which is offset against sales revenue in the income statement. This flow of costs is illustrated in Exhibit 8–1.

EXHIBIT 8–1
The Flow of Costs through Financial Statements



In a perpetual inventory system, entries in the accounting records parallel this flow of costs. When merchandise is purchased, its cost (net of allowable cash discounts) is added to the asset account Inventory. As the merchandise is sold, its cost is removed from the Inventory account and transferred to the Cost of Goods Sold account.

The valuation of inventory and cost of goods sold is of critical importance to managers and to external users of financial statements. In many cases, inventory is a company's largest asset, and the cost of goods sold is its largest expense. These two accounts have a significant effect on the financial statement subtotals and ratios used in evaluating the liquidity and profitability of the business.

Several different methods of pricing inventory and of measuring the cost of goods sold are acceptable under generally accepted accounting principles. These different methods may produce significantly different results, both in a company's financial statements and in its income tax returns. Therefore, managers and investors should understand the effects of the different inventory valuation methods.

[1] As explained in Chapter 6, the *operating cycle* of a merchandising business is the period of time required to convert cash into inventory, inventory into accounts receivable, and accounts receivable into cash. Assets expected to be converted into cash within one year or the operating cycle, whichever is longer, are regarded as current assets.

[2] Some companies deal in inventories that can be sold in a worldwide market at quoted market prices. Examples include mutual funds, stock brokerages, and companies that deal in commodities such as agricultural crops or precious metals. Often these companies value their inventories at market price rather than at cost. Our discussions in this chapter are directed to the more common situation in which inventories are valued at cost.

WHICH UNIT DID WE SELL?

Purchases of merchandise are recorded in the same manner under all of the inventory valuation methods. The differences in these methods lie in determining *which costs* are removed from the Inventory account when merchandise is sold.

We illustrated the basic entries relating to purchases and sales of merchandise in Chapter 6. In that introductory discussion, however, we made a simplifying assumption: All of the units in inventory had been acquired at the same unit cost. In practice, a company often has in its inventory identical units of a given product that were acquired at *different costs.* Acquisition costs may vary because the units were purchased at different dates, from different suppliers, or in different quantities.

When identical units of inventory have different unit costs, a question arises as to *which of these costs* should be used in measuring the cost of goods sold.

DATA FOR AN ILLUSTRATION

To illustrate the alternative methods of measuring the cost of goods sold, assume that Mead Electric Company sells electrical equipment and supplies. Included in the company's inventory are five Elco AC-40 generators. These generators are identical; however, two were purchased on January 5 at a per-unit cost of $1,000, and the other three were purchased a month later, shortly after Elco had announced a price increase, at a per-unit cost of $1,200. These purchases are reflected in Mead's inventory subsidiary ledger in Exhibit 8–2.

Item Elco AC-40 **Primary supplier** Elco Manufacturing
Description Portable generator **Secondary supplier** Vegas Wholesale Co.
Location Daily St. warehouse **Inventory level: Min:** 2 **Max:** 5

	Purchased			Sold			Balance		
Date	Units	Unit Cost	Total	Units	Unit Cost	Cost of Goods Sold	Units	Unit Cost	Total
Jan. 5	2	$1,000	$2,000				2	$1,000	$2,000
Feb. 5	3	1,200	3,600				2	1,000	
							3	1,200	5,600

EXHIBIT 8–2
Inventory Subsidiary Ledger

Notice that, on February 5, the Balance columns contain two "layers" of unit cost information, representing the units purchased at the two different unit costs. A new **cost layer** is created whenever units are acquired at a different per-unit cost. (As all units comprising a cost layer are sold, the layer is eliminated from the inventory. Therefore, a business is unlikely to have more than three or four cost layers in its inventory at any given time.)

Now assume that, on March 1, Mead sells one of these Elco generators to Boulder Construction Company for $1,800 cash. What cost should be removed from the Inventory account and recognized as the cost of goods sold—$1,000, $1,200, or some other amount?

In answering such questions, accountants may use an approach called **specific identification,** or they may adopt a **cost flow assumption.** Either of these approaches is acceptable. Once an approach has been selected, however, it should be *applied consistently* in accounting for all sales of this particular type of merchandise.

SPECIFIC IDENTIFICATION

LO8-1

LEARNING OBJECTIVE
In a perpetual inventory system, determine the cost of goods sold using (a) specific identification, (b) average cost, (c) FIFO, and (d) LIFO. Discuss the advantages and shortcomings of each method.

The specific identification method is acceptable only when the actual costs of individual units of merchandise can be determined from the accounting records. For example, each of the generators in Mead's inventory may have an identification number, and these numbers may appear on the purchase invoices. With this identification number, Mead's accounting department can determine whether the generator sold to Boulder Construction cost $1,000 or $1,200. The *actual cost* of this particular unit then is used in recording the cost of goods sold.

COST FLOW ASSUMPTIONS

If the items in inventory are *homogeneous* in nature (identical, except for insignificant differences), it is *not necessary* for the seller to use the specific identification method. Rather, the seller may follow the more convenient practice of using a *cost flow assumption.* Using a cost flow assumption, often referred to as simply a flow assumption, is particularly common where the company has a large number of identical inventory items that were purchased at different prices.

When a cost flow assumption is in use, the seller makes an *assumption* as to the sequence in which units are withdrawn from inventory. For example, the seller might assume that the oldest merchandise always is sold first or that the most recently purchased items are the first to be sold.

Three cost flow assumptions are in widespread use:

1. *Average cost.* This assumption values all merchandise—units sold and units remaining in inventory—at the *average* per-unit cost. (In effect, the average-cost method assumes that units are withdrawn from the inventory in random order.)
2. *First-in, first-out (FIFO).* As the name implies, FIFO involves the assumption that goods sold are the *first* units that were purchased—that is, the *oldest* goods on hand. Thus the remaining inventory is comprised of the most recent purchases.
3. *Last-in, first-out (LIFO).* Under LIFO, the units sold are assumed to be those *most recently* acquired. The remaining inventory, therefore, is assumed to consist of the earliest purchases.

The cost flow assumption selected by a company *need not* correspond to the actual physical movement of the company's merchandise. When the units of merchandise are identical (or nearly identical), it *does not matter* which units are delivered to the customer in a particular sales transaction. Therefore, in measuring the income of a business that sells units of identical merchandise, accountants consider the flow of *costs* to be more important than the physical flow of the merchandise.

The use of a cost flow assumption *eliminates the need for separately identifying each unit sold and looking up its actual cost.* Experience has shown that these cost flow assumptions provide useful and reliable measurements of the cost of goods sold, as long as they are applied consistently to all sales of the particular type of merchandise.

AVERAGE-COST METHOD

When the **average-cost method** is in use, the *average cost* of all units in inventory is computed after every purchase. This average cost is computed by dividing the total cost of goods available for sale by the number of units in inventory. Because the average cost may change following each purchase, this method also is called the **moving average method** when a perpetual inventory system is used.

As of January 5, Mead had only two Elco generators in its inventory, each acquired at a purchase cost of $1,000. Therefore, the average cost is $1,000 per unit. After the purchase on February 5, Mead had five Elco generators in inventory, acquired at a total cost of $5,600 (2 units at $1,000, plus 3 units at $1,200 = $5,600). Therefore, the *average* per-unit cost now is $1,120 ($5,600 ÷ 5 units = $1,120).

On March 1, two entries are made to record the sale of one of these generators to Boulder Construction Company. The first recognizes the revenue from this sale, and the

second recognizes the cost of the goods sold. These entries follow, with the cost of goods sold measured by the average-cost method:

Cash	1,800	
Sales		1,800
To record the sale of one Elco AC-40 generator.		
Cost of Goods Sold	1,120	
Inventory		1,120
To record the cost of one Elco AC-40 generator sold to Boulder Construction Co. Cost determined by the average-cost method.		

(The entry to recognize the $1,800 in sales revenue is the same, regardless of the inventory method in use. Therefore, we will not repeat this entry in our illustrations of the other cost flow assumptions.)

When the average-cost method is in use, the inventory subsidiary ledger is modified slightly from the format in Exhibit 8–2. Following the sale on March 1, Mead's subsidiary ledger for Elco generators would be modified to show the average unit cost as in Exhibit 8–3.

EXHIBIT 8–3
Inventory Subsidiary Ledger—Average-Cost Basis

	Purchased			Sold			Balance		
Date	Units	Unit Cost	Total	Units	Unit Cost	Cost of Goods Sold	Units	Unit Cost	Total
Jan. 5	2	$1,000	$2,000				2	$1,000*	$2,000
Feb. 5	3	1,200	3,600				5	$1,120**	5,600
Mar. 1				1	$1,120	$1,120	4	$1,120	4,480

*$2,000 total cost ÷ 2 units = $1,000.

**$5,600 total cost ÷ 5 units = $1,120.

Notice that the Unit Cost column for purchases still shows actual unit costs—$1,000 and $1,200. The Unit Cost columns relating to sales and to the remaining inventory, however, show the *average unit cost* ($5,600 total ÷ 5 units = $1,120).

Under the average-cost assumption, all items in inventory are assigned the *same* per-unit cost (the average cost). Hence, it does not matter which units are sold; the cost of goods sold always is based on the current average unit cost. When one generator is sold on March 1, the cost of goods sold is $1,120; if three generators had been sold on this date, the cost of goods sold would have been $3,360 (3 units × $1,120 per unit).

FIRST-IN, FIRST-OUT METHOD

The **first-in, first-out method,** often called *FIFO,* is based on the assumption that the *first merchandise purchased is the first merchandise sold.* Thus, the accountant for Mead Electric would assume that the generator sold on March 1 was one of those purchased on January 5. The entry to record the cost of goods sold would be:

Cost of Goods Sold	1,000	
Inventory		1,000
To record the cost of one Elco AC-40 generator sold to Boulder Construction Co. Cost determined by the FIFO flow assumption.		

Following this sale, Mead's inventory ledger would appear as shown in Exhibit 8–4.

EXHIBIT 8–4
Inventory Subsidiary Ledger—FIFO Basis

	Purchased			Sold			Balance		
Date	Units	Unit Cost	Total	Units	Unit Cost	Cost of Goods Sold	Units	Unit Cost	Total
Jan. 5	2	$1,000	$2,000				2	$1,000	$2,000
Feb. 5	3	1,200	3,600				2	1,000	
							3	1,200	5,600
Mar. 1				1	$1,000	$1,000	1	1,000	
							3	1,200	4,600

Notice that FIFO uses actual purchase costs, rather than an average cost. Thus, if merchandise has been purchased at several different costs, the inventory will include several different cost layers. The cost of goods sold for a given sales transaction also may involve several different cost layers. To illustrate, assume that Mead had sold *four* generators to Boulder Construction, instead of only one. Under the FIFO flow assumption, Mead would assume that it first sold the two generators purchased on January 5 and then two of those purchased on February 5. Thus the total cost of goods sold ($4,400) would include items at *two different unit costs,* as shown here:

2 generators from Jan. 5 purchase @ $1,000	$2,000
2 generators from Feb. 5 purchase @ $1,200	$2,400
Total cost of goods sold (4 units)	$4,400

In the FIFO method, the cost of goods sold always is recorded at the oldest available purchase costs, and the units remaining in inventory are valued at the more recent acquisition costs.

LAST-IN, FIRST-OUT METHOD

The **last-in, first-out method,** commonly known as *LIFO,* is among the most widely used methods of determining the cost of goods sold and valuing inventory. As the name suggests, the *most recently* purchased merchandise (the last in) is assumed to be sold first. If Mead were using the LIFO method, it would assume that the generator sold on March 1 was one of those acquired on February 5, the most recent purchase date. Thus, the cost transferred from inventory to the cost of goods sold would be $1,200.

The journal entry to record the cost of goods sold is shown as follows. The inventory subsidiary ledger record after this entry has been posted is shown in Exhibit 8–5.

Cost of Goods Sold	1,200	
Inventory		1,200
To record the cost of one Elco AC-40 generator sold to Boulder Construction Co. Cost determined by the LIFO flow assumption.		

Date	Purchased			Sold			Balance		
	Units	Unit Cost	Total	Units	Unit Cost	Cost of Goods Sold	Units	Unit Cost	Total
Jan. 5	2	$1,000	$2,000				2	$1,000	$2,000
Feb. 5	3	1,200	3,600				2	1,000	
							3	1,200	5,600
Mar. 1				1	$1,200	$1,200	2	1,000	
							2	1,200	4,400

EXHIBIT 8–5
Inventory Subsidiary Ledger—LIFO Basis

Like FIFO, the LIFO method uses actual purchase costs, rather than an average cost. Thus, the inventory may have several different cost layers. If a sale includes more units than are included in the most recent cost layer, some of the goods sold are assumed to come from the next most recent layer. For example, if Mead had sold four generators (instead of one) on March 1, the cost of goods sold determined under the LIFO assumption would be $4,600:

3 generators from Feb. 5 purchase @ $1,200	$3,600
1 generator from Jan. 5 purchase @ $1,000	$1,000
Total cost of goods sold (4 units)	$4,600

Because LIFO transfers the most recent purchase costs to the cost of goods sold, the goods remaining in inventory are valued at the oldest acquisition costs.

EVALUATION OF THE METHODS

All three of the cost flow assumptions just described are acceptable for use in financial statements and in income tax returns. As we have explained, it is not necessary that the physical flow of merchandise correspond to the cost flow assumption. Different flow assumptions may be used for different types of inventory or for inventories in different geographical locations.

The only requirement for using a flow assumption is that the units to which the assumption is applied should be *homogeneous* in nature—that is, virtually identical to one another. If each unit is unique, such as the sale of portraits by an art studio, only the specific identification method can properly match sales revenue with the cost of goods sold.

Each inventory valuation method has certain advantages and shortcomings. In the final analysis, the selection of inventory valuation methods is a managerial decision. However, the method (or methods) used in financial statements always should be disclosed in notes accompanying the statements.

Specific Identification The specific identification method is best suited for unique inventories of high-priced, low-volume items. This is the only method that exactly parallels the physical flow of the merchandise. If each item in the inventory is unique, as in the case of valuable paintings, custom jewelry, and most real estate, specific identification is clearly the logical choice.

The specific identification method has an intuitive appeal, because it assigns actual purchase costs to the specific units of merchandise sold or in inventory. However, when the units in inventory are identical (or nearly identical), the specific identification method may produce *misleading results* by implying differences in value that—under current market conditions—do not exist. There is also the potential to manipulate the company's financial statement numbers by selecting which items (and as a result which costs) are sold.

As an example, assume that a coal dealer has purchased 100 tons of coal at a cost of $90 per ton. A short time later, the company purchases another 100 tons of the *same grade* of coal—but this time the cost is $120 per ton. The two purchases are in separate piles; thus it would be possible for the company to use the specific identification method in accounting for sales.

Assume now that the company has an opportunity to sell 10 tons of coal at a retail price of $180 per ton. Does it really matter from which pile this coal is removed? The answer is *no;* the coal is a homogeneous product. Under current market conditions, the coal in each pile is equally valuable. To imply that it is more profitable to sell coal from one pile rather than the other is an argument of questionable logic.

Average Cost Identical items will have the same accounting values only under the average-cost method. Assume, for example, that a hardware store sells a given size nail for 65 cents per pound. The hardware store buys the nails in 100-pound quantities at different times at prices ranging from 40 to 50 cents per pound. Several hundred pounds of nails are always on hand, stored in a large bin. The average-cost method properly recognizes that when a customer buys a pound of nails it is not necessary to know exactly which nails the customer selected from the bin in order to measure the cost of goods sold. Therefore, the average-cost method avoids the shortcomings of the specific identification method. It is not necessary to keep track of the specific items sold and of those still in inventory. Also, it is not possible to manipulate income merely by selecting the specific items to be delivered to customers.

A shortcoming of the average-cost method is that changes in current replacement costs of inventory are concealed because these costs are averaged with older costs. As a result, neither the valuation of ending inventory nor the cost of goods sold will quickly reflect changes in the current replacement cost of merchandise.

First-In, First-Out The distinguishing characteristic of the FIFO method is that the oldest purchase costs are transferred to the cost of goods sold, while the most recent costs remain in inventory.

Over the past 50 years, we have lived in an inflationary economy, which means that most prices rise over time. When purchase costs are rising, the FIFO method assigns *lower* (older) costs to the cost of goods sold and the higher (more recent) costs to the goods remaining in inventory.

By assigning lower costs to the cost of goods sold, FIFO usually causes a business to report *higher profits* than would be reported under the other inventory valuation methods. Some companies favor the FIFO method for financial reporting purposes, because their goal is to report the highest net income possible. For income tax purposes, however, reporting more income than necessary results in paying more income taxes than necessary.

Some accountants and decision makers believe that FIFO tends to *overstate* a company's profitability in periods of rising prices. Revenue is based on current market conditions. By offsetting this revenue with a cost of goods sold based on older (and lower) prices, gross profits may be overstated consistently.

A conceptual advantage of the FIFO method is that in the balance sheet inventory is valued at recent purchase costs. Therefore, this asset appears in the balance sheet at an amount more closely approximating its current replacement cost.

Last-In, First-Out The LIFO method is one of the most interesting and controversial flow assumptions. The basic assumption in the LIFO method is that the most recently purchased units are sold first and that the older units remain in inventory. This assumption is *not* in accord with the physical flow of merchandise in many businesses. Yet there are strong logical arguments in support of the LIFO method, in addition to income tax considerations.

For the purpose of measuring income, most accountants consider the *flow of costs* more important than the physical flow of merchandise. Supporters of the LIFO method contend that the measurement of income should be based on *current market conditions.* Therefore, current sales revenue should be offset by the *current* cost of the merchandise sold. By the LIFO method, the costs assigned to the cost of goods sold are relatively current because they reflect the most recent purchases.

There is one significant shortcoming to the LIFO method. The valuation of the asset inventory is based on the company's oldest inventory acquisition costs. After the company has been in business for many years, these oldest costs may greatly understate the current replacement cost of the inventory. When an inventory is valued by the LIFO method, the company also should disclose the current replacement cost of the inventory in a note to the financial statements.

During periods of rising inventory replacement costs, the LIFO method results in the lowest valuation of inventory and measurement of net income. Therefore, LIFO is regarded as the most *conservative* of the inventory pricing methods. FIFO, on the other hand, is the least conservative method.[3]

Income tax considerations are the principal strategic reason for the popularity of the LIFO method. Remember that the LIFO method assigns the most recent inventory purchase costs to the cost of goods sold. In the common situation of rising prices, these most recent costs are also the highest costs. By reporting a higher cost of goods sold than results from other inventory valuation methods, the LIFO method usually results in *lower taxable income.* In short, if inventory costs are rising, a company can reduce the amount of its income tax obligation by using the LIFO method in its income tax return.

It may seem reasonable that a company would use the LIFO method in its tax return to reduce taxable income and use the FIFO method in its financial statements to increase the amount of net income reported to investors and creditors. However, income tax regulations allow a corporation to use LIFO in its income tax return *only* if the company also uses LIFO in its financial statements. This is referred to as the LIFO conformity requirement. Because of this unique requirement, income tax considerations often provide the overriding strategic reason for selecting the LIFO method.

DO INVENTORY METHODS REALLY AFFECT PERFORMANCE?

Except for their effects on income taxes, the answer to this question is *no.*

During a period of rising prices, a company might *report* higher profits by using FIFO instead of LIFO. But the company would not really *be* any more profitable. An inventory valuation method affects only the *allocation of costs* between the Inventory account and the Cost of Goods Sold account. It has *no effect* on the total costs actually *incurred* in purchasing or manufacturing inventory. Except for the amount of income taxes paid, differences in the profitability reported under different inventory methods exist only on paper.

The inventory method in use does affect the amount of income taxes owed. To the extent that an inventory method reduces these taxes, it does increase profitability. In Exhibit 8–6 we summarize characteristics of the basic inventory valuation methods.

THE PRINCIPLE OF CONSISTENCY

The principle of **consistency** is one of the basic concepts underlying reliable financial statements. This principle means that, once a company has adopted a particular accounting method, it must *follow that method consistently,* rather than switch methods from one year to the next. Thus, once a company has adopted a particular inventory flow assumption (or the specific identification method), it should continue to apply that assumption to all sales of that type of merchandise.

The principle of consistency does *not* prohibit a company from *ever* changing its accounting methods. If a change is made, however, the reasons for the change must be explained, and the effects of the change on the company's financial statements must be fully disclosed.

JUST-IN-TIME (JIT) INVENTORY SYSTEMS

In recent years, much attention has been paid to the **just-in-time (JIT) inventory system** in manufacturing operations. The phrase "just-in-time" usually means that purchases of raw materials and component parts arrive just in time for use in the manufacturing process—often within a few hours of the time they are scheduled for use. A second application of the just-in-time concept is completing the manufacturing process just in time to ship the finished goods to customers.

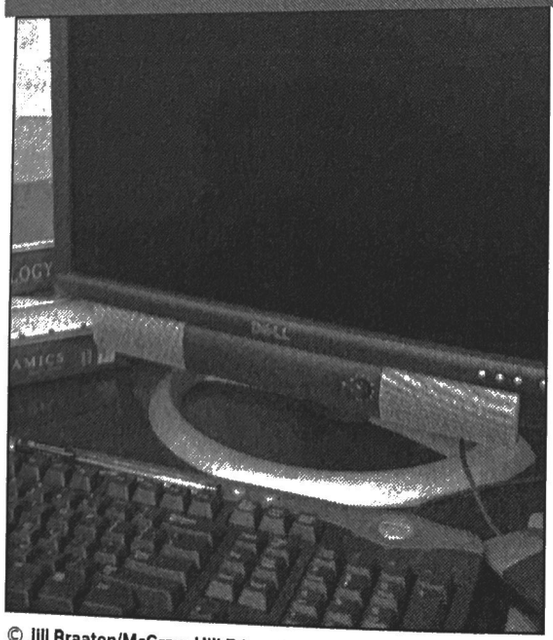
[3] During a prolonged period of *declining* inventory replacement costs, this situation reverses: FIFO becomes the most conservative method, and LIFO the least conservative.

EXHIBIT 8–6 Summary of Inventory Valuation Methods

Valuation Method	Costs Allocated to: Cost of Goods Sold	Inventory	Comments
Specific identification	Actual costs of the units sold	Actual cost of units remaining	• Parallels physical flow • Logical method when units are unique • May be misleading when the units are identical
Flow assumptions (acceptable only for an inventory of *homogeneous units*):			
Average cost	Number of units sold times the *average unit cost*	Number of units on hand times the *average unit cost*	• Assigns all units the same *average unit cost* • Current costs are averaged in with older costs
First-in, first-out (FIFO)	Costs of *earliest purchases* on hand at the time of the sale (first-in, first-out)	Cost of *most recently* purchased units	• Cost of goods sold is based on older costs • Inventory valued at most recent costs • May overstate income during periods of rising prices; may increase income taxes due
Last-in, first-out (LIFO)	Cost of *most recently purchased* units (last-in, first-out)	Costs of *earliest* purchases (assumed *still* to be in inventory)	• Cost of goods sold shown at most recent prices • Inventory shown at old (and perhaps out-of-date) costs • Most conservative method during periods of rising prices; often results in lower income taxes due

Although a just-in-time system reduces the size of a company's inventories, it does not eliminate them entirely. The 2013 balance sheet of **Dell Computer Corporation**, for example, shows inventories of $1,382 million (Dell reports its inventories by the FIFO method).

CASE IN POINT



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Dell Computer Corporation generates millions in revenue each day by selling computers on the Internet. The company has long been a model of just-in-time manufacturing. Dell doesn't start ordering components or assembling computers until an order has been booked. To have computer components available on a timely basis, many of Dell's suppliers keep components warehoused in close proximity to Dell's factories. The JIT philosophy applies to suppliers, assemblers, and distributors. A customer order placed Monday morning can be on a delivery truck by Tuesday evening.

The concept of minimizing inventories applies more to manufacturing operations than to retailers. Ideally, manufacturers have buyers lined up for their merchandise even before the goods are produced. Many retailers, in contrast, want to offer their customers a large selection of in-stock merchandise—which means a big inventory.

The just-in-time concept actually involves much more than minimizing the size of inventories. It has been described as the philosophy of constantly working to increase efficiency throughout the organization. One basic goal of an accounting system is to provide management with useful information about the efficiency—or inefficiency—of operations.

Taking a Physical Inventory

LO8-2

LEARNING OBJECTIVE
Explain the need for taking a physical inventory.

In Chapter 6 we explained the need for businesses to make a complete physical count of the merchandise on hand at least once a year. The primary reason for this procedure of taking inventory is to adjust the perpetual inventory records for unrecorded **shrinkage losses,** such as theft, spoilage, or breakage.

The **physical inventory** usually is taken at (or near) the end of the company's fiscal year.[4] Often a business selects a fiscal year ending after a period of high activity. For example, many large retailers use a fiscal year that starts February 1 and ends January 31.

RECORDING SHRINKAGE LOSSES

LO8-3

LEARNING OBJECTIVE
Explain shrinkage losses and other year-end adjustments to inventory.

In most cases, the year-end physical count of the inventory reveals some shortages or damaged merchandise. The costs of missing or damaged units are removed from the inventory records using the same flow assumption as is used in recording the costs of goods sold.

To illustrate, assume that a company's inventory subsidiary ledger shows the following 158 units of a particular product in inventory at year-end:

8 units purchased Nov. 2 @ $100	$ 800
150 units purchased Dec. 10 @ $115	17,250
Total (158 units)	$18,050

A year-end physical count, however, discloses that only 148 of these units actually are on hand. On the basis of this physical count, the company should adjust its inventory records to reflect the loss of 10 units.

The inventory flow assumption in use affects the measurement of shrinkage losses in the same way it affects the cost of goods sold. If the company uses FIFO, for example, the missing units are valued at the oldest purchase costs shown in the inventory records. Eight of the missing units are assumed to have cost $100 per unit and the other 2, $115 per unit. Under FIFO, the shrinkage loss amounts to $1,030 (8 units @ $100 + 2 units @ $115). But if this company uses LIFO, the missing units all are assumed to have come from the most recent purchase (on December 10). Therefore, the shrinkage loss amounts to $1,150 (10 units @ $115).

If shrinkage losses are small, the costs removed from inventory may be charged (debited) directly to the Cost of Goods Sold account. If these losses are *material* in amount, the offsetting debit should be entered in a special loss account, such as Inventory Shrinkage Losses. In the income statement, a loss account is deducted from revenue in the same manner as an expense account.

LCM AND OTHER WRITE-DOWNS OF INVENTORY

In addition to shrinkage losses, the value of inventory may decline because the merchandise has become obsolete or is unable to be sold for other reasons. If inventory has become obsolete or is otherwise unsalable, its carrying amount in the accounting records should be *written down* to zero (or to its "scrap value," if any). A **write-down** of inventory reduces both

[4] The reason for taking a physical inventory near year-end is to ensure that any shrinkage losses are reflected in the annual financial statements. The stronger the company"s system of internal control over inventories, the farther away this procedure may be moved from the balance sheet date.

the carrying amount of the inventory in the balance sheet and the net income of the current period. The reduction in income is handled in the same manner as a shrinkage loss. If the write-down is relatively small, the loss is changed or debited directly to the Cost of Goods Sold account. If the write-down is *material in amount,* however, it is charged to a special loss account, perhaps entitled Loss from Write-Down of Inventory.

The Lower-of-Cost-or-Market (LCM) Rule An asset is an economic resource. It may be argued that no economic resource is worth more than it would cost to *replace* that resource in the open market. For this reason, accountants traditionally have valued inventory in the balance sheet at the lower of its (1) cost or (2) market value. In this context, "market value" means *current replacement cost.* The inventory is valued at the lower of its historical cost or its current replacement cost. This accounting convention is referred to as the **lower-of-cost-or-market (LCM) rule.**

The LCM rule can be used in conjunction with any cost flow assumption. It may also be applied on the basis of individual inventory items, major inventory categories, or the entire inventory. To illustrate, assume that Joel's Ski Shop uses the FIFO cost flow assumption. The store sells various lines of merchandise with costs and market values shown in Exhibit 8–7.

EXHIBIT 8–7
Applying the LCM Rule by Individual Item, by Category, and by Total Inventory

			LCM Applied on the Basis of . . .		
	FIFO Cost	Market Value	Individual Items	Inventory Category	Total Inventory
Ski equipment			$16,000		
Downhill skis	$16,000	$18,000	3,000		
Cross-country skis	4,000	3,000		$20,000	
Total ski equipment	$20,000	$21,000			
Ski accessories			1,500		
Ski boots	$ 2,400	$ 1,500	6,000		
Ski jackets	6,600	6,000		7,500	
Total ski accessories	$ 9,000	$ 7,500	**$26,500**	**$27,500**	**$28,500**
Total inventory	$29,000	$28,500			

Measured at its FIFO cost, the inventory of Joel's Ski Shop is currently recorded at $29,000 in the general ledger. If management applies the LCM rule on the basis of *individual items,* the inventory would be written down to its market value of $26,500. This is accomplished by reducing or crediting the Merchandise Inventory account for $2,500 ($29,000 – $26,500). The offsetting debit is charged to either the Cost of Goods Sold or to the Loss from Write-Down of Inventory account, depending on the materiality of the dollar amount.

If management applies the LCM rule on the basis of *inventory category,* it would write down the $29,000 FIFO cost by $1,500 ($29,000 – $27,500). Likewise, if the LCM rule is applied on the basis of *total inventory,* a write-down of only $500 is required ($29,000 – $28,500).

In their financial statements, most companies state that inventory is valued at the lower-of-cost-or-market. In an inflationary economy, however, the lower of these two amounts is usually cost, especially for companies using LIFO.[5]

THE YEAR-END CUTOFF OF TRANSACTIONS

Making a proper *cutoff* of transactions is an essential step in the preparation of reliable financial statements. A proper cutoff simply means that the purchases and sales of inventory occurring near year-end are recorded in the correct accounting period.

[5] A notable exception is the petroleum industry, in which the replacement cost of inventory can fluctuate very quickly and in either direction. Large oil companies occasionally report LCM adjustments of several hundred million dollars in a single year.

One aspect of a proper cutoff is determining that all purchases of merchandise through the end of the period are recorded in the inventory records and included in the physical count of merchandise on hand at year-end. Of equal importance is determining that the cost of all merchandise sold through the end of the period has been removed from the inventory accounts and included in the Cost of Goods Sold. This merchandise should *not* be included in the year-end physical count.

If some sales transactions have not been recorded as of year-end, the quantities of merchandise shown in the inventory records will exceed the quantities actually on hand. When the results of the physical count are compared with the inventory records, these unrecorded sales easily could be mistaken for inventory shortages.

Making a proper cutoff may be difficult if sales transactions are occurring while the merchandise is being counted. For this reason, many businesses count their physical inventory during nonbusiness hours, even if they must shut down their sales operations for a day.

Matching Revenue and the Cost of Goods Sold Accountants must determine that both the sales revenue and the cost of goods sold relating to sales transactions occurring near year-end are recorded in the *same* accounting period. Otherwise, the revenues and expenses from these transactions will not be properly matched in the company's income statements.

Goods in Transit A sale should be recorded when title to the merchandise passes to the buyer. In making a year-end cutoff of transactions, questions may arise when goods are in transit between the seller and the buyer as to which company owns the merchandise. The answer to such questions lies in the terms of shipment. If these terms are **F.O.B. (free on board) shipping point,** title passes at the point of shipment and the goods are the property of the buyer while in transit. If the terms of the shipment are **F.O.B. destination,** title does not pass until the shipment reaches its destination and the goods belong to the seller while in transit.

Many companies ignore these distinctions, because goods in transit usually arrive within a day or two. In such cases, the amount of merchandise in transit usually is *not material* in dollar amount, and the company may follow the *most convenient* accounting procedures. It usually is most convenient to record all purchases when the inbound shipments arrive and all sales when the merchandise is shipped to the customer.

In some industries, however, goods in transit may be very material. Oil companies, for example, at any point in time may have millions of dollars of inventory in transit in pipelines and supertankers. In these situations, the company must consider the terms of each shipment in recording its purchases and sales.

YOUR TURN You as a Sales Manager

As sales manager for Tempto Co., a producer of fine home furnishings, you have responsibility for the northeast region of the country. Assume you have just returned from the company's annual sales managers' conference in New Orleans. At the conference, in casual conversation with some of the regional managers, you became aware that several managers report sales that are scheduled for shipment in early January as if they were shipped in late December. What should you do?

(See our comments on Connect.)

LO8-4

PERIODIC INVENTORY SYSTEMS

LEARNING OBJECTIVE In a periodic inventory system, determine the ending inventory and the cost of goods sold using (a) specific identification, (b) average cost, (c) FIFO, and (d) LIFO.

In our preceding discussions, we have emphasized the perpetual inventory system—that is, inventory records that are kept continuously up-to-date. With the extensive use of technology, today most large business organizations use perpetual inventory systems.

Some small businesses, however, use *periodic* inventory systems. In a periodic inventory system, the cost of merchandise purchased during the year is debited to a Purchases account,

rather than to the Inventory account. When merchandise is sold to a customer, an entry is made recognizing the sales revenue, but no entry is made to reduce the inventory account or to recognize the cost of goods sold.

The inventory on hand and the cost of goods sold for the year are not determined until year-end. At the end of the year, all goods on hand are counted and priced at cost. The cost assigned to this ending inventory is then used to compute the cost of goods sold. (The dollar amounts are assumed for the purpose of completing this illustration.)

Inventory at the beginning of the year	$10,000
Add: Purchases during the year	80,000
Cost of goods available for sale during the year	$90,000
Less: Inventory based on year-end count	7,000
Cost of goods sold	$83,000

The only item in this computation that is kept continuously up-to-date in the accounting records is the Purchases account. The amounts of inventory at the beginning and end of the year are determined by annual physical observation.

Determining the cost of the year-end inventory involves two distinct steps: counting the merchandise and pricing the inventory—that is, determining the cost of the units on hand. Together, these procedures determine the proper valuation of inventory and the cost of goods sold.

Applying Flow Assumptions in a Periodic System In our discussion of perpetual inventory systems, we have emphasized the costs that are transferred from inventory to the cost of goods sold as the sales occur. In a periodic system, the emphasis shifts to determining the costs that should be assigned to inventory at the end of the period.

To illustrate, assume that The Kitchen Counter, a retail store, uses a periodic inventory system. The year-end physical inventory indicates that 12 units of a particular model food processor are on hand. Purchases of these food processors during the year are listed in Exhibit 8–8.

EXHIBIT 8–8
Summary of Inventory Purchases

	Number of Units	Cost per Unit	Total Cost
Beginning inventory	10	$80	$ 800
First purchase (Mar. 1)	5	90	450
Second purchase (July 1)	5	100	500
Third purchase (Oct. 1)	5	120	600
Fourth purchase (Dec. 1)	5	130	650
Available for sale	30		$3,000
Units in ending inventory	12		
Units sold	18		

In Exhibit 8–8, note that of the 30 food processors available for sale in the course of the year, 12 are still on hand. This means that 18 of these food processors apparently were sold.[6] We will now use these data to determine the cost of the year-end inventory and the cost of goods sold using the specific identification method and the average-cost, FIFO, and LIFO flow assumptions.

Specific Identification If specific identification is used, the company must identify the 12 food processors on hand at year-end and determine their actual costs from purchase invoices. Assume that these 12 units have an actual total cost of $1,240. The cost of goods

[6] The periodic inventory method does not distinguish between merchandise sold and shrinkage losses. Shrinkage losses are included automatically in the cost of goods sold.