

# Introduction to Accounting: The Language of Business

## Lesson 6: Inventory

Supplemental Textbook



To determine the cost of goods sold, accountants must have accurate merchandise inventory figures. Accountants use two basic methods for determining the amount of merchandise inventory—perpetual inventory procedure and periodic inventory procedure. We mention perpetual inventory procedure only briefly here. In the next chapter, we emphasize perpetual inventory procedure and further compare it with periodic inventory procedure.

When discussing inventory, we need to clarify whether we are referring to the physical goods on hand or the Merchandise Inventory account, which is the financial representation of the physical goods on hand. The difference between perpetual and periodic inventory procedures is the frequency with which the Merchandise Inventory account is updated to reflect what is physically on hand. Under **perpetual inventory procedure**, the Merchandise Inventory account is continuously updated to reflect items on hand. For example, your supermarket uses a scanner to ring up your purchases. When your box of Rice Krispies crosses the scanner, the Merchandise Inventory account shows that one less box of Rice Krispies is on hand.

Under **periodic inventory procedure**, the Merchandise Inventory account is updated periodically after a physical count has been made. Usually, the physical count takes place immediately before the preparation of financial statements.

**Perpetual inventory procedure** Companies use perpetual inventory procedure in a variety of business settings. Historically, companies that sold merchandise with a high individual unit value, such as automobiles, furniture, and appliances, used perpetual inventory procedure. Today, computerized cash registers, scanners, and accounting software programs automatically keep track of inflows and outflows of each inventory item. Computerization makes it economical for many retail stores to use perpetual inventory procedure even for goods of low unit value, such as groceries.

Under perpetual inventory procedure, the Merchandise Inventory account provides close control by showing the cost of the goods that are supposed to be on hand at any particular time. Companies debit the Merchandise Inventory account for each purchase and credit it for each sale so that the current balance is shown in the account at all times. Usually, firms also maintain detailed unit records showing the quantities of each type of goods that should be on hand. Company personnel also take a physical inventory by actually counting the units of inventory on hand. Then they compare this physical count with the records showing the units that should be on hand. Chapter 7 describes perpetual inventory procedure in more detail.

**Periodic inventory procedure** Merchandising companies selling low unit value merchandise (such as nuts and bolts, nails, Christmas cards, or pencils) that have not computerized their inventory systems often find that the extra costs of record-keeping under perpetual inventory procedure more than outweigh the benefits. These merchandising companies often use periodic inventory procedure.

Under periodic inventory procedure, companies do not use the Merchandise Inventory account to record each purchase and sale of merchandise. Instead, a company corrects the balance in the Merchandise Inventory account as the result of a physical inventory count at the end of the accounting period. Also, the company usually does not maintain other records showing the exact number of units that should be on hand. Although periodic inventory procedure reduces record-keeping, it also reduces control over inventory items.

Companies using periodic inventory procedure make no entries to the Merchandise Inventory account nor do they maintain unit records during the accounting period. Thus, these companies have no up-to-date balance against which to compare the physical inventory count at the end of the period. Also, these companies make no attempt to

determine the cost of goods sold at the time of each sale. Instead, they calculate the cost of all the goods sold during the accounting period at the end of the period. To determine the cost of goods sold, a company must know:

- Beginning inventory (cost of goods on hand at the beginning of the period).
- Net cost of purchases during the period.
- Ending inventory (cost of unsold goods at the end of the period).

The company would show this information as follows:

Beginning inventory	\$ 34,000
Add: Net cost of purchases during the period	140,000
Cost of goods available for sale during the period	\$174,000
Deduct: Ending inventory	20,000
Cost of goods sold during the period	\$154,000

In this schedule, notice that the company began the accounting period with USD 34,000 of merchandise and purchased an additional USD 140,000, making a total of USD 174,000 of goods that could have been sold during the period. Then, a physical inventory showed that USD 20,000 remained unsold, which implies that USD 154,000 was the cost of goods sold during the period. Of course, the USD 154,000 is not necessarily the precise amount of goods sold because no actual record was made of the dollar cost of the goods sold. Periodic inventory procedure basically assumes that everything not on hand at the end of the period has been sold. This method disregards problems such as theft or breakage because the Merchandise Inventory account contains no up-to-date balance at the end of the accounting period against which to compare the physical count.

Under periodic inventory procedure, a merchandising company uses the **Purchases account** to record the cost of merchandise bought for resale during the current accounting period. The Purchases account, which is increased by debits, appears with the income statement accounts in the chart of accounts.

To illustrate entries affecting the Purchases account, assume that Hanlon Retail Food Store made two purchases of merchandise from Smith Wholesale Company. Hanlon purchased USD 30,000 of merchandise on credit (on account) on May 4, and on May 21 purchased USD 20,000 of merchandise for cash. The required journal entries for Hanlon are:

May	4	Purchases (+A)	30,000	
		Accounts Payable (+L)		
		To record purchases of merchandise on account.		30,000
	21	Purchases (+A)	20,000	
		Cash (-A)		
		To record purchase of merchandise for cash.		20,000

The buyer deducts purchase discounts and purchase returns and allowances from purchases to arrive at net purchases. The accountant records these items in contra accounts to the Purchases account.

**Purchase discounts** Often companies purchase merchandise under credit terms that permit them to deduct a stated cash discount if they pay invoices within a specified time. Assume that credit terms for Hanlon's May 4 purchase are 2/10, n/30. If Hanlon pays for the merchandise by May 14, the store may take a 2 per cent discount. Thus, Hanlon must pay only USD 29,400 to settle the USD 30,000 account payable. The entry to record the payment of the invoice on May 14 is:

May	14	Accounts Payable (-L)	30,000	
		Cash (-A)		29,400
		Purchase Discount (+SE)		600
		To record payment on account within the discount period.		

The buyer records the purchase discount only when the invoice is paid within the discount period and the discount is taken. The **Purchase Discounts account** is a contra account to Purchases that reduces the recorded

invoice price of the goods purchased to the price actually paid. Hanlon reports purchase discounts in the income statement as a deduction from purchases.

Companies base purchase discounts on the invoice price of goods. If an invoice shows purchase returns or allowances, they must be deducted from the invoice price before calculating purchase discounts. For example, in the previous transaction, the invoice price of goods purchased was USD 30,000. If Hanlon returned USD 2,000 of the goods, the seller calculates the 2 per cent purchase discount on USD 28,000.

**Interest rate implied in cash discounts** To decide whether you should take advantage of discounts by using your cash or borrowing, make this simple analysis. Assume that you must pay USD 10,000 within 30 days or USD 9,800 within 10 days to settle a USD 10,000 invoice with terms of 2/10, n/30. By advancing payment 20 days from the final due date, you can secure a discount of USD 200. The interest expense incurred to borrow USD 9,800 at 12 per cent per year for 20 days is USD 65.33, calculated as (USD 9,800 x .12 x 20/360). You would save USD 134.67 (USD 200 - USD 65.33) by borrowing the money and paying the invoice within the discount period.

In terms of an annual rate of interest, the 2 per cent rate of discount for 20 days is equivalent to a 36 per cent annual rate: (360/20) X 2 per cent. The formula is:

$$\text{Equivalent annual rate of interest} = \frac{\text{The number of days in a year (assumed to be 360)}}{\text{The number of days from the end of the discount period until the final due date}} \times \text{The percentage rate of discount}$$

You can convert all cash discount terms to their approximate annual interest rate equivalents by use of this formula. Thus, a company could afford to pay up to 36 per cent [(360/20) X 2 per cent] on borrowed funds to take advantage of discount terms of 2/10, n/ 30. The company could pay 18 per cent on terms of 1/10, n/30.

**Purchase returns and allowances** A purchase return occurs when a buyer returns merchandise to a seller. When a buyer receives a reduction in the price of goods shipped, a purchase allowance results. Then, the buyer commonly uses a debit memorandum to notify the seller that the account payable with the seller is being reduced (Accounts Payable is debited). The buyer may use a copy of a debit memorandum to record the returns or allowances or may wait for confirmation, usually a credit memorandum, from the seller.

Both returns and allowances reduce the buyer's debt to the seller and decrease the cost of the goods purchased. The buyer may want to know the amount of returns and allowances as the first step in controlling the costs incurred in returning unsatisfactory merchandise or negotiating purchase allowances. For this reason, buyers record purchase returns and allowances in a separate **Purchase Returns and Allowances account**. If Hanlon returned USD 350 of merchandise to Smith Wholesale before paying for the goods, it would make this journal entry:

Accounts Payable (-L)	350	
Purchase Returns and Allowances (+SE)		350
To record return of damaged merchandise to supplier		

The entry would have been the same to record a USD 350 allowance. Only the explanation would change.

If Hanlon had already paid the account, the debit would be to Cash instead of Accounts Payable, since Hanlon would receive a refund of cash. If the company took a discount at the time it paid the account, only the net amount

would be refunded. For instance, if a 2 per cent discount had been taken, Hanlon's journal entry for the return would be:

Cash (+A)	343	
Purchase Discounts (-SE)	7	
Purchase Returns and Allowances (+SE)		350

To record return of damaged merchandise to supplier and record receipt of cash.

Purchase returns and allowances is a contra account to the Purchases account, and the income statement shows it as a deduction from purchases. When both purchase discounts and purchase returns and allowances are deducted from purchases, the result is **net purchases**.

Transportation costs are an important part of cost of goods sold. To understand how to account for transportation costs, you must know the meaning of the following terms:

- **FOB shipping point** means "free on board at shipping point". The buyer incurs all transportation costs after the merchandise has been loaded on a railroad car or truck at the point of shipment. Thus, the buyer is responsible for ultimately paying the freight charges.
- **FOB destination** means "free on board at destination". The seller ships the goods to their destination without charge to the buyer. Thus, the seller is ultimately responsible for paying the freight charges.
- **Passage of title** is a term that indicates the transfer of the legal ownership of goods. Title to the goods normally passes from seller to buyer at the FOB point. Thus, when goods are shipped FOB shipping point, title usually passes to the buyer at the shipping point. When goods are shipped FOB destination, title usually passes at the destination.
- **Freight prepaid** means the seller must initially pay the freight at the time of shipment.
- **Freight collect** indicates the buyer must initially pay the freight bill on the arrival of the goods.

To illustrate the use of these terms, assume that a company ships goods FOB shipping point, freight collect. Title passes at the shipping point. The buyer is responsible for paying the USD 100 freight costs and does so. The seller makes no entry for freight charges; the entry on the buyer's books is:

Transportation-In (or Freight-In) (+SE)	100	
Cash (-A)		100

To record payment of freight bill on goods purchased.

The **Transportation-In account** records the inward freight costs of acquiring merchandise. Transportation-In is an adjunct account in that it is added to net purchases to arrive at **net cost of purchases**. An **adjunct account** is closely related to another account (Purchases, in this instance), and its balance is added to the balance of the related account in the financial statements. Recall that a contra account is just the opposite of an adjunct account. Buyers deduct a contra account, such as accumulated depreciation, from the related fixed asset account in the financial statements.

When shipping goods FOB destination, freight prepaid, the seller is responsible for and pays the freight bill. Because the seller cannot bill a separate freight cost to the buyer, the buyer shows no entry for freight on its books. The seller, however, has undoubtedly considered the freight cost in setting selling prices. The following entry is required on the seller's books:

Delivery Expense (or Transportation-Out Expense) (-SE)	100	
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To record freight cost on goods sold.

When the terms are FOB destination, the seller records the freight costs as **delivery expense**; this selling expense appears on the income statement with other selling expenses.

FOB terms are especially important at the end of an accounting period. Goods in transit then belong to either the seller or the buyer, and one of these parties must include these goods in its ending inventory. Goods shipped FOB destination belong to the seller while in transit, and the seller includes these goods in its ending inventory. Goods shipped FOB shipping point belong to the buyer while in transit, and the buyer records these goods as a purchase and includes them in its ending inventory. For example, assume that a seller ships goods on 2009 December 30, and they arrive at their destination on 2010 January 5. If terms are FOB destination, the seller includes the goods in its 2009 December 31, inventory, and neither seller nor buyer records the exchange transaction until 2010 January 5. If terms are FOB shipping point, the buyer includes the goods in its 2009 December 31, inventory, and both parties record the exchange transaction as of 2009 December 30.

Sometimes the seller prepays the freight as a convenience to the buyer, even though the buyer is ultimately responsible for it. The buyer merely reimburses the seller for the freight paid. For example, assume that Wood Company sold merchandise to Loud Company with terms of FOB shipping point, freight prepaid. The freight charges were USD 100. The following entries are necessary on the books of the buyer and the seller:

Buyer—Loud Company		Seller—Wood Company	
Transportation-In (-SE)	100	Accounts Receivable (+A)	100
Accounts Payable (+L)		Cash (-A)	100
	100		

Such entries are necessary because Wood initially paid the freight charges when not required to do so. Therefore, Loud Company must reimburse Wood for the charges. If the buyer pays freight for the seller (e.g. FOB destination, freight collect), the buyer merely deducts the freight paid from the amount owed to the seller. The following entries are necessary on the books of the buyer and the seller:

Buyer—Loud Company		Seller—Wood Company	
Accounts Payable (-L)	100	Delivery Expense (-SE)	100
		Accounts Receivable (-A)	
Cash (-A)	100		100

Purchase discounts may be taken only on the purchase price of goods. Therefore, a buyer who owes the seller for freight charges cannot take a discount on the freight charges owed, even if the buyer makes payment within the discount period. We summarize our discussion of freight terms and the resulting journal entries to record the freight charges in Exhibit 1.

**Merchandise inventory** is the cost of goods on hand and available for sale at any given time. To determine the cost of goods sold in any accounting period, management needs inventory information. Management must know its cost of goods on hand at the start of the period (beginning inventory), the net cost of purchases during the period, and the cost of goods on hand at the close of the period (ending inventory). Since the ending inventory of the preceding period is the beginning inventory for the current period, management already knows the cost of the beginning inventory. Companies record purchases, purchase discounts, purchase returns and allowances, and transportation-in throughout the period. Therefore, management needs to determine only the cost of the ending inventory at the end of the period in order to calculate cost of goods sold.

**Taking a physical inventory** Under periodic inventory procedure, company personnel determine ending inventory cost by taking a **physical inventory**. Taking a physical inventory consists of counting physical units of

each type of merchandise on hand. To calculate inventory cost, they multiply the number of each kind of merchandise by its unit cost. Then, they combine the total costs of the various kinds of merchandise to provide the total ending inventory cost.

In taking a physical inventory, company personnel must be careful to count all goods owned, regardless of where they are located, and include them in the inventory.

Shipping point: Detroit-  
**Goods travel from shipping point to destination**  
**If shipping terms are:**

Destination: San Diego

FOB shipping point—Buyer incurs the freight charges  
 Freight prepaid—Seller initially pays the freight charges  
**If the freight terms are combined as follows:**

FOB destination—Seller incurs the freight charge  
 Freight collect—Buyer initially pays the freight charges

Terms	Party that	
	Initially Pays	Ultimately Bears Expense
(1) FOB shipping point, freight collect	Buyer	Buyer
(2) FOB destination, freight prepaid	Seller	Seller
(3) FOB shipping point, freight prepaid	Seller	Buyer
(4) FOB destination, freight collect	Buyer	Seller

### Exhibit 1: Summary of shipping terms

**Explanations:**

*FOB shipping point, freight collect* – Buyer both incurs and initially pays the freight charges. The proper party (buyer) paid the freight. The buyer debits Transportation-In and credits Cash.

*FOB destination, freight prepaid* – Seller both incurs and initially pays the freight charges. The proper party (seller) paid the freight. The seller debits Delivery Expense and credits Cash.

*FOB shipping point, freight prepaid* – Buyer incurs the freight charges, and seller initially pays the freight charges. Buyer must reimburse seller for freight charges. The buyer debits Accounts Receivable and credits Cash upon paying the freight. The buyer debits Transportation-In and credits Accounts Payable when informed of the freight charges.

*FOB destination, freight collect* – Seller incurs freight charges, and buyer initially pays freight charges. Buyer deducts freight charges from amount owed to seller. The buyer debits Accounts Payable and credits Cash when paying the freight. The seller debits Delivery Expense and credits Accounts Receivable when informed of the freight charges.

Thus, companies should include goods shipped to potential customers on approval in their inventories. Similarly, companies should not record **consigned goods** (goods delivered to another party who attempts to sell them for a commission) as sold goods. These goods remain the property of the owner (consignor) until sold by the consignee and must be included in the owner's inventory.

**Merchandise in transit** is merchandise in the hands of a freight company on the date of a physical inventory. As stated above, buyers must record merchandise in transit at the end of the accounting period as a purchase if the goods were shipped FOB shipping point and they have received title to the merchandise. In general, the goods belong to the party who ultimately bears the transportation charges.

When accounting personnel know the beginning and ending inventories and the various items making up the net cost of purchases, they can determine the cost of goods sold. To illustrate, assume the following account balances for Hanlon Retail Food Store as of 2010 December 31:

Merchandise Inventory, 2010 January 1	\$ 24,000	Dr.
Purchases	167,000	Dr.
Purchase Discounts	3,000	Cr.
Purchase Returns and Allowances	8,000	Cr.
Transportation-In	10,000	Dr.

By taking a physical inventory, Hanlon determined the 2010 December 31, merchandise inventory to be USD 31,000. Hanlon then calculated its cost of goods sold as shown in Exhibit 2. This computation appears in a section of the income statement directly below the calculation of net sales.

Cost of goods sold:			
Merchandise inventory, 2010 January 1			\$ 24,000
Purchases		\$167,000	
Less: Purchase discounts	\$3,000		
Purchase returns and allowances	8,000	11,000	
Net Purchases		\$156,000	
Add: Transportation-in		10,000	
Net cost of purchases			166,000
Cost of goods available for sale			\$190,000
Less: Merchandise inventory, 2010 December 31			31,000
Cost of goods sold			\$159,000

This illustration is the same as Exhibit 7, repeated here for your convenience.

**Exhibit 2: Determination of cost of goods sold for Hanlon Retain Food Store\***

In Exhibit 2, Hanlon's beginning inventory (USD 24,000) plus net cost of purchases (USD 166,000) is equal to **cost of goods available for sale** (USD 190,000). The firm deducts the ending inventory cost (USD 31,000) from cost of goods available for sale to arrive at cost of goods sold (USD 159,000).

Another way of looking at this relationship is the following diagram:



Beginning inventory and net cost of purchases combine to form cost of goods available for sale. Hanlon divides the cost of goods available for sale into ending inventory (which is the cost of goods not sold) and cost of goods sold.

To continue the calculation appearing in Exhibit 2, net cost of purchases (USD 166,000) is equal to purchases (USD 167,000), less purchase discounts (USD 3,000) and purchase returns and allowances (USD 8,000), plus transportation-in (USD 10,000).

As shown in Exhibit 2, ending inventory cost (merchandise inventory) appears in the income statement as a deduction from cost of goods available for sale to compute cost of goods sold. Ending inventory cost (merchandise inventory) is also a current asset in the end-of-period balance sheet.

Companies use periodic inventory procedure because of its simplicity and relatively low cost. However, periodic inventory procedure provides little control over inventory. Firms assume any items not included in the physical count of inventory at the end of the period have been sold. Thus, they mistakenly assume items that have been stolen have been sold and include their cost in cost of goods sold.

To illustrate, suppose that the cost of goods available for sale was USD 200,000 and ending inventory was USD 60,000. These figures suggest that the cost of goods sold was USD 140,000. Now suppose that USD 2,000 of goods

were actually shoplifted during the year. If such goods had not been stolen, the ending inventory would have been USD 62,000 and the cost of goods sold only USD 138,000. Thus, the USD 140,000 cost of goods sold calculated under periodic inventory procedure includes both the cost of the merchandise delivered to customers and the cost of merchandise stolen.

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### An accounting perspective:

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#### Uses of technology

Many companies are building private networks to link their employees, customers, and suppliers together. These networks within the Internet are referred to as companies' intranets. The Internet can be likened to the entire universe, while an intranet can be likened to a solar system within the universe. A company's intranet is built to be secure from outside users. For instance, these networks are designed to be secure against "hackers" and other unauthorized persons. The intranet software typically encrypts data sent over the Internet to safeguard financial transactions.

#### Choosing an accounting career

This chapter discusses how companies have a choice in inventory cost methods between specific identification, FIFO, LIFO, and weighted-average. Similarly, one of the greatest benefits of obtaining an accounting degree is the broad range of career choices available. There are over 40 different types of accounting jobs available in public accounting, private industry, and governmental accounting. For example, check out the list of accounting jobs at: [http://www.uncwil.edu/stuaff/career/Majors/accounting.htm#related\\_careertitles](http://www.uncwil.edu/stuaff/career/Majors/accounting.htm#related_careertitles).

One of the primary reasons many students go into accounting is successful job placement. Accounting majors have been better able to find positions than majors in any of the other business options, with the possible exception of management information systems (MIS). Even the relative demand for MIS majors has diminished recently, while the demand for accounting majors remains strong. We are currently experiencing a shortage of accounting majors across the nation. Another important factor to keep in mind regarding job placement is where you would like to be three to five years from now. Accounting offers an excellent foundation with opportunities for advancement, whereby many accounting graduates make double their entry-level salary in only five years.

Many students pursue an accounting degree because it does not restrict their career opportunities as much as having a different business degree. For example, with an accounting degree, a student can apply for positions in management, marketing, and finance, as well as accounting. In fact, many recruiters in business favor accounting graduates because they recognize an accounting degree as a more difficult business degree to obtain. However, management, marketing, and finance students cannot apply for accounting positions because they lack necessary accounting coursework. In fact, with some additional courses in systems, an accounting major is well equipped to pursue a career in any business field including information systems.

Have you ever taken advantage of a pre-inventory sale at your favorite retail store? Many stores offer bargain prices to reduce the merchandise on hand and to minimize the time and expense of taking the inventory. A smaller inventory also enhances the probability of taking an accurate inventory since the store has less merchandise to

count. From Chapter 6 you know that companies use inventory amounts to determine the cost of goods sold; this major expense affects a merchandising company's net income. In this chapter, you learn how important inventories are in preparing an accurate income statement, statement of retained earnings, and balance sheet.

This chapter discusses merchandise inventory carried by merchandising retailers and wholesalers. **Merchandise inventory** is the quantity of goods held by a merchandising company for resale to customers. Merchandising companies determine the quantity of inventory items by a physical count.

The merchandise inventory figure used by accountants depends on the quantity of inventory items and the cost of the items. This chapter discusses four accepted methods of costing the items: (1) specific identification; (2) first-in, first-out (FIFO); (3) last-in, first-out (LIFO); and (4) weighted-average. Each method has advantages and disadvantages.

This chapter stresses the importance of having accurate inventory figures and the serious consequences of using inaccurate inventory figures. When you finish this chapter, you should understand how taking inventory connects with the cost of goods sold figure on the store's income statement, the retained earnings amount on the statement of retained earnings, and both the inventory figure and the retained earnings amount on the store's balance sheet.

### **Inventories and cost of goods sold**

Inventory is often the largest and most important asset owned by a merchandising business. The inventory of some companies, like car dealerships or jewelry stores, may cost several times more than any other asset the company owns. As an asset, the inventory figure has a direct impact on reporting the solvency of the company in the balance sheet. As a factor in determining cost of goods sold, the inventory figure has a direct impact on the profitability of the company's operations as reported in the income statement. Thus, the importance of the inventory figure should not be underestimated.

### **Importance of proper inventory valuation**

A merchandising company can prepare accurate income statements, statements of retained earnings, and balance sheets only if its inventory is correctly valued. On the income statement, a company using periodic inventory procedure takes a physical inventory to determine the cost of goods sold. Since the cost of goods sold figure affects the company's net income, it also affects the balance of retained earnings on the statement of retained earnings. On the balance sheet, incorrect inventory amounts affect both the reported ending inventory and retained earnings. Inventories appear on the balance sheet under the heading "Current Assets", which reports current assets in a descending order of liquidity. Because inventories are consumed or converted into cash within a year or one operating cycle, whichever is longer, inventories usually follow cash and receivables on the balance sheet.

Recall that under periodic inventory procedure we determine the cost of goods sold figure by adding the beginning inventory to the net cost of purchases and deducting the ending inventory. In each accounting period, the appropriate expenses must be matched with the revenues of that period to determine the net income. Applied to inventory, matching involves determining (1) how much of the cost of goods available for sale during the period should be deducted from current revenues and (2) how much should be allocated to goods on hand and thus carried forward as an asset (merchandise inventory) in the balance sheet to be matched against future revenues. Because we determine the cost of goods sold by deducting the ending inventory from the cost of goods available for sale, a highly significant relationship exists: Net income for an accounting period depends directly on the valuation of ending inventory. This relationship involves three items:

First, a merchandising company must be sure that it has properly valued its ending inventory. If the ending inventory is overstated, cost of goods sold is understated, resulting in an overstatement of gross margin and net income. Also, overstatement of ending inventory causes current assets, total assets, and retained earnings to be overstated. Thus, any change in the calculation of ending inventory is reflected, dollar for dollar (ignoring any income tax effects), in net income, current assets, total assets, and retained earnings.

Second, when a company misstates its ending inventory in the current year, the company carries forward that misstatement into the next year. This misstatement occurs because the ending inventory amount of the current year is the beginning inventory amount for the next year.

Third, an error in one period's ending inventory automatically causes an error in net income in the opposite direction in the next period. After two years, however, the error washes out, and assets and retained earnings are properly stated.

Exhibit 3 and Exhibit 4 prove that net income for an accounting period depends directly on the valuation of the inventory. Allen Company's income statements and the statements of retained earnings for years 2009 and 2010 show this relationship.

**ALLEN COMPANY**

	<b>For Year Ended 2009 December 31</b>	
	<b>Ending Inventory Correctly Stated</b>	<b>Ending Inventory Overstated By \$5,000</b>
<b>Income Statement</b>		
Sales	\$400,000	\$400,000
Cost of goods available for sale	\$300,000	\$300,000
Ending inventory	35,000	40,000
Cost of goods sold	265,000	260,000
Gross margin	\$135,000	\$140,000
Other expenses	\$85,000	85,000
Net income	\$ 50,000	\$55,000
<b>Statement of Retained Earnings</b>		
Beginning retained earnings	\$120,000	\$120,000
Net income	50,000	55,000
Ending retained earnings	\$170,000	\$175,000

Exhibit 3: Effects of an overstated ending inventory

**ALLEN COMPANY**

	<b>For Year Ended 2010 December 31</b>	
	<b>Beginning Inventory Correctly Stated</b>	<b>Beginning Inventory Overstated By \$5,000</b>
<b>Income Statement</b>		
Sales	\$425,000	\$425,000
Beginning inventory	\$ 35,000	\$40,000
Purchases	290,000	290,000
Cost of goods available for sale	\$325,000	\$330,000
Ending inventory	45,000	45,000
Cost of goods sold	280,000	285,000
Gross margin	\$145,000	\$140,000
Other expenses	53,500	53,500
Net income	\$ 91,500	\$ 86,500
<b>Statement of Retained Earnings</b>		
Beginning retained earnings	\$170,000	\$175,000
Net income	91,500	86,500
Ending retained earnings	\$261,500	\$261,500

Exhibit 4: Effects of an overstated beginning inventory

In Exhibit 3 the correctly stated ending inventory for the year 2009 is USD 35,000. As a result, Allen has a gross margin of USD 135,000 and net income of USD 50,000. The statement of retained earnings shows a beginning retained earnings of USD 120,000 and an ending retained earnings of USD 170,000. When the ending inventory is

overstated by USD 5,000, as shown on the right in Exhibit 3, the gross margin is USD 140,000, and net income is USD 55,000. The statement of retained earnings then has an ending retained earnings of USD 175,000. The ending inventory overstatement of USD 5,000 causes a USD 5,000 overstatement of net income and a USD 5,000 overstatement of retained earnings. The balance sheet would show both an overstated inventory and an overstated retained earnings. Due to the error in ending inventory, both the stockholders and creditors may overestimate the profitability of the business.

Exhibit 4 is a continuation of Exhibit 3 and contains Allen's operating results for the year ended 2010 December 31. Note that the ending inventory in Exhibit 3 now becomes the beginning inventory of Exhibit 4. However, Allen's inventory at 2010 December 31, is now an accurate inventory of USD 45,000. As a result, the gross margin in the income statement with the beginning inventory correctly stated is USD 145,000, and Allen Company has net income of USD 91,500 and an ending retained earnings of USD 261,500. In the income statement columns at the right, in which the beginning inventory is overstated by USD 5,000, the gross margin is USD 140,000 and net income is USD 86,500, with the ending retained earnings also at USD 261,500.

Thus, in contrast to an overstated ending inventory, resulting in an overstatement of net income, an overstated beginning inventory results in an understatement of net income. If the beginning inventory is overstated, then cost of goods available for sale and cost of goods sold also are overstated. Consequently, gross margin and net income are understated. Note, however, that when net income in the second year is closed to retained earnings, the retained earnings account is stated at its proper amount. The overstatement of net income in the first year is offset by the understatement of net income in the second year. For the two years combined the net income is correct. At the end of the second year, the balance sheet contains the correct amounts for both inventory and retained earnings. Exhibit 5 summarizes the effects of errors of inventory valuation:

	Ending Inventory		Beginning Inventory	
	Understated	Overstated	Understated	Overstated
Cost of good sold	Overstated	Understated	Understated	Overstated
Net income	Understated	Overstated	Overstated	Understated

Exhibit 5: Inventory errors

## Determining inventory cost

To place the proper valuation on inventory, a business must answer the question: Which costs should be included in inventory cost? Then, when the business purchases identical goods at different costs, it must answer the question: Which cost should be assigned to the items sold? In this section, you learn how accountants answer these questions.

The costs included in inventory depend on two variables: quantity and price. To arrive at a current inventory figure, companies must begin with an accurate physical count of inventory items. They multiply the quantity of inventory by the unit cost to compute the cost of ending inventory. This section discusses the taking of a physical inventory and the methods of costing the physical inventory under both perpetual and periodic inventory procedures. The remainder of the chapter discusses departures from the cost basis of inventory measurement.

As briefly described in an earlier Chapter, to take a physical inventory, a company must count, weigh, measure, or estimate the physical quantities of the goods on hand. For example, a clothing store may count its suits; a hardware store may weigh bolts, washers, and nails; a gasoline company may measure gasoline in storage tanks;

and a lumberyard may estimate quantities of lumber, coal, or other bulky materials. Throughout the taking of a physical inventory, the goal should be accuracy.

Taking a physical inventory may disrupt the normal operations of a business. Thus, the count should be administered as quickly and as efficiently as possible. The actual taking of the inventory is not an accounting function; however, accountants often plan and coordinate the count. Proper forms are required to record accurate counts and determine totals. Identification names or symbols must be chosen, and those persons who count, weigh, or measure the inventory items must know these symbols.

<b>Inventory Tag</b>	
<b>JMA Corp.</b>	
Inventory Tag No. 281	Date
Description	
Location	
Quantity Counted	
Counted by	
Checked by	
<b>Duplicate Inventory Tag</b>	
Inventory Tag No. 281	Date
Description	
Location	
Quantity Counted	
Counted by	
Checked by	

Exhibit 6: Inventory tag

Taking a physical inventory often involves using inventory tags, such as that in Exhibit 6. These tags are consecutively numbered for control purposes. A tag usually consists of a stub and a detachable duplicate section. The duplicate section facilitates checking discrepancies. The format of the tags can vary. However, the tag usually provides space for (1) a detailed description and identification of inventory items by product, class, and model; (2) location of items; (3) quantity of items on hand; and (4) initials of the counters and checkers.

The descriptive information and count may be entered on one copy of the tag by one team of counters. Another team of counters may record its count on the duplicate copy of the tag. Discrepancies between counts of the same items by different teams are reconciled by supervisors, and the correct counts are assembled on intermediate inventory sheets. Only when the inventory counts are completed and checked does management send the final sheets to the accounting department for pricing and extensions (quantity X price). The tabulated result is the dollar amount of the physical inventory. Later in the chapter we explain the different methods accountants use to cost inventory.

Usually, inventory cost includes all the necessary outlays to obtain the goods, get the goods ready to sell, and have the goods in the desired location for sale to customers. Thus, inventory cost includes:

- Seller's invoice price less any purchase discount.
- Cost of the buyer's insurance to cover the goods while in transit.

- Transportation charges when borne by the buyer.
- Handling costs, such as the cost of pressing clothes wrinkled during shipment.

In theory, the cost of each unit of inventory should include its net invoice price plus its share of other costs incurred in shipment. The 1986 Tax Reform Act requires companies to assign these costs to inventory for tax purposes. For accounting purposes, these cost assignments are recommended but not required.

Practical difficulties arise in allocating some of these costs to inventory items. Assume, for example, that the freight bill on a shipment of clothes does not separate out the cost of shipping one shirt. Also, assume that the company wants to include the freight cost as part of the inventory cost of the shirt. Then, the freight cost would have to be allocated to each unit because it cannot be measured directly. In practice, allocations of freight, insurance, and handling costs to the individual units of inventory purchased are often not worth the additional cost. Consequently, in the past many companies have not assigned the costs of freight, insurance, and handling to inventory. Instead, they have expensed these costs as incurred. When companies omit these costs from both beginning and ending inventories, they minimize the effect of expensing these costs on net income. The required allocation for tax purposes has probably resulted in many companies using the same inventory amounts in their financial statements.

Even if a company derives a cost for each unit in inventory, the inventory valuation problem is not solved. Management must consider two other aspects of the problem:

- If goods were purchased at varying unit costs, how should the cost of goods available for sale be allocated between the units sold and those that remain in inventory? For example, assume Hi-Fi Buys, Inc., purchased two identical DVD players for resale. One cost USD 250 and the other, USD 200. If one was sold during the period, should Hi-Fi Buys assign it a cost of USD 250, USD 200, or an average cost of USD 225?
- Does the fact that current replacement costs are less than the costs of some units in inventory have any bearing on the amount at which inventory should be carried? Using the same example, if Hi-Fi Buys can currently buy all DVD players for USD 200, is it reasonable to carry some units in inventory at USD 250 rather than USD 200?

We answer these questions in the next section.

Generally companies should account for inventories at historical cost; that is, the cost at which the items were purchased. However, this rule does not indicate how to assign costs to ending inventory and to cost of goods sold when the goods have been purchased at different unit costs. For example, suppose a retailer has three shirts on hand. One costs USD 20; another, USD 22; and a third, USD 24. If the retailer sells two shirts for USD 30 each, what is the cost of the two shirts sold?

Accountants developed these four inventory costing methods to solve costing problems: (1) specific identification; (2) first-in, first-out (FIFO); (3) last-in, first-out (LIFO); and (4) weighted-average. Before explaining the inventory costing methods, we briefly introduce perpetual inventory procedure and compare periodic and perpetual inventory procedures.

Under periodic inventory procedure, firms debit the Purchases account when goods are acquired; they use other accounts, such as Purchase Discounts, Purchase Returns and Allowances, and Transportation-In, for purchase-related transactions. Companies determine cost of goods sold only at the end of the period as the difference between cost of goods available for sale and ending inventory. They keep no records of the cost of items as they are

sold, and have no information on possible inventory shortages. They assume any goods not in ending inventory have been sold.

Item	TV-96874	Maximum	26
Location		Minimum	6

2008 Date	Purchased			Sold			Balance		
	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost
Beg. inv.							8	\$300	\$2,400
July 5	10	\$300	\$3,000				18	300	5,400
7				12	\$300	\$3,600	6	300	1,800
12	10	315	3,150				6	300	1,800
22				6	300	1,800	10	315	3,150
				2	315	630			
24	8	320	2,560				8	315	2,520
								315	2,520
							8	320	2,560

Exhibit 7: Perpetual inventory record (FIFO method)

The availability of inventory management software packages is causing more and more businesses to change from periodic to perpetual inventory procedure. Under perpetual inventory procedure, companies have no Purchases and purchase-related accounts. Instead, they make all entries involving merchandise purchased for sale to customers directly in the Merchandise Inventory account. Thus, they debit or credit Merchandise Inventory in place of debiting or crediting Purchases, Purchase Discounts, Purchase Returns and Allowances, and Transportation-In. At the time of each sale, firms make two entries: the first debits Accounts Receivable or Cash and credits Sales at the retail selling price. The second debits Cost of Goods Sold and credits Merchandise Inventory at cost. Therefore, at the end of the period the Merchandise Inventory account shows the cost of the inventory that should be on hand. Comparison of this amount with the cost obtained by taking and pricing a physical inventory may reveal inventory shortages. Thus, perpetual inventory procedure is an important element in providing internal control over goods in inventory.

**Perpetual inventory records** Even though companies could apply perpetual inventory procedure manually, tracking units and dollars in and out of inventory is much easier using a computer. Both manual and computer processing maintain a record for each item in inventory. Look at Exhibit 7, an inventory record for Entertainment World, a firm that sells many different brands of television sets. This inventory record shows the information on one particular brand and model of television set carried in inventory. Other information on the record includes (1) the maximum and minimum number of units the company wishes to stock at any time, (2) when and how many units were acquired and at what cost, and (3) when and how many units were sold and what cost was assigned to cost of goods sold. The number of units on hand and their cost are readily available also. Entertainment World assumes that the first units acquired are the first units sold. This assumption is the first-in, first-out (FIFO) method of inventory costing; we will discuss it later.

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## An accounting perspective:

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### Uses of technology

Keeping track of inventories under a perpetual inventory system is much more cost-effective with computers. Under a manual system, the cost of an up-to-date inventory for stores with high turnover would outweigh the benefit. Most retail stores use scanning devices to read the inventory numbers of products purchased at the cash register. These bar codes not only provide accurate sales prices but also record the merchandise sold so that the total cost of the store's inventory is up to date.

The following comparison reveals several differences between accounting for inventories under periodic and perpetual procedures. We explain these differences by using data from Exhibit 7 and making additional assumptions. Later, we discuss other journal entries under perpetual inventory procedure.

These entries record the purchase on July 5 under each of the methods:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Purchases (+A)	3,000	Merchandise Inventory (+A)	3,000
Accounts Payable (+L)	3,000	Accounts Payable (+L)	3,000

Assuming the merchandise sold on July 7 was priced at USD 4,800, these entries record the sale:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Receivable (+A)	4,800	Accounts Receivable (+A)	4,800
Sales (+SE)	4,800	Sales (+SE)	4,800
		Cost of Goods Sold (-SE)	3,600
		Merchandise Inventory(-A)	3,600

Several other transactions not included in Exhibit 7 could occur:

- Assume that two of the units purchased on July 5 were returned to the supplier because they were defective. The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Payable	600	Accounts Payable	600
Purchase Returns and Allowances	600	Merchandise Inventory	600

- Assume that the supplier instead granted an allowance of USD 600 to the company because of the defective merchandise. The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Accounts Payable (-L)	600	Accounts Payable (-L)	600
Purchase Returns and Allowances (-A)	600	Merchandise Inventory (-A)	600

- Assume that the company incurred and paid freight charges of USD 100 on the purchase of July 5. The entries would be:

<b>Periodic Procedure</b>		<b>Perpetual Procedure</b>	
Transportation-In (+A)	100	Merchandise Inventory (+A)	100
Cash (-A)	100	Cash (-A)	100

In these entries, notice that under perpetual inventory procedure the Merchandise Inventory account records purchases, purchase returns and allowances, purchase discounts, and transportation-in. Also, when goods are sold, the seller debits (increases) Cost of Goods Sold and credits or reduces Merchandise Inventory.

At the end of the accounting period, under perpetual inventory procedure, the only merchandise-related expense account to be closed is Cost of Goods Sold. The Purchases, Purchase Returns and Allowances, Purchase Discounts, and Transportation-In accounts do not even exist.

Beginning Inventory and Purchases				Sales			
Date	Units	Unit Cost	Total Cost	Date	Units	Price	Total
Beginning inventory	10	\$8.00	\$ 80	March 10	10	\$12.00	\$120
March 2	10	8.50	85	July 14	20	12.00	240
May 28	20	8.40	168	September 7	10	14.00	140
August 12	10	9.00	90	November 22	20	14.00	280
October 12	20	8.80	176				
December 21	10	9.10	91				
	<u>80</u>		<u>\$690</u>		<u>60</u>		<u>\$780</u>

Ending inventory = 20 units, determined By taking a physical inventory.

Exhibit 8: Beginning inventory, purchases and sales

### An accounting perspective:

#### Business insight

When you buy a box of breakfast cereal at the supermarket, the cashier scans the bar code on the box. The name of the item and the price appear on a video display that you can see. The information is also printed on the sales slip so that you can later compare the items paid for with the items received. But this is not the end of the story. The information is also fed to the store's computer to update the inventory records. The information is included with other information and is used to order more merchandise from the warehouse so the items can be replenished in the store. At a certain point, the company also uses the reduced inventory levels to order more merchandise from suppliers, such as wholesalers that supply the region with breakfast cereals and other goods. The paperwork for the purchase and payment are often handled electronically through a process called electronic data interchange (EDI) and electronic funds transfer (EFT).

Using the data for purchases, sales, and beginning inventory in Exhibit 8, next we explain the four inventory costing methods. Except for the specific identification method, we first present all of the methods using periodic inventory procedure and then present all of the methods using perpetual inventory procedure. Total goods available for sale consist of 80 units with a total cost of USD 690. A physical inventory determined that 20 units are on hand at the end of the period. Sales revenue for the 60 units sold was USD 780. The questions to be answered are: What is the cost of the 20 units in inventory? What is the cost of the 60 units sold?

**Specific identification** The **specific identification method** of inventory costing attaches the actual cost to an identifiable unit of product. Firms find this method easy to apply when purchasing and selling large inventory items such as autos. Under the specific identification method, the firm must identify each unit in inventory, unless it is unique, with a serial number or identification tag.

To illustrate, assume that the company in Exhibit 8 can identify the 20 units on hand at year-end as 10 units from the August 12 purchase and 10 units from the December 21 purchase. The company computes the ending inventory as shown in Exhibit 9; it subtracts the USD 181 ending inventory cost from the USD 690 cost of goods

available for sale to obtain the USD 509 cost of goods sold. Note that you can also determine the cost of goods sold for the year by recording the cost of each unit sold. The USD 509 cost of goods sold is an expense on the income statement, and the USD 181 ending inventory is a current asset on the balance sheet.

The specific identification costing method attaches cost to an identifiable unit of inventory. The method does not involve any assumptions about the flow of the costs as in the other inventory costing methods. Conceptually, the method matches the cost to the physical flow of the inventory and eliminates the emphasis on the timing of the cost determination. Therefore, periodic and perpetual inventory procedures produce the same results for the specific identification method.

	Units	Unit Cost	Total Cost
Ending inventory composed of purchases made on:			
August 12	10	\$ 9.00	\$ 90
December 21	10	9.10	91
Ending inventory	20		\$181
Cost of goods sold composed of:			
Beginning inventory	10	8.00	\$ 80
Purchases made on:			
March 2	10	8.50	85
May 28	20	8.40	168
October 12	20	8.80	176
			\$509
Cost of goods available for sale			\$690
Ending inventory			181
Cost of goods sold			\$509

#### Exhibit 9: Determining ending inventory under specific identification

**FIFO (first-in, first-out) under periodic inventory procedure** The **FIFO (first-in, first-out)** method of inventory costing assumes that the costs of the first goods purchased are those charged to cost of goods sold when the company actually sells goods. This method assumes the first goods purchased are the first goods sold. In some companies, the first units in (bought) must be the first units out (sold) to avoid large losses from spoilage. Such items as fresh dairy products, fruits, and vegetables should be sold on a FIFO basis. In these cases, an assumed first-in, first-out flow corresponds with the actual physical flow of goods.

Because a company using FIFO assumes the older units are sold first and the newer units are still on hand, the ending inventory consists of the most recent purchases. When using periodic inventory procedure, to determine the cost of the ending inventory at the end of the period under FIFO, you would begin by listing the cost of the most recent purchase. If the ending inventory contains more units than acquired in the most recent purchase, it also includes units from the next-to-the-latest purchase at the unit cost incurred, and so on. You would list these units from the latest purchases until that number agrees with the units in the ending inventory.

In Exhibit 10, you can see how to determine the cost of ending inventory under FIFO using periodic inventory procedure. The company assumes that the 20 units in inventory consist of 10 units purchased December 21 and 10 units purchased October 12. The total cost of ending inventory is USD 179, and the cost of goods sold is USD 511.

We show the relationship between the cost of goods sold and the cost of ending inventory under FIFO using periodic inventory procedure in Exhibit 11. The 80 units in cost of goods available for sale consists of the beginning inventory and all of the purchases during the period. Under FIFO, the ending inventory of 20 units consists of the most recent purchases—10 units of the December 21 purchase and 10 units of the October 12 purchase—costing USD 179. We assume the beginning inventory and other earlier purchases have been sold during the period, representing the cost of goods sold of USD 511.

	Units	Unit Cost	Total Cost	
Ending inventory composed of purchases made on:				
December 21	10	\$9.10	\$ 91	
October 12	10	8.80	88	
Ending inventory	20		\$179	
Cost of goods sold composed of:				
Beginning inventory	10	8.00	\$ 80	
Purchases made on:				
March 2	10	8.50	85	
May 28	20	8.40	168	
August 12	10	9.00	90	
October 12	10	8.80	88	
			\$511	
Cost of goods available for sale				\$690
Ending inventory				179
Cost of goods sold				\$511

Exhibit 10: Determining FIFO cost of ending inventory under periodic inventory procedure

Illustration 7.9 FIFO Flow of Costs

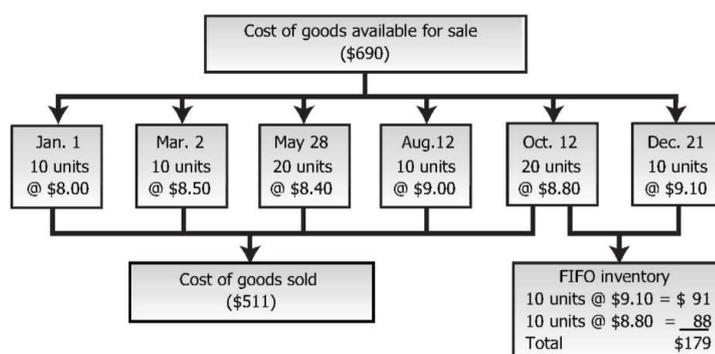


Exhibit 11: FIFO flow of costs

**LIFO (last-in, first-out) under periodic inventory procedure** The **LIFO (last-in, first-out)** method of inventory costing assumes that the costs of the most recent purchases are the first costs charged to cost of goods sold when the company actually sells the goods.

In Exhibit 12, we show the use of LIFO under periodic inventory procedure. Since the company charges the latest costs to cost of goods sold under periodic inventory procedure, the ending inventory always consists of the oldest costs. Therefore, when determining the cost of inventory under periodic inventory procedure, the company lists the oldest units and their costs. The first units listed are those in beginning inventory, then the first purchase, and so on, until the number listed agrees with the units in ending inventory. Thus, ending inventory in Exhibit 12 consists of the 10 units from beginning inventory and the 10 units purchased on March 2. The total cost of these 20 units, USD 165, is the ending inventory cost; the cost of goods sold is USD 525. Exhibit 13 is a graphic representation of the LIFO flow of costs under periodic inventory procedure.

	Units	Unit Cost	Total Cost
Ending inventory composed of:			
Beginning inventory	10	\$8.00	\$ 80
March 2 purchase	10	8.50	85
Ending inventory	20		\$165
Cost of goods sold composed of purchases made on:			
December 21	10	9.10	\$ 91
October 12	20	8.80	176
August 12	10	9.00	90
May 28	20	8.40	168
			\$525
Cost of goods available for sale			\$690
Ending inventory			165
Cost of goods sold			\$525

Exhibit 12: Determining LIFO cost of ending inventory under periodic inventory procedure

Illustration 7.11 LIFO Flow of Costs under Periodic Inventory Procedure

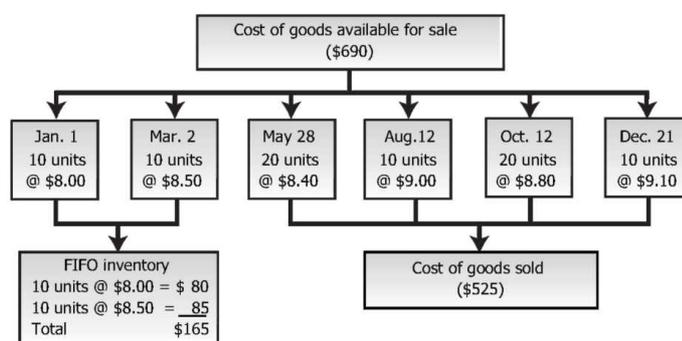


Exhibit 13: LIFO flow of costs under periodic inventory procedure

**Weighted-average under periodic inventory procedure** The **weighted-average method** of inventory costing is a means of costing ending inventory using a weighted-average unit cost. Companies most often use the weighted-average method to determine a cost for units that are basically the same, such as identical games in a toy store or identical electrical tools in a hardware store. Since the units are alike, firms can assign the same unit cost to them.

Under periodic inventory procedure, a company determines the average cost at the end of the accounting period by dividing the total units purchased plus those in beginning inventory into total cost of goods available for sale. The ending inventory is carried at this per unit cost. To see how a company uses the weighted-average method to determine inventory costs using periodic inventory procedure, look at Exhibit 14. Note that we compute weighted-average cost per unit by dividing the cost of units available for sale, USD 690, by the total number of units available for sale, 80. Thus, the weighted-average cost per unit is USD 8.625, meaning that each unit sold or remaining in inventory is valued at USD 8.625.

	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Beginning inventory	10	\$8.00	\$ 80.00
<b>Purchases</b>			
March 2	10	8.50	85.00
May 28	20	8.40	168.00
August 12	10	9.00	90.00
October 12	20	8.80	176.00
December 21	10	9.10	91.00
Total	80		\$690.00
Weighted-average unit cost is \$690 / 80, or \$8.625			
Ending inventory then is \$8.625 x 20			172.50
Cost of goods sold: \$8.625 x 60			\$517.50

Exhibit 14: Determining ending inventory under weighted-average method using periodic inventory procedure

<b>Date</b>	<b>Purchased</b>		<b>Sold</b>			<b>Balance</b>			
	<b>Units</b>	<b>Unit Cost</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>	
Beg. inv.						10	\$8.00	80	
Mar. 2	10	\$8.50				10(A)	8.00	80	
						10	8.50	85	
Mar. 10			10	\$8.00	(A)\$80	10	8.50	85	
May 28	20	8.40				10(B)	8.50	85	Sales are assumed to be from the oldest units on hand
						20(C)	8.40	168	
July 14			10	8.50	(B)85				
			10	8.40	(C)85	10	8.40	84	
Aug. 12	10	9.00				10(D)	8.40	84	
						10	9.00	90	
Sept. 7			10	8.40	(D)84	10	9.00	90	
Oct. 12	20	8.80				10(E)	9.00	90	
						20(F)	8.80	176	
Nov. 22			10	9.00	(E)90				
			10	8.80	(F)88	10	8.80	88	
Dec 21	10	9.10				10	8.80	88	Total of \$179 would agree with balance already existing in Merchandise Inventory account.
						10	9.10	91	
Total cost of ending inventory =								\$179	

Exhibit 15: Determining FIFO cost of ending inventory under perpetual inventory procedure

**FIFO under perpetual inventory procedure** Under perpetual inventory procedure, the ending balance in the Merchandise Inventory account reflects the most recent purchases as a result of making the required entries during the period. Also, the firm has already recorded the cost of goods sold in the Cost of Goods Sold account. Exhibit 15 shows how to determine the cost of ending inventory under FIFO using perpetual inventory procedure. This illustration uses the same format as the earlier perpetual inventory record in Exhibit 7. The company keeps a record of the balance in the inventory account as it makes purchases and sells items from inventory.

Date	Purchased			Sold			Balance			
	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	Units	Unit Cost	Total Cost	
Beg. inv.								\$8.00	80	
Mar. 2	10	\$8.50	\$85				10	8.00	80	
							10	8.50	85	
Mar. 10				10	\$8.50	85	10	8.00	80	
May 28	20	8.40	168				10	8.00	80	Sales are assumed to be from most recent purchases
							20	8.40	168	
July 14				20	8.40	168	10	8.00	80	
Aug. 12	10	9.00	90				10	8.00	80	
							10	9.00	90	
Sept. 7				10	9.00	90	10	8.00	80	
Oct. 12	20	8.80	176				10	8.00	80	
							20	8.80	176	
Nov. 22				20	8.80	176	10	8.00	80	
Dec. 21	10	9.10	91				10	8.00	80	Total of \$171 would agree with balance already existing in Merchandise Inventory account.
							10	9.10	91	

Total cost of ending inventory = \$171

#### Exhibit 16: Determining LIFO cost of ending inventory under perpetual inventory procedure

Notice in Exhibit 15 that each time a sale occurs, the company assumes the items sold are the oldest on hand. Thus, after each transaction, it can readily determine the balance in the Merchandise Inventory account from the perpetual inventory record. The balance after the December 21 purchase represents the 20 units from the most recent purchases. The total cost of ending inventory is USD 179, which the company reports as a current asset on the balance sheet. During the accounting period, as sales occurred the firm would have debited a total of USD 511 to Cost of Goods Sold. Adding this USD 511 to the ending inventory of USD 179 accounts for the USD 690 cost of goods available for sale. Under FIFO, using either perpetual or periodic inventory procedures results in the same total amounts for ending inventory and for cost of goods sold.

**LIFO under perpetual inventory procedure** Look at Exhibit 16 to see the LIFO method using perpetual inventory procedure. Under this procedure, the inventory composition and balance are updated with each purchase and sale. Notice in Exhibit 16 that each time a sale occurs, the items sold are assumed to be the most recent ones acquired. Despite numerous purchases and sales during the year, the ending inventory still includes the 10 units from beginning inventory in our example. The remainder of the ending inventory consists of the last purchase because no sale occurred after the December 21 purchase. The total cost of the 20 units in ending inventory is USD 171; the cost of goods sold is USD 519. Exhibit 17 shows graphically the LIFO flow of costs under perpetual inventory procedure.

Applying LIFO on a perpetual basis during the accounting period, as shown in Exhibit 16, results in different ending inventory and cost of goods sold figures than applying LIFO only at year-end using periodic inventory procedure. (Compare Exhibit 16 and Exhibit 12 to verify that ending inventory and cost of goods sold are different under the two procedures.) For this reason, if LIFO is applied on a perpetual basis during the period, special

adjustments are sometimes necessary at year-end to take full advantage of using LIFO for tax purposes. Complicated applications of LIFO perpetual inventory procedures that require such adjustments are beyond the scope of this text.

**Illustration 7.15** LIFO Flow of Costs under Perpetual Inventory Procedure

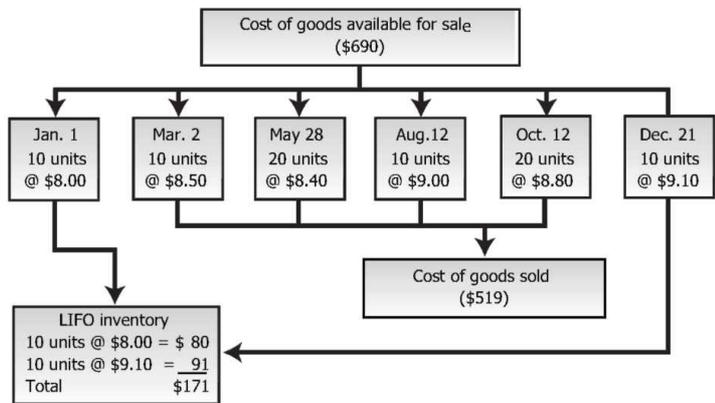


Exhibit 17: LIFO flow of costs under perpetual inventory procedure

Date	Purchased			Units	Sold		Units	Balance	
	Units	Unit Cost	Total Cost		Unit Cost	Total Cost		Unit Cost	Total Cost
Beg. inv.							10	Unit Cost \$8.00	Total Cost 80.00
Mar. 2	10	\$8.50	\$85				20	8.25 <sup>aA</sup>	165.00
Mar. 10				10	\$8.25 <sup>B</sup>	\$82.50	10	8.25	82.80
May 28	20	8.40	168				30	8.35 <sup>b</sup>	250.50
July 14				20	8.35	167.00	10	8.35	83.50
Aug. 12	10	9.00	90				20	8.675 <sup>c</sup>	173.50
Sept. 7				10	8.675	86.75	10	8.675	86.75
Oct. 12	20	8.80	176				30	8.758 <sup>c</sup>	262.75
Nov. 22					8.758	175.17	10	8.758	87.58
Dec 21	10	9.10	91				20	\$8.929 <sup>e</sup>	\$178.58 <sup>C</sup>

<sup>a</sup>\$165.00/20 = \$8.25. <sup>b</sup>\$250.50/30 = \$8.35. <sup>c</sup>\$173.50/20 = \$8.675. <sup>d</sup>\$262.75/30 = \$8.758.  
<sup>e</sup>\$175.58/20 = \$8.929 \* rounding difference.

<sup>A</sup> A new unit cost is calculated after each purchase. <sup>B</sup>The unit cost of sales is the most recently calculated cost. <sup>C</sup> Balance of \$178.58 would agree with balance already existing in the Merchandise Inventory account.

**Exhibit 18: Determining ending inventory under weighted-average method using perpetual inventory procedure**

Look at Exhibit 17 and Exhibit 13, the flow of inventory costs under LIFO using both the perpetual and periodic inventory procedures. Note that ending inventory and cost of goods sold are different under the two procedures.

**Weighted-average under perpetual inventory procedure** Under perpetual inventory procedure, firms compute a new weighted-average unit cost after each purchase by dividing total cost of goods available for sale by total units available for sale. The unit cost is a moving weighted-average because it changes after each purchase. In Exhibit 18, you can see how to compute the moving weighted-average using perpetual inventory procedure. The new weighted-average unit cost computed after each purchase is the unit cost for inventory items sold until a new purchase is made. The unit cost of the 20 units in ending inventory is USD 8.929 for a total inventory cost of USD 178.58. Cost of goods sold under this procedure is USD 690 minus the USD 178.58, or USD 511.42.

**Advantages and disadvantages of specific identification** Companies that use the specific identification method of inventory costing state their cost of goods sold and ending inventory at the actual cost of specific units sold and on hand. Some accountants argue that this method provides the most precise matching of costs and revenues and is, therefore, the most theoretically sound method. This statement is true for some one-of-a-kind items, such as autos or real estate. For these items, use of any other method would seem illogical.

One disadvantage of the specific identification method is that it permits the manipulation of income. For example, assume that a company bought three identical units of a given product at different prices. One unit cost USD 2,000, the second cost USD 2,100, and the third cost USD 2,200. The company sold one unit for USD 2,800. The units are alike, so the customer does not care which of the identical units the company ships. However, the gross margin on the sale could be either USD 800, USD 700, or USD 600, depending on which unit the company ships.

**Advantages and disadvantages of FIFO** The FIFO method has four major advantages: (1) it is easy to apply, (2) the assumed flow of costs corresponds with the normal physical flow of goods, (3) no manipulation of income is possible, and (4) the balance sheet amount for inventory is likely to approximate the current market

value. All the advantages of FIFO occur because when a company sells goods, the first costs it removes from inventory are the oldest unit costs. A company cannot manipulate income by choosing which unit to ship because the cost of a unit sold is not determined by a serial number. Instead, the cost attached to the unit sold is always the oldest cost. Under FIFO, purchases at the end of the period have no effect on cost of goods sold or net income.

The disadvantages of FIFO include (1) the recognition of paper profits and (2) a heavier tax burden if used for tax purposes in periods of inflation. We discuss these disadvantages later as advantages of LIFO.

**Advantages and disadvantages of LIFO** The advantages of the LIFO method are based on the fact that prices have risen almost constantly for decades. LIFO supporters claim this upward trend in prices leads to inventory, or paper, profits if the FIFO method is used. **Inventory, or paper, profits** are equal to the current replacement cost of a unit of inventory at the time of sale minus the unit's historical cost.

For example, assume a company has three units of a product on hand, each purchased at a different cost: USD 12, USD 15, and USD 20 (the most recent cost). The sales price of the unit normally rises because the unit's replacement cost is rising. Assume that the company sells one unit for USD 30. FIFO gross margin would be USD 18 (USD 30 – USD 12), while LIFO would show a gross margin of USD 10 (USD 30 – USD 20). LIFO supporters would say that the extra USD 8 gross margin shown under FIFO represents inventory (paper) profit; it is merely the additional amount that the company must spend over cost of goods sold to purchase another unit of inventory (USD 8 + USD 12 = USD 20). Thus, the profit is not real; it exists only on paper. The company cannot distribute the USD 8 to owners, but must retain it to continue handling that particular product. LIFO shows the actual profits that the company can distribute to the owners while still replenishing inventory.

During periods of inflation, LIFO shows the largest cost of goods sold of any of the costing methods because the newest costs charged to cost of goods sold are also the highest costs. The larger the cost of goods sold, the smaller the net income.

Those who favor LIFO argue that its use leads to a better matching of costs and revenues than the other methods. When a company uses LIFO, the income statement reports both sales revenue and cost of goods sold in current dollars. The resulting gross margin is a better indicator of management's ability to generate income than gross margin computed using FIFO, which may include substantial inventory (paper) profits.

Supporters of FIFO argue that LIFO (1) matches the cost of goods not sold against revenues, (2) grossly understates inventory, and (3) permits income manipulation.

The first criticism—that LIFO matches the cost of goods not sold against revenues—is an extension of the debate over whether the assumed flow of costs should agree with the physical flow of goods. LIFO supporters contend that it makes more sense to match current costs against current revenues than to worry about matching costs for the physical flow of goods.

The second criticism—that LIFO grossly understates inventory—is valid. A company may report LIFO inventory at a fraction of its current replacement cost, especially if the historical costs are from several decades ago. LIFO supporters contend that the increased usefulness of the income statement more than offsets the negative effect of this undervaluation of inventory on the balance sheet.

The third criticism—that LIFO permits income manipulation—is also valid. Income manipulation is possible under LIFO. For example, assume that management wishes to reduce income. The company could purchase an abnormal amount of goods at current high prices near the end of the current period, with the purpose of selling the goods in the next period. Under LIFO, these higher costs are charged to cost of goods sold in the current period,

resulting in a substantial decline in reported net income. To obtain higher income, management could delay making the normal amount of purchases until the next period and thus include some of the older, lower costs in cost of goods sold.

**Tax benefit of LIFO** The LIFO method results in the lowest taxable income, and thus the lowest income taxes, when prices are rising. The Internal Revenue Service allows companies to use LIFO for tax purposes only if they use LIFO for financial reporting purposes. Companies may also report an alternative inventory amount in the notes to their financial statements for comparison purposes. Because of high inflation during the 1970s, many companies switched from FIFO to LIFO for tax advantages.

**Advantages and disadvantages of weighted-average** When a company uses the weighted-average method and prices are rising, its cost of goods sold is less than that obtained under LIFO, but more than that obtained under FIFO. Inventory is not as badly understated as under LIFO, but it is not as up-to-date as under FIFO. Weighted-average costing takes a middle-of-the-road approach. A company can manipulate income under the weighted-average costing method by buying or failing to buy goods near year-end. However, the averaging process reduces the effects of buying or not buying.

The four inventory costing methods, specific identification, FIFO, LIFO, and weighted-average, involve assumptions about how costs flow through a business. In some instances, assumed cost flows may correspond with the actual physical flow of goods. For example, fresh meats and dairy products must flow in a FIFO manner to avoid spoilage losses. In contrast, firms use coal stacked in a pile in a LIFO manner because the newest units purchased are unloaded on top of the pile and sold first. Gasoline held in a tank is a good example of an inventory that has an average physical flow. As the tank is refilled, the new gasoline mixes with the old. Thus, any amount used is a blend of the old gas with the new.

Although physical flows are sometimes cited as support for an inventory method, accountants now recognize that an inventory method's assumed cost flows need not necessarily correspond with the actual physical flow of the goods. In fact, good reasons exist for simply ignoring physical flows and choosing an inventory method based on other criteria.

In Exhibit 19 and Exhibit 20, we use data from Exhibit 8 to show the cost of goods sold, inventory cost, and gross margin for each of the four basic costing methods using perpetual and periodic inventory procedures. The differences for the four methods occur because the company paid different prices for goods purchased. No differences would occur if purchase prices were constant. Since a company's purchase prices are seldom constant, inventory costing method affects cost of goods sold, inventory cost, gross margin, and net income. Therefore, companies must disclose on their financial statements which inventory costing methods were used.

**Which is the correct method?** All four methods of inventory costing are acceptable; no single method is the only correct method. Different methods are attractive under different conditions.

If a company wants to match sales revenue with current cost of goods sold, it would use LIFO. If a company seeks to reduce its income taxes in a period of rising prices, it would also use LIFO. On the other hand, LIFO often charges against revenues the cost of goods not actually sold. Also, LIFO may allow the company to manipulate net income by changing the timing of additional purchases.

The FIFO and specific identification methods result in a more precise matching of historical cost with revenue. However, FIFO can give rise to paper profits, while specific identification can give rise to income manipulation. The

weighted-average method also allows manipulation of income. Only under FIFO is the manipulation of net income not possible.

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### An accounting perspective:

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#### Business insight

Management decides which inventory costing method or methods (LIFO, FIFO, etc.) to use. Also, management must determine which method is the most meaningful and useful in representing economic results. Then, it must use the selected method consistently.

The principal business of Kellwood Company is the marketing, merchandising, and manufacturing of apparel, primarily for women. Note in the following footnote from Kellwood's financial statements that it, like other companies, uses several costing methods within the same enterprise:

Summary of significant accounting policies

#### **3. Inventories and revenue recognition**

*Inventories are stated at the lower of cost or market. The first-in, first-out (FIFO) method is used to determine the value of 46 per cent of the domestic inventories, and the last-in, first-out (LIFO) method is used to value the remaining domestic inventories. Inventories of foreign subsidiaries are valued using the specific identification method. Sales are recognized when goods are shipped.*

Generally, companies use the inventory method that best fits their individual circumstances. However, this freedom of choice does not include changing inventory methods every year or so, especially if the goal is to report higher income. Continuous switching of methods violates the accounting principle of consistency, which requires using the same accounting methods from period to period in preparing financial statements. Consistency of methods in preparing financial statements enables financial statement users to compare statements of a company from period to period and determine trends.

	Specific			Weighted
	Identification	FIFO	LIFO	- Average
Sales	\$780.00	\$780.00	\$780.00	\$780.00
Cost of goods sold:				
Beginning inventory	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Purchases	610.00	610.00	610.00	610.00
Cost of goods available for sale	\$690.00	\$690.00	\$690.00	\$690.00
Ending inventory	181.00	179.00	171.00	178.58
Cost of goods sold	\$509.00	\$511.00	\$519.00	\$511.42
Gross Margin	\$271.00	\$269.00	\$261.00	\$268.58

Exhibit 19: Effects of different inventory costing methods using perpetual inventory procedure

	Specific			Weighted-
	Identification	FIFO	LIFO	Average
Sales	\$780.00	\$780.00	\$780.00	\$780.00
Cost of goods sold:				
Beginning inventory	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Purchases	610.00	610.00	610.00	610.00
Cost of goods available for sale	\$690.00	\$690.00	\$690.00	\$690.00
Ending inventory	181.00	179.00	165.00	172.50
Cost of goods sold	\$509.00	\$511.00	\$525.00	\$517.50
Gross Margin	\$271.00	\$269.00	\$255.00	\$262.50

Exhibit 20: Effects of different inventory costing methods using periodic inventory procedure

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### An accounting perspective:

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#### Business insight

Sometimes, companies change inventory methods in spite of the principle of consistency. Improved financial reporting is the only justification for a change in inventory method. A company that changes its inventory method must make a full disclosure of the change. Usually, the company makes a full disclosure in a footnote to the financial statements. The footnote consists of a complete description of the change, the reasons why the change was made, and, if possible, the effect of the change on net income.

J. M. Tull Industries, Inc., sells a diverse range of metals (aluminum, brass, copper, steel, stainless steel, and nickel alloys) for severe corrosion conditions and high-temperature applications. For example, when J. M. Tull changed from lower of average cost or market to LIFO, the following footnote appeared in its annual report:

**Note B. Change in accounting method for inventory**

*The company changed its method of determining inventory cost from the lower of average cost or market method to the last-in, first-out (LIFO) method for substantially all inventory. This change was made because management believes LIFO more clearly reflects income by providing a closer matching of current cost against current revenue.*

Now we illustrate in more detail the journal entries made when using perpetual inventory procedure. Data from Exhibit 15 serves as the basis for some of the entries.

You would debit the Merchandise Inventory account to record the increases in the asset due to purchase costs and transportation-in costs. You would credit Merchandise Inventory to record the decreases in the asset brought about by purchase returns and allowances, purchase discounts, and cost of goods sold to customers. The balance in

the account is the cost of the inventory that should be on hand at any date. This entry records the purchase of 10 units on March 2 in Exhibit 15:

Mar.	2	Merchandise Inventory (+A)	85	
		Accounts Payable (+L)		85
		To record purchases of 10 units at \$8.50 on account.		

You would also record the 10 units sold on the perpetual inventory record in Exhibit 15. Perpetual inventory procedure requires two journal entries for each sale. One entry is at selling price—a debit to Accounts Receivable (or Cash) and a credit to Sales. The other entry is at cost—a debit to Cost of Goods Sold and a credit to Merchandise Inventory. Assuming that the 10 units sold on March 10 in Exhibit 15 had a retail price of USD 13 each, you would record the following entries:

Mar.	10	Accounts Receivable (+A)	130	
		Sales (+SE)		130
		To record 10 units sold at \$13 each on account.		
	10	Cost of Goods Sold (-SE)	80	
		Merchandise Inventory (-A)		80
		To record cost of \$8 on each of the 10 units sold.		

When a company sells merchandise to customers, it transfers the cost of the merchandise from an asset account (Merchandise Inventory) to an expense account (Cost of Goods Sold). The company makes this transfer because the sale reduces the asset, and the cost of the goods sold is one of the expenses of making the sale. Thus, the Cost of Goods Sold account accumulates the cost of all the merchandise that the company sells during a period.

A sales return also requires two entries, one at selling price and one at cost. Assume that a customer returned merchandise that cost USD 20 and originally sold for USD 32. The entry to reduce the accounts receivable and to record the sales return of USD 32 is:

Mar.	17	Sales Return and Allowances (-SE)	32	
		Accounts Receivable (-A)		32
		To record the reduction in amount owed by a customer upon return of goods.		

The entry that increases the Merchandise Inventory account and decreases the Cost of Goods Sold account by USD 20 is as follows:

Mar.	17	Merchandise Inventory (+A)	20	
		Cost of Goods Sold (+SE)		20
		To record replacement of goods returned to inventory.		

Sales returns affect both revenues and cost of goods sold because the goods charged to cost of goods sold are actually returned to the seller. In contrast, sales allowances granted to customers affect only revenues because the customers do not have to return goods. Thus, if the company had granted a sales allowance of USD 32 on March 17, only the first entry would be required.

The balance of the Merchandise Inventory account is the cost of the inventory that should be on hand. This fact is a major reason some companies choose to use perpetual inventory procedure. The cost of inventory that should be on hand is readily available. A physical inventory determines the accuracy of the account balance. Management may investigate any major discrepancies between the balance in the account and the cost based on the physical count. It thereby achieves greater control over inventory. When a shortage is discovered, an adjusting entry is required. Assuming a USD 15 shortage (at cost) is discovered, the entry is:

Dec.	31	Loss from Inventory Shortage (-SE)	15	
		Merchandise Inventory (-A)		15
		To record inventory shortage		

Assume that the Cost of Goods Sold account had a balance of USD 200,000 by year-end when it is closed to Income Summary. There are no other purchase-related accounts to be closed. The entry to close the Cost of Goods Sold account is:

Dec. 31	Income Summary	200,000	
	Cost of Goods Sold		200,000
	To close Cost of Goods Sold account to Income Summary at the end of the year.		

## Departures from cost basis of inventory measurement

Generally, companies should use historical cost to value inventories and cost of goods sold. However, some circumstances justify departures from historical cost. One of these circumstances is when the utility or value of inventory items is less than their cost. A decline in the selling price of the goods or their replacement cost may indicate such a loss of utility. This section explains how accountants handle some of these departures from the cost basis of inventory measurement.

Companies should not carry goods in inventory at more than their net realizable value. **Net realizable value** is the estimated selling price of an item less the estimated costs that the company incurs in preparing the item for sale and selling it. Damaged, obsolete, or shopworn goods often have a net realizable value lower than their historical cost and must be written down to their net realizable value. However, goods do not have to be damaged, obsolete, or shopworn for this situation to occur. Technological changes and increased competition have caused significant reductions in selling prices for such products as computers, TVs, DVD players, and digital cameras.

To illustrate a necessary write-down in the cost of inventory, assume that an automobile dealer has a demonstrator on hand. The dealer acquired the auto at a cost of USD 18,000. The auto had an original selling price of USD 19,600. Since the dealer used the auto as a demonstrator and the new models are coming in, the auto now has an estimated selling price of only USD 18,100. However, the dealer can get the USD 18,100 only if the demonstrator receives some scheduled maintenance, including a tune-up and some paint damage repairs. This work and the sales commission cost USD 300. The net realizable value of the demonstrator, then, is USD 17,800 (selling price of USD 18,100 less costs of USD 300). For inventory purposes, the required journal entry is:

Loss Due to the Decline in Market Value of Inventory (-SE)	200	
Merchandise Inventory (-A)		200
To write down inventory to net realizable value (\$18,000 - \$17,800)		

This entry treats the USD 200 inventory decline as a loss in the period in which the decline in utility occurred. Such an entry is necessary only when the net realizable value is less than cost. If net realizable value declines but still exceeds cost, the dealer would continue to carry the item at cost.

The **lower-of-cost-or-market (LCM) method** is an inventory costing method that values inventory at the lower of its historical cost or its current market (replacement) cost. The term cost refers to historical cost of inventory as determined under the specific identification, FIFO, LIFO, or weighted-average inventory method. Market generally refers to a merchandise item's replacement cost in the quantity usually purchased. The basic assumption of the LCM method is that if the purchase price of an item has fallen, its selling price also has fallen or will fall. The LCM method has long been accepted in accounting.

Under LCM, inventory items are written down to market value when the market value is less than the cost of the items. For example, assume that the market value of the inventory is USD 39,600 and its cost is USD 40,000. Then, the company would record a USD 400 loss because the inventory has lost some of its revenue-generating ability.

The company must recognize the loss in the period the loss occurred. On the other hand, if ending inventory has a market value of USD 45,000 and a cost of USD 40,000, the company would not recognize this increase in value. To do so would recognize revenue before the time of sale.

**LCM applied** A company may apply LCM to each inventory item (such as Monopoly), each inventory class (such as games), or total inventory. To see how the company would apply the method to individual items and total inventory, look at Exhibit 21.

If LCM is applied on an item-by-item basis, ending inventory would be USD 5,000. The company would deduct the USD 5,000 ending inventory from cost of goods available for sale on the income statement and report this inventory in the current assets section of the balance sheet. Under the class method, a company applies LCM to the total cost and total market for each class of items compared. One class might be games; another might be toys. Then, the company values each class at the lower of its cost or market amount. If LCM is applied on a total inventory basis, ending inventory would be USD 5,100, since total cost of USD 5,100 is lower than total market of USD 5,150.

An annual report of Du Pont contains an actual example of applying LCM. The report states that "substantially all inventories are valued at cost as determined by the last-in, first-out (LIFO) method; in the aggregate, such valuations are not in excess of market". The term in the aggregate means that Du Pont applied LCM to total inventory.

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### An accounting perspective:

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#### Business insight

Procter & Gamble markets a broad range of laundry, cleaning, paper, beauty care, health care, food, and beverage products around the world. Procter & Gamble's footnote in its Notes to Consolidated Financial Statements in its annual report illustrates that companies often disclose LCM in their notes to financial statements.

*Inventories are valued at cost, which is not in excess of current market price. Cost is primarily determined by either the average cost or the first-in, first-out method. The replacement cost of last-in, first-out inventories exceeds carrying value by approximately USD 169 [million].*

Item	Quantity	Unit Cost	Unit Market	Total Cost	Total Market	LCM on Item-by-Item Basis
1	100 units	\$10	\$9.00	\$1,000	\$ 900	\$ 900
2	200 units	8	8.75	1,600	1,750	1,600
3	500 units	5	5.00	2,500	2,500	2,500
				\$5,100	\$5,150	\$5,000

#### Exhibit 21: Application of lower-of-cost-or-market method

Merchandise inventory, 2010 January	\$ 40,000
Net cost of purchases	480,000
Cost of goods available for sale	\$520,000
Less estimated cost of goods sold:	
Net sales	\$700,000
Gross margin (30% of \$700,000)	210,000
Estimated cost of goods sold	490,000
Estimated inventory, 2010 December 31	\$ 30,000

#### Exhibit 22: Inventory estimation using gross margin method

A company using periodic inventory procedure may estimate its inventory for any of the following reasons:

- To obtain an inventory cost for use in monthly or quarterly financial statements without taking a physical inventory. The effort of taking a physical inventory can be very expensive and disrupts normal business operations; once a year is often enough.
- To compare with physical inventories to determine whether shortages exist.
- To determine the amount recoverable from an insurance company when fire has destroyed inventory or the inventory has been stolen.

Next, we introduce two recognized methods of estimating the cost of ending inventory when a company has not taken a physical inventory—the gross margin method and the retail inventory method.

**Gross margin method** The steps in calculating ending inventory under the gross margin method are:

- Estimate gross margin (based on net sales) using the same gross margin rate experienced in prior accounting periods.
- Determine estimated cost of goods sold by deducting estimated gross margin from net sales.
- Determine estimated ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

Thus, the **gross margin method** estimates ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

The gross margin method assumes that a fairly stable relationship exists between gross margin and net sales. In other words, gross margin has been a fairly constant percentage of net sales, and this relationship has continued into the current period. If this percentage relationship has changed, the gross margin method does not yield satisfactory results.

To illustrate the gross margin method of computing inventory, assume that for several years Field Company has maintained a 30 per cent gross margin on net sales. The following data for 2010 are available: The January 1 inventory was USD 40,000; net cost of purchases of merchandise was USD 480,000; and net sales of merchandise were USD 700,000. As shown in Exhibit 22, Field can estimate the inventory for 2010 December 31, by deducting the estimated cost of goods sold from the actual cost of goods available for sale.

An alternative format for calculating estimated ending inventory uses the standard income statement format and solves for the one unknown (ending inventory):

Net sales		\$700,000	
Less cost of goods sold:			
Merchandise inventory, 2010 January 1	\$ 40,000		
Net cost of purchases	480,000		
Cost of goods available for sale	\$520,000		
Less estimated inventory, 2010 December 31			
Estimated cost of goods sold	490,000	(70% of net sales)	
Estimated gross margin	\$210,000	(30% of net sales)	

We know that:

Costs of goods available for sale – Ending inventory = Cost of goods sold

Therefore (let X = Ending inventory):

USD 520,000 - X = USD 490,000

X = USD 30,000

The gross margin method is not precise enough to be used for year-end financial statements. At year-end, a physical inventory must be taken and valued by either the specific identification, FIFO, LIFO, or weighted-average methods.

**Retail inventory method** Retail stores frequently use the retail inventory method to estimate ending inventory at times other than year-end. Taking a physical inventory during an accounting period (such as monthly or quarterly) is too time consuming and significantly interferes with business operations. The **retail inventory method** estimates the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices. The advantage of this method is that companies can estimate ending inventory (at cost) without taking a physical inventory. Thus, the use of this estimate permits the preparation of interim financial statements (monthly or quarterly) without taking a physical inventory. The steps for finding the ending inventory by the retail inventory method are:

- Total the beginning inventory and the net amount of goods purchased during the period at both cost and retail prices.
- Divide the cost of goods available for sale by the retail price of the goods available for sale to find the cost/retail price ratio.
- Deduct the retail sales from the retail price of the goods available for sale to determine ending inventory at retail.
- Multiply the cost/retail price ratio or percentage by the ending inventory at retail prices to reduce it to the ending inventory at cost.

	<b>Cost</b>	<b>Retail</b>
Merchandise inventory, 2010 January 1	\$ 22,000	\$ 40,000
Purchases	182,000	303,000
Purchase returns	(2,000)	(3,000)
Purchase allowances	(3,000)	
Transportation-in	5,000	
Goods available for sale	\$204,000	\$340,000
Cost/retail price ratio: \$204,000/\$340,000=60%		
Sales		280,000
Ending inventory at retail prices		\$ 60,000
Times cost/retail price ratio		x 60%
Ending inventory at cost, 2010 March 31	\$ 36,000	

### Exhibit 23: Inventory estimation

In Exhibit 23, we show the retail inventory method. In the exhibit, the cost (USD 22,000) and retail (USD 40,000) amounts for beginning inventory are available from the preceding period's computation. The amounts for the first quarter purchases, purchase returns, purchase allowances, and transportation-in came from the accounting records. The amounts for purchase allowances and transportation-in appear only in the cost column. The first quarter sales amount (USD 280,000) is from the Sales account and stated at retail (sales) prices. The difference between what was available for sale at retail prices and what was sold at retail prices (which is sales) equals what should be on hand (March 31 inventory of USD 60,000) expressed in retail prices. The retail price of the March 31 inventory needs to be converted into cost for use in the financial statements. We do this by multiplying it times the cost/retail price ratio. In the example, the cost/retail price ratio is 60 per cent, which means that on the average, 60 cents of each sales dollar is cost of goods sold. To find the 2010 March 31, inventory at cost (USD 36,000), we multiplied the ending inventory at retail (USD 60,000) by 60 per cent.

Once the March 31 inventory has been estimated at cost (USD 36,000), we deduct the cost of the inventory from cost of goods available for sale (USD 204,000) to determine cost of goods sold (USD 168,000). We can also find the cost of goods sold by multiplying the cost/retail price ratio of 60 per cent by sales of USD 280,000.

For the next quarterly period, the USD 36,000 and USD 60,000 amounts would appear on the schedule as beginning inventory at cost and retail, respectively. We would include other quarterly data regarding purchases, purchase returns, purchase allowances, and transportation-in to determine goods available for sale at cost and at retail. From these amounts, we could compute a new cost/retail price ratio for the second quarter.

At the end of each year, merchandisers usually take a physical inventory at retail prices. Since the retail prices are on the individual items (while the cost is not), taking an inventory at retail prices is more convenient than taking an inventory at cost. Accountants can then compare the results of the physical inventory to the calculation of inventory at retail under the retail inventory method for the fourth quarter to determine whether a shortage exists.

Both the gross margin and the retail inventory methods can help you detect inventory shortages. To illustrate how you can determine inventory shortages using the retail method, assume that a physical inventory taken at year end, showed only USD 62,000 of retail-priced goods in the store. Assume that use of the retail method for the fourth quarter showed that USD 66,000 of goods should be on hand, thus indicating a USD 4,000 inventory shortage at retail. After converting the USD 4,000 to USD 2,400 of cost (USD 4,000 X 0.60) you would report this as a "Loss from inventory shortage" in the income statement. Knowledge of such shortages may lead management to reduce or prevent them, by increasing security or improving the training of employees.

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## An ethical perspective: Dorsey hardware

Terry Dorsey started Dorsey Hardware, a small hardware store, two years ago and has struggled to make it successful. The first year of operations resulted in a substantial loss; in the second year, there was a small net income. His initial cash investment was almost depleted because he had to withdraw money for living expenses. The current year of operations looked much better. His customer base was growing and seemed to be loyal. To increase sales, however, Terry had to invest his remaining funds and the proceeds of a USD 40,000 bank loan into doubling the size of his inventory and purchasing some new display shelves and a new truck.

At the end of the third year, Terry's accountant asked him for his ending inventory figure and later told him that initial estimates indicated that net income (and taxable income) for the year would be approximately USD 80,000. Terry was delighted until he learned that the federal income taxes on that income would be about USD 17,250. He told the accountant that he did not have enough cash to pay the taxes and could not even borrow it, since he already had an outstanding loan at the bank. Terry asked the accountant for a copy of the income statement figures so he could see if any items had been overlooked that might reduce his net income. He noticed that ending inventory of USD 160,000 had been deducted from cost of goods available for sale of USD 640,000 to arrive at cost of goods sold of USD 480,000. Net sales of USD 720,000 and expenses of USD 160,000 could not be changed. But Terry hit on a scheme to reduce his net income. The next day he told his accountant that he had made an error in determining ending inventory and that its correct amount was USD 120,000. This lower inventory amount would increase cost of goods sold by USD 40,000 and reduce net income by that same amount. The resulting income taxes would be about USD 6,000, which was just about what Terry had paid in estimated taxes.

To justify his action in his own mind, Terry used the following arguments: (1) federal taxes are too high, and the federal government seems to be taxing the little guy out of existence; (2) no harm is really done because, when the business becomes more profitable, I will use correct inventory amounts, and this loan from the government will be paid back; (3) since I am the only one who knows the correct ending inventory I will not get caught; and (4) I bet a lot of other people do the same thing.

### Analyzing and using financial results—inventory turnover ratio

An important ratio for managers, investors, and creditors to consider when analyzing a company's inventory is the inventory turnover ratio. This ratio tests whether a company is generating a sufficient volume of business based on its inventory. To calculate the **inventory turnover ratio**:

$$\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

Inventory turnover measures the efficiency of the firm in managing and selling inventory: thus, it gauges the liquidity of the firm's inventory. A high inventory turnover is generally a sign of efficient inventory management and profit for the firm; the faster inventory sells, the less time funds are tied up in inventory. A relatively low

turnover could be the result of a company carrying too much inventory or stocking inventory that is obsolete, slow-moving, or inferior.

In assessing inventory turnover, analysts also consider the type of industry. When making comparisons among firms, they check the cost-flow assumption used to value inventory and cost of products sold.

Abercrombie & Fitch reported the following financial data for 2000 (in thousands):

Cost of goods sold.....	\$728,229
Beginning inventory.....	75,262
Ending inventory.....	120,997

Their inventory turnover is:

$$\text{USD } 728,229 / [(\text{USD } 75,262 + \text{USD } 120,997) / 2] = 7.4 \text{ times}$$

You should now understand the importance of taking an accurate physical inventory and knowing how to value this inventory. In another chapter, you will learn the general principles of internal control and how to control cash. Cash is one of a company's most important and mobile assets.

### Understanding the learning objectives

- Net income for an accounting period depends directly on the valuation of ending inventory.
- If ending inventory is overstated, cost of goods sold is understated, resulting in an overstatement of gross margin, net income, and retained earnings.
- When ending inventory is misstated in the current year, companies carry that misstatement forward into the next year.
- An error in the net income of one year caused by misstated ending inventory automatically causes an error in net income in the opposite direction in the next period because of the misstated beginning inventory.
- Inventory cost includes all necessary outlays to obtain the goods, get the goods ready to sell, and have the goods in the desired location for sale to customers.
- Inventory cost includes:
  - a. Seller's gross selling price less purchase discount.
  - b. Cost of insurance on the goods while in transit.
  - c. Transportation charges when borne by the buyer.
  - d. Handling costs, such as the cost of pressing clothes wrinkled during shipment.
- **Specific identification:** Attaches actual cost of each unit of product to units in ending inventory and cost of goods sold. Specific identification creates precise matching in determining net income.
- **FIFO (first-in, first-out):** Ending inventory consists of the most recent purchases. FIFO assumes that the costs of the first goods purchased are those charged to cost of goods sold when goods are sold. During periods of rising prices, FIFO creates higher net income since the costs charged to cost of goods sold are lower.
- **LIFO (last-in, first-out):** Ending inventory consists of the oldest costs. LIFO assumes that the costs of the most recent purchases are the first costs charged to cost of goods sold. Net income is usually lower under LIFO since the costs charged to cost of goods sold are higher due to inflation. The ending inventory may differ between perpetual and periodic inventory procedures.
- **Weighted-average:** Ending inventory is priced using a weighted-average unit cost. Under perpetual inventory procedure, a new weighted-average is determined after each purchase. Under periodic procedure, the average is determined at the end of the accounting period by dividing the total number of units purchased plus those in beginning inventory into total cost of goods available for sale. In determining cost of goods sold,

this average unit cost is applied to each item. Under the weighted-average method, in a period of rising prices net income is usually higher than income under LIFO and lower than income under FIFO.

- **Specific identification:** Advantages: (1) States cost of goods sold and ending inventory at the actual cost of specific units sold and on hand, and (2) provides the most precise matching of costs and revenues. Disadvantage: Income manipulation is possible.

- **FIFO:** Advantages: (1) FIFO is easy to apply, (2) the assumed flow of costs often corresponds with the normal physical flow of goods, (3) no manipulation of income is possible, and (4) the balance sheet amount for inventory is likely to approximate the current market value. Disadvantages: (1) Recognizes paper profits, and (2) tax burden is heavier if used for tax purposes when prices are rising.

- **LIFO:** Advantages: (1) LIFO reports both sales revenue and cost of goods sold in current dollars, and (2) lower income taxes result if used for tax purposes when prices are rising. Disadvantages: (1) Often matches the cost of goods not sold against revenues, (2) grossly understates inventory, and (3) permits income manipulation.

- **Weighted-average:** Advantages: Due to the averaging process, the effects of year-end buying or not buying are lessened. Disadvantage: Manipulation of income is possible.

- Perpetual inventory procedure requires an entry to Merchandise Inventory whenever goods are purchased, returned, sold, or otherwise adjusted, so that inventory records reflect actual units on hand at all times. Thus, an entry is required to record cost of goods sold for each sale.

- Companies should not carry goods in inventory at more than their net realizable value. Net realizable value is the estimated selling price of an item less the estimated costs incurred in preparing the item for sale and selling it. Inventory items are written down to market value when the market value is less than the cost of the items. If market value is greater than cost, the increase in value is not recognized. LCM may be applied to each inventory item, each inventory class, or total inventory.

- The steps in calculating ending inventory under the gross margin method are:

- a. Estimate gross margin (based on net sales) using the same gross margin rate experienced in prior accounting periods.

- b. Determine estimated cost of goods sold by deducting estimated gross margin from net sales.

- c. Determine estimated ending inventory by deducting estimated cost of goods sold from cost of goods available for sale.

- The retail inventory method estimates the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices. To find the cost/retail price ratio, divide the cost of goods available for sale by the retail price of the goods available for sale.

- Inventory turnover ration =  $\frac{(\text{Cost of goods sold})}{(\text{Average inventory})}$

- Inventory turnover measures the efficiency of the firm in managing and selling inventory. It gauges the liquidity of the firm's inventory.

### Demonstration problem

**Demonstration problem A** Following are data related to Adler Company's beginning inventory, purchases, and sales:

**Beginning Inventory and Purchases**

<b>Units</b>	<b>Unit Cost</b>	<b>Sales</b>	<b>Units</b>
Beginning inventory 6,250	@ \$3.00	February 3	5,250
March 15 5,000	@ 3.12	May 4	4,500
May 10 8,750	@ 3.30	September 16	8,000
August 12 6,250	@ 3.48	October 9	7,250
November 20 3,750	@ 3.72		
30,000			25,000

a. Compute the ending inventory under each of the following methods:

Specific identification (assume ending inventory is taken equally from the August 12 and November 20 purchases).

FIFO: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

LIFO: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

Weighted-average: (a) Assume use of perpetual inventory procedure.

(b) Assume use of periodic inventory procedure.

(Carry unit cost to four decimal places and round total cost to nearest dollar.)

b. Give the journal entries to record the individual purchases and sales (Cost of Goods Sold entry only) under the LIFO method and perpetual procedure.

**Demonstration problem B** a. Joel Company reported annual net income as follows:

2007.... USD 27,200

2008.... USD 28,400

2009.... USD 24,000

Analysis of the inventories shows that certain clerical errors were made with the following results:

	<b>Incorrect inventory amount</b>	<b>Correct inventory amount</b>
2007 December 31	\$4,800	\$5,680
2008 December 31	5,600	4,680

What is the corrected net income for 2007, 2008, and 2009?

b. The records of Little Corporation show the following account balances on the day a fire destroyed the company's inventory:

Merchandise inventory, January 1 USD 40,000

Net cost of purchases (to date) USD 200,000

Sales (to date) USD 300,000

Average rate of gross margin for the past five years 30 per cent of net sales.

Compute an estimated value of the ending inventory using the gross margin method.

c. The records of Draper Company show the following account balances at year-end:

	<b>Cost</b>	<b>Retail</b>
Merchandise inventory, January 1	.\$17,600	\$25,000
Purchases	68,000	100,000
Transportation-in	1,900	
Sales		101,000

Compute the estimated ending inventory at cost using the retail inventory method.

## Solution to demonstration problem

**Solution to demonstration problem A** a. The ending inventory is 5,000 units, calculated as follows:

	<b>Units</b>
Beginning inventory	6,250
Purchases	23,750
Goods available	30,000
Sales	25,000
Ending inventory	5,000

Ending inventory under specific identification:

<b>Purchased</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
November 20	2,500	\$3.72	\$ 9,300
August 12	2,500	3.48	8,700
			\$ 18,000

2. Ending inventory under FIFO:

(a) Perpetual:

Date	Purchased			Units	Sold		Units	Balance	
	Units	Unit Cost	Total Cost		Unit Cost	Total Cost		Unit	Unit
Beg. inv.							6,250	\$3.00	\$18,750
Feb. 3				5,250	\$3.00	\$15,750	1,000	3.00	3,000
Mar. 15	5,000	\$3.12	\$15,600				1,000	3.00	3,000
							5,000	3.12	15,600
May 4				1,000	3.00	3,000	1,500	3.12	4,680
				3,500	3.12	10,920			
May 10	8,750	3.30	28,875				1,500	3.12	4,680
							8,750	3.30	28,875
Aug. 12	6,250	3.48	21,750				1,500	3.12	4,680
							8,750	3.30	28,875
							6,250	3.48	21,750
Sept. 16				1,500	3.12	4,680	2,250	3.30	7,425
				6,500	3.30	21,450	6,250	3.48	21,750
Oct. 9				2,250	3.30	7,425	1,250	3.48	4,350
				5,000	3.48	17,400			
Nov. 20	3,750	3.72	13,950				1,250	3.48	4,350
							3,750	3.72	13,950

Ending inventory = (1,250 X \$3.48) + (3,750 X \$3.72) = \$18,300

(b) Periodic:

Purchased	Units	Unit Cost	Total Cost
November 20	3,750	\$3.72	\$ 13,950
August 12	1,250	3.48	4,350
	5,000		\$ 18,300 *

\*Note that the cost of ending inventory is the same as under perpetual.

3. Ending inventory under LIFO:

(a) Perpetual:

Date	Purchased			Units	Sold		Units	Balance	
	Units	Unit Cost	Total Cost		Unit Cost	Total Cost		Unit	Unit
Beg. inv.							6,250	\$3.00	\$18,750
Feb. 3				5,250	\$3.00	\$15,750	1,000	3.00	3,000
Mar. 15	5,000	\$3.12	\$15,600				1,000	3.00	3,000
							5,000	3.12	15,600
May 4				4,500	3.12	14,040	1,000	3.00	3,000
							500	3.12	1,560
May 10	8,750	3.30	28,875				1,000	3.00	3,000
							500	3.12	1,560
Aug. 12	6,250	3.48	21,750				8,750	3.30	28,875
							1,000	3.00	3,000
							500	3.12	1,560
							8,750	3.30	28,875
Sept. 16				6,250	3.48	21,750	1,000	3.00	3,000
				1,750	3.30	5,775	500	3.12	1,560
							7,000	3.30	23,100
Oct. 9				7,000	3.30	23,100	1,000	3.00	3,000
				250	3.12	780	250	3.12	780
Nov. 20	3,750	3.72	13,950				1,000	3.00	3,000
							250	3.12	780
							3,750	3.72	13,950
Ending inventory =	(1,000 X \$3.00) + (250 X \$3.12) + (3,750 X \$3.72) =								\$17,730

(b) Periodic:

	<b>Units</b>	<b>Cost</b>	<b>Unit</b>	<b>Total</b>
Merchandise Inventory, January 1	5,000	\$3.00		\$ 15,000

4. Ending inventory under weighted-average:

(a) Perpetual:

<b>Date</b>	<b>Purchased</b>		<b>Units</b>	<b>Sold</b>		<b>Total</b>	<b>Balance</b>		
	<b>Units</b>	<b>Unit Cost</b>		<b>Unit Cost</b>	<b>Unit Cost</b>		<b>Unit Cost</b>	<b>Units</b>	<b>Unit Cost</b>
Beg. inv.							6,250	\$3.0000	\$18,750
Feb. 3			5,250	\$3.00	\$15,750		1,000	3.0000	3,000
Mar. 15	5,000	\$3.12	\$15,600				6,000	3.1000	18,600
								<sup>a</sup>	
May 4			4,500	3.10	13,950		1,500	3.1000	4,650
May 10	8,750	3.30	28,875				10,250	3.2707	33,525
								<sup>b</sup>	
Aug. 12	6,250	3.48	21,750				16,500	3.3500	55,275
								<sup>c</sup>	
Sept. 16			8,000	3.35	26,800		8,500	3.3500	28,475 *
Oct. 9			7,250	3.35	24,288		1,250	3.3500	4,187 *
Nov. 20	3,750	3.72	13,950				5,000	3.6274	18,137
								<sup>d</sup>	

Ending inventory = (5,000 X \$3.6274) = \$18,137

<sup>a</sup> \$18,600 = \$3.100 X 6,000   <sup>b</sup> \$33,525 = \$3.2707 X 10,250   <sup>c</sup> \$55,275 = \$3.3500 X 16,500   <sup>d</sup> \$18,137 = \$3.6274 X 5,000

6,000 10,250 16,500 5,000

\* Rounding difference.

(b) Periodic

<b>Purchased</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Total</b>
Merchandise Inventory, January 1	6,250	\$3.00	\$ 18,750
March 15	5,000	3.12	15,600
May 10	8,750	3.30	28,875
August 12	6,250	3.48	21,750
November 20	3,750	3.72	13,950
	30,000		\$ 98,925

Weighted-average unit cost = \$98,925/30,000 = \$3.2975

Ending inventory cost = \$3.2975 x 5,000 = \$16,488\*

\*Rounding difference

b. Journal entries under LIFO perpetual:

Feb.	3	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record cost of \$3 on 5,200 units sold	15,750	15,750
Mar.	15	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 5,000 units at \$3.12 on Account.	15,600	15,600
May	4	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record cost of \$3.12 on 4,500 units sold.	14,040	14,040
	10	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 8,750 units at \$3.30 on account.	28,875	28,875
Aug.	12	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 6,250 units at \$3.48 on account	21,750	21,750
Sept.	16	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record costs of \$3.48 and \$3.30 on 6,250 units at 1,750 units sold, respectively.	27,525	27,525
Oct.	9	Cost of Goods Sold (-SE) Merchandise Inventory (-A) To record costs of \$3.30 and \$3.12 on 7,000 units and 250 units sold, respectively.	23,880	23,880
Nov.	20	Merchandise Inventory (+A) Accounts Payable (+L) To record purchase of 3,750 units at \$3.72 on account.	13,950	13,950

**Solution to demonstration problem B a. Corrected net income:**

	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
Net income as reported	\$ 27,200	28,400	24,000	\$ 79,600
Adjustments				
(1)	880			
(2)		(880)		
		(920)		
(3)			920	
Corrected net income	\$ 28,080	26,600	24,920	\$ 79,600
(1) Ending inventory understated (\$ 5,680 - \$ 4,800 = \$ 880)				
(2) Beginning inventory understated (5,680 - 4,800 = 880)				
Ending inventory overstated (5,600 - 4,680 = 920)				
(3) Beginning inventory overstated (5,600 - 4,680 = 920)				

**b. Computation of inventory:**

Merchandise Inventory, January 1		\$
		40,000
Net cost of purchases		200,000
Cost of goods available for sale		\$ 240,000
Less estimated cost of goods sold:		
Net Sales	\$ 300,000	
Gross margin (\$300,000 X 0.30)	90,000	
Estimated cost of goods sold		210,000
Inventory at cost, estimated by gross margin method.		\$ 30,000

**c. Computation of inventory:**

	<b>Cost</b>	<b>Retail</b>
Merchandise Inventory, January 1	\$ 17,600	\$ 25,000
Purchases	68,000	100,000
Transportation-in	1,900	—
Goods available for sale	\$ 87,500	\$ 125,000
\$		
Cost/retail price ratio:		
\$87,500/\$125,000 = 70%		
Sales		101,000

Ending inventory at retail price		\$24,000
Times cost/retail price ratio		X 70%
Ending inventory at cost, December 31.	\$ 16,800	

## Key terms

**FIFO (first-in, first-out)** A method of costing inventory that assumes the costs of the first goods purchased are those charged to cost of goods sold when the company actually sells goods.

**Gross margin method** A procedure for estimating inventory cost in which estimated cost of goods sold (determined using an estimated gross margin) is deducted from the cost of goods available for sale to determine estimated ending inventory. The estimated gross margin is calculated using gross margin rates (in relation to net sales) of prior periods.

**Inventory, or paper, profits** Equal to the current replacement cost to purchase a unit of inventory at time of sale minus the unit's historical cost.

**Inventory turnover ratio** Cost of goods sold/Average inventory.

**LIFO (last-in, first-out)** A method of costing inventory that assumes the costs of the most recent purchases are the first costs charged to cost of goods sold when the company actually sells the goods.

**Lower-of-cost-or-market (LCM) method** An inventory costing method that values inventory at the lower of its historical cost or its current market (replacement) cost.

**Merchandise inventory** The quantity of goods held by a merchandising company for resale to customers.

**Net realizable value** Estimated selling price of an item less the estimated costs incurred in preparing the item for sale and selling it.

**Retail inventory method** A procedure for estimating the cost of the ending inventory by applying a cost/retail price ratio to ending inventory stated at retail prices.

**Specific identification method** An inventory costing method that attaches the actual cost to an identifiable unit of product.

**Weighted-average method** A method of costing ending inventory using a weighted-average unit cost. Under perpetual inventory procedure, a new weighted-average is calculated after each purchase. Under periodic procedure, the weighted-average is determined by dividing the total number of units purchased plus those in beginning inventory into total cost of goods available for sale. Units in the ending inventory are carried at this per unit cost.

## Self-test

### True-false

Indicate whether each of the following statements is true or false.

Overstated ending inventory results in an overstatement of cost of goods sold and an understatement of gross margin and net income.

In a period of rising prices, FIFO results in the lowest cost of goods sold.

Under LCM, inventory is written down to market value when the market value is less than the cost, and inventory is written up to market value when the market value is greater than the cost.

Under the gross margin method, an estimate must be made of gross margin to determine estimated cost of goods sold and estimated ending inventory.

To use the retail inventory method, both cost and retail prices must be known for the goods available for sale.

Under perpetual procedure, cost of goods sold is determined as a result of the closing entries made at the end of the period.

### Multiple-choice

Select the best answer for each of the following questions.

Jack Company began the accounting period with inventory of 3,000 units at USD 30 each. During the period, the company purchased an additional 5,000 units at USD 36 each and sold 4,600 units. Assume the use of periodic inventory procedure for the following six questions.

Cost of ending inventory using FIFO is:

- a. USD 104,400.
- b. USD 122,400.
- c. USD 120,000.
- d. USD 147,600.
- e. None of the above.

Cost of goods sold using FIFO is:

- a. USD 165,600.
- b. USD 150,000.
- c. USD 147,600.
- d. USD 122,400.
- e. None of the above.

Cost of ending inventory using LIFO is:

- a. USD 104,400.
- b. USD 114,750.
- c. USD 156,000.
- d. USD 122,400.
- e. None of the above.

Cost of goods sold using LIFO is:

- a. USD 155,250.
- b. USD 114,000.
- c. USD 147,600.
- d. USD 165,600.
- e. None of the above.

Cost of ending inventory using weighted-average is:

- a. USD 114,750.
- b. USD 157,600.
- c. USD 122,400.
- d. USD 109,650.
- e. None of the above.

Cost of goods sold using weighted-average is:

- a. USD 147,200.
- b. USD 160,350.
- c. USD 155,250.
- d. USD 114,000.
- e. None of the above.

During a period of rising prices, which inventory method might be expected to give the highest net income?

- a. Weighted-average.
- b. FIFO.
- c. LIFO.

d. Specific identification.

e. Cannot determine.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

## Questions

- Why is proper inventory valuation so important?
- Why does an understated ending inventory understate net income for the period by the same amount?
- Why does an error in ending inventory affect two accounting periods?
- What is the meaning of taking a physical inventory?
- What is the accountant's responsibility regarding taking a physical inventory?
- Which cost elements are included in inventory? What practical problems arise by including the costs of such elements?
- Which accounts that are used under periodic inventory procedure are not used under perpetual inventory procedure?
- What entries are necessary under perpetual inventory procedure when goods are sold?
- Why is there closer control over inventory under perpetual inventory procedure than under periodic inventory procedure?
- Why is perpetual inventory procedure being used increasingly in business?
- What is the cost flow assumption? What is meant by the physical flow of goods? Does a relationship between cost flows and the physical flow of goods exist, or should such a relationship exist?
- Indicate how a company can manipulate its net income if it uses LIFO. Is the same opportunity available under FIFO? Why or why not?
- What are the main advantages of using FIFO and LIFO?
- Which inventory method is the correct one? Can a company change inventory methods?
- Why are ending inventory and cost of goods sold the same under FIFO perpetual and FIFO periodic?
- Would you agree with the following statement? Reducing the amount of taxes payable currently is a valid objective of business management and, since LIFO results in such a reduction, all businesses should use LIFO.
- What is net realizable value, and how is it used?
- Why is it acceptable accounting practice to recognize a loss by writing down an item in inventory to market, but unacceptable to recognize a gain by writing up an inventory item?
- Under what conditions would the gross margin method of computing an estimated inventory yield approximately correct amounts?
- What are the main reasons for estimating ending inventory?
- Should a company rely exclusively on the gross margin method to determine the ending inventory and cost of goods sold for the end-of-year financial statements?
- How can the retail method be used to estimate inventory?
- **The Limited** Based on the notes to the financial statements of The Limited contained in the Annual Report Appendix, what inventory methods were used?

## Exercises

**Exercise A** Crocker Company reported annual net income as follows:

2008	\$484,480
2009	487,680
2010	409,984

Analysis of its inventories revealed the following incorrect inventory amounts and these correct amounts:

	<b>Incorrect Inventory Amount</b>	<b>Correct inventory amount</b>
2008 December 31	\$ 76,800	\$89,600
2009 December 31	86,400	77,600

Compute the annual net income for each of the three years assuming the correct inventories had been used.

**Exercise B** Slate Truck Company manufactures trucks and identifies each truck with a unique serial plate. On December 31, a customer ordered 5 trucks from the company, which currently has 20 trucks in its inventory. Ten of these trucks cost USD 20,000 each, and the other 10 cost USD 25,000 each. If Slate wished to minimize its net income, which trucks would it ship? By how much could Slate reduce net income by selecting units from one group versus the other group?

**Exercise C** Miami Discount Company inventory records show:

	<b>Units</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Beginning inventory	3,000	\$38.00	\$114,000
Purchases:			
February 14	900	39.00	35,100
March 18	2,400	40.00	96,000
July 21	1,800	40.30	72,540
September 27	1,800	40.60	73,080
November 27	600	41.00	24,600
Sales:			
April 15	2,800		
August 20	2,000		
October 3	1,500		

The December 31 inventory was 4,200 units. Miami Discount Company uses perpetual inventory procedure. Present a schedule showing the measurement of the ending inventory using FIFO perpetual inventory procedure.

**Exercise D** Using the data in the previous exercise for Miami Discount Company, present a schedule showing the measurement of the ending inventory using LIFO perpetual inventory procedure.

**Exercise E** London Company had a beginning inventory of 160 units at USD 24 (total = USD 3,840) and the following inventory transactions during the year:

January 8, sold 40 units.

January 11, purchased 80 units at USD 30.00.

January 15, purchased 80 units at USD 32.00.

January 22, sold 80 units.

Using the preceding information, price the ending inventory at its weighted-average cost, assuming perpetual inventory procedure.

**Exercise F** Kettle Company made the following purchases of Product A in its first year of operations:

	<b>Units</b>	<b>Unit Cost</b>
January 2	1,400	@ \$7.40
March 31	1,200	@ 7.00
July 5	2,400	@ 7.60
November 1	1,800	@ 8.00

The ending inventory that year consisted of 2,400 units. Kettle uses periodic inventory procedure.

a. Compute the cost of the ending inventory using each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average.

b. Which method would yield the highest amount of gross margin? Explain why it does.

**Exercise G** The following are selected transactions and other data of the Custer Company:

Purchased 20 units at USD 360 per unit on account on 2010 September 18.

Sold 6 units on account for USD 576 per unit on 2010 September 20.

Discovered a shortage of USD 2,640 at year-end after a physical inventory.

Prepare journal entries for these transactions using FIFO perpetual inventory procedure. Assume the beginning inventory consists of 20 units at USD 336 per unit.

**Exercise H** Following are selected transactions of Gamble Company:

Purchased 100 units of merchandise at USD 240 each; terms 2/10, n/30.

Paid the invoice in transaction 1 within the discount period.

Sold 80 units at USD 384 each for cash.

Purchased 100 units at USD 360; terms 2/10, n/30.

Paid the invoice in transaction 4 within the discount period.

Sold 60 units at USD 552 each for cash.

Prepare journal entries for the six preceding items. Assume Gamble uses FIFO perpetual inventory procedure.

**Exercise I** Wells Company had the following transactions during February:

Purchased 135 units at USD 65 on account.

Sold 108 units at USD 90 on account.

Purchased 170 units at USD 75 on account.

Sold 122 units at USD 95 on account.

Sold 67 units at USD 100 on account.

The beginning inventory consisted of 67 units purchased at a cost of USD 55.

Prepare the journal entries relating to inventory for these five transactions, assuming Wells accounts for inventory using perpetual inventory procedure and the LIFO inventory method. Do not record the entries for sales.

**Exercise J** Following are inventory data for Kintech Company:

January 1 inventory on hand, 400 units at USD 28.80.

January sales were 80 units.

February sales totaled 120 units.

March 1, purchased 200 units at USD 30.24.

Sales for March through August were 160 units.

September 1, purchased 40 units at USD 33.12.

September through December sales were 180 units.

**Exercise K** A company purchased 1,000 units of a product at USD 12.00 and 2,000 units at USD 13.20. It sold all of these units at USD 18.00 each at a time when the current cost to replace the units sold was USD 13.80. Compute the amount of gross margin under FIFO that LIFO supporters would call inventory, or paper, profits.

**Exercise L** Clayton Company's inventory was 12,000 units with a cost of USD 160 each on 2010 January 1. During 2010, numerous units were purchased and sold. Also during 2010, the purchase price of this product fell

steadily until at year-end it was USD 120. The inventory at year-end was 18,000 units. State which method of inventory measurement, LIFO or FIFO, would have resulted in higher reported net income, and explain briefly.

**Exercise M** Levi Motor Company owns a luxury automobile that it has used as a demonstrator for eight months. The auto has a list or sticker price of USD 85,000 and cost Levi USD 75,000. At the end of the fiscal year, the auto is on hand and has an expected selling price of USD 80,000. Costs expected to be incurred to sell the auto include tune-up and maintenance costs of USD 3,000, advertising of USD 1,000, and a commission of 5 per cent of the selling price to the employee selling the auto. Compute the amount at which the auto should be carried in inventory.

**Exercise N** Pure Sound Systems used one sound system as a floor model. It cost USD 3,600 and had an original selling price of USD 4,800. After six months, the sound system was damaged and replaced by a newer model. The sound system had an estimated selling price of USD 2,880, but when the company performed USD 480 in repairs, it could be sold for USD 3,840. Prepare the journal entry, if any, that must be made on Pure Sound's books to record the decline in market value.

**Exercise O** Your assistant has compiled the following data:

Item	Quantity (units)	Unit Cost	Unit Market	Total Cost	Total Market
A	300	\$ 57.60	\$ 55.20	\$17,280	\$16,560
B	300	28.80	33.60	8,640	10,080
C	900	21.60	21.60	19,440	19,440
D	500	12.00	13.20	6,000	6,600

Calculate the dollar amount of the ending inventory using the LCM method, applied on an item-by-item basis, and the amount of the decline from cost to lower-of-cost-or-market.

**Exercise P** Use the data in the previous exercise to compute the cost of the ending inventory using the LCM method applied to the total inventory.

**Exercise Q** Tilley-Mill Company takes a physical inventory at the end of each calendar-year accounting period to establish the ending inventory amount for financial statement purposes. Its financial statements for the past few years indicate an average gross margin on net sales of 25 per cent. On July 18, a fire destroyed the entire store building and its contents. The records in a fireproof vault were intact. Through July 17, these records show:

Merchandise inventory, January 1 USD 672,000

Merchandise purchases USD 9,408,000

Purchase returns USD 134,400

Transportation-in USD 504,000

Sales USD 14,336,000

Sales returns USD 672,000

The company was fully covered by insurance and asks you to determine the amount of its claim for loss of merchandise.

**Exercise R** Ryan Company takes a physical inventory at the end of each calendar-year accounting period. Its financial statements for the past few years indicate an average gross margin on net sales of 30 per cent.

On June 12, a fire destroyed the entire store building and the inventory. The records in a fireproof vault were intact. Through June 11, these records show:

Merchandise inventory, January 1	\$120,000
Merchandise purchases	\$3,000,000
Purchase returns	\$36,000

Transportation -in	\$204,000
Sales	\$3,720,000

The company was fully covered by insurance and asks you to determine the amount of its claim for loss of merchandise.

**Exercise S** Victoria Falls Company, Inc., records show the following account balances for the year ending 2010 December 31:

	<b>Cost</b>	<b>Retail</b>
Beginning inventory	USD 42,000	USD 57,500
Purchases	25000	37500
Transportation-in	500	
Sales		52500

Using these data, compute the estimated cost of ending inventory using the retail method of inventory valuation.

### Problems

**Problem A** Kelley Company reported net income of USD 358,050 for 2009, USD 371,400 for 2010, and USD 325,800 for 2011, using the incorrect inventory amounts shown for 2009 December 31, and 2010. Recently, Kelley corrected the inventory amounts for those dates. Kelley used the correct 2011 December 31, inventory amount in calculating 2011 net income.

	<b>Incorrect</b>	<b>Correct</b>
2009 December 31	USD 72,600	USD 86,200
2010 December 31	84000	70200

Prepare a schedule that shows: (a) the reported net income for each year, (b) the amount of correction needed for each year, and (c) the correct net income for each year.

**Problem B** An examination of the financial records of Lanal Company on 2009 December 31, disclosed the following with regard to merchandise inventory for 2009 and prior years:

- 2005 December 31, inventory was correct.
- 2006 December 31, inventory was overstated USD 200,000.
- 2007 December 31, inventory was overstated USD 100,000.
- 2008 December 31, inventory was understated USD 220,000.
- 2009 December 31, inventory was correct.

The reported net income for each year was:

2006	\$384,000
2007	544,000
2008	670,000
2009	846,000

- a. Prepare a schedule of corrected net income for each of the four years, 2006-2009.
- b. What error(s) would have been included in each December 31 balance sheet? Assume each year's error is independent of the other years' errors.
- c. Comment on the implications of your corrected net income as contrasted with reported net income.

**Problem C** Brett Company sells personal computers and uses the specific identification method to account for its inventory. On 2010 November 30, the company had 46 Orange III personal computers on hand that were acquired on the following dates and at these stated costs:

	<b>Units</b>		<b>Unit cost</b>
July 3	10	@	\$10,080
September 10	20	@	\$ 9,600
November 29	16	@	\$10,700

Brett sold 36 Orange III computers at USD 12,720 each in December. There were no purchases of this model in December.

- Compute the gross margin on December sales of Orange III computers assuming the company shipped those units that would maximize reported gross margin.
- Repeat part (a) assuming the company shipped those units that would minimize reported gross margin for December.
- In view of your answers to parts (a) and (b), what would be your reaction to an assertion that the specific identification method should not be considered an acceptable method for costing inventory?

**Problem D** The inventory records of Thimble Company show the following:

March 1 Beginning inventory consists of 10 units costing USD 40 per unit.

3 Sold 5 units at USD 94 per unit.

10 Purchased 16 units at USD 48 per unit.

12 Sold 8 units at USD 96 per unit.

20 Sold 7 units at USD 96 per unit.

25 Purchased 16 units at USD 50 per unit.

31 Sold 8 units at USD 96 per unit.

Assume all purchases and sales are made on credit.

Using FIFO perpetual inventory procedure, prepare the appropriate journal entries for March.

**Problem E** The following purchases and sales for Ripple Company are for April 2010. There was no inventory on April 1.

<b>Purchases</b>			<b>Sales</b>	
	<b>Units</b>	<b>Unit Cost</b>		<b>Units</b>
April 3	3,200	@ \$33.00	April 6	1,500
April 10	1,600	@ 34.00	April 12	1,400
April 22	2,000	@ 35.00	April 25	2,300
April 28	1,800	@ 36.00		

a. Compute the ending inventory as of 2010 April 30, using perpetual inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

b. Repeat a using periodic inventory procedure.

**Problem F** Refer to the data in problem E

a. Using LIFO perpetual inventory procedure, prepare the journal entries for the purchases and sales (Cost of Goods Sold entry only).

b. Repeat (a) using LIFO periodic inventory procedure, including closing entries.

**Problem G** The following data relate to the beginning inventory, purchases, and sales of Braxton Company for the year 2010:

	<b>Units</b>	<b>Unit Cost</b>
Merchandise Inventory, January 1	1,400	@ \$5.04
Purchases:		
February 2	1,000	@ 4.80
April 5	2,000	@ 3.60
June 15	1,200	@ 3.00
September 30	1,400	@ 2.88
November 28	1,800	@ 4.20
Sales:		
March 10	900	
May 15	1,800	
July 6	800	
August 23	600	
December 22	2,500	

a. Assuming use of perpetual inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

b. Repeat (a) assuming use of periodic inventory procedure.

**Problem H** Welch Company accounts for a product it sells using LIFO periodic inventory procedure. Product data for the year ended 2009 December 31, are shown below. Merchandise inventory on January 1 was 3,000 units at USD 14.40 each.

<b>Purchases</b>			<b>Sales</b>		
	<b>Units</b>	<b>Unit Cost</b>		<b>Units</b>	<b>Unit Co st</b>
January 5	6,000	@ \$18.00	January 10	4,000	@ \$28.80
March 31	18,000	@ 21.60	April 2	15,000	@ 32.40
August 12	12,000	@ 27.00	August 22	16,000	@ 36.00
December 26	6,000	@ 28.80	December 24	3,000	@ 39.60

a. Compute the gross margin earned on sales of this product for 2009.

b. Repeat part (a) assuming that the December 26 purchase was made in January 2010.

c. Recompute the gross margin assuming that 10,000 rather than 6,000 units were purchased on December 26 at the same cost per unit.

d. Solve parts (a), (b), and (c) using the FIFO method.

**Problem I** The accountant for Gentry Company prepared the following schedule of the company's inventory at 2009 December 31, and used the LCM method applied to total inventory in determining cost of goods sold:

<b>Item</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Unit Market</b>
Q	4,200	\$7.20	\$7.20
R	2,400	6.00	5.76
S	5,400	4.80	4.56
T	4,800	4.20	4.32

a. State whether this approach is an acceptable method of inventory measurement and show the calculations used to determine the amounts.

b. Compute the amount of the ending inventory using the LCM method on an item-by-item basis.

c. State the effect on net income in 2009 if the method in (b) was used rather than the method referred to in (a).

**Problem J** As part of a loan agreement with a local bank, Brazos Company must present quarterly and cumulative income statements for the year 2009. The company uses periodic inventory procedure and marks its merchandise to sell at a price yielding a gross margin of 30 per cent. Selected data for the first six months of 2009 are as follows:

<b>First</b>	<b>Second</b>
--------------	---------------

	<b>Quarter</b>	<b>Quarter</b>
Sales	\$248,000	\$256,000
Purchases	160,000	184,000
Purchase returns and allowances	9,600	11,200
Purchase discounts	3,200	3,520
Sales returns and allowances	8,000	4,800
Transportation-in	8,000	8,320
Miscellaneous selling expenses	25,600	24,000
Miscellaneous administrative expenses	9,600	8,000

The cost of the physical inventory taken 2008 December 31, was USD 30,400.

a. Indicate how income statements can be prepared without taking a physical inventory at the end of each of the first two quarters of 2009.

b. Prepare income statements for the first quarter, the second quarter, and the first six months of 2009.

Cobb Company records show the following information for 2010:

	<b>Cost</b>	<b>Retail</b>
Sales		\$350,400
Purchases	\$270,000	420,000
Transportation-in	26,280	—
Merchandise inventory, January 1	12,000	17,400
Purchase returns	15,120	18,600

Compute the estimated year-end inventory balance at cost using the retail method of estimating inventory.

#### Alternate problems

**Alternate problem A** Harris Company reported net income of USD 312,000 for 2009, USD 324,000 for 2010, and USD 348,000

Recently Harris corrected these inventory amounts. Harris used the correct 2011 December 31, inventory amount in calculating 2011 net income.

2009 December 31	\$96,000	\$108,000
2010 December 31	91,200	84,000

Prepare a schedule that shows: (a) the reported net income for each year, (b) the amount of correction needed for each year, and (c) the correct net income for each year.

**Alternate problem B** An examination of the financial records of Jersey Company on 2009 December 31, disclosed the following with regard to merchandise inventory for 2009 and prior years:

- 2008 December 31, inventory was correct.
- 2009 December 31, inventory was understated USD 50,000.
- 2010 December 31, inventory was overstated USD 35,000.
- 2011 December 31, inventory was understated USD 30,000.
- 2012 December 31, inventory was correct.

The reported net income for each year was:

2009	\$292,500
2010	\$355,000
2011	\$382,500
2012	\$350,000

- a. Prepare a schedule of corrected net income for each of the four years, 2009-2012.
- b. What errors would have been included in each December 31 balance sheet? Assume each year's error is independent of the other years' errors.
- c. Comment on the implications of the corrected net income as contrasted with reported net income.

**Alternate problem C** High Surf Company sells the Ultra-Light model wind surfer and uses the specific identification method to account for its inventory. The Ultra-Lights are identical except for identifying serial numbers. On 2009 August 1, the company had three Ultra-Lights that cost USD 14,000 each in its inventory. During the month, the company purchased the following:

	Units		Unit cost
August 3	5	@	\$13,000
August 17	6	@	\$14,500
August 28	6	@	15,000

High Surf Company sold 13 Ultra-Lights in August at USD 20,000 each.

- a. Compute the gross margin earned by the company in August if it shipped the units that would maximize gross margin.
- b. Repeat part (a) assuming the company shipped the units that would minimize gross margin.
- c. Do you think High Surf Company should be permitted to use the specific identification method of accounting for Ultra-Lights in view of the manipulation possible as shown by your calculations in (a) and (b)?

**Alternate problem D** The inventory records of Coral Company show the following:

- Jan. 1 Beginning inventory consists of 12 units costing USD 48 per unit.
  - 5 Purchased 15 units @ USD 49.92 per unit.
  - 10 Sold 9 units @ USD 108 per unit.
  - 12 Sold 7 units @ USD108 per unit.
  - 20 Purchased 20 units @ USD 50.16 per unit.
  - 22 Purchased 5 units @ USD 48 per unit.
  - 30 Sold 20 units @ USD 110.40 per unit.
- Assume all purchases and sales are made on account.

- Using FIFO perpetual inventory procedure, compute cost of goods sold for January.
- Using FIFO perpetual inventory procedure, prepare the journal entries for January.
- Compute the cost of goods sold under FIFO periodic inventory procedure. Is there a difference between the amount computed using the two different procedures?

**Alternate problem E** Following are data for Dandy Company for the year 2010:

	<b>Units</b>		<b>Unit Cost</b>
Merchandise Inventory, January 1	700	@	\$20.40
Purchases:			
February 2	500	@	21.00
		@	
April 5	1,000		24.00
June 1 5	600	@	2/.00
September 30	700	@	30.00
November 28	900	@	31.20
	4,400		
Sales:			
March 5	400		
July 18	1,200		
August 12	800		
October 15	900		
	3,300		

- Compute the ending inventory as of 2010 December 31, assuming use of perpetual inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).
- Compute the ending inventory as of 2010 December 31, assuming use of periodic inventory procedure, under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average.

**Alternate problem F** Refer to the data in alternate problem E

- Give the journal entries to record the purchases and sales (Cost of Goods Sold entry only) for the year under FIFO perpetual.
- Give the journal entries to record the purchases for the year and necessary year-end entries to charge Income Summary with the cost of goods sold for the year under FIFO periodic.

**Alternate problem G** Following are data related to a product of Coen Company for the year 2010:

	<b>Units</b>		<b>Unit Cost</b>
Merchandise Inventory, January 1	2,100	@	\$12.60
Purchases:			
March 10	1,500	@	12.00
May 24	3,000	@	11.20
July 15	1,800	@	10.50
September 20	2,100	@	9.00
December 1	2,700	@	10.00
Sales:			
April 5	1,400		
June 13	2,900		
October 9	2,300		
November 21	1,700		

- Assuming use of perpetual inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2) LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

b. Assuming use of periodic inventory procedure, compute the ending inventory and cost of goods sold under each of the following methods: (1) FIFO, (2), LIFO, and (3) weighted-average (carry unit cost to four decimal places and round total cost to nearest dollar).

**Alternate problem H** Star Company accounts for its inventory using the LIFO method under periodic inventory procedure. Data on purchases, sales, and inventory for the year ended 2009 December 31, are:

	Units		Unit Cost
Merchandise inventory, January 1	2,000	@	\$20
Purchases:			
January /	5,000	@	24
July 7	10,000	@	28
December 21	6,000	@	32

During 2009, 16,000 units were sold for USD 1,280,000, leaving an inventory on 2009 December 31, of 7,000 units.

- Compute the gross margin earned on sales during 2009.
- Compute the change in gross margin that would have resulted if the purchase of December 21 had been delayed until 2010 January 6.
- Recompute the gross margin assuming that 9,000 units rather than 6,000 units were purchased on December 21 at the same cost per unit.
- Solve parts (a), (b), and (c) using the FIFO method.

**Alternate problem I** Data on the ending inventory of Jannis Company on 2009 December 31, are:

Item	Quantity	Unit Cost	Unit Market
1	8,400	\$3.20	\$3.12
2	16,800	2.88	3.04
3	5,600	2.80	2.88
4	14,000	3.84	3.60
5	11,200	3.60	3.68
6	2,800	3.04	2.88

- Compute the ending inventory applying the LCM method to the total inventory.
- Determine the ending inventory by applying the LCM method on an item-by-item basis.

**Alternate problem J** The sales and cost of goods sold for Lively Company for the past five years were as follows:

Year	Sales (net)	Cost of Goods Sold
2004	\$ 9,984,960	\$ 6,240,600
2005	10,794,240	6,746,400
2006	12,346,560	7,716,600
2007	11,926,080	7,272,000
2008	12,747,840	7,920,000

The following information is for the seven months ended 2009 July 31:

Sales	\$7,748,000
Purchases	4,588,800
Purchase returns	28,800
Sales returns	173,760
Merchandise inventory, 2009 January 1	948,000

To secure a loan, Lively Company has been asked to present current financial statements. However, the company does not wish to take a complete physical inventory as of 2009 July 31.

- Indicate how financial statements can be prepared without taking a complete physical inventory.

b. From the data given, compute the estimated inventory as of 2009 July 31.

**Alternate problem K** Apple Company's records contained the following inventory information:

	<b>Cost</b>	<b>Retail</b>
Sales		\$420,000
Purchases	\$396,000	582,000
Purchase returns	8,400	12,000
Transportation-in	10,800	—
Merchandise inventory January 1	21,600	30,000

*Beyond the numbers—Critical thinking*

**Business decision case A** Susan Green and Carol Lewis, were interested in starting part-time business activities to supplement their family incomes. Both heard a presentation by the manufacturer of an exercise device and decided to become a distributor of this exerciser. Green's sales territory is Cobb County, and Lewis's sales territory is Gwinnett County. Each owns her own business.

To induce Green and Lewis to become distributors, the manufacturer made price concessions on the first 1,000 units purchased. The manufacturer sold the first 200 units at USD 15 each, the next 300 at USD 18 per unit, and the next 500 at USD 19 per unit. After that, Green and Lewis had to pay USD 20 per unit.

During the first year, each bought 1,200 units; coincidentally, both sold exactly 950 units for USD 27 each. Green had USD 2,600 of selling expenses; Lewis incurred USD 1,700 of selling expenses. (Green's expenses were considerably higher because on December 28 she distributed 4,000 sales brochures to households in her territory at a cost of USD 800. The brochures stressed that people would want to take off the extra pounds gained during the holiday season; also, these exercisers were inexpensive and could be used at home.)

At the end of the year, both had to determine their net incomes. Green received a B in the accounting course she took at State University. She remembered the FIFO inventory method and plans to use it. Lewis knows nothing about inventory costing methods. However, her husband is acquainted with the LIFO inventory method used at the company where he works. He will help her compute the cost of the ending inventory and the cost of goods using LIFO.

- Prepare income statements for Green and Lewis.
- Which business has performed better? Explain why.
- Determine the inventory turnovers for Green and Lewis.

**Business decision case B** Connie Dalton owns and operates a sporting goods store. On February 2 the store suffered extensive fire damage, and all of the inventory was destroyed. Dalton uses periodic inventory procedure and has the following information in her accounting records, which were undamaged:

Merchandise Inventory, January 1	\$ 80,000
Purchases:	
January 8	32,000
January 20	48,000
January 30	64,000
Net Sales:	
During January	240,000
February 1 and 2	16,000

Dalton's gross margin rate on net sales has been 40 per cent for the past three years. Her insurance company offered to pay USD 56,000 to settle this inventory loss unless Dalton can show that she suffered a greater loss. She has asked you, her CPA, to help her in determining her loss.

Answer these questions: Based on your analysis, should Dalton settle for USD 56,000? If not, how can she show that she suffered a greater loss? What is your estimate of her loss?

**Annual report analysis C** Refer to the financial statements of The Limited in the Annual Report Appendix. Describe how inventory values are determined (see Footnote 1). Also, determine the inventory turnover ratio for 2000.

**Ethics case – Writing experience D** Respond in writing to the following questions based on the ethics case concerning Terry Dorsey:

- Do you believe that Terry's scheme will work?
- What would you do if you were Terry's accountant?
- Comment on each of Terry's points of justification.

**Group project E** In teams of two or three students, interview the manager of a merchandising company. Inquire about inventory control methods, inventory costing methods, and any other information about the company's inventory procedures. As a team, write a memorandum to your instructor summarizing the results of the interview. The heading of the memorandum should include the date, to whom it is written, from whom, and the subject matter.

**Group project F** In a team of two or three students, locate and visit a nearby retail store that uses perpetual inventory procedure and a computerized inventory management system. Investigate how the system works by interviewing a knowledgeable person in the company. Write a report to your instructor and make a short presentation to the class on your findings.

**Group project G** With a small group of students, identify and visit a retail store that uses periodic inventory procedure and uses the retail inventory method for preparing interim (monthly or quarterly) financial reports. Discover how the retail inventory method is applied and how the end-of-year inventory amount is calculated. Write a report to your instructor summarizing your findings.

#### Using the Internet—A view of the real world

Visit the National Association of State Boards of Accountancy website at:

<http://www.nasba.org>

Find the address of the state board of accountancy in your state. Also check out some of the information provided at websites of other state boards by clicking on any sites that appear at the end of a listing for a particular state. In a report to your instructor, summarize what you learned about state boards at some of these sites.

Visit the Lexis-Nexis website at:

<http://www.lexis-nexis.com>

Determine the kinds of information that can be obtained at this site. Specifically, what kinds of products and services are available? What is the background of Lexis-Nexis? What pricing information is available for using its services? Write a report to your instructor summarizing your findings.

#### Answers to self-test

##### True-false

**False.** Overstated ending inventory results in an understatement of cost of goods sold and an overstatement of gross margin and net income.

**True.** The cost of goods sold consists of the earliest purchases at the lowest costs in a period of rising prices.

**False.** Under LCM, inventory is adjusted to market value only when the market (replacement) value is less than the cost.

**True.** The first step in the gross margin method is to estimate gross margin using the gross margin rate experienced in the past.

**True.** The cost/retail ratio is computed by dividing the cost of goods available for sale by the retail price of the goods available for sale.

**False.** Under perpetual procedure, the Cost of Goods Sold account is updated as sales occur.

##### Multiple-choice

**b.** The cost of ending inventory using FIFO consists of the most recent purchase:

$$\text{Cost of ending inventory} = 3,400 \times \text{USD } 36 = \text{USD } 122,400$$

**c.** The cost of goods sold using FIFO is:

$$\text{Cost of goods available for sale} = (3,000 \times \text{USD } 30) + (5,000 \times \text{USD } 36) = \text{USD } 270,000$$

$$\text{Cost of goods sold} = \text{USD } 270,000 - \text{USD } 122,400 = \text{USD } 147,600$$

**a.** The cost of ending inventory using LIFO is:

$$(3,000 \times \text{USD } 30) + (400 \times \text{USD } 36) = \text{USD } 104,400$$

**d.** The cost of goods sold using LIFO is:

$$\text{USD } 270,000 - \text{USD } 104,400 = \text{USD } 165,600$$

**a.** The cost of ending inventory using weighted-average cost is computed:

$$\text{Unit cost} = \text{USD } 270,000 \div 8,000 = \text{USD } 33.75$$

$$\text{Cost of ending inventory} = 3,400 \times \text{USD } 33.75 = \text{USD } 114,750$$

**c.** The cost of goods sold using weighted-average cost is:

$$\text{USD } 270,000 - \text{USD } 114,750 = \text{USD } 155,250$$

**b.** During a period of rising prices, FIFO results in the lowest cost of goods sold, thus the highest net income.

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