CHAPTER

8

Inventories: Cost Measurement and Flow Assumptions

OBJECTIVES

After reading this chapter, you will be able to:

1 Describe how inventory accounts are classified.

2 Explain the uses of the perpetual and periodic inventory systems.

3 Identify how inventory quantities are determined.

4 Determine the cost of inventory.

5 Compute ending inventory and cost of goods sold under specific identification, FIFO, average cost, and LIFO.

6 Explain the conceptual issues regarding alternative inventory cost flow assumptions.

7 Understand dollar-value LIFO.

8 Explain additional LIFO issues.

9 Understand inventory disclosures.

10 Record foreign currency transactions involving inventory (Appendix).

Keep Your Eye on the Ball

Effective management and control of inventory is critical to the profitability and overall performance of many companies. For example, **Wal-Mart** executives closely monitor the $26.612 billion of inventory reported in its 2004 annual report. With approximately 25% of its total assets represented by inventory, the level of inventory has widespread effects on its financial performance. Management of inventory involves widespread tasks such as making sure that a company has sufficient quantities of the right items, controlling shrinkage (the reduction of inventory because of theft or loss), and evaluating the impact of interest costs related to the debt financing of inventory. Company executives realize that effective inventory management may be the difference between operating success and failure. To enhance inventory management, Wal-Mart has begun implementing radio frequency identification (RFID), a scanning technology similar to bar codes that allows inventory to be tracked from the supplier to the final customer, and promises dramatic reductions in inventory losses.

In addition to merchandising companies such as Wal-Mart, manufacturing companies, such as **General Mills**, also face special challenges in management of its inventory. Proper inventory management can allow managers to achieve significant operational efficiencies and economies of scale. A well-functioning inventory system allows managers to take advantage of quantity

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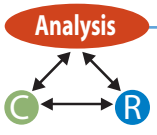
discounts in the purchase of inventory, increase productivity, and lower manufacturing costs through the scheduling of longer production runs. However, given the demand and supply uncertainties that exist in business, inventory also serves as a buffer to ensure that adequate goods exist that allow management to maintain desired service levels. Inventory decisions are not made in isolation. Because General Mills sells large amounts of inventory to Wal-Mart, the two companies are "partners" that have inevitable conflicts. For example, General Mills would like to deliver its products as soon as they are manufactured; however, Wal-Mart would prefer to receive the items when they are ready to put them on store shelves. The resolution of these intercompany conflicts is also a consideration in effective inventory management. Whether your company is a manufacturer or a merchandiser, inventory is something that will be watched closely.

For Further Investigation

For a discussion of recent innovations in inventory management, consult the Business & Company Resource Center (BCRC):

- "Radio Frequency Identification: The Wave of the Future," Harold E. Davis and Michael S. Luehlfing, *Journal of Accountancy*, 0021-8448, November 2004, v198, i5, p43–49.
- "NCR Corp.'s Retail-Checkout Technology Likely to Shape Future of Shopping," *Knight Ridder/Tribune Business News*, September 20, 2004.

Inventories are assets of a company that are (1) held for sale in the ordinary course of business, (2) in the process of production for sale, or (3) held for use in the production of goods or services to be made available for sale. Inventory specifically *excludes* any assets that a company does not sell in the normal course of business, such as marketable securities, or property, plant, and equipment that the company intends to sell.



Accounting for inventories is important because the purchase, manufacture, and sale of products are critical to the profitability of many companies. The cost (carrying value) of the inventory usually has a material effect on a company's balance sheet. Since the ending inventory of one period is the beginning inventory of the next period, the cost of the inventory on a company's balance sheet will have an effect on its cost of goods sold and net income of the next period. In addition, various accounting practices, such as alternative cost flow assumptions and valuation principles, are widely used and may have a significant effect on asset valuation and income determination. In this chapter we discuss the classifications of inventory, the perpetual and periodic inventory systems, the determination of inventory quantities and costs, and alternative inventory cost flow assumptions.

Classifications of Inventory

1 Describe how inventory accounts are classified.

A company may use several different accounts to classify inventory, depending on its business. A merchandising company, whether wholesale or retail, purchases goods for resale and *does not* alter their physical form. Consequently, it needs only one type of inventory account, usually called (**merchandise**) **inventory.** A manufacturing company *does* change the physical form of the goods and typically uses three inventory accounts, usually called **raw materials inventory, work in process inventory,** and **finished goods inventory.** We show the flow of inventory costs for these two types of companies in Exhibit 8-1. We discuss the three categories of inventory accounts used by a manufacturing company in the following sections. Both types of companies may use more accounts internally, and may combine account balances in their financial statements.

Raw Materials Inventory

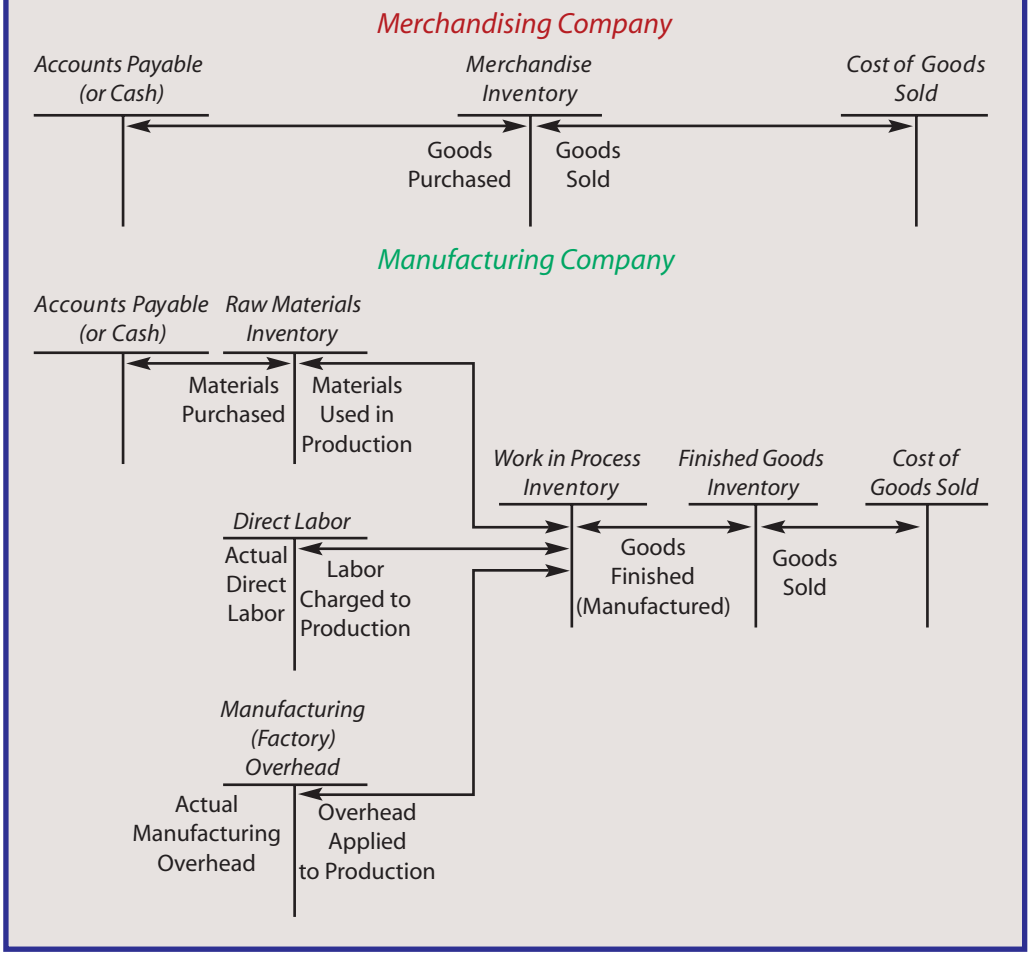
Raw materials inventory includes the tangible goods acquired for direct use in the production process. This inventory includes materials that a company acquired from natural sources, such as the iron ore used by a steel mill. Raw materials also may include products purchased from other companies, such as the steel or subassemblies used in the manufacture of appliances. Raw materials are different from **parts inventory,** which is the term often used for the inventory of replacement parts.

Sometimes, a company includes in raw materials inventory those materials that are not directly a part of its manufacturing process but are needed for its successful operation. However, the company often includes them in an account called **factory supplies, manufacturing supplies,** or **indirect materials.** Examples of materials in this category include lubricating oil and cleaning supplies.

Work in Process Inventory

Work (or goods) in process inventory includes the products that are started in the manufacturing process but are not yet complete. This partially completed inventory includes three cost components: (1) raw materials, (2) direct labor, which is the cost of the labor used directly in the manufacture of the product, and (3) manufacturing (or factory) overhead, which includes the costs other than raw materials and direct labor that are part of the manufacturing process. These latter costs include **variable manufacturing overhead,** such as supplies and some indirect labor, and **fixed manufacturing overhead,** such as insurance, utilities, and depreciation on the assets used in the production activities.

EXHIBIT 8-1 Flow of Inventory Costs



Finished Goods Inventory

Finished goods inventory includes the completed manufactured products awaiting sale. The inventory includes the same three cost components as the work in process inventory, but all the costs are combined into a single cost per unit for all the completed units.

Reporting Inventory in a Company's Financial Statements

A company reports the cost of the inventory that it sold as cost of goods sold on its income statement, and deducts the amount from net sales to determine its gross profit. A company reports the cash it paid to purchase or produce its inventory in the operating activities section of its statement of cash flows. The inventory cost that a company reports on its balance sheet is the final amount that results from a series of steps. First the company must decide what items to include in the inventory and count the physical inventory quantities. Then it must determine the costs of the units it purchased or produced during the accounting period, taking into consideration the costs for freight-in and the reductions for purchases discounts, returns, and allowances. The company uses a cost flow assumption to allocate the costs of the beginning inventory plus the units purchased or produced during the year between the ending inventory and the cost of goods sold. We discuss each of these steps in the following sections.

Inventories of Service Companies

A service company generally doesn't have a physical inventory. However, it often has an "inventory" of services that it has provided but not yet billed. For example, a company that provides computer consulting services will pay its employees each period but may only bill its services when certain "contract milestones" are reached. The company has an inventory of "unbilled services provided" that it reports as an asset, and then recognizes as an expense when it recognizes the revenue.

Alternative Inventory Systems

2 Explain the uses of the perpetual and periodic inventory systems.

A company may account for inventory quantities and costs using either the **perpetual system** or the **periodic system.**

Perpetual Inventory System

A company using a perpetual system keeps a continuous record of the physical quantities in its inventory. It records the purchase, or production, and use of each item of inventory in detailed subsidiary records, although it often only records units without including costs. A perpetual physical system allows management to plan and control the inventory and avoid stock-outs. To help inventory control and the preparation of periodic financial statements, many perpetual systems also include costs. Such systems are becoming much more common with today's computer-based accounting systems. For example, most retail stores use "point of sale" cash register systems in which each product has a unique code, such as the UPC code, that is entered into the system as each unit is sold. Some companies are adopting radio frequency identification technology (RFID) to track inventory by attaching RFID tags. Both UPC codes and RFID tags enable the retailer to immediately update its Inventory and Cost of Goods Sold accounts as each sale is made. A company maintains these accounts as summary accounts, which makes it possible to know the inventory and the cost of goods sold at all times. The company usually records purchases returns and allowances, purchases discounts taken, and freight-in in separate accounts that it uses to compute the income for the period.

When a company uses a perpetual system, it should take a physical count at least once a year to confirm the balance in the inventory account. Any difference between the physical count and the inventory account balance results from errors in recording, shrinkage, waste, breakage, theft, and other causes. The company adjusts its inventory account and also increases cost of goods sold (or recognizes a loss) for the cost of the difference in the two quantities so that the perpetual records are in agreement with the physical count. The size of the difference provides useful information for inventory control purposes and is another advantage of the perpetual system.

Periodic Inventory System

A company using a periodic system does *not* maintain a continuous record of the physical quantities (or costs) of inventory on hand. It takes physical counts periodically, which should be at least once a year and generally at the end of the year. This is the only time(s) when it knows the physical quantities on hand, and therefore the quantities used or sold during the period. The company determines the cost of the ending inventory by assigning costs to the physical quantities on hand based on the cost flow assumption it is using. Then it calculates the cost of goods sold by subtracting the ending inventory from the cost of goods available for sale. The cost of goods available for sale is the sum of the beginning inventory and either the net purchases for a merchandising company or the costs of the units produced for the period for a manufacturing company. This system is adequate for relatively low cost inventory items, particularly when the costs of a perpetual inventory system are likely to be greater than its benefits.

In the periodic system, a company typically does not record (debit) the costs of the purchases of inventory in an inventory account. This would lead to an overstatement of the permanent Inventory account, because the company does not reduce (credit) the account during the period for the cost of the inventory sold. Therefore, in a periodic system the company usually records (debits) costs of purchases of inventory in a temporary account, Purchases, while the beginning inventory cost remains in the Inventory account.

In both the perpetual and periodic systems, the company usually records purchases returns and allowances, purchases discounts taken, and freight-in in separate accounts. It uses each of these amounts in the computation of net purchases as follows:

$$\text{Net Purchases} = \text{Purchases} + \text{Freight-in} - \text{Purchases Returns and Allowances} - \text{Purchases Discounts Taken}$$

In summary, the difference between a perpetual and a periodic inventory system may be illustrated by the following equations:

Perpetual Inventory System

Beginning Inventory + Purchases (net) − Goods Sold = Ending Inventory

Periodic Inventory System

Beginning Inventory + Purchases (net) − Ending Inventory = Goods Sold

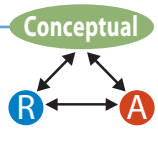
Note that you can think of each equation in terms of *units* or *costs*.

Items to be Included in Inventory Quantities

3 Identify how inventory quantities are determined.

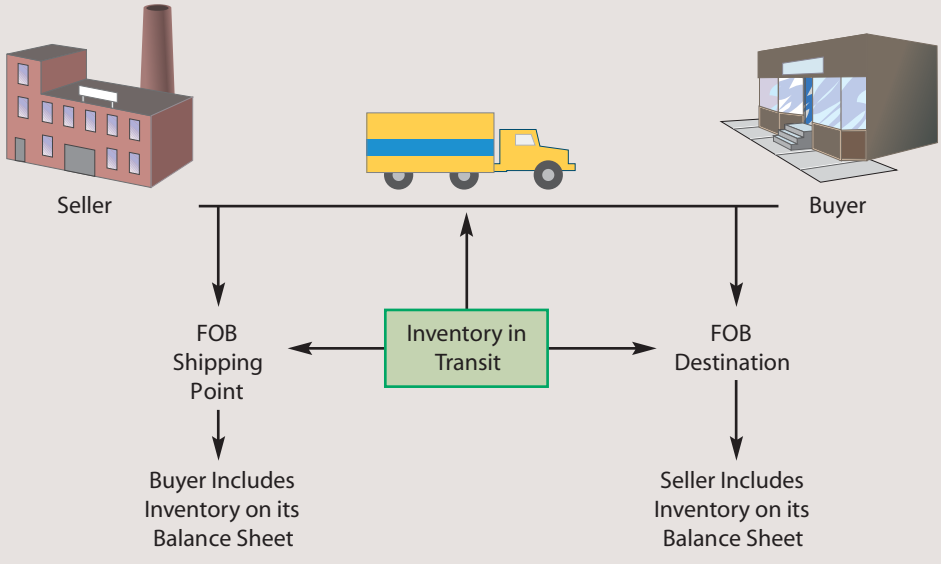
The basic criterion for including items in inventory is *economic control* rather than physical possession or legal ownership. In simple situations, all three occur at the same time. However, because there may be differences in more complex situations, the *economic substance* of the transaction should always take precedence over its *legal form* to determine whether the buyer or the seller has economic control. While control is often easy to determine, it may be affected by the following issues.

Goods are often shipped under one of two alternatives: **FOB** (free-on-board) **shipping point** or **FOB destination.** When goods are in transit at the end of the accounting period, the terms of shipment determine whether the seller or the buyer includes them in its inventory. **If the goods are shipped FOB shipping point, control of (and legal title to) the goods is transferred at the shipping point when the seller delivers them to the buyer,** or to a transportation company that is acting as an agent for the buyer. The buyer has economic control and includes those goods in its inventory, and the seller excludes them. **If goods are shipped FOB destination, control of (and legal title to) the goods is not transferred until the goods are delivered to the buyer's destination.** The seller has economic control and includes those goods in its inventory, and the buyer excludes them. We show these situations in Exhibit 8-2.



Economic control may also transfer before or after physical possession (and legal ownership) transfer. For example, suppose the buyer requests that the seller holds the goods to be delivered later, and the goods are segregated from the seller's other inventory so that the risk of ownership has passed to the buyer. In this case, control has passed and the seller should exclude the goods from inventory and the buyer should include them. This is known as a "bill and hold" sale. Also, goods may be transferred on **consignment.** As we discuss in Chapter 18, the company delivering the goods, the **consignor,** retains economic control (and ownership), while the company receiving the goods, the **consignee,** attempts to sell them. The consignor includes the goods in its inventory until they are sold by the consignee. Transfer of control may also be affected by product financing arrangements (discussed in Chapter 9), and by sales made when there is a right of return (discussed in Chapter 6).

EXHIBIT 8-2 Is It the Buyer's or Seller's Inventory?



Physical transfer of goods usually determines when the seller records the sale and the buyer records the inventory, respectively, in their accounting systems. However, both companies should adjust the recorded amounts in situations where physical possession is not consistent with economic control on the balance sheet date. However, companies may ignore these adjustments if the effects are not material.

As we discuss in Chapter 18, what a company includes in inventory depends on its revenue recognition decisions. A company first decides when it is appropriate to recognize revenue and then matches the cost of goods sold against that revenue. As it recognizes the cost of goods sold, it reduces its inventory.

Determination of Inventory Costs

4 Determine the cost of inventory.

There are two issues in determining inventory costs. We discuss the costs attached to each unit *available for sale* in this section. We discuss the costs attached to the *ending inventory* and *cost of goods sold* (the inventory cost flow assumption) later in this chapter.

The cost of inventory is the price paid or consideration given to acquire it.[1] Thus, **inventory cost includes costs directly or indirectly incurred in bringing an item to its existing condition and location**. For each item of inventory, purchased or manufactured, a company must make a decision as to whether or not each cost meets this definition. If it does, the company includes it in the cost of the inventory. If it does not, the company immediately recognizes it as an expense. The cost of purchased inventory should include the purchase price (net of purchases discounts, as we discuss later) plus payments directly related to the inventory, such as freight-in, receiving, unpacking, inspecting, storage, insurance, personal property taxes, sales and other applicable taxes, and similar costs. When a company purchases more than one type of inventory for a

1. "Restatement and Revision of Accounting Research Bulletins," *Accounting Research and Terminology Bulletins, Final Edition, No. 43* (New York: AICPA, 1961), ch. 4, par. 4; and "Inventory Costs—An Amendment of ARB No. 43, Chapter 4," *FASB Statement of Financial Accounting Standards No. 151* (Norwalk, Conn.: FASB, 2004).

single sum and it cannot identify the costs of each type, it should use the relative fair value method to apportion the cost, as we discuss in Chapter 10.

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Some costs that should be attached to inventor normally are excluded because of the cost/benefit relationship. For example, the costs of operating a purchasing department are necessary to bring the item to its existing condition and location, but the practical difficulties involved in allocating these costs to the separate inventories often exceed the benefits that result from not making an allocation. Also, **FASB Statement No. 151** requires that abnormal amounts of idle facility costs, freight and handling costs, and spoilage are expensed in the period and are *not* included in the cost of inventory.

Another cost that *may* be included in the cost of inventory is the interest cost for amounts a company borrowed to finance the purchase of the inventory. It can be argued that this interest cost is incurred indirectly in order to bring an item to its existing condition and location and, therefore, should be added to the inventory cost. Alternatively, it can be argued that borrowing costs are period costs associated with the general activities of the company, and none is related specifically to the acquisition of a particular inventory item. According to *FASB Statement No. 34*, interest costs are *not* included in the cost of inventory that is *routinely manufactured* (discussed in Chapter 10). However, interest cost is included in the cost of inventory that is manufactured over an extended period of time (as we discuss in Chapter 18).

When a company manufactures inventory, it adds the **product costs** that are directly and indirectly incurred in the production activity to the cost of inventory. The costs that it includes are acquisition and production costs (including manufacturing overhead). The company expenses **period costs**, such as general and administrative costs, except for the portion of such costs that are clearly related to production and thus are included in inventory costs. Selling costs are not associated with bringing the item to its existing condition and location. Instead, they are an expense of the period and not an inventory cost because they apply to the units sold during the period and not to the units held in inventory.

Purchases Discounts

Many sellers offer discounts to buyers to encourage prompt payment. These discounts, called purchases discounts, may be accounted for by the gross price method or the net price method. These methods raise questions about whether purchases discounts should directly affect a company's income or its inventory cost. They also can be used to show how efficient managment is.

Under the gross price method, a company records the purchase at the gross price and records the amount of the discount in the accounting system only if the discount is *taken*. This discount should be deducted from the purchase price of the inventory. **Under the net price method, a company records the purchase at its net price and records the amount of the discount in the accounting system only if the discount is**

not taken. This discount lost should be treated as a period expense.[2] We illustrate these two alternatives in Example 8-1 for a company that purchases $1,000 of goods under terms of 1/10, n/30 (a 1% discount is allowed if payment is made within 10 days; otherwise, full payment is due within 30 days).

EXAMPLE 8-1 Alternative Methods of Accounting for Purchases Discounts

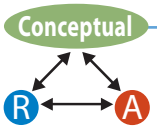
	Gross Price Method			Net Price Method		

To record the purchase	Inventory (or Purchases)
	  Accounts Payable
		1,000	
			1,000
				Inventory (or Purchases)
				  Accounts Payable
					990	
						990

To record payment within the discount period	Accounts Payable
	  Purchases Discounts Taken
	  Cash
		1,000	
			10
			990
				Accounts Payable
				  Cash
					990	
						990

To record payment outside the discount period	Accounts Payable
	  Cash
		1,000	
			1,000
				Accounts Payable
				Purchases Discounts Lost
				  Cash
					990
					10
						
						1,000

Adjusting entry at end of period if discount has expired and invoice is unpaid	No entry required			Purchases Discounts Lost Accounts Payable	10	 10



Conceptual Evaluation of the Two Methods

The correct inventory cost is the invoice price less all available discounts. Therefore, a company should treat the purchases discounts lost under the net price method as a financing expense for the period and should not include it in inventory cost, because **losing the discount does not increase the economic benefit to be derived from the inventory.** To be consistent, a company should treat the purchases discounts taken under the gross price method as a reduction in inventory cost. However, if some discounts were not taken, the inventory cost would include those discounts lost, even though they do not increase the economic benefits of the inventory. **Therefore, the correct inventory cost is always recorded under the net price method, but under the gross price method only if all discounts are taken** (or if the company makes an adjustment to remove the discounts lost from the cost of the inventory and records the cost as a financing expense).

Sometimes it is argued that the discounts taken under the gross method should be treated as an increase in income. This is not correct because the matching principle would be violated, since the discounts may relate to goods that have not yet been sold. Furthermore, a company does not earn income by buying goods and paying bills. **The revenue recognition principle requires that a sale of goods (or services) occur before a company recognizes income.** However, for practical reasons, a company may include purchases discounts in income; this is acceptable provided that the amount is not material. Retailing companies often follow this procedure.

Another advantage of the net price method is that it isolates the purchases discounts lost, thereby highlighting inefficiencies, which assists the management control process. For example, if a company purchases goods on terms of 2/10, n/30 and does not take the discount, it is paying 2% to delay payment by 20 days (the 30-day maximum less the 10 days allowed to take the discount), which is an approximate annual rate of 36% (2% × 360/20).

2. In a third method, the allowance method, the purchase is recorded at the net price, the accounts payable at the gross price, and the difference is debited to an allowance account. The allowance account is reduced by the difference between the cash paid to the supplier and the accounts payable balance. It is also adjusted for purchases discounts not taken.

The net price method can be criticized, though, because Accounts Payable does not represent the maximum amount of the liability that the company may be required to pay, although it does reflect the most likely amount if the company generally takes the discounts. However, the adjusting entry illustrated in Example 8-1 for expired discounts will ensure that the correct liability (the gross price) appears on the company's balance sheet. Despite the advantages of the net price method, the gross price method is more common because it is simpler to use and the results produced usually are not materially different from the net price method.

Purchases discounts are different from trade discounts. As we discussed in Chapter 7, **trade discounts are discounts deducted prior to arriving at the invoice price** and do not enter into the accounting system.

Secure Your Knowledge 8-1

- Common inventory classifications used by companies range from a single (merchandise) inventory account for merchandisers to raw materials inventory, work in process inventory, and finished goods inventory for manufacturers.
- Two alternative inventory systems may be used to account for inventory:
  - A perpetual inventory system, which makes inventory management and control easier, and keeps a continuous record of inventory quantities and cost of goods sold.
  - A periodic inventory system relies on physical counts of inventory to determine inventory quantities and cost of goods sold.
- Economic control is the key factor that a company should consider in determining whether an item is a part of inventory (substance over form).
- Inventory costs should include all costs (e.g., purchase price, freight-in, insurance, taxes) that are directly or indirectly incurred to obtain the inventory.

Cost Flow Assumptions

5 Compute ending inventory and cost of goods sold under specific identification, FIFO, average cost, and LIFO.

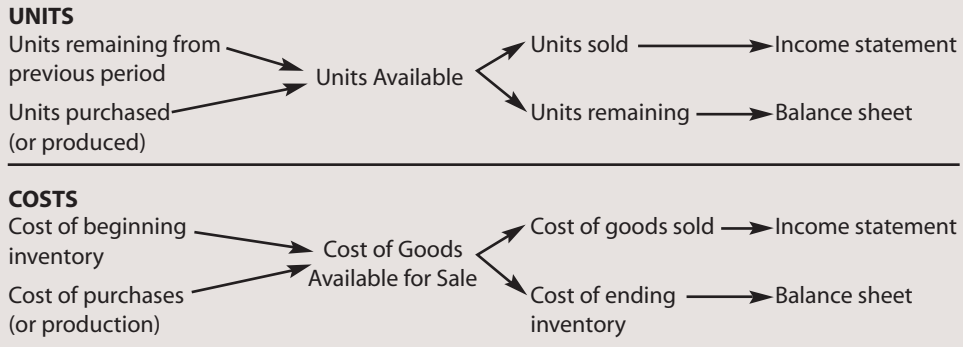
A company typically starts an accounting period with some units in the beginning inventory and then purchases or produces additional units during the period. Together these are the *goods available for sale*, which the company then either sells or retains in its ending inventory.

For financial statement purposes, a company must attach *costs* to these units. The cost of the beginning inventory (the cost of the ending inventory of the preceding period) is the beginning balance in the Inventory account. The beginning balance in Inventory plus the cost of purchases or production (discussed earlier) is the *cost of the goods available for sale*. This total cost is allocated between the cost of goods sold and ending inventory using a *cost flow assumption*. The major cost flow assumptions are specific identification; first-in, first-out (FIFO); average cost; and last-in, first-out (LIFO). We show both the unit relationship and the cost flow relationship in Exhibit 8-3.

Cost flow assumptions are important for two reasons. First, a company has inventories at each year-end. If there were none, all the cost of goods available for sale would be transferred to cost of goods sold. Second, the costs of purchases and production change during the year. If these costs did not change, all units would have the same cost. Therefore, alternative cost flow assumptions would not affect the cost of goods sold or the ending inventory. Note that we are discussing *cost* flow assumptions here. There is no requirement that they be related to the *physical* flow (except for the specific identification method).

We discuss each cost flow assumption in the following sections and apply it to both the perpetual and the periodic inventory systems using the information for the Dalton

EXHIBIT 8-3 Illustration of Unit and Cost Flow Relationships



Company shown in Example 8-2. Recall that under the periodic system, the ending inventory is computed before the cost of goods sold, whereas under the perpetual system, the cost of goods sold is calculated first. To make the example less complicated, we use a merchandising company, although a manufacturing company uses the same principles.

EXAMPLE 8-2 Inventory Inflows and Outflows for Dalton Company

Inventory, April 1	100	units @ $10 per unit	$1,000
Purchases, April 10	80	units @ $11 per unit	880
Purchases, April 20	70	units @ $12 per unit	840
Goods Available for Sale	250	units	$2,720

Sales, April 18	(90)	units	140 units
Sales, April 27	(50)	units	
Inventory, April 30	110	units	

Notes: (1) The beginning inventory is valued at $10 per unit for all the flow assumptions. However, if costs are changing, this value would be different for different flow assumptionsbecause the beginning inventory for the current period is the ending inventory of the preceding period.
(2) The company uses a monthly accounting period.

Specific Identification

Under the specific identification inventory cost flow assumption, a company identifies each unit sold and each unit remaining in the ending inventory and includes the actual costs of those units in cost of goods sold and ending inventory, respectively. For example, the company must specifically identify each unit sold on April 27. If all the units are from beginning inventory, the company's cost of goods sold is $10 for each unit. However, if they are from the units purchased on April 10 or April 20, its cost of goods sold would be either $11 or $12 for each unit, respectively. Similarly, the company must identify each unit in the ending inventory and attach the appropriate cost of $10, $11, or $12 to it.

The specific identification method can be applied in either a perpetual or a periodic inventory system. However, it is more reasonable to use it with a perpetual system in which each unit is identified as it is sold and the appropriate cost attached. While the specific identification method seems simple and matches costs as expenses against revenues, there are significant objections to its use. It may be practical in a few situations in

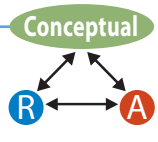
which units are costly and can be easily distinguished (for example, a car dealership). But, in many complex manufacturing and retailing situations it is not practical to apply the specific identification method because the cost of each individual unit is not identifiable (e.g., a single can of soup), and it is not known which specific units are sold. In addition, as volume increases, so does the cost of record keeping, and the method may become too expensive to use.

Another argument against the method is that the amount of profit varies even though the units of inventory are identical. Continuing the preceding example, if the units were sold on April 27 for $30, then using a $10 unit or a $12 unit for sale would make the gross profit either $20 per unit or $18 per unit, respectively. In summary, the specific identification method can produce ending inventory and cost of goods sold amounts at the two extremes of FIFO and LIFO, or at values in between. This ability of a company's management to select, or "manipulate," its profits is not desirable. However, the method is appropriate if each item is unique. We do not show any summary amounts in this section because they are so dependent on the assumptions regarding the particular units selected for sale.

First-In, First-Out (FIFO)

Under the FIFO cost flow assumption, a company includes the earliest costs incurred in the cost of goods sold, and includes the most recent costs in the ending inventory. We show these relationships as follows:

In other words, the first costs incurred are the first transferred to cost of goods sold. Consequently, the ending inventory consists of the most recent costs incurred. Therefore, in periods of rising costs, FIFO produces a lower cost of goods sold amount based on older and lower costs. However, the ending inventory is based on the most recent and higher costs, as we discuss in the evaluation section later in this chapter.



If the Dalton Company uses the periodic method, it computes the ending inventory of $1,280 first, as we show in Example 8-3. The ending inventory of 110 units is based on the most recent costs incurred. It includes 40 units purchased on April 10 for $11 each and 70 units purchased on April 20 for $12 each. The company calculates the cost of goods sold of $1,440 by subtracting the ending inventory from the cost of goods available for sale as we show in Example 8-3. Therefore, it is based on the earliest costs incurred and includes the beginning inventory of 100 units at $10 each and 40 units from the April 10 purchase at $11 each.

EXAMPLE 8-3 FIFO Cost Flow Assuption (Periodic Inventory System)

Ending Inventory (110 units):

40 units @ $11	$ 440
70 units @ $12	840
	$1,280

Cost of Goods Sold (140 units):

Beginning Inventory	+	Purchases	–	Ending Inventory	=	Cost of Goods Sold
$1,000	+	$1,720	–	$1,280	=	$1,440

If the Dalton Company uses the perpetual inventory system (for costs as well as physical quantities), it calculates the cost of goods sold of $1,440 and the ending inventory of $1,280 as we show in Example 8-4. The $1,440 cost of goods sold for 140 units is based on the earliest costs incurred. For the April 18 sale, the 90 units have a cost of $10 per unit (from the beginning inventory). For the April 27 sale of 50 units, 10 units have a cost of $10 per unit from the beginning inventory and 40 units have a cost of $11 per unit (from the April 10 purchase). The company determines the $1,280 ending inventory by deducting the $1,440 cost of goods sold from the $2,720 cost of goods available for sale. The ending inventory is 110 units and includes the most recent costs: the cost of the remaining 40 units from the first purchase on April 10 and the 70 units purchased on April 20.

EXAMPLE 8-4 FIFO Cost Flow Assuption (Perpetual Inventory System)

Cost of Goods Sold (140 units):

April 18	90 units @ $10	$ 900
April 27	50 units: 10 units @ $10	100
	40 units @ $11	440
Total		$1,440

Ending Inventory (110 units):

Beginning Inventory	+ Purchases	– Cost of Goods Sold	= Ending Inventory
$1,000	+ $1,720	– $1,440	= $1,280*

*40 units @ $11	=	$ 440
70 units @ $12	=	840
		$1,280

Note that the ending inventory and the cost of goods sold under both the perpetual and the periodic systems are identical; this always is true for the FIFO cost flow assumption because the most recent costs incurred always are included in the ending inventory.

Average Cost

Under the average cost flow assumption, a company considers all the costs and units to be combined so that no individual units or costs are identified. When a company uses the periodic inventory system, the average cost method is known as the **weighted average** method. The company calculates the cost of the units for the period based on the cost of the beginning inventory and the average cost of the units purchased or manufactured, weighted according to the number of units at each cost. In other words, **under the weighted average method, the average cost per unit for the period is the cost of goods available for sale divided by the number of units available for sale.** The company uses this average cost for both its ending inventory and the cost of goods sold.

The weighted average unit cost for the Dalton Company in April is $10.88 (the cost of goods available for sale of $2,720 ÷ the number of units available for sale of 250), as we show in Example 8-5. It records the ending inventory at this $10.88 cost per unit, resulting in a total cost of $1,197. The company computes the $1,523 cost of goods sold by deducting the ending inventory from the cost of goods available for sale of $2,720. It is also equal to the 140 units sold multiplied by the $10.88 weighted average cost.

When a company uses the average cost method under a perpetual inventory system (for costs as well as physical quantities), the same principles are applied. But it is known as

EXAMPLE 8-5 Weighted Average Cost Flow Assumption (Periodic Inventory System)

Cost of goods available for sale ($1,000 + $1,720)	$2,720
Units available for sale	250
Average cost (Cost ÷ Number of units)	$10.88
Ending inventory (110 units @ $10.88)	$1,197

Beginning Inventory	+ Purchases	– Ending Inventory	= Cost of Goods Sold
$1,000	+ $1,720	– $1,197	= $1,523

a **moving average** method because a new weighted average cost must be calculated after *each* purchase, as we show in Example 8-6. The new weighted average is computed in the same way as in the weighted average method. That is, **under the moving average method, the average cost per unit is the cost of the units available for sale after the purchase divided by the number of units available for sale at that time.** This average cost is used to determine the cost of each sale made until the next purchase, when a new average cost is calculated. The average cost after the April 10 purchase is $10.44 (cost of goods available for sale of $1,880 ÷ the number of units available for sale of 180). Therefore, the sales on April 18 have a cost of $10.44 per unit for a total cost of goods sold of $940. The purchase on April 20 increases the average cost to $11.125 per unit, and therefore the 50 units sold on April 27 have a total cost of $556. The total cost of goods sold for April is $1,496 ($940 + $556). The company records the ending inventory at the final average cost for the period, which it calculates after the last purchase. The cost of $11.125 per unit for the 110 units results in a total ending inventory of $1,224 (see Example 8-6).

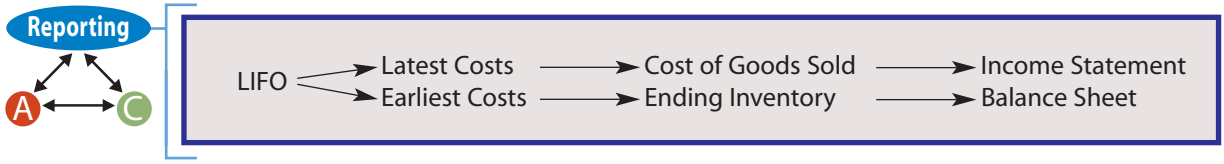
EXAMPLE 8-6 Moving Average Cost Flow Assumption (Perpetual Inventory System)

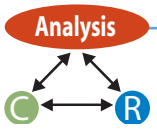
April 1, Beginning Inventory	100	units @ $10	$ 1,000
April 10, Purchases	80	units @ $11	880
April 10, Balance	180	units @ $10.44	$ 1,880
April 18, Sales	(90)	units @ $10.44	(940)
April 18, Balance	90	units @ $10.44	$ 940
April 20, Purchases	70	units @ $12	840
April 20, Balance	160	units @ $11.125	$ 1,780
April 27, Sales	(50)	units @ $11.125	(556)
April 30, Balance	110	units @ $11.125	$ 1,224
Cost of Goods Sold (140 units)	$940 + $556		$ 1,496
Ending Inventory (110 units @ $11.125)			$ 1,224

Last-In, First-Out (LIFO)

Under the LIFO cost flow assumption, a company includes the most recent costs incurred in the cost of goods sold, and includes the earliest costs (part or all of which

are costs incurred in previous periods) in the ending inventory. We show these relationships as follows:





Therefore, in periods of rising costs, LIFO produces a higher cost of goods sold figure based on the most recent costs. However, the ending inventory is based on the oldest and lowest costs. We discuss the logic behind this procedure later in this chapter.

If the Dalton Company uses the periodic inventory system, it gives no consideration to the timing of the individual sales. It calculates the ending inventory of $1,110 and the cost of goods sold of $1,610 as we show in Example 8-7. The ending inventory includes the earliest costs, which are the cost of the beginning inventory and the cost of the 10 units from the first purchase on April 10. The company computes the cost of goods sold by subtracting the ending inventory from the cost of goods available for sale. This implicitly includes the cost of the 70 units purchased on April 20 ($840) and the cost of 70 units purchased on April 10 ($770).

EXAMPLE 8-7 LIFO Cost Flow Assumption (Periodic Inventory System)

Ending Inventory (110 units):

100 units @ $10	$1,000
10 units @ $11	110
	$1,110

Cost of Goods Sold (140 units):

Beginning Inventory	+	Purchases	–	Ending Inventory	=	Cost of Goods Sold
$1,000	+	$1,720	–	$1,110	=	$1,610

If the Dalton Company uses the perpetual inventory system (for costs as well as physical quantities), it calculates the cost of goods sold for each sale at the cost(s) of the most recent purchase(s). The $1,580 cost of goods sold for 140 units includes the sale of 90 units on April 18, and 50 units on April 27, as we show in Example 8-8. For the April 18 sale, 80 of the 90 units have a cost of $11 each from the April 10 purchase and 10 units have a cost of $10 each from the beginning inventory. The 50 units on April 27 have a cost of $12 from the April 20 purchase. The company computes the $1,140 ending inventory by deducting the $1,580 cost of goods sold from the $2,720 cost of goods available for sale. It consists of 110 units and includes the earliest costs: the cost of the 90 units left from the beginning inventory and the remaining 20 units from the April 20 purchase.

Note that the cost of goods sold and the ending inventory are *not* the same for the LIFO perpetual method and the LIFO periodic method because of different assumptions about the timing of the sales. Under the periodic method, the whole accounting period (a month in this example) is treated as a single time period, and all the sales are assumed to take place after all the units have been purchased during the period. Therefore, the cost of goods sold includes the costs of the *most recent purchases of the period*. Under the perpetual method, each event is recorded as it occurs. Therefore, the cost of goods sold is calculated when each sale is made and includes the costs of the *most recent purchase(s) at that time*.

EXAMPLE 8-8 LIFO Cost Flow Assumption (Perpetual Inventory System)

Cost of Goods Sold (140 units):

April 18	90 units: 80 units @ $11	$ 880
	10 units @ $10	100
April 27	50 units @ $12	600
		$1,580

Ending Inventory (110 units):

Beginning Inventory	+	Purchases	−	Cost of Goods Sold	=	Ending Inventory
$1,000	+	$1,720	−	$1,580	=	$1,140*

*90 units @ $10 = $ 900
20 units @ $12 = 240
$1,140

In the Dalton Company example, unit sales are less than unit purchases for the period. Therefore, under the *periodic* inventory system, the company does *not* include costs from the beginning inventory in cost of goods sold. However, the first sale in the month is larger than the first purchase. Therefore, under the *perpetual* inventory system, the company includes the costs of 10 units of its beginning inventory in cost of goods sold. Furthermore, under the perpetual system, the second sale of 50 units has a cost of $12 per unit from the second purchase, leaving 20 units of that purchase in inventory. However, under the periodic system, the company includes the entire purchase of units at $12 each in its cost of goods sold, leaving none in inventory. These factors explain the difference of $30 in the cost of goods sold and the ending inventory between the two methods.

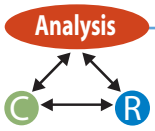
In each case the LIFO ending inventory of the Dalton Company consists of two layers. Each period in which the number of units in inventory *increases*, the company adds a layer of costs to its LIFO inventory. When the number of units in inventory *decreases*, the company removes costs from its beginning inventory of the period in the reverse order in which it added them—that is, it removes the most recent layers first and includes them in cost of goods sold.

Comparison of Inventory Cost Flow Assumptions

We summarize the cost of goods sold and the inventory amounts for the Dalton Company calculated in the preceding examples in Example 8-9. However, we exclude the specific identification method because, as we discussed previously, the results are dependent on the assumptions regarding the particular units selected for sale.

EXAMPLE 8-9 Effects of Inventory Cost Flow Assumptions

Cost Flow Assumption and Method	Cost of Goods Available for Sale	Cost of Goods Sold	Ending Inventory
FIFO, periodic	$2,720	$1,440	$1,280
FIFO, perpetual	2,720	1,440	1,280
Weighted average, periodic	2,720	1,523	1,197
Moving average, perpetual	2,720	1,496	1,224
LIFO, periodic	2,720	1,610	1,110
LIFO, perpetual	2,720	1,580	1,140



In this example, costs rose throughout the period. As a result, the FIFO method produces the lowest cost of goods sold because it includes the oldest and lowest costs. Since the cost of goods sold is lowest, the gross profit (and income) is highest. Correspondingly, the ending inventory using FIFO has the highest cost because it includes the most recent and highest costs. In contrast, the LIFO method produces the highest cost of goods sold and the lowest gross profit (and income) because it includes the most recent and highest costs. The LIFO ending inventory is lowest because it includes the earliest and lowest costs. The average cost amounts are between the FIFO and LIFO extremes because the ending inventory and the cost of goods sold include an average of both the lower and higher costs of the period. Note that this example is simplified because we assumed that the beginning inventory was $10 per unit for FIFO, average, and LIFO. When an inventory cost flow assumption is used in consecutive periods, the beginning inventory in each period is different under the alternative cost flow assumptions.

The Dalton Company was experiencing rising costs, but if costs were falling consistently, the opposite relationships would occur. The use of LIFO would produce a higher ending inventory, a lower cost of goods sold, and a higher gross profit (and income) than FIFO. When costs fluctuate, no general relationships can be described. The differences between the amounts under the periodic and the perpetual inventory systems for each cost flow assumption result from the different calculations and not from any differences in the logic underlying the cost flow assumptions.

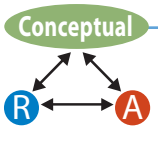
Conceptual Evaluation of Inventory Cost Flow Assumptions

6 Explain the conceptual issues regarding alternative inventory cost flow assumptions.

Many arguments are made in favor of each of the alternative cost flow assumptions. These arguments focus on a comparison of LIFO and FIFO, although the average cost method may be considered as similar to FIFO for this discussion. Sometimes, the FIFO and average cost methods are referred to as nonLIFO methods. Initially, our discussion assumes that inventory costs are rising. The advantages of LIFO are that it provides a better measure of income in times of rising costs, and it results in the payment of less income taxes. The disadvantages of LIFO are the impact of the liquidation of LIFO layers, the possibility of income manipulation, the inventory valuation on the balance sheet, and the lack of comparability among companies using LIFO. There also are several issues involved in selecting a method. We discuss and evaluate each of these issues in the following sections. In addition, we discuss specific arguments that relate solely to the average cost method. We discussed the arguments for and against the specific identification method earlier in the chapter.

Income Measurement

For financial reporting, the basic criterion a company uses to select a cost flow assumption is to achieve a "proper determination of income through the process of matching appropriate costs and revenues."[3] **There is no requirement that the assumed flow of costs be related to the actual physical flow of goods.** Most companies use a FIFO method for the physical management of inventory to reduce the likelihood of obsolescence. Such companies may use any of the alternative cost flow assumptions in their financial statements.



But what are "appropriate" costs? Unfortunately, there is no simple answer as to whether income is better measured under LIFO or FIFO. Both methods match historical costs with revenues, but **the major argument in favor of LIFO is that it matches the most recent costs with revenue.** The most recent costs are closer to replacement costs. Therefore, LIFO excludes from a company's income some (but not all) of the holding gains, so that the income reflects the earnings after capital has been maintained and is a

3. *Accounting Research and Terminology Bulletins, Final Edition, op. cit.*

better measure of the increase in wealth of the company. **A holding gain (or inventory profit) is the difference between the historical cost and the replacement cost of units sold.** In contrast, FIFO matches the earliest costs with revenue and *includes* all the holding gains in income.

In the Dalton Company example, when the company sells a unit on April 27 for $30, if the unit cost of the goods sold is $10 (FIFO) and the most recent acquisition cost was $12 per unit, the gross profit of $20 per unit (the selling price of $30 minus the cost of $10) includes a holding gain of $2 per unit (the most recent cost to replace the inventory of $12 less the cost of $10). The LIFO method records in cost of goods sold the cost of $12 per unit, resulting in a gross profit of $18 per unit, thereby *excluding* the holding gain of $2 from income. We show these two alternatives in Example 8-10. To continue this example, suppose that the company started with $10 cash, which it used to purchase a unit of inventory. When the company sells that unit for $30, it recognizes $20 of income under FIFO. If the company distributes the $20 income as a dividend, it is left with $10 cash, which is not enough to purchase a unit of inventory at its higher price of $12. Thus the income of $20 includes a holding gain of $2, which is not real income since the company cannot distribute it to the owners without leaving it worse off in terms of its ability to maintain the same level of inventory.

EXAMPLE 8-10 Alternative Cost Flow Assumptions and Holding Gains (per Unit)

	FIFO	LIFO ($12)	LIFO ($11)
Revenue	$30	$30	$30
Cost of goods sold	(10)	(12)	(11)
Gross profit	$20	$18	$19
Holding gains (excluded from income)		2	1
		$20	$20

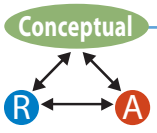
In this example, the LIFO method excluded all the holding gains. However, in other situations, it may not exclude them all. Under LIFO the Dalton Company included units at $11 per unit in the cost of goods sold (for the periodic method), whereas the most recent purchase price was $12 per unit. Therefore, the income included holding gains of $1 on each of these units. We also show this alternative in Example 8-10.

Also note that if the replacement cost of the inventory was $13 at the end of the month, the Dalton Company has not achieved the matching of current costs with revenue, even on the $12 units, and would include even more holding gains in income. In summary, it can be seen that "matching appropriate costs and revenues" is interpreted very widely. FIFO, LIFO, average cost, and specific identification all match historical cost with revenue, and are generally accepted accounting principles.

Income Tax Effects

As we have seen, LIFO produces the highest cost of goods sold and the lowest income under conditions of rising costs. Although it might be thought that a company would consider it undesirable to report low *accounting* income, it must be remembered that lower *taxable* income results in payment of lower income taxes. For example, three long-time LIFO users—**Exxon, General Motors,** and **General Electric**—have together saved more than $2 billion in taxes compared to what they would have paid using FIFO.

The use of LIFO for the computation of federal income taxes presents a special situation. The Internal Revenue Code permits a company to use LIFO for income tax purposes



only if it also uses LIFO in its financial statements. This requirement is known as the **LIFO conformity rule.** A company might prefer to report a higher income for accounting purposes when costs are rising by using FIFO even though, as discussed before, its income is overstated because it includes holding gains. The LIFO conformity rule prevents a company from having "the best of both worlds" by using FIFO for financial reporting and LIFO for income taxes. This is in contrast to many situations in which a company can use different methods (e.g., when it uses straight-line depreciation for financial reporting and accelerated depreciation for income tax reporting). A company must decide whether it is willing to report a lower accounting income in order to achieve the advantages of the real economic benefits of reduced cash payments for income taxes.

Because of rulings by the Internal Revenue Service that allow a company using LIFO more latitude in the supplementary reporting of cost of goods sold and income on a FIFO basis, the Securities and Exchange Commission issued a ruling indicating how such disclosures should be made.[4] Also, since there was a lack of authoritative literature on the specifics of applying LIFO in complex situations, the tendency was to follow the income tax rules, which were much more specific. Since this did not always lead to appropriate financial reporting, the AICPA published an *Issues Paper* that was endorsed by the SEC, thereby giving it authoritative status.[5] The specific topics included in these two publications are beyond the scope of this book.

The Tax Reform Act of 1986 established "uniform capitalization rules" that require a company to include in inventory certain costs that previously it expensed as incurred for tax purposes. These costs include such items as purchasing, warehousing, and distribution costs, including related officer salaries and administrative costs. Because a cost must be capitalized for income tax purposes does not mean that capitalizing it for financial reporting is preferable, or even appropriate. Each situation must be analyzed based on the particular circumstances. The likely result in many situations is that inventory cost is different between financial reporting and income tax reporting.

Liquidation of LIFO Layers

A company using the LIFO method may liquidate inventory during a period. This occurs when the number of units in ending inventory is less than the number in beginning inventory because unit sales are more than the units acquired during the period. Therefore, some of the beginning inventory costs are included in cost of goods sold. In other words, the layers of LIFO inventory costs added in previous periods are removed in reverse order; the last costs added are the first expensed. Assuming rising costs, these units have lower costs attached to them; thus cost of goods sold is lower and gross profit (and income) is higher than if the liquidation did not occur. This increased amount of income is often referred to as a **LIFO liquidation profit.**

Many companies adopted LIFO in 1939 when the method was first allowed to be used by all companies for income tax purposes, and also in the higher inflation period between 1975 and 1985. Therefore, a company's LIFO liquidation profit may be significant because it includes some very old costs in cost of goods sold. An extreme example of LIFO liquidation profits occurs when a company liquidates its inventory down to the base (the beginning inventory in the year it adopted LIFO). In summary, liquidations bring units with a cost from previous years into cost of goods sold and produce an unrealistically high income.

4. "Codification of Financial Reporting Policies," *SEC Accounting Rules* (Chicago: Commerce Clearing House, August 2005), sec. 205.
5. "Identification and Discussion of Certain Financial Accounting and Reporting Issues Concerning LIFO Inventories," *Issues Paper* (New York: AICPA, 1984), and "LIFO Inventory Accounting Practices for Financial Statement Purposes," *Staff Accounting Bulletin 58* (Washington, D.C.: SEC, 1985).

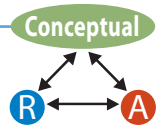
Example: LIFO Liquidation Profit To illustrate the concept of a LIFO liquidation profit, assume that a company was formed in 2003. Its 2007 beginning inventory of $644,000 is made up of four layers as follows:

2003:	10,000 units at $20 per unit =	$200,000
2004:	6,000 units at $22 per unit =	132,000
2005:	8,000 units at $24 per unit =	192,000
2006:	4,000 units at $30 per unit =	120,000
Inventory, January 1, 2007		$644,000

In 2007 the company purchases (or manufactures) 50,000 units at $35 per unit but sells 60,000 units. The company has an inventory liquidation of 10,000 units. It includes these 10,000 units in cost of goods sold at the most recent beginning inventory costs; that is, the most recently added layers. Therefore, the company's cost of goods sold for 2007 includes costs from 2007, 2006, and 2005, as follows:

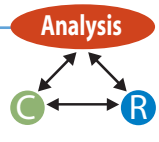
50,000 units at $35 per unit =	$1,750,000	(2007 costs)
4,000 units at $30 per unit =	120,000	(2006 costs)
6,000 units at $24 per unit =	144,000	(2005 costs)
60,000	$2,014,000	

If, instead, the company had purchased (or produced) 60,000 units at $35 each (thus avoiding the LIFO liquidation), the company would have had a cost of goods sold in 2007 of $2,100,000 (60,000 units × $35 per unit) consisting entirely of 2007 costs. The difference of $86,000 ($2,100,000 − $2,014,000) is the LIFO liquidation profit (before income taxes). If we assume an income tax rate of 30%, the effect of the LIFO liquidation is to increase gross profit by $86,000, income tax expense by $25,800 ($86,000 × 30%), and net income by $60,200 ($86,000 × 70%). Note that the company's income is higher (because cost of goods sold includes older and lower costs) even though there is **no economic substance to the higher income, and the company pays the additional income taxes** (because of the higher taxable income reported under the LIFO conformity rule). A company that reports to the SEC is required to disclose the amount of its LIFO liquidation profit so that users of the financial statements may obtain a better understanding of the profit earned by the company. For example, **Eastman Kodak Company** reported LIFO liquidation profits of $69 million and $45 million in 2004 and 2003, respectively. ♦



Earnings (Income) Management

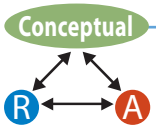
As we have seen, a company's liquidation of inventory under LIFO, whether intentional or not, results in higher income (assuming rising costs). Such a liquidation may be caused by economic factors beyond the control of the company, such as a strike or a scarcity of raw materials, or as a result of a management decision such as the adoption of a "just-in-time" inventory system, which results in a permanent reduction in the size of the inventory. Also a liquidation may be deliberately created by delaying purchases. Intentional liquidation to artificially increase income is a significant concern. If a company is facing a period of lower income, management can increase income intentionally by liquidating inventory. This can be achieved by delaying purchases until after the end of the fiscal year.



Also, a company may influence (manage) its income by increasing its purchases. To illustrate, refer back to the Dalton Company periodic LIFO example and assume that the company purchased an additional 40 units on April 29 at $12 per unit. Total purchases then would be $2,200 ($1,720 + $480). The ending inventory would then consist of 150 units (110 + 40) and have a cost of $1,550 (100 units at $10 each from the beginning

inventory + 50 units at $11 each from the April 10 purchase). The cost of goods sold would be computed as follows:

Beginning Inventory	+	Purchases	−	Ending Inventory	=	Cost of Goods Sold
$1,000	+	$2,200	−	$1,550	=	$1,650

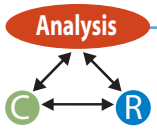


Thus purchasing additional units has increased cost of goods sold by $40 ($1,650 − $1,610) even though unit sales remain unchanged. **It is inconsistent with the revenue recognition principle for income to be affected by the purchasing activities of a company,** but it is an inevitable result of the LIFO method. The FIFO and average cost methods do not produce unusual results when inventory liquidation occurs, nor are they as susceptible to earnings management.

Management should make decisions about purchasing or manufacturing inventory on the basis of economic and operating factors. The use of LIFO, however, allows management to influence the company's income through the acceleration of, or delay in, acquiring inventory.

Inventory Valuation

The LIFO method produces a lower ending (and beginning) inventory value on a company's balance sheet (again assuming rising costs) because the oldest costs remain in this inventory. The recorded amount of this inventory often has little or no relationship to the costs of the current period or to the costs that will be incurred to replace the inventory, and therefore is *not relevant*. This low valuation affects the computation and evaluation of current assets, working capital, total assets, and any financial ratios that include inventory, thereby *reducing comparability* between companies using LIFO and those using FIFO. Furthermore, comparability between two or more companies using LIFO is impaired, because each company's inventory valuation depends on the year in which it adopted LIFO. For example, if companies in the same industry adopted LIFO in different years, each company's LIFO base will include costs of different years. (The year of adoption is *not* a required disclosure.) In addition, if the companies increase their inventories by different amounts in later years, the additional LIFO layers were added at different costs.



Therefore, a user evaluating a company that uses LIFO should always convert the inventory to nonLIFO (FIFO or average) amounts. As we show later, a company that uses LIFO and files with the SEC must disclose the nonLIFO value of its inventory.

The FIFO method produces a higher ending inventory value on the balance sheet (assuming rising costs) because it includes the most recent costs. This value approximates the costs that will be incurred to replace the inventory, but how closely depends on when the purchases included in the ending inventory were made and how fast costs are rising. Therefore, the FIFO inventory value is more *relevant*.

Average Cost

The average cost method is based on the assumption that during the period a company combines all the costs so that the unit costs included in cost of goods sold are the same as those remaining in inventory. Thus the method produces the same cost in a particular period for identical units that have the same utility. The weighted average method treats the accounting period as a single time period and produces the same unit cost for cost of goods sold and ending inventory. The general principle underlying the moving average method is the same, except that the period used is the time between the respective purchases. The same unit cost is used for the sales made in that time period and for the inventory at the end of that period. However, over the total accounting period, the unit costs used for the cost of goods sold vary as each purchase is made, and the unit cost for the ending inventory is the average cost calculated after the last purchase of the period.

The disadvantage of the average cost method is that the average is affected by the costs incurred in previous periods. Although the influence from these past periods becomes minimal as time passes, it still means that the average cost does not reflect the actual costs paid, either for the units sold or for those held in inventory in the current period.

Link to Ethical Dilemma

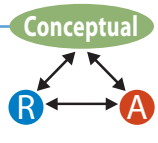
As the CFO of a large manufacturing company, you realize that, although the company performed well over the past fiscal year, reported earnings will fall short of analysts' expectations. Knowing that failure to meet these expectations will likely result in a fall in the company's stock price and possibly the loss of your job, you assemble your most trusted financial experts to provide advice as to how to increase earnings. A plan is developed that would:

- Delay all inventory purchases until the next fiscal year (because you are using LIFO, this delay would result in the liquidation of inventory and a corresponding increase in income)
- Implement a sales program that would allow customers who accepted delivery of merchandise in the current year to defer payment for six months (normal practice requires payment within 30 days)

The financial experts all agree that these two actions are acceptable under GAAP and would allow the company to meet its earnings target. Discuss the ethical implications of these actions.

Management's Selection of an Inventory Cost Flow Assumption

The previous discussion shows that there are many financial accounting and tax issues involved in selecting an inventory cost flow assumption. In most cases, however, the decision should focus on the expected future cost changes.



If a company expects that costs will *rise* for several years, it should select LIFO because, as we discussed earlier, LIFO is a better measure of income. Also the LIFO conformity rule will allow the use of LIFO for income tax reporting and the company will save income taxes. Therefore, the financial reporting rules and the income tax rules are consistent. However, most companies probably consider the tax savings to be more important than the financial reporting issues!

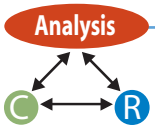
The additional cash that results from the tax savings is reduced because the LIFO method is more costly to use than the FIFO method. These costs result from the additional costs of record keeping and financial statement preparation, such as keeping track of the LIFO layers for each type of inventory and the requirements imposed by the Internal Revenue Service. For a small company, these additional costs may be greater than the income tax savings that would result from the adoption of LIFO. For larger companies, however, the income tax savings are likely to exceed the additional costs (assuming rising prices), as is evidenced by the number of companies that use LIFO (see Exhibit 8-5).

Alternatively, if costs are expected to *fall* for several years, the decision is not as simple. For financial reporting purposes it can be argued that LIFO is still preferable because the most recent (and lowest) costs should be included in cost of goods sold because the inventory can be replaced at those lower costs. However, for income tax purposes, the use of FIFO is preferable because the company pays less income taxes. Although a company

could use LIFO internally and FIFO for income taxes, it is unlikely to do so because of the additional record keeping costs it would incur. Therefore, if a company expects falling costs, it will use FIFO. Unfortunately, this means that income tax considerations are determining the accounting principle used for financial reporting.

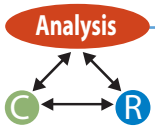
Arguments are made that a company should not adopt LIFO even when its costs are expected to rise. This is because of the lower income that will result and a possible perception that the company is less successful and that its stock price will be lower. However, efficient capital markets research, discussed in Chapter 1, has indicated that stock market prices are *not* affected by the selection of an inventory cost flow assumption. That is, the stock market compensates for the lower reported income under LIFO.

In most situations the FIFO and weighted average *cost* flow assumptions approximate the *physical* flow of the items in inventory, whereas LIFO does not. For example, a retail store will try to impose a FIFO physical flow on its customers by selling the oldest items first. But, the customers may impose more of an average flow on the store by the way they select items from the shelves. However, accounting principles do *not* require that the selected cost flow method approximate the physical flow of goods but only that the method be systematic, based on cost, and match costs and revenues appropriately, as we discussed earlier. Therefore, a company's selection of a cost flow assumption should *not* depend on the perceived physical flow of goods.



Management also may be reluctant to adopt LIFO if the company pays them bonuses on the basis of accounting income. This tends to discourage management from using LIFO in periods of rising costs, since the lower reported income produces lower bonuses. In addition, a higher income results in higher earnings per share and a higher rate of return. These factors are considered important by many users of financial statements. Remember, however, that using a method other than LIFO in periods of rising costs causes the company to pay additional taxes.

There are several additional miscellaneous disadvantages of LIFO that a company should consider before adopting LIFO. First, adopting LIFO could increase its income taxes initially because the income tax rules require that the opening inventory in the year that LIFO is adopted must be stated at cost. Therefore, if the inventory previously had been written down to a market value lower than cost for income tax purposes (as we discuss in Chapter 9), it would be necessary to write the inventory back up and pay additional taxes on that amount. Second, the use of LIFO might also cause a company to be limited in its *financial flexibility*, because of covenants included in its bond indentures or other borrowing agreements. For example, the company might be required to maintain a certain current ratio or debt-to-equity ratio. Finally, the use of LIFO might cause a company to be less concerned about controlling the level of its inventories because of the company's lower *apparent* investment in those inventories.



Many manufacturing companies that expect falling costs use the average cost flow assumption in their financial statements. A company uses this method because (1) it operates a standard cost system (discussed in a cost accounting book) for its budgeting and control, and (2) it is unlikely to result in significantly more income taxes than FIFO.

Secure Your Knowledge 8-2

- Because a company carries inventory and the cost of the inventory changes during a period, it uses a cost flow assumption to assign costs to the physical units in ending inventory and cost of goods sold.
- The specific identification cost flow assumption (under which the company identifies the actual cost of each unit in ending inventory and cost of goods) is appropriate for perpetual inventory systems in which each item is unique.

(continued)

- The FIFO cost flow assumption (under which the company includes the earliest costs in costs of goods sold and the most recent costs in ending inventory) is generally viewed as providing a more relevant inventory valuation and a better approximation of the physical flow of inventory compared to LIFO.
- The LIFO cost flow assumption (under which the company includes the most recent costs in costs of goods sold and the earliest costs in ending inventory) is generally viewed as providing both a more relevant measure of income when costs are rising, as well as tax benefits. However, it is more susceptible to income distortions because of inventory liquidations or management of inventory quantities.
- The average cost flow assumption (under which the company combines all costs and units and applies a weighted average cost to both ending inventory and cost of goods sold) produces income measures and inventory valuations that fall between the FIFO and LIFO values and is often used by manufacturers.

Dollar-Value LIFO

7 Understand dollar-value LIFO.

The dollar-value LIFO method follows the same cost flow assumption as the LIFO method, but it overcomes three difficulties involved in applying the simple LIFO approach.

First, the LIFO method requires a company to keep numerous detailed records. As with other methods, the company must record the physical quantities of each item in its inventory from either a physical count or the perpetual inventory records. Then, it must apply unit costs from the years since it adopted LIFO, in the LIFO order. Finally, it must correctly account for the liquidations in LIFO inventory that occurred over the years.

Second, fluctuations in the physical quantities of similar inventory items may occur. For example, the quantity of one inventory item may significantly decline during a period causing a partial liquidation of its LIFO layers, whereas the quantity of a very similar inventory item may increase. As these fluctuations occur over time, the LIFO layers for each individual item would be reduced, thereby removing many of the advantages of LIFO.

Third, as technological changes take place, inventory made with one material is replaced by inventory made with substitute materials, or an outdated design is replaced by a newer design. Strict application of the LIFO method would require a company to start a new LIFO base for the new inventory item, and as the old item is phased out to reduce its inventory to zero. This would eliminate the advantages of LIFO built up in previous periods. With the rate of technological change in many industries, the advantages of LIFO would be lost.

Dollar-value LIFO overcomes part of the first problem by the use of *current costs* and *cost indexes*, and the second and third problems by the use of *inventory pools*. Under the dollar-value LIFO method, a company may group the inventory into pools that are similar as to types of material or use. Some companies may consider their entire inventory as one pool, but usually several pools are used. We discuss cost indexes and inventory pools in more detail later in the chapter.

The general principle of the dollar-value LIFO method is that a company initially values its ending inventory at current cost and "rolls back" this cost to the cost at the beginning of the base year (the year in which it adopted LIFO) to *eliminate the change in costs* from the physical quantity of the ending inventory. A comparison of the year's beginning and ending inventory at base-year costs indicates whether there has been a real increase (or decrease) in the physical quantity of the inventory. The company "rolls forward" the increase (or decrease) to the appropriate current cost level, and adds this layer of current cost (or subtracts it from) the beginning inventory to determine its ending inventory. The application of the dollar-value LIFO method requires the four steps we show in Exhibit 8-4.

It is necessary to convert the inventory to base-year costs in order to isolate the *quantity* increase from the *cost* increase. To show that a comparison of base-year *costs* reflects changes in *quantity*, consider the following two simplified examples. First, assume a company has a beginning inventory of 100 units at $20 each, or $2,000, when it adopts

EXHIBIT 8-4 Dollar-Value LIFO Calculation Steps

Step 1. Value the total ending inventory at current-year costs.

Step 2. Convert (roll back) the ending inventory cost to base-year costs by applying the base - year conversion index:

$$\text{Ending Inventory at Base-Year Costs} = \text{Ending Inventory at Current-Year Costs} \times \frac{\text{Base-Year Cost Index}}{\text{Current Cost Index}}$$

Step 3. Compute the change in the inventory level (physical quantity) for the year at base-year costs by comparing the ending inventory at base-year costs with the beginning inventory at base-year costs.

Step 4.

a. If there is an increase in the inventory level at base-year costs, there has been a real *increase* in the physical quantity of the inventory over the year. Convert (roll forward) this increase to current-year costs by applying the current-year conversion index:

$$\text{Layer Increase at Current-Year Costs} = \text{Increase at Base-Year Costs} \times \frac{\text{Current Cost Index}}{\text{Base-Year Cost Index}}$$

The ending inventory cost is the dollar-value LIFO inventory cost at the beginning of the year *plus* the layer increase at current-year costs.

b. If there is a decrease in the inventory level at base-year costs, there has been a real decrease in the physical quantity of the inventory over the period. This decrease reduces the inventory on a LIFO layer basis, and therefore it must be converted to the costs of the most recently added layer or layers:

$$\begin{matrix}\text{Decrease at Costs of} \\ \text{Most Recently Added Layer(s)}\end{matrix} = \text{Decrease at Base-Year Costs} \times \frac{\text{Cost Index of Most Recently Added Layer(s)}}{\text{Base-Year Cost Index}}$$

The ending inventory cost is the dollar-value LIFO cost at the beginning of the year *minus* the decrease at the costs of the most recently added layer(s). Note that the decrease may eliminate more than one layer of LIFO inventory, and therefore the decrease at base-year costs has to be converted to the costs of as many layers as is necessary to eliminate the total decrease.

dollar-value LIFO. At the end of the year, it has an ending inventory of 100 units at a current cost of $21 each, or $2,100. It might appear from a simple comparison of the two costs ($2,100 versus $2,000) that the *physical quantity* of the inventory has increased. However, this is not the case. The quantity has remained unchanged, and the cost change (from $20 to $21 per unit, or an increase of 5%) has accounted for the entire change in the cost of the inventory. Reducing the inventory of $2,100 to the base-year costs gives an amount of $2,000 [$2,100 × (100 ÷ 105) = $2,000]. Since the beginning and ending inventory amounts are $2,000 when they are both measured in terms of the same costs (base year), there has been no increase in quantity. The increase from $2,000 to $2,100 resulted solely from the increase in costs.

In the second example, we can isolate the quantity increase from the cost increase without knowing the number and costs of the units. To illustrate, assume a company has a beginning inventory of $1,000 and a cost index (discussed later) of 100 when it adopted dollar-value LIFO. Assume further that the ending inventory at current cost is $1,430 and costs have increased 10%. That is, the cost index is 110 (100 × 1.10 = 110). The quantity increase in the inventory is not 43% ($1,430 ÷ $1,000 = 1.43). Rather, the ending inventory at base-year costs is $1,300 [$1,430 × (100 ÷ 110) = $1,300], and therefore inventory has increased in quantity by 30% ($1,300 ÷ $1,000 = 1.30). The total increase of 43% in the cost of the inventory is made up of an increase in the quantity of 30% and a cost increase of 10% (1.30 × 1.10 = 1.43). To complete the example, the increase in inventory of $300 at base-year costs is converted to ending costs of $330 [$300 × (110 ÷ 100)], and therefore the LIFO ending inventory is valued at $1,330 ($1,000 + $330).

Example: Dollar-Value LIFO

We show how to apply the four steps discussed in Exhibit 8-4 for the Wagner Company using the basic data in Example 8-11. The Wagner Company adopted LIFO at the beginning

of 2006 and has taken an ending inventory at the *current costs* for each year as indicated. In addition, the company has experienced yearly changes in the level of its costs as indicated by its cost index for each year. (We discuss the determination of a cost index later.)

EXAMPLE 8-11 Data for Wagner Company

Date	Ending Inventory at Current Costs	Cost Index
January 1, 2006	$10,000	100
December 31, 2006	12,100	110
December 31, 2007	13,125	125
December 31, 2008	16,800	140
December 31, 2009	12,360	120

We show the calculation of the dollar-value LIFO ending inventory in Example 8-12. The base year is 2006, so the beginning inventory needs no adjustment. The 2006 ending inventory at the current cost of $12,100 is reduced to $11,000 at base-year costs. Therefore, the real (quantity) increase in inventory is $1,000 ($11,000 − $10,000 at base-year costs), which is $1,100 [$1,000 × (110 ÷ 100)] in 2006 costs. The ending LIFO inventory cost for 2006 is $11,100, which is made up of two layers, the base layer of $10,000 plus the layer added in 2006 of $1,100.

In 2007, the company reduces its ending inventory of $13,125 at the current cost to $10,500 at base-year costs. This indicates a real (quantity) *decrease* in inventory of $500 (the $10,500 2007 ending inventory less the $11,000 2006 ending inventory, *both* at base-year costs). The company subtracts the decrease from the most recently added layer, which is the layer added in 2006. Therefore it converts the decrease of $500 in base-year costs to 2006 costs and *not* to 2007 costs. Consequently it applies the 110 cost index to the $500 decrease, resulting in a decrease of $550 in terms of 2006 costs and an ending inventory of $10,550.

In 2008, the company has an increase in inventory at base-year costs, and therefore adds another layer, so that its ending LIFO inventory of $12,650 consists of three layers.

In 2009, the company has a decrease in its cost index. It calculates the ending inventory at base-year costs in exactly the same manner as we discussed previously. In this case the $10,300 ending inventory at base-year costs is $1,700 lower than the $12,000 beginning inventory at base-year costs. This completely eliminates the layer of $1,500 (at base-year costs) added in 2008, and so the company must go back into the 2006 layer to account for the remaining decrease of $200 at base-year costs (no layer was added in 2007). The ending LIFO inventory of $10,330 consists of the base inventory plus the remainder of the layer added in 2006. ♦

Determination of Cost Index

The preceding discussion refers to the use of a cost index rather than a price index. A **cost index** refers to an internally generated index that is specific to a company's particular inventory, whereas a **price index** is a more general index prepared by an external organization, such as a government or trade association. Although the concepts underlying the two are identical, we use the term *cost index* because IRS regulations require that in most situations a company use an internally developed index specific to the company's particular operations. However, the IRS has simplified the LIFO method by allowing the use of published price indexes in certain situations.

EXAMPLE 8-12 Dollar-Value LIFO Inventory Calculations

Date	Step 1: Ending Inventory at Current Costs	×	Step 2: Base-Year Cost Index / Current Cost Index	=	Step 2: Inventory at Base-Year Costs	Step 3: Increase (Decrease) at Base-Year Costs	×	Step 4: Relevant Cost Index / Base-Year Cost Index	=	Step 4: Increase (Decrease) at Relevant Current Costs	Step 4: Ending Inventory at LIFO	Layers in LIFO Ending Inventory
1/1/06					$10,000	—		—		—	$10,000	$10,000
12/31/06	$12,100	×	100/110	=	11,000	$1,000	×	110/100	=	$1,100	11,100	10,000 ($10,000 @ 100) 1,100 ($1,000 @ 110)
12/31/07	13,125	×	100/125	=	10,500	(500)	×	110/100	=	(550)	10,550	10,000 ($10,000 @ 100) 550 ($500 @ 110)
12/31/08	16,800	×	100/140	=	12,000	1,500	×	140/100	=	2,100	12,650	10,000 ($10,000 @ 100) 550 ($500 @ 110) 2,100 ($1,500 @ 140)
12/31/09	12,360	×	100/120	=	10,300	(1,500)	×	140/100		(2,100)	10,330	10,000 ($10,000 @ 100) 330 ($300 @ 110)
						(200)	×	110/100	=	(220)		

If a company uses an internally developed cost index, it must compute an index based on the particular cost per unit it has experienced in the current year as compared to the base year. Typically, the company prepares the index using a sample of its total inventory. Two methods to compute the cost index are used in practice: the double-extension method and the link-chain method.

Under the **double-extension** method, a sample of the ending inventory is priced at current-year costs and at base-year costs, and the cost index is computed as follows:

$$\text{Cost Index} = \frac{\text{Sample of Ending Inventory at Current-Year Costs}}{\text{Sample of Ending Inventory at Base-Year Costs}} \times 100$$

This is known as the double-extension method because the ending inventory is priced and "extended" twice—once at current costs and once at base-year costs. The double-extension method is appropriate for companies that have little change in the characteristics of their inventory items. When changes are frequent, determination of base-year costs for new items is difficult. For example, if a company adopted LIFO in 1990 and develops a new product in 2007, the double-extension method would require the computation of the cost in 1990 of the new product. Since the product, perhaps including the technology, did not exist in 1990, the difficulties of such a calculation are obvious. In such situations the link-chain method should be used.

Under the **link-chain** method, a company prices a sample of the ending inventory at current costs for the current year and for the previous year, and therefore the method avoids the problems of the double-extension method we just discussed. The ratio of the current-year current cost to the previous-year current cost is used to compute a cost index for the *year*. This index is multiplied by the cost index carried forward from the previous year to determine the current year cumulative index as follows:

$$\text{Cost Index} = \frac{\text{Sample of Ending Inventory at Current-Year Costs}}{\text{Sample of Ending Inventory at Previous-Year Costs}} \times \text{Previous-Year Cost Index}$$

Inventory Pools

As we discussed earlier in the chapter, a company may use inventory pools in conjunction with dollar-value LIFO. The purpose of the pools is to maintain the benefits from using LIFO when fluctuations in the physical quantities of similar inventory items occur and when technological change takes place.

To illustrate the concept of an inventory pool, consider the Herrmann Soup Company, which adopts dollar-value LIFO on January 1, 2007 using a single pool. The pool includes three types of soup that the company manufactures, and we show the calculation of the total cost of the beginning inventory in Example 8-13. The company assigns a cost index of 100 to the beginning inventory and uses it as the base for calculating the cost index in later years.

EXAMPLE 8-13 Herrmann Soup Company Inventory, January 1, 2007

Type	Quantity	Cost per Unit	Total Cost
Mushroom	10,000	$0.25	$2,500
Vegetable	8,000	0.20	1,600
Tomato	22,000	0.16	3,520
	40,000		$7,620

During 2007, the transactions we show in Example 8-14 occurred. The company purchased 150,000 cans of soup and sold 139,000 cans, leaving 51,000 cans in ending inventory, including the quantities of each type as shown. Using the double-extension method, the company calculates a cost index of 107 for the ending inventory by dividing the ending inventory at current-year costs by the ending inventory at base-year costs. Completing the remaining steps in the dollar-value LIFO calculations results in an ending inventory at LIFO cost of $10,167, as we show in Example 8-14.

EXAMPLE 8-14 Inventory Pools

Purchases and Sales During 2007

Type	Beginning Quantity	Quantity Purchased	Cost per Unit	Quantity Sold	Inventory Quantity December 31, 2007
Mushroom	10,000	60,000	$0.30	54,000	16,000
Vegetable	8,000	40,000	0.24	38,000	10,000
Tomato	22,000	50,000	0.14	47,000	25,000
	40,000	150,000		139,000	51,000

$$\text{Cost Index} = \frac{\text{Ending Inventory at Current-Year Costs}}{\text{Ending Inventory at Base-Year Costs}} \times 100$$

$$= \frac{(16{,}000 \times \$0.30) + (10{,}000 \times \$0.24) + (25{,}000 \times \$0.14)}{(16{,}000 \times \$0.25) + (10{,}000 \times \$0.20) + (25{,}000 \times \$0.16)} \times 100$$

$$= \frac{\$10{,}700}{\$10{,}000} \times 100$$

$$= 107$$

LIFO Cost of Ending Inventory

$$\text{Ending Inventory at Base-Year Costs} = \frac{\text{Ending Inventory at Current-Year Costs}}{\text{Current Cost Index}} \times \text{Base-Year Cost Index}$$

$$= \$10{,}700 \times \frac{100}{107}$$

$$= \$10{,}000$$

$$\text{Increase in Inventory at Base-Year Costs} = \text{Ending Inventory at Base-Year Costs} - \text{Beginning Inventory at Base-Year Costs}$$

$$= \$10{,}000 - \$7{,}620$$

$$= \$2{,}380$$

$$\text{Layer Increase at Current-Year Costs} = \text{Increase at Base-Year Costs} \times \frac{\text{Current Cost Index}}{\text{Base-Year Cost Index}}$$

$$= \$2{,}380 \times \frac{107}{100}$$

$$= \$2{,}547 \text{ (rounded)}$$

$$\text{Total LIFO Ending Inventory Cost} = \$7{,}620 + \$2{,}547$$

$$= \$10{,}167$$

The preceding discussion assumed that the entire ending inventory cost was a single inventory "pool." When a company uses the dollar-value LIFO method, however, it may include the inventory in one or several "inventory pools." IRS regulations do not specify what types of items are to be included in the same pool, other than to say they should be "substantially similar." If a company uses more than one pool, it must compute a separate cost index for each (or a representative sample of the pool). In general, the fewer the pools and the more items included in each pool, the more likely it is that increases in some items will offset decreases in other items in the pool, thereby avoiding the liquidation of LIFO layers and the loss of the tax benefits of LIFO. In other words, a company would typically prefer to have the fewest number of pools allowed. In a surprising decision several years ago, **Stauffer Chemical Company**

increased its LIFO pools from 8 to 280, which increased its income by $16.5 million (and resulted in additional taxes being paid).

Note also that the current cost used in the dollar-value LIFO calculations can be the cost of the first purchases in a year, the last purchases in a year, or the average cost of all purchases during the year as assumed in the preceding example. Once a choice is made, however, it must be applied consistently.

Additional LIFO Considerations

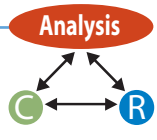
8 Explain additional LIFO issues.

Several other items concerning LIFO are important, including the LIFO valuation adjustment, interim statements using LIFO, a change to or from LIFO, and international accounting differences. We discuss these topics in the following sections.

LIFO Valuation Adjustment

Frequently, a company uses LIFO for external financial reporting and income tax purposes but uses another method for internal management. In this case, the company makes a valuation adjustment to convert its internally reported ending inventory to LIFO for external reporting. This adjustment increases (decreases) cost of goods sold for the period and decreases (increases) the ending inventory by the amount of the *change* in the difference between the beginning and ending inventories under the two methods. However, the company usually does not adjust the inventory account directly. Instead, it uses a valuation adjustment. This adjustment has a variety of names including *Valuation Allowance* or (inappropriately) *LIFO Reserve*. Typically, this adjustment is not part of the company's formal accounting system, but the company does report the amount in its balance sheet or its notes because the SEC requires the disclosure. When this occurs, the company subtracts the *cumulative* balance of the adjustment to report the ending inventory at LIFO. We illustrate this situation with the disclosures of **General Mills** and **Marathon Oil** in Real Report 8-1 later in the chapter.

You should also note that the *change* in the adjustment for the year is the difference between the LIFO cost of goods sold and what the cost of goods sold would have been under the method used internally (FIFO or average). A user can use this change to adjust the cost of goods sold of a company using LIFO to the other method, which improves the comparability of the two companies. The *total* amount of the adjustment is the cumulative difference between the two cost of goods sold amounts since LIFO was adopted. Multiplying this amount by the income tax rate gives the cumulative savings in income tax expense, while multiplying the amount by the after-tax rate gives the cumulative effect on income.



Interim Statements Using LIFO

If a company uses LIFO for annual reporting purposes, it must use LIFO for interim (i.e., quarterly) reporting purposes (discussed in Chapter 5). **APB Opinion No. 28** states that if a company using LIFO has an inventory liquidation at an interim date that it expects to replace by the end of the annual period, it does not include the LIFO liquidation in its inventory, and its cost of sales includes the expected cost of replacement of the liquidated LIFO inventory.[6]

Consequently, when a company has an inventory liquidation at the end of a quarter, it must forecast its year-end physical quantities. If the forecast indicates that the company will not liquidate any inventory at the end of the year, it removes the effect of the LIFO liquidation from the interim financial statements. The company decreases the inventory value and increases the cost of goods sold by the difference between the replacement cost and the LIFO cost for the number of units that it has liquidated. If the forecast indicates that the liquidation will still exist at the end of the year, the company includes the effect of the LIFO liquidation in its interim financial statements.

6. "Interim Financial Reporting," *APB Opinion No. 28* (New York: AICPA, 1973), par. 14(b).

LINK TO RATIO ANALYSIS

Analysts often use financial ratios such as inventory turnover and average days in inventory to evaluate the effectiveness of a company's inventory management and control activities. It is important to note that the accounting choice between FIFO and LIFO can have a significant impact on this evaluation since each method will produce different income statement and balance sheet amounts. Therefore, it would not be useful to compare companies that make different accounting choices without first adjusting for these differences. Fortunately, the disclosure of the "LIFO reserve" allows the following adjustments to be made:

FIFO Inventory = LIFO Inventory + LIFO Reserve

FIFO Cost of Goods Sold = LIFO Cost of Goods Sold – Increase (or + Decrease) in LIFO Reserve

Using amounts obtained from General Mills' annual report, we show this conversion below:

	2004	2003
Inventory (as reported, LIFO)	$ 1,063	$ 1,082
Add: LIFO Reserve	+ 41	+ 27
Inventory (FIFO)	$ 1,104	$ 1,109
Cost of Sales (as reported)	$ 6,584	
Less: Increase in LIFO Reserve	– 14	
Cost of Sales (FIFO)	$ 6,570	

With these adjustments, you can now perform an appropriate analysis.

Change to or from LIFO

Although the adoption of an inventory cost flow assumption is a long-term decision, a company may occasionally change its method. When the company changes *to* LIFO from another method, usually the effect on the results of prior periods is not determinable. Then *FASB Statement No. 154* requires that the company apply the change prospectively, as of the earliest date practicable. A company that changes to another method *from* LIFO retroactively restates the results of prior periods and treats the change as a retrospective adjustment.[7] We discuss these changes in Chapter 23.

LINK TO INTERNATIONAL DIFFERENCES

International accounting standards for inventories also require a company to base its inventory values on cost. However, the IASB does not allow the use of LIFO because it is clearly inconsistent with any presumed physical flow of the inventory, an issue that has not been considered relevant for U.S. accounting principles. Also, LIFO is not permitted to be used for income tax purposes in most countries and, therefore, there has been no incentive to allow its use for financial reporting.

7. "Accounting Changes and Error Corrections," *FASB Statement No. 154* (Norwalk, Conn.: 2005), par. 7–9.

Secure Your Knowledge 8-3

- Dollar-value LIFO was developed to overcome practical difficulties with the application of LIFO.
- The calculation of a cost index is necessary to convert the inventory to base-year costs so that *quantity* increases (decreases) may be isolated from *cost* increases (decreases).
- Inventory is often included in one or more inventory pools to keep the advantages of LIFO when there are fluctuations in the physical quantities of similar products and/or technological change.
- For a company that uses LIFO for financial reporting purposes but an alternative cost flow assumption for internal management, a LIFO valuation adjustment is necessary to convert the internally reported ending inventory to a LIFO basis.
- If a company has a LIFO liquidation in an interim reporting period but expects to replace the inventory by year-end, the impact of the liquidation is removed from its interim financial statements.

Disclosure of Inventory Values and Methods

9 Understand inventory disclosures.

Exhibit 8-5 shows the relative use of alternative inventory methods by 600 surveyed companies and the proportion of the inventory cost determined by LIFO. The trend to the use of LIFO between 1973 and 1982 is clearly indicated, although the trend has reversed somewhat with the lower inflation since then. There were more than 600 responses to the methods used, since many companies use more than one method, as indicated by the categories listed in the second section.

EXHIBIT 8-5 Inventory Cost Determination

	Number of Companies										
	2003	2000	1997	1994	1991	1988	1985	1982	1979	1976	1973
Methods											
First-in, first-out (FIFO)	384	386	415	417	421	396	381	373	390	389	394
Last-in, first-out (LIFO)	251	283	326	351	361	379	402	407	374	331	150
Average cost	167	180	188	192	200	213	223	238	241	232	235
Other	31	38	32	42	50	50	48	53	56	50	57
	833	887	961	1,002	1,032	1,038	1,054	1,071	1,061	1,002	836
Use of LIFO											
All inventories	26	23	17	17	23	20	26	28	20	9	8
50% or more inventories	120	148	170	186	186	207	231	206	194	167	49
Less than 50% of inventories	77	82	99	98	95	90	83	88	94	84	78
Not determinable	28	30	40	50	57	62	62	85	66	71	25

Source: *Accounting Trends and Techniques* (New York: AICPA, 1974, 1977, 1980, 1983, 1986, 1989, 1992, 1995, 1998, 2001, and 2004).

Real Report 8-1 shows examples of the way in which three companies disclose the methods used for inventory. Companies are required to disclose the inventory method, or methods, used. **Marathon Oil** reports a single inventory amount in the balance sheet and shows the breakdown in the notes to the financial statements. It categorizes its inventory by functional groups, while **General Mills** categorizes its inventory by type and product.

Hewlett-Packard uses FIFO, while General Mills uses LIFO in the United States and FIFO elsewhere. Marathon Oil discloses the difference between LIFO costs and current costs.

Real Report 8-1 Examples of Disclosure of Inventory Values and Methods

HEWLETT-PACKARD COMPANY
(millions)
Balance Sheet

Assets (in part)	October 31, 2004	October 31, 2003
Inventory	$7,071	$6,065

Notes to Consolidated Financial Statements (in part)

Note 1 Summary of Significant Accounting Policies (in part)

Inventory—Inventory is valued at the lower of cost or market, with cost computed on a first-in, first-out basis.

GENERAL MILLS, INC.

Notes to Consolidated Financial Statements (in part)

Note 1 Summary of Significant Accounting Policies (in part)

C. Inventories. Inventories are valued at the lower of cost or market. We generally use the LIFO method of valuing inventory because we believe that it is a better match with current revenues. However, FIFO is used for most foreign operations, where LIFO is not recognized for statutory purposes.

Note 6 Inventories
The components of inventories are as follows:

In Millions	May 30, 2004	May 25, 2003
Raw materials, work in process and supplies	$ 234	$ 221
Finished goods	793	818
Grain	77	70
Reserve for LIFO valuation method	(41)	(29)
Total inventories	$1,063	$1,082

At May 30, 2004 and May 25, 2003, respectively, inventories of $765 million and $767 million were valued at LIFO. LIFO accounting decreased fiscal 2004 earnings by $0.02 per share and had a negligible impact on fiscal 2003 and 2002 earnings. Results of operations were not materially affected by a liquidation of LIFO inventory. The difference between replacement cost and the stated LIFO inventory value is not materially different from the reserve for LIFO valuation method.

MARATHON OIL

Notes to Financial Statements (in part)

Note 12. Inventories

(In millions) December 31	2004	2003
Liquid hydrocarbons and natural gas	$ 676	$ 674
Refined products and merchandise	1,192	1,151
Supplies and sundry items	129	130
Total	1,995	1,955

The LIFO method accounted for 92 percent and 91 percent of total inventory value at December 31, 2004 and 2003. Current acquisition costs were estimated to exceed the LIFO inventory values at December 31, 2004 and 2003, by approximately $1,294 million and $655 million. Cost of revenues was reduced and income from operations was

Continued

increased by $4 million in 2004 and $11 million in 2003 and less than $1 million in 2002 as a result of liquidations of LIFO inventories.

Questions

1. Why do you think Hewlett-Packard uses FIFO while General Mills uses LIFO?
2. Why does General Mills use LIFO in the United States and FIFO elsewhere?
3. If the inventory costs of General Mills are rising throughout the world, what is the effect on the financial statements of its use of FIFO?
4. How would you explain the meaning of General Mills' disclosure about the impact of LIFO accounting to a shareholder?
5. For Marathon Oil, how would you explain the statement that the LIFO liquidation increased income from operations?

1/3 Link to Ratio Analysis

Effective inventory management and control is a critical ingredient to a company's success. While management wants to keep an adequate supply of inventory on hand to meet customer demands and maintain desired service levels, there is a cost associated with carrying high levels of inventory (e.g., storage costs, risk of obsolescence, damage, theft, insurance, and taxes). Unfortunately, reducing costs by reducing inventory levels can also have adverse consequences such as lost sales, stockouts, and dissatisfied customers. Companies use a variety of tools, such as computerized inventory tracking systems, to manage and control their inventories. The effectiveness of an inventory management program can be evaluated using financial ratios such as inventory turnover and average days in inventory.

Using data obtained from the company's annual report, the computation of inventory turnover ratios for **General Mills** and **ConAgra** are shown below:

(amounts in millions)	General Mills		ConAgra	
	2004	2003	2004	2003
Cost of Goods Sold (assuming FIFO)	$6,570		$11,326.1	
Inventories (on FIFO basis)	$1,104	$1,109	$2,625.6	$2,455.6

General Mills: $$\text{Inventory Turnover} = \frac{\$6{,}750}{\left(\frac{\$1{,}104 + \$1{,}109}{2}\right)} = 5.94$$

ConAgra: $$\text{Inventory Turnover} = \frac{\$11{,}326.1}{\left(\frac{\$2{,}625.6 + \$2{,}455.6}{2}\right)} = 4.46$$

Dividing the turnover ratio into 365 days shows that General Mills and ConAgra hold inventory an average of 61.45 and 81.84 days, respectively. The industry average, obtained from **Thomson Analytics** is approximately 61 days. Because higher inventory turnover ratios generally signal more effective inventory management and control, General Mills appears to manage and control its inventory better than ConAgra; however, there is still room for improvement since General Mills' inventory turnover is approximately average for the industry.

APPENDIX: FOREIGN CURRENCY TRANSACTIONS INVOLVING INVENTORY

10 Record foreign currency transactions involving inventory.

Many U.S. companies conduct inventory transactions with customers and suppliers in foreign countries. Sometimes the transaction is expressed in U.S. dollars. For example, most purchases and sales of crude oil are expressed in terms of the U.S. dollar. In these situations there is no accounting issue. For example, if a U.S. oil company purchases 10,000 barrels of crude oil from Saudi Arabia, the price is quoted in dollars and not in the equivalent amount of riyals. If the price is $50 per barrel, the company records a purchase of inventory and the related payment of $500,000 ($50 × 10,000).

In many situations, however, the transaction is expressed in terms of the foreign currency. In these cases the company must record the transaction in U.S. dollars. Therefore, it converts the foreign currency amount into dollars at the exchange rate on the day of the transaction. Exhibit 8-6 shows selected foreign exchange rates. For example, suppose a U.S. company purchases inventory of electronic components from a Japanese company for 50 million yen (¥) when the exchange rate is $0.008 (1 yen = $0.008). If the U.S. company pays cash of $400,000 (¥50,000,000 × $0.008) on the same day to purchase yen to settle the transaction, the U.S. company records the transaction as follows:

Inventory (or Purchases)	400,000	
Cash		400,000

EXHIBIT 8-6 Selected Foreign Exchange Rates

Currency (Country)	Price in U.S. dollars*
Pound (Britain)	$1.81
Dollar (Canada)	0.83
Euro	1.25
Shekel (Israel)	0.22
Yen (Japan)	0.0091
Peso (Mexico)	0.09
Riyal (Saudi Arabia)	0.27
Franc (Switzerland)	0.80

*Note that the exchange rates are stated in terms of $ per unit of foreign currency. Exchange rates are often stated in terms of units of foreign currency per $.

Source: *The Wall Street Journal* (August 12, 2005).

More often, transactions between companies in different countries involve credit terms. This allows time for processing the order and payment across international borders. In addition, currency exchange rates change continuously. As a result, the exchange rate is likely to have changed between the date the U.S. company records a purchase transaction and the date it makes the payment. On the date of the payment, the company records an exchange gain or loss to account for the difference between the purchase price of the inventory and the amount of the payment. **An exchange gain or loss is caused by a change in the exchange rate between the date of a purchase or sale on credit and the date of the payment or receipt.** More specifically, when exchange rates are stated in terms of $ per unit of foreign currency, exchange gains and losses occur for purchases or sales on credit as follows:

1. An exchange *gain* occurs when the exchange rate *declines* between the date a company records a *payable* from a purchase of inventory and the date of the cash *payment*.

2. An exchange *gain* occurs when the exchange rate *increases* between the date a company records a *receivable* from a sale of inventory and the date of the cash *receipt*.
3. An exchange *loss* occurs when the exchange rate *increases* between the date a company records a *payable* from a purchase of inventory and the date of the cash *payment*.
4. An exchange *loss* occurs when the exchange rate *declines* between the date a company records a *receivable* from a sale of inventory and the date of the cash *receipt*.

Example: Exchange Gain

We first illustrate an exchange gain that occurs when the exchange rate declines between the date a company records a credit purchase of inventory and the date of the cash payment. Suppose that in the preceding example the U.S. company made the purchase of the electronic components on credit. Because the company purchased the inventory when the exchange rate was $0.008, it records the acquisition as follows:

Inventory	400,000	
Accounts Payable		400,000

The Japanese company has a right to receive 50 million yen, and the U.S. company is obligated to pay sufficient dollars that will convert to 50 million yen on the date that the payment is made. Now assume that the exchange rate on the date of payment is $0.0078 (1 yen = $0.0078). In this case, since only $0.0078 now is needed to buy 1 yen, the U.S. company will have to pay fewer dollars to buy 50 million yen. That is, the yen has become less expensive. More specifically, the U.S. company has to pay only $390,000 (¥50,000,000 × $0.0078). Therefore, the company has incurred an exchange *gain* of $10,000 ($400,000 − $390,000), which it records at the time of payment for the inventory as follows:

Accounts Payable	400,000	
Cash		390,000
Exchange Gain		10,000

The exchange gain occurs because the U.S. company has to pay only $390,000 to settle its credit purchase originally recorded at $400,000. The gain can also be computed by multiplying the amount owed by the change in the exchange rate [¥50,000,000 × ($0.008 − $0.0078) = $10,000]. Remember that the Japanese company still receives 50 million yen; it is the U.S. company that has the exchange gain. ♦

Example: Exchange Loss

We now illustrate an exchange loss that occurs when the exchange rate declines between the date a company records a credit sale and the date of the cash receipt. Suppose that a U.S. company sells computer equipment to a German company on credit and agrees to a price of 300,000 euros rather than a price in dollars. On the date of the sale, the exchange rate is $1.20 (1 euro = $1.20), and therefore the U.S. company records the sale of $360,000 (300,000 euros × $1.20) as follows (assuming the inventory has a cost of $200,000):

Accounts Receivable	360,000	
Sales Revenue		360,000
Cost of Goods Sold	200,000	
Inventory		200,000

The German company has an obligation to pay 300,000 euros regardless of the exchange rate on the date of payment. If the exchange rate is $1.18 when it pays the amount owed, the U.S. company can convert those euros into only $354,000 (300,000 euros × $1.18). As a result, it has incurred an exchange *loss* of $6,000 ($354,000 − $360,000), which it records at the time of the cash collection as follows:

Cash	354,000	
Exchange Loss	6,000	
Accounts Receivable		360,000

The exchange loss can also be computed by multiplying the amount receivable by the change in the exchange rate [300,000 euros × ($1.20 − $1.18) = $6,000]. For financial reporting purposes, the company usually reports the net amount of Exchange Gains and Losses in the Other Items section of its income statement. This amount is included in the income statement because the exchange gains and losses were caused by fluctuations in the exchange rates that resulted in increased or decreased dollar cash flows during the accounting period.

Note that the U.S. company experienced exchange gains and losses in the preceding situations because it agreed to transactions expressed in terms of foreign currencies. Therefore, the U.S. company accepts the risks associated with exchange rate changes. When the transactions are expressed in U.S. dollars, the foreign company accepts, and the U.S. company avoids, the risks associated with exchange rate changes. ♦

SUMMARY

At the beginning of the chapter, we identified several objectives you would accomplish after reading the chapter. The objectives are listed below, each followed by a brief summary of the key points in the chapter discussion.

1. **Describe how inventory accounts are classified.** A retailer needs only one type of inventory account, usually called (merchandise) inventory. A manufacturer typically uses three inventory accounts, usually called raw materials inventory, work in process inventory, and finished goods inventory.
2. **Explain the uses of the perpetual and periodic inventory systems.** A company using a perpetual system keeps a continuous record of the physical quantities in its inventory. A company using a periodic system does not keep a continuous record of the physical quantities (or costs) of inventory on hand.
3. **Identify how inventory quantities are determined.** The basic criterion for including items in inventory is economic control rather than physical possession. Issues include goods shipped FOB shipping point and FOB destination, and goods transferred on consignment.
4. **Determine the cost of inventory.** Inventory cost includes costs directly or indirectly incurred in bringing an item to its existing condition and location. Purchases discounts may be recorded under the gross or net method.
5. **Compute ending inventory and cost of goods sold under specific identification, FIFO, average cost, and LIFO.** Under the specific identification cost flow assumption, a company identifies each unit sold and each unit remaining in the ending inventory, and includes the actual costs of those units in cost of goods sold and ending inventory. Under the FIFO cost flow assumption, a company includes the earliest costs incurred in the cost of goods sold and includes the most recent costs in the ending inventory. Under the average cost flow assumption, a company considers all the costs and units to be combined so that no individual units or costs can be identified. Under the weighted average method, a company computes an average cost for the period. Under the moving average method, a company computes an average cost after each acquisition of inventory. Under the LIFO cost flow assumption, a company includes the most recent costs incurred in the cost of goods sold and includes the earliest costs (including costs incurred in previous periods) in the ending inventory.
6. **Explain the conceptual issues regarding alternative inventory cost flow assumptions.** Conceptual issues include income measurement, income tax effects, liquidation of LIFO layers, earnings (income) management, inventory valuation, average cost, and management's selection of an inventory cost flow assumption.

7. **Understand dollar-value LIFO.** Exhibit 8-4 summarizes the four dollar-value calculation steps.
8. **Explain additional LIFO issues.** Additional LIFO issues include the LIFO valuation adjustment, interim statements using LIFO, a change to or from LIFO, and international accounting differences.
9. **Understand inventory disclosures.** Exhibit 8-5 illustrates the proportion of companies using various methods. Companies must disclose the inventory method, or methods, used. A company using LIFO must disclose the difference between the LIFO and the nonLIFO inventory value.
10. **Record foreign currency transactions involving inventory (Appendix).** A U.S. company records a credit purchase from (or sale to) a company in a foreign country in the usual way. An exchange gain or loss is caused by a change in the exchange rate between the date of the credit purchase (sale) and the date of the payment (receipt). It is recorded as the difference between the accounts payable (receivable) and cash payment (receipt).

Answers to Real Report Questions

Real Report 8-1 Answers

1. General Mills' choice to use LIFO is appropriate for a company with rising inventory costs and appears to be driven primarily by tax considerations since LIFO will produce lower income amounts in periods of rising prices. Hewlett-Packard, which possesses a much larger inventory balance, uses FIFO, which is consistent with costs that fall over time (or increase very slowly) and results in relevant balance sheet amounts.
2. LIFO is generally not allowed for tax purposes in foreign countries. With this tax advantage eliminated and the fact that LIFO is typically more complex and costly to implement, the benefits of FIFO (higher income and balance sheet amounts in periods of rising prices) most likely outweigh any remaining benefits of using LIFO.
3. Given rising inventory costs, General Mills' decision to use LIFO will result in lower inventory values, earnings, and taxes (assuming the use of LIFO for income tax purposes) relative to FIFO.
4. The use of the LIFO cost flow assumption resulted in increased cash flow for General Mills. While reported earnings decreased $0.02 per share in the current fiscal year, the company was able to use LIFO for tax purposes, resulting in lower taxable income and increased cash flow. Additionally, if the company was still able to meet analyst expectations of earnings while using LIFO, the use of the LIFO assumption could be interpreted as a positive signal regarding the company's ability to generate future earnings.
5. The majority of Marathon Oil's inventory (92% and 91% at December 31, 2004 and 2003, respectively) is accounted for under the LIFO method which, during periods of rising prices, results in inventory layers with that have lower (noncurrent) costs attached to them. Even though total inventory increased from 2003 to 2004, Marathon Oil sold more inventory than it purchased at some point during the year causing the lower costs in inventory to be expensed. This liquidation of inventory valued at noncurrent costs led to lower cost of revenues (cost of goods sold) and higher income from operations.

Questions

Q8-1 Distinguish among the types of inventory accounts used for merchandising and manufacturing companies.

Q8-2 What are the cost components of each of the three inventory accounts of a manufacturing company?

Q8-3 Explain the differences between the perpetual and periodic inventory systems in terms of inventory quantity and cost. Does the use of a perpetual system eliminate the need for taking a physical inventory count?

Q8-4 What is the general rule used to determine if a company includes an item in inventory? Apply the concept to the accounting for goods in transit and goods on consignment.

Q8-5 Which of the following items does a manufacturing company include in its inventory account? (a) Goods in transit purchased FOB shipping point, invoice received, (b) Raw materials, (c) Goods out on consignment, (d) Goods in transit sold to Breyer, Inc., shipped FOB destination, (e) Manufacturing supplies.

Q8-6 Which of these costs does a company include in its inventory cost? (a) Sales commissions, (b) Supervisor's salary, (c) Freight charges, (d) Indirect factory production labor, (e) Storage costs, (f) Corporate executive salaries.

Q8-7 Discuss the advantages and disadvantages of the two methods of accounting for purchases discounts taken in regard to management's needs, inventory cost, and the valuation of accounts payable.

Q8-8 What criteria should a company use to decide between alternative inventory cost flow assumptions?

Evaluate the relevance of the LIFO cost flow assumption. Why is LIFO not allowed under international accounting standards?

Q8-9 During a period of rising costs, indicate whether the LIFO cost flow assumption results in a larger or a smaller net income as compared to the FIFO cost flow assumption and explain why. Explain how a company's net income would compare during a period of falling costs.

Q8-10 Discuss the cost flow assumptions of the LIFO inventory method. Under what conditions would a company's ending inventory differ under a perpetual and a periodic LIFO system?

Q8-11 Explain the issue of inventory liquidation when a company uses the LIFO cost flow assumption. Why is this an issue exclusive to LIFO?

Q8-12 Discuss the LIFO and FIFO cost flow assumptions relative to the issue of holding gains (inventory profits).

Q8-13 Explain the dollar-value LIFO method of inventory valuation. What are the advantages of dollar-value LIFO as compared to simple LIFO?

Q8-14 Describe the double-extension and link-chain methods used in dollar-value LIFO and when each should be used.

Q8-15 When a company changes from FIFO to LIFO, what effect does the change have on its net income and working capital of the current period?

Q8-16 What is the impact of LIFO inventory liquidation on a company's interim financial statements?

Q8-17 (Appendix) Explain what causes an exchange gain or loss and when each occurs.

Multiple Choice (AICPA Adapted)

Select the best answer for each of the following.

M8-1 The moving average inventory cost flow method is applicable to which of the following inventory systems?

	Periodic	Perpetual
a.	Yes	Yes
b.	Yes	No
c.	No	No
d.	No	Yes

Questions M8-2 and M8-3 are based on the following data: City Stationers, Inc., had 200 calculators on hand on January 1, 2007, costing $18 each. Purchases and sales of calculators during the month of January were as follows:

Date	Purchases	Sales
Jan. 12		150 @ $28
15	100 @ $20	
27	100 @ $22	
30		100 @ $32

City does not maintain perpetual inventory records. According to a physical count, 150 calculators were on hand at January 31, 2007.

M8-2 The cost of the inventory on January 31, 2007 under the FIFO method is

a. $400
b. $2,700
c. $3,100
d. $3,200

M8-3 The cost of the inventory on January 31, 2007 under the LIFO method is

a. $400
b. $2,700
c. $3,100
d. $3,200

M8-4 Goods on consignment should be included in the inventory of

a. The consignor but not the consignee
b. Both the consignor and the consignee
c. The consignee but not the consignor
d. Neither the consignor nor the consignee

M8-5 On December 31, 2006 Kern Company adopted the dollar-value LIFO inventory method. All of Kern's inventories constitute a single pool. The inventory on December 31, 2006 using the dollar-value LIFO inventory method, was $600,000. Inventory data for 2007 are as follows:

Dec. 31, 2007 inventory at year-end prices	$780,000
Relevant price index at year-end (base year 2006)	120

Under the dollar-value LIFO inventory method, Kern's inventory method, Kern's inventory on December 31, 2007 would be

a. $650,000
b. $655,000
c. $660,000
d. $720,000

M8-6 Assuming no beginning inventory, what can be said about the trend of inventory prices if cost of goods sold computed when inventory is valued using the FIFO method exceeds cost of goods sold when inventory is valued using the LIFO method?

a. Prices decreased.
b. Prices remained unchanged.
c. Prices increased.
d. Price trend *cannot* be determined from information given.

M8-7 Dixon Menswear Shop regularly buys shirts from Colt Company and is allowed trade discounts of 20% and

10% from the list price. Dixon purchased shirts from Colt on May 28, 2007, and received an invoice with a list price amount of $5,000, and payment terms of 2/10, n/30. Dixon uses the net method to record purchases. Dixon should record the purchase at

a. $3,600
b. $3,528
c. $3,500
d. $3,430

M8-8 The following items were included in Venicio Corporation's inventory account on December 31, 2007:

Merchandise out on consignment, at sales price, including 40% markup on selling price	$14,000
Goods purchased, in transit, shipped F.O.B. shipping point	12,000
Goods held on consignment by Venicio	9,000

Venicio's inventory account at December 31, 2007 should be reduced by

a. $14,600
b. $17,400
c. $23,000
d. $35,000

M8-9 When the double-extension approach to the dollar-value LIFO inventory cost flow method is used, the inventory layer added in the current year is multiplied by an index number. How would the following be used in the calculation of this index number?

	Ending inventory at current-year cost	Ending inventory at base-year cost
a.	Numerator	Denominator
b.	Numerator	Not Used
c.	Denominator	Numerator
d.	Not Used	Denominator

M8-10 The LIFO inventory cost flow method may be applied to which of the following inventory systems?

	Periodic	Perpetual
a.	No	No
b.	No	Yes
c.	Yes	Yes
d.	Yes	No

EXERCISES

E8-1 ***Inventory Accounts for a Manufacturing Company*** The Fujita Company produces a single product. Costs accumulated at the end of the period are as follows:

Raw material purchases	$54,000	Production supervisor's salary	$ 20,000
Depreciation on manufacturing equipment	3,000	Shipping costs on units sold	43,500
Sales commissions	20,000	Materials used in production	81,400
Factory labor	36,000	Goods completed	115,000
Property tax on manufacturing equipment	3,500	Costs of units sold	150,000

Assume the beginning raw material inventory to be $67,400, the beginning finished goods inventory to be $123,500, and no beginning work in process inventory.

Required
Compute the closing account balances of each of the three inventory accounts: Raw Materials, Work in Process, and Finished Goods.

E8-2 ***Goods in Transit*** The Gravais Company made two purchases on December 29, 2007. One purchase for $3,000 was shipped FOB destination, and the second for $4,000 was shipped FOB shipping point. Neither purchase had been received on December 31, 2007.

Required
Which of these purchases, if either, does the Gravais Company include in inventory on December 31, 2007? What is the cost?

E8-3 ***Items Included in Inventory*** The following are several items that the controller of the Golosow Company has questioned regarding their inclusion in Inventory:

1. An invoice has been received for goods ordered. The goods were shipped FOB destination but have not been received.
2. Purchases have been ordered and received, but no invoice has arrived.
3. Product was shipped to a customer today, FOB destination, and the invoice mailed.
4. Purchases are in the receiving department but they are damaged and will be returned.
5. Product is in the shipping department and the invoice has not been mailed to the customer.
6. Product is in the receiving department. It was returned by a customer without notification.

Required
For each of the preceding items indicate whether Golosow should include them in Inventory.

E8-4 ***Inventory Valuation*** A retailer of washing machines receives a rebate of $25 per machine purchased if total purchases exceed 1,000 units. On reviewing the inventory records in December, it discovers that it has purchased 1,100 units during the year. The company claims the rebate immediately but it is not received until January.

Required
Prepare journal entries to record the claiming of the rebate and its receipt. What effect do these events have on the inventory valuation on December 31?

E8-5 ***Discounts*** The Hirsch Company buys inventory for $20,000 on terms of 2/10, n/30. It pays within the discount period.

Required
Prepare the journal entries to record the purchase and the payment under both the (1) gross price and (2) net price methods.

E8-6 ***Discounts*** The Nelson Company bought inventory for $50,000 on terms of 2/15, n/60. It pays for the first $37,500 of inventory purchased within the discount period and pays for the remaining $12,500 two months later.

Required
Prepare the journal entries to record the purchase and the payment under both the (1) gross price and (2) net price methods.

E8-7 ***Alternative Inventory Methods*** The Nevens Company uses a periodic inventory system. During November the following transactions occurred:

Date		Transaction	Units	Cost/Unit
November	1	Balance	500	$3.50
	8	Sale	350	
	13	Purchase	300	4.00
	21	Purchase	200	5.00
	28	Sale	150	

Required
Compute the cost of goods sold for November and the inventory at the end of November for each of the following cost flow assumptions:

1. FIFO
2. LIFO
3. Average cost

E8-8 ***Alternative Inventory Methods*** The perpetual inventory records of the Park Company indicate the following transactions in the month of June:

	Units	Cost/Unit
Inventory, June 1	200	$3.20
Purchases		
June 3	200	3.50
June 17	250	3.60
June 24	300	3.65
Sales		
June 6	300	
June 21	200	
June 27	150	

Required 
Compute the cost of goods sold for June and the inventory at the end of June, using each of the following cost flow assumptions:

1. FIFO
2. LIFO
3. Average cost (round unit costs to 2 decimal places)

E8-9 AICPA Adapted *Alternative Inventory Methods* The Frate Company was formed on December 1, 2006. The following information is available from Frate's inventory records for Product Ply:

	Units	Unit Cost
January 1, 2007		
(beginning inventory)	800	$ 9.00
Purchases:		
January 6, 2007	1,500	10.00
January 24, 2007	1,200	10.50
February 17, 2007	600	11.00
March 27, 2007	900	11.50

A physical inventory on March 31, 2007 shows 1,600 units on hand.

Required
Prepare schedules to compute the ending inventory at March 31, 2007 under each of the following inventory methods:

1. FIFO
2. LIFO
3. Weighted average

Show supporting computations in good form.

E8-10 *LIFO, Perpetual and Periodic* The inventory records of the Riedel Company showed the following transactions for the fiscal period ended June 30:

	Units	Cost/Unit
June 1 Inventory	700	$6.20
June 3 Purchases	400	6.40
June 15 Sales @ $12.00	300	
June 22 Sales @ $12.50	600	
June 30 Purchases	600	6.70

Required
Compute the ending inventory and the cost of goods sold under the LIFO cost flow assumption, assuming both a perpetual and a periodic inventory system. Explain any difference in the final inventory valuations.

E8-11 *Dollar-Value LIFO* A company adopted the LIFO method when its inventory was $1,800. One year later its ending inventory was $2,100 and costs had increased 5% during the year.

Required
What is the ending inventory using dollar-value LIFO?

E8-12 *Dollar-Value LIFO* On January 1, 2006 the Sato Company adopted the dollar-value LIFO method of inventory costing. The company's ending inventory records appear as follows:

Year	Current Cost	Index
2006	$40,000	100
2007	56,100	120
2008	58,500	130
2009	70,000	140

Required 
Compute the ending inventory for the years 2006, 2007, 2008, and 2009, using the dollar-value LIFO method (round to the nearest dollar).

E8-13 **AICPA Adapted** ***Dollar-Value LIFO*** The Belstock Company manufactures one product. On December 31, 2006 Belstock adopted the dollar-value LIFO inventory method. The inventory on that date, using the dollar-value LIFO inventory method, was $200,000. Inventory data for succeeding years are as follows:

Year	Inventory at Respective Year-End Prices	Price Index (Base Year 2006)
2007	$231,000	1.05
2008	299,000	1.15
2009	300,000	1.20

Required

Compute the inventory for the following dates using the dollar-value LIFO method for each year:

1. December 31, 2007,
2. December 31, 2008, and
3. December 31, 2009.

E8-14 **AICPA Adapted** ***Dollar-Value LIFO*** The Acute Company manufactures a single product. On December 31, 2006 Acute adopted the dollar-value LIFO inventory method. It computes the inventory on that date using the dollar-value LIFO inventory method as $300,000. Inventory data for succeeding years are as follows:

Year Ended December 31,	Inventory at Respective Year-End Prices	Relevant Price Index (Base Year 2003)
2007	$363,000	1.10
2008	420,000	1.20
2009	430,000	1.25

Required

Compute the inventory amounts at December 31, 2007, 2008, and 2009, using the dollar-value LIFO inventory method for each year.

E8-15 ***Inventory Pools*** The Stone Shoe Company adopted dollar-value LIFO on January 1, 2007. The company produces four products and uses a single inventory pool. The company's beginning inventory consists of the following:

Type	Quantity	Cost per Unit	Total Cost
Running	80,000	$16	$1,280,000
Tennis	30,000	15	450,000
Basketball	60,000	14	840,000
Soccer	40,000	17	680,000
	210,000		$3,250,000

During 2007, the company has the following purchases and sales:

Type	Quantity Purchased	Cost per Unit	Quantity Sold	Selling Price per Unit
Running	150,000	$19	140,000	$40
Tennis	130,000	16	100,000	38
Basketball	100,000	14	90,000	37
Soccer	120,000	18	140,000	42
	500,000		470,000	

Required

1. Compute the LIFO cost of the ending inventory. (Round the cost index to 4 decimal places.)
2. By how much would the company's gross profit be different if it had used four pools instead of a single pool?

E8-16 ***FIFO Used Internally, LIFO Used Externally*** The Grimstad Company uses FIFO for internal reporting purposes and LIFO for financial reporting and income tax purposes. At the end of 2007 the following information was obtained from the inventory records:

	2006	2007
Ending inventory, FIFO	$100,000	$140,000
Ending inventory, LIFO	80,000	115,000

Required
1. Prepare the necessary adjusting journal entry, assuming that the company converts the accounts to LIFO at the end of 2007.
2. Indicate how the company would disclose the inventory value on its comparative balance sheets prepared at the end of 2007.
3. By how much would the company's cost of goods sold be different in 2007 if it used FIFO for external reporting?

E8-17 ***LIFO and Interim Financial Reports*** The following values were obtained from the inventory records of the Harris Company, which has a fiscal year ending on December 31:

Inventory, January 1, 2007, LIFO	$80,000
Inventory, March 31, 2007, LIFO	70,000

Required
1. Under what conditions is the company's inventory liquidation not reflected in its first-quarter interim financial statements?
2. Assuming that the liquidation is not to be reflected, what adjusting worksheet entry would the company make and how would you determine the amount?

E8-18 ***Exchange Gains and Losses (Appendix)*** On January 15, 2007, the Searle Company, a U.S. company, acquired machinery on credit from a British company for £12,000. The company paid for the machine on January 30, 2007. The exchange rates on January 15 and 30 were $1.85 and $1.80, respectively.

Required
Record the journal entries for the acquisition and payment by the Searle Company.

E8-19 ***Exchange Gains and Losses (Appendix)*** On June 21, 2007, the Livingston Company, a U.S. company, sold merchandise on credit to a Swiss company for 25,000 francs. The company received payment for the merchandise on July 10, 2007. The exchange rates on June 21 and July 10 were $0.69 and $0.68, respectively.

Required
Record the journal entries for the sale and collection by the Livingston Company.

PROBLEMS

P8-1 ***Items to Be Included in Inventory*** As the auditor of the Hayes Company for the year ended December 31, 2007, you found the following transactions occurred near its closing date:
1. Merchandise received on January 8, 2008, and costing $800, was recorded on January 6, 2008. An invoice on hand showed the shipment was made FOB supplier's warehouse on December 31, 2007. Since the merchandise was not on hand at December 31, 2007, it was not included in the inventory.
2. A product costing $600 was in Hayes' shipping room when the physical inventory was taken. It was not included in the inventory because it was marked "Hold for customer's shipping instructions." Investigation revealed that the customer's order was dated December 18, 2007, but that the case was shipped and the customer billed on January 10, 2008.
3. A machine, made to order for a customer, was finished on December 31, 2007. The customer had inspected it and was satisfied with it. The customer was billed in full for $2,000 on that date. The machine was excluded from inventory although it was shipped on January 2, 2008.
4. Merchandise costing $800 was received on December 26, 2007, but a purchase was not recorded. The goods were "on consignment from Milliken Company."
5. Merchandise costing $4,000 was received on January 2, 2008, and the related purchase invoice recorded January 5. The invoice showed that the shipment was made on December 29, 2007, FOB destination.

Required
For each situation, state whether the Hayes Company should include the merchandise in its inventory. Give your reason for the decision on each item.

P8-2 ***Valuation of Inventory*** The inventory on hand at the end of 2007 for the Reddall Company is valued at a cost of $87,450. The following items were not included in this inventory:
1. Purchased goods in transit, under terms FOB shipping point, invoice price $3,700, freight costs $170.
2. Goods out on consignment to Marlman Company, sales price $2,800, shipping costs of $210.
3. Goods sold to Grina Co. under terms FOB destination, invoiced for $1,700, which included $251 freight charges to deliver the goods. Goods are in transit.

4. Goods held on consignment by the Reddall Company at a sales price of $2,700, which included sales commission of 20% of sales price.
5. Purchased goods in transit, shipped FOB destination, invoice price $2,100 which included freight charges of $190.

Required

Determine the cost of the ending inventory that Reddall should report on its December 31, 2007 balance sheet, assuming that its selling price is 140% of the cost of the inventory.

P8-3 ***Cost of Sales*** As an accountant for the Lee Company, your supervisor gave you the following calculations of the gross profit for the first quarter:

Alternative	Sales ($50 per unit)	Cost of Goods Sold	Gross Profit
A	$500,000	$200,000	$300,000
B	500,000	228,000	272,000
C	500,000	213,333	286,667

The three alternative cost flow assumptions are FIFO, Average, and LIFO (the alternatives are not necessarily presented in this sequence). The company uses the periodic inventory system. The computation of the cost of goods sold under each alternative is based on the following data:

	Units	Cost/Unit
Inventory, January 1	12,000	$20
Purchase, January 10	4,000	21
Purchase, February 15	6,000	22
Purchase, March 10	8,000	23

Required

Prepare schedules computing the ending inventory (in units and dollars) and proving the cost of goods sold shown here under each of the three alternatives.

P8-4 ***Discounts*** On April 11, Edwards Construction Company purchased inventory for $20,000 on terms of 2/10, n/30. It pays the account balance on April 21.

Required

1. Prepare the journal entries to record the purchase and payment using each of the following methods: (a) gross price, (b) net price.
2. If the company sold half the inventory during April for $12,000, how much income would it recognize under each method?
3. Assume that the invoice was misfiled and, as a result, the company did not pay until April 30. Prepare the journal entries to record the purchase and payment under each of the methods. If the company sold half the inventory during April for $12,000, how much income would it recognize under each method?

P8-5 ***Alternative Inventory Methods*** The Garrett Company has the following transactions during the months of April and May:

Date		Transaction	Units	Cost/Unit
April	1	Balance	400	
	17	Purchase	200	$5.50
	25	Sale	150	
	28	Purchase	100	5.75
May	5	Purchase	250	5.50
	18	Sale	300	
	22	Sale	50	

The cost of the inventory on April 1 is $5, $4, and $2 per unit, respectively, under the FIFO, average, and LIFO cost flow assumptions.

Required

1. Compute the costs of goods sold for each month and the inventories at the end of each month for the following alternatives:
   a. FIFO periodic
   b. FIFO perpetual
   c. LIFO periodic
   d. LIFO perpetual
   e. Weighted average (round unit costs to 2 decimal places)
   f. Moving average (round unit costs to 2 decimal places)
2. Reconcile the difference between the LIFO periodic and the LIFO perpetual results.

P8-6 ***Alternative Inventory Methods*** The Totman Company has the following transactions during the months of January and February:

Date		Transaction	Units	Cost/Unit
January	1	Balance	200	
	10	Purchase	50	$25
	22	Sale	40	
	28	Purchase	60	$27
February	4	Purchase	40	$28
	14	Sale	50	
	23	Sale	20	

The cost of the inventory at January 1 is $24, $23, and $15 per unit, respectively, under the FIFO, average, and LIFO cost flow assumptions.

Required

1. Compute the cost of goods sold for each month and the inventories at the end of each month for the following alternatives:
   a. FIFO periodic
   b. FIFO perpetual
   c. LIFO periodic
   d. LIFO perpetual
   e. Weighted average (round unit costs to 2 decimal places)
   f. Moving average (round unit costs to 2 decimal places)
2. Reconcile the difference between the LIFO periodic and the LIFO perpetual results.
3. If the company had purchased an additional 25 units for $30 each on February 27, compute the cost of goods sold for February under FIFO periodic and LIFO periodic.
4. For February, compute the company's inventory turnover under the FIFO and LIFO periodic methods. Use ending inventory instead of average inventory for convenience. Which measure would you use in your evaluation of the company? How would you convert a monthly inventory turnover into an annual measure to use for comparison with other companies? What assumptions are involved?

P8-7 ***Alternative Inventory Methods*** The Habicht Company was formed in 2006 to produce a single product. The production and sales for the next four years were as follows:

	Production		Sales		
	Units	Total Costs	Units	Sales Revenue	Units in Ending Inventory
2006	100,000	$200,000	80,000	$400,000	20,000
2007	120,000	234,000	110,000	550,000	30,000
2008	130,000	247,000	150,000	750,000	10,000
2009	130,000	240,500	120,000	600,000	20,000

Required

1. Determine the gross profit for each year under each of the following periodic inventory methods:
   a. FIFO
   b. LIFO
   c. Average cost (round unit costs to 3 decimal places)
2. Explain whether the company's return on assets (net income divided by average total assets, as we discussed in Chapter 6) would be higher under FIFO or LIFO.

P8-8 AICPA Adapted ***LIFO and Inventory Pools*** On January 1, 2004 Grover Company changed its inventory cost flow method to the LIFO cost method from the FIFO cost method for its raw materials inventory. It made the change for both financial statement and income tax reporting purposes. Grover uses the multiple-pools approach, under which it groups substantially identical raw materials into LIFO inventory pools; it uses weighted average costs in valuing annual incremental layers. The composition of the December 31, 2006 inventory for the Class F inventory pool is as follows:

	Units	Weighted Average Unit Cost	Total Cost
Base year inventory—2004	9,000	$10.00	$ 90,000
Incremental layer—2005	3,000	11.00	33,000
Incremental layer—2006	2,000	12.50	25,000
Inventory, December 31, 2006	14,000		$148,000

Inventory transactions for the Class F inventory pool during 2007 were as follows:

- On March 2, 2007, 4,800 units were purchased at a unit cost of $13.50 for $64,800.
- On September 1, 2007, 7,200 units were purchased at a unit cost of $14.00 for $100,800.
- A total of 15,000 units were used for production during 2007.

The following transactions for the Class F inventory pool took place during 2008:

- On January 11, 2008, 7,500 units were purchased at a unit cost of $14.50 for $108,750.
- On May 14, 2008, 5,500 units were purchased at a unit cost of $15.50 for $85,250.
- On December 29, 2008, 7,000 units were purchased at a unit cost of $16.00 for $112,000.
- A total of 16,000 units were used for production during 2008.

Required

1. Prepare a schedule to compute the inventory (units and dollar amounts) of the Class F inventory pool at December 31, 2007. Show supporting computations in good form.
2. Prepare a schedule to compute the cost of Class F raw materials used in production for the year ended December 31, 2007.
3. Prepare a schedule to compute the inventory (units and dollar amounts) of the Class F inventory pool at December 31, 2008. Show supporting computations in good form.

P8-9 ***Dollar-Value LIFO*** The Olson Company adopted the dollar-value LIFO method for inventory valuation at the beginning of 2006. The following information about the inventory at the end of each year is available from the company records:

Year	Current Costs	Index
2005	$50,000	100
2006	60,000	108
2007	70,000	115
2008	73,000	125
2009	78,000	135

Required

1. Calculate the dollar-value LIFO inventory at the end of each year.
2. Prepare the appropriate disclosures for the year 2009 annual report if the company uses current cost internally and LIFO for financial reporting. Why would the company use current cost internally?

P8-10 ***Dollar-Value LIFO*** The Kwestel Company adopted the dollar-value LIFO method for inventory valuation at the beginning of 2006. The following information about the inventory at the end of each year is available from the company records:

Year	Current Cost	Index
2005	$ 8,000	100
2006	10,800	120
2007	11,500	130
2008	14,000	145
2009	10,500	125

Required

Calculate the dollar-value LIFO inventory at the end of each year.

P8-11 ***Dollar-Value LIFO and Inventory Pools*** The Webster Company adopted dollar-value LIFO on January 1, 2007. The company produces three products: X, Y, and Z. The company's beginning inventory consisted of the following:

Type	Quantity	Cost per Unit	Total Cost
X	30,000	$4.25	$127,500
Y	10,000	3.50	35,000
Z	25,000	2.00	50,000
	65,000		$212,500

During 2007, the company had the following purchases and sales:

Type	Quantity Purchased	Cost per Unit	Quantity Sold	Selling Price per Unit
X	110,000	$4.75	90,000	$10.00
Y	100,000	3.75	85,000	7.50
Z	75,000	2.10	70,000	5.00
	285,000		245,000	

Required

1. Compute the LIFO cost of the ending inventory assuming Webster Company uses a single inventory pool. (Round cost index to 4 decimal places.)
2. Compute the LIFO cost of the ending inventory assuming Webster Company uses three inventory pools. (Round cost indexes to 4 decimal places.)

P8-12 ***Comprehensive*** The Kelly Company adopted dollar-value LIFO on January 1, 2006 using two inventory pools, each of which includes two types of inventory items. The following information about the inventory at the end of each year is available:

	Pool 1			Pool 2		
Year	Number of Units	Type	Average Cost per Unit	Number of Units	Type	Average Cost per Unit
2006	20,000	A	$10	40,000	C	$5
	10,000	B	20	20,000	D	8
2007	30,000	A	11	50,000	C	7
	12,000	B	24	22,000	D	9
2008	40,000	A	12	46,000	C	6
	14,000	B	22	20,000	D	8
2009	45,000	A	12	60,000	C	7
	13,000	B	25	25,000	D	8

Required

1. Compute the cost index for each year for each pool using a base of 100 for each index. (Round each cost index to 4 decimal places.)
2. Compute the dollar-value LIFO inventory at the end of each year.

P8-13 **AICPA Adapted** ***Double-Extension: Dollar-Value LIFO*** On January 1, 2007 Lucas Distributors, Inc., adopted the dollar-value LIFO inventory method for income tax and external financial reporting. However, Lucas continued to use the FIFO inventory method for internal accounting and management purposes. In applying the LIFO method, Lucas uses internal conversion cost indexes and the multiple-pools approach under which substantially identical inventory items are grouped into LIFO inventory pools. The following data were available for Inventory Pool No. 1, which is comprised of products A and B, for the 2 years following the adoption of LIFO:

	FIFO Basis per Records		
	Units	Unit Cost	Total Cost
Inventory, 1/1/07			
Product A	12,000	$30	$360,000
Product B	8,000	25	200,000
			$560,000
Inventory, 12/31/07			
Product A	17,000	$35	$595,000
Product B	9,000	28	252,000
			$847,000
Inventory, 12/31/08			
Product A	13,000	$40	$520,000
Product B	10,000	32	320,000
			$840,000

Required

1. Prepare a schedule to compute the internal conversion cost indexes for 2007 and 2008. Round indexes to two decimal places.
2. Prepare a schedule to compute the inventory amounts at December 31, 2007 and 2008, using the dollar-value LIFO inventory method.

P8-14 ***LIFO Liquidation Profit*** The Hammond Company adopted LIFO when it was formed on January 1, 2005. Since then, the company has had the following purchases and sales of its single inventory item:

Year	Units Purchased	Cost per Unit	Units Sold	Price per Unit
2005	10,000	$5	8,000	$12
2006	12,000	6	9,000	13
2007	15,000	8	14,000	16

In December 2008, the controller realized that because of an unexpected increase in demand, the company had sold 22,000 units but had purchased only 19,000 units during the year. In 2008, each unit had been sold for $19, and each unit purchased had cost $10. The income tax rate is 30%.

Required

1. If the company makes no additional purchases in 2008, how much LIFO liquidation profit will it report?
2. Prepare the appropriate annual report disclosures for 2008.
3. If the company purchases an additional 7,000 units in December 2008, how much income tax will the company save?
4. If the company purchases the additional 7,000 units, how much income tax has the company saved over the four-year period by using LIFO instead of the FIFO cost flow assumption?

P8-15 ***Comprehensive*** The following information for 2007 is available for the Marino Company:

1. The beginning inventory is $100,000.
2. Purchases of $300,000 were made on terms of 2/10, n/30. Eighty percent of the discounts were taken.
3. Purchases returns of $4,000 were made.
4. At December 31, purchases of $20,000 were in transit, FOB destination, on terms of 2/10, n/30.
5. The company made sales of $640,000. The gross selling price per unit is twice the net cost of each unit sold.
6. Sales allowances of $6,000 were made.
7. The company uses the LIFO periodic method and the gross method for purchases discounts.

Required

1. Compute the cost of the ending inventory before the physical inventory is taken.
2. Compute the amount of the cost of goods sold that came from the purchases of the period and the amount that came from the beginning inventory.

P8-16 AICPA Adapted ***Inventory Valuation*** You are engaged in an audit of the Roche Mfg. Company for the year ended December 31, 2007. To reduce the workload at year-end, the company took its annual physical inventory under your observation on November 30, 2007. The company's inventory account, which includes raw materials and work in process, is on a perpetual basis and it uses the first-in, first-out method of pricing. It has no finished goods inventory. The company's physical inventory revealed that the book inventory of $60,570 was understated by $3,000. To avoid distorting the interim financial statements, the company decided not to adjust the book inventory until year-end except for obsolete inventory items. Your audit revealed this information about the November 30 inventory:

a. Pricing tests showed that the physical inventory was overpriced by $2,200.
b. Footing and extension errors resulted in a $150 understatement of the physical inventory.
c. Direct labor included in the physical inventory amounted to $10,000. Overhead was included at the rate of 200% of direct labor. You determined that the amount of direct labor was correct and the overhead rate was proper.
d. The physical inventory included obsolete materials recorded at $250. During December, these materials were removed from the inventory account by a charge to cost of sales. Your audit also disclosed the following information about the December 31, 2007 inventory.
e. Total debits to certain accounts during December are:

	December
Purchases	$24,700
Direct labor	12,100
Manufacturing overhead expense	25,200
Cost of sales	68,600

f. The cost of sales of $68,600 included direct labor of $13,800.
g. Normal scrap loss on established product lines is negligible. However, a special order started and completed during December had excessive scrap loss of $800, which was charged to Manufacturing Overhead Expense.

Required

1. Compute the correct amount of the physical inventory at November 30, 2007.
2. Without prejudice to your solution to Requirement 1, assume that the correct amount of the inventory at November 30, 2007 was $57,700. Compute the amount of the inventory at December 31, 2007.

P8-17 AICPA Adapted ***Comprehensive*** The Allen Company is a wholesale distributor of automotive replacement parts. Initial amounts taken from Allen's accounting records are as follows:

Inventory at December 31, 2007 (based on physical count of goods in Allen's warehouse on December 31, 2007)	$1,250,000
Sales in 2007	$9,000,000

Accounts payable at December 31, 2007:

Vendor	Terms	Amount
Baker Company	2% 10 days, net 30	$ 265,000
Charlie Company	Net 30	210,000
Dolly Company	Net 30	300,000
Eager Company	Net 30	225,000
Full Company	Net 30	—
Greg Company	Net 30	—
		$1,000,000

Additional information is as follows:

1. Parts held on consignment from Charlie to Allen, the consignee, amounting to $155,000, were included in the physical count of goods in Allen's warehouse on December 31, 2007 and in accounts payable at December 31, 2007.
2. $22,000 of parts, which were purchased from Full and paid for in December 2007 were sold in the last week of 2007 and appropriately recorded as sales of $28,000. The parts were included in the physical count of goods in Allen's warehouse on December 31, 2007 because the parts were on the loading dock waiting to be picked up by customers.

3. Parts in transit on December 31, 2007 to customers, shipped FOB shipping point on December 28, 2007, amounted to $34,000. The customers received the parts on January 7, 2008. Sales of $40,000 to the customers for the parts were recorded by Allen on January 3, 2008.
4. Retailers were holding $210,000 at cost ($250,000 at retail) of goods on consignment from Allen, the consignor, at their stores on December 31, 2007.
5. Goods were in transit from Greg to Allen on December 31, 2007. The cost of the goods was $25,000, and they were shipped FOB shipping point on December 29, 2007.
6. A quarterly freight bill in the amount of $2,000 specifically relating to merchandise purchases in December 2007, all of which was still in the inventory at December 31, 2007, was received on January 4, 2008. The freight bill was not included in either the inventory or in accounts payable at December 31, 2007.
7. All of the purchases from Baker occurred during the last seven days of the year. These items have been recorded in accounts payable and accounted for in the physical inventory at cost before discount. Allen's policy is to pay invoices in time to take advantage of all cash discounts, adjust inventory accordingly, and record accounts payable, net of cash discounts.

Required

Prepare a schedule of adjustments to the initial amounts of inventory, accounts payable, and sales. Show the effect, if any, of each of the transactions separately and indicate if the transactions would have no effect on the amount.

CASES

COMMUNICATION

C8-1 Dollar-Value LIFO

AICPA Adapted In January Broome, Inc., requested and secured permission from the Commissioner of Internal Revenue to compute inventories under the last-in, first-out (LIFO) method and elected to determine inventory cost under the dollar-value method. Broome, Inc., satisfied the Commissioner that cost could be accurately determined by use of an index number computed from a representative sample selected from the Company's single inventory pool.

Required

1. Why should a company include inventories in (a) its statement of financial position and (b) the computation of its net income?
2. The Internal Revenue Code allows some accountable events to be considered differently for income tax reporting purposes and financial accounting purposes, while other accountable events must be reported the same for both purposes. Discuss why it might be desirable to report some accountable events differently for financial accounting purposes than for income tax reporting purposes.
3. Discuss the ways and conditions under which the FIFO and LIFO inventory costing methods produce different inventory valuations. Do not discuss procedures for computing inventory cost.
4. Discuss the specific advantages and disadvantages of using the dollar-value LIFO application as compared to traditional LIFO methods. Ignore income tax considerations.

C8-2 FIFO and LIFO

AICPA Adapted *Part a.* A company may compute inventory under one of various cost flow assumptions. Among these assumptions are first-in, first-out (FIFO) and last-in, first-out (LIFO). In the past, some companies have changed from FIFO to LIFO for computing portions or all of their inventory.

Required

1. Ignoring income tax, explain what effects a change from FIFO to LIFO has on a company's net earnings and working capital.
2. Explain the difference between the FIFO assumption of earnings and operating cycle and the LIFO assumption of earnings and operating cycle.

Part b. A company using LIFO inventory may establish a "Reserve for the Replacement of LIFO Inventory" account.

Required

Explain why and how a company establishes this "reserve" account and where it should show the account on its statement of financial position.

C8-3 Cash Discounts, FIFO, and LIFO

AICPA Adapted Taylor Company, a household appliances dealer, purchases its inventories from various suppliers. Taylor has consistently stated its inventories at the lower of cost (FIFO) or market.

Required

1. Taylor is considering alternate methods of accounting for the cash discounts it takes when paying its suppliers promptly. From a theoretical standpoint, discuss the acceptability of each of the following methods:
   a. Financial income when payments are made.
   b. Reduction of cost of goods sold for period when payments are made.
   c. Direct reduction of purchase cost.
2. Identify the effects on both the balance sheet and the income statement of a company using the LIFO inventory method instead of the FIFO method over a substantial time period when purchase prices of household appliances are rising. State why these effects take place.

C8-4 Specific Identification

AICPA Adapted Happlia Co. imports expensive household appliances. Each model has many variations and each unit has an identification number. Happlia pays all costs for getting the goods from the port to its central warehouse in Des Moines. After repackaging, the goods are consigned to retailers. A retailer makes a sale, simultaneously buys the appliance from Happlia, and pays the balance due within one week.

To alleviate the overstocking of refrigerators at a Minneapolis retailer, some were reshipped to a Kansas City retailer where they were still held in inventory at December 31, 2007. Happlia paid the costs of this reshipment.

Happlia uses the specific identification inventory costing method.

Required

1. In regard to the specific identification inventory costing method
   a. Describe its key elements.
   b. Discuss why it is appropriate for Happlia to use this method.
2. a. What general criteria should Happlia use to determine inventory carrying amounts at December 31, 2007? Ignore lower of cost or market considerations.
   b. Give four examples of costs included in these inventory carrying amounts.
3. What costs should be reported in Happlia's 2007 income statement? Ignore lower of cost or market considerations.

CREATIVE AND CRITICAL THINKING

C8-5 Cash Discounts

AICPA Adapted The Atgar Corporation records all purchases and the corresponding liabilities net of cash discounts. Whenever it pays after the discount period, it credits cash for the full amount of the invoice, and debits accounts payable for the net amount and an expense account for the discount lost.

Required

Explain the arguments for and against this treatment of cash discounts.

C8-6 Purchases Discounts

The Auge Company annually purchases 1,000 tons of raw material at a cost of $100,000 with terms of 2/10, n/30. Freight costs amount to $10,000 and storage and handling costs to $7,500.

Required

1. What is the correct inventory cost?
2. Explain whether your answer to Requirement 1 would change if the discount were not taken.
3. Would your answer to Requirement 1 change if the storage and handling costs were fixed costs and therefore not dependent on the volume of material stored?

C8-7 Cost Flow Assumptions

AICPA Adapted A company should determine cost for inventory purposes by the inventory cost flow method most clearly reflecting its periodic income.

Required

1. Explain the fundamental cost flow assumptions of the average cost, FIFO, and LIFO inventory cost flow methods.
2. Discuss the reasons a company uses LIFO in an inflationary economy.
3. Where there is evidence that the utility of goods, in their disposal in the ordinary course of business, will be less than cost, explain the proper accounting treatment and under what concept that treatment is justified.

C8-8 LIFO

The 1970s were a period of historically high inflation. The 1976 financial statements of the Ford Motor Company included the following note:

Note 1 (in part): Inventory valuation. Inventories are stated at the lower of cost or market. In 1976 the company changed its method of accounting from first-in, first-out (FIFO) to last-in, first-out (LIFO) for most of its U.S. inventories.

The change to LIFO reduced net income in 1976 by $81 million or $0.86 a share. There is no effect on prior years'

earnings resulting from the change to LIFO in 1976 and, accordingly, prior years' earnings have not been restated. If the FIFO method of inventory accounting had been used by the company, inventories on December 31, 1976, would have been $166 million higher than reported.

Required

1. Explain the arguments that must have been used in favor of LIFO for the management of Ford to accept a reduction in net income of $81 million.
2. Explain the disadvantages that are likely to result from the adoption of LIFO.
3. Explain why the effect on earnings is $81 million when the effect on the inventory valuation is $166 million.
4. Explain whether your answers to Requirements 1 and 2 would change if you were discussing a change to LIFO for a Ford dealer.

C8-9 Selection of an Inventory Method and Ethical Issues

The Kelly Company uses FIFO. It has experienced rising costs for the last 5 years and expects that trend to continue. The King Company increased the number of LIFO pools it uses to account for its inventory.

Required

1. Explain why you think each company follows its policy.
2. Does either practice create ethical issues?

C8-10 Interpretation of GAAP and Ethical Issues

Robin Smith is considering buying shares in the Mah Company. The company has reported an increase in net income this year. On careful reading of the notes to the financial statements, Robin learns that the company had a LIFO liquidation this year. Robin understands what caused the liquidation but has asked you for advice about how to interpret it.

Required

1. Prepare a short memo to Robin to answer the question.
2. Could a LIFO liquidation profit create ethical issues?

C8-11 Exchange Rates (Appendix)

The Gasper Company has transactions with companies in many countries. It purchases components from companies in Korea and several European countries and sells its products throughout the world. The CEO is concerned that the stock market does not like companies to have volatile earnings. However, she is more willing to accept volatility if earnings are higher than they otherwise would be.

Required

Select a type of business with which you are familiar and that would be appropriate for Gasper Company's international activities. Write a memo to the CEO outlining how to eliminate her concerns.

C8-12 Analyzing Coca-Cola's Inventory Disclosures

Refer to the financial statements and related notes of the Coca-Cola Company in Appendix A of this book.

Required

1. Which inventory method(s) does the company use? Explain why you think the company selected this method(s).
2. Compute the inventory turnover ratio for 2004 and 2003 using the ending inventory instead of the average inventory. What is your evaluation of the difference?
3. Recreate summary journal entries to record the transactions that affected inventory during 2004.

C8-13 Ethics and Free Textbooks

Textbook publishers provide a copy of a particular book to each professor who is making a decision about adopting a book for the class. These books may be solicited by the professor or may be unsolicited. Some of the books are stamped "For Faculty Use Only." "Used book" companies send out reps who are reimbursed for their travel expenses and are paid a commission to buy these books from the professors at a low price. A lot of these books are purchased at the end of spring, held as inventory over the summer, and sold to university bookstores before the beginning of fall classes. The bookstores sell them to students or return them. Depending on the condition of the book, it is sold to students as either "new" or "used."

Required

From financial reporting and ethical perspectives, discuss the issues raised by the above situation.

Research Simulations

R8-1 Researching GAAP

Situation

To pump up sales of all brands, **Philip Morris** is moving aggressively to ship extra cases of cigarettes into distributors' warehouses and record them as sales, a practice generally known as "trade loading." (Adapted from *Fortune*, April 6, 1992). Philip Morris' president has asked you whether these shipments may be recognized as revenue.

Directions

Research the related generally accepted accounting principles and prepare a short memo to the president. Cite your references and applicable paragraph numbers.

R8-2 Researching GAAP

Situation

The Fenimore Manufacturing Company uses the average cost method. It has followed a policy of expensing all its manufacturing cost variances. It is considering a change in its policy that will involve allocating them between cost of goods sold and inventory. Fenimore's president has asked you which of these alternative policies is consistent with GAAP.

Directions

Research the related generally accepted accounting principles and prepare a short memo to the president. Cite your references and applicable paragraph numbers.