CHAPTER

8

Inventories: Cost Measurement and Flow Assumptions

OBJECTIVES

After careful study of 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).
SYNOPSIS

Classifications of Inventory

1. Inventories are the 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.

2. A merchandising company needs only one type of inventory account, usually called merchandise inventory.

3. Inventories of a manufacturing concern normally include raw materials, goods in process, and finished goods. Raw materials inventory includes materials that will be used in the production process. Supplies that do not actually become a physical part of the finished product are normally recorded in an indirect materials account. Work (or goods) in process inventory consists of the raw materials, direct labor, and manufacturing (factory) overhead costs currently in the production process. Finished goods inventory includes the completed manufactured products that have not been sold.

Alternative Inventory Systems

4. A perpetual inventory system provides for a continuous record of changes in inventory. To facilitate this, all purchases and sales of goods are recorded directly into the inventory account. Despite maintaining continuous records of the inventory, a company that uses a perpetual inventory system should make a physical count of the ending inventory at least once a year to verify the accuracy of the accounting records.

5. A company using the periodic inventory system does not maintain a continuous record of the physical quantities (or costs) of inventory on hand and will not be able to determine its inventory accurately until it takes a physical inventory at the end of the period. When purchases are made a company with a periodic system usually debits the costs of inventory to a Purchases account.

Items to Be Included in Inventory Quantities

6. Economic control at the balance sheet date, and not legal ownership or physical possession, determines what items a company includes in its ending inventory. Frequently, some inventory is in transit to the company or its customers at the balance sheet date. If the goods are shipped FOB (free on board) shipping point, control of (and legal title to) the goods is transferred to the buyer at the shipping point. Therefore, the goods in transit should be included in the buyer’s inventory. If the goods are shipped FOB destination, the legal title to the goods is transferred to the buyer on delivery. Therefore, the goods remain under the control and legal ownership of the seller while in transit and should be retained in the seller’s inventory.
Determination of Inventory Costs

7. "Inventory cost includes costs directly or indirectly incurred in bringing the inventory to its existing condition and location. The cost of purchased inventory includes the purchase price (net of purchases discounts), freight-in, insurance, storage, applicable taxes, and similar items. While we include freight-in (the cost of shipping inventory items to us), freight-out (the cost of shipping items we sell to customers) is not included as a cost of inventory. Freight out is considered a selling cost. Selling costs, which are not associated with bringing the inventory to its existing condition and location, are never included in inventory."

8. Because of cost/benefit considerations, some costs (for example, the costs of a purchasing department) are usually recognized when incurred, rather than attached to inventory. 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.

9. Material manufacturing costs directly or indirectly related to the production of inventory are considered to be costs of inventory. Variable manufacturing overhead is directly related and is always included in inventory. Fixed manufacturing overhead is more difficult to classify and may or may not be included in the cost of inventory.

10. Purchases discounts are accounted for by the gross price method or the net price method. In the gross price method purchases are recorded at gross prices and discounts are recorded only when they are taken. A company using the net price method records purchases at net prices and records discounts only when they are not taken.

Cost Flow Assumptions

11. A company allocates the cost of goods available for sale between the cost of goods sold and the ending inventory by means of a cost flow assumption. Most companies use a first-in, first-out method for the physical management of inventory. However, the physical flow of goods does not need to match the assumed flow of costs used for financial statements.

12. The specific identification cost flow assumption identifies each inventory unit as sold or remaining in the ending inventory, and includes the actual costs of those units in cost of goods sold and ending inventory, respectively. The average cost assumption considers that all the costs and units are commingled and does not identify individual costs and units, instead using the average cost of each unit to assign costs to goods sold and ending inventory. The FIFO cost flow assumption allocates costs in the order in which they are incurred. That is, the first input costs incurred are the first to be transferred to cost of goods sold. With FIFO, the ending inventory and cost of goods sold are the same under the perpetual and periodic systems. In the LIFO cost flow assumption, the most recent costs incurred are the first to be transferred out or sold, so the earliest costs incurred are assigned to the ending inventory.

Conceptual Evaluation of Inventory Cost Flow Assumptions

13. Different cost of goods sold and inventory values usually result from different cost flow assumptions. During periods of rising prices, FIFO produces lower cost of goods sold, higher ending inventory, and higher gross profit (and income) than LIFO because FIFO includes the oldest and lowest costs in cost of goods sold. The opposite results are produced during periods of falling prices. Results from the average cost assumption fall between the FIFO and LIFO extremes.
14. In periods of rising costs, LIFO results in the lowest gross profit (and income) and, consequently, reduces income taxes. Federal tax regulations permit the use of LIFO for income tax purposes only if it is also used in the company’s financial statements (the LIFO conformity rule).

15. In a period of inflation, a LIFO liquidation profit results when a company sells more units than it purchases. This profit occurs because the cost of goods sold includes the lower costs of inventory acquired in previous periods. The lowering of cost of goods sold results in an unrealistically high gross profit. The company then reports higher income, which has no economic substance, and pays higher income taxes. This is contrary to what usually happens under LIFO during an era of inflation, when current period purchases raise the cost of goods sold and decrease net income.

16. In a period of rising prices, the LIFO method may result in an inventory valuation that is lower than current costs and is not relevant for users. The value of the ending inventory on the balance sheet of a company using the FIFO method is usually relevant because it includes the most recent costs.

17. A company may influence, or manage, its income by increasing or delaying purchases. It is inconsistent with the revenue recognition principle for income to be affected by the purchasing activities of a company. However, it is an inevitable result of using the LIFO method. The FIFO and average cost methods do not produce unusual results when inventory liquidation occurs, nor as they as susceptible to earnings management.

18. The selection of an inventory cost flow assumption by management should in most cases be based on the expectation of future cost changes. If rising prices are expected, LIFO should generally be used as a better measure of gross profit (and income).

Dollar-Value LIFO

19. Dollar-value LIFO, a variation of the LIFO method, keeps track of inventory costs according to dollar-value layers rather than physical units. Using dollar-value LIFO, inventory may be grouped into pools that are similar as to types of material or use. Use of inventory pools helps eliminate LIFO liquidations due to fluctuations in the quantities of individual inventory items. The dollar-value LIFO method simplifies recordkeeping, which may become very complicated under ordinary LIFO.

Additional LIFO Considerations

20. According to APB Opinion No. 28, the effect of a temporary LIFO inventory liquidation that will not exist at year-end should not be included in interim financial statements. A liquidation that is expected to last beyond the end of the year should, however, be included. When a company changes to LIFO from another inventory method, usually the effect of the change on prior periods is not determinable and only the effect of the change on the results of current operations is disclosed. A change from LIFO is disclosed by retroactively restating the results of prior periods.

21. International accounting standards for inventories are generally the same as U.S. standards. However, the IASB does not allow the use of LIFO.
True-False Questions

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

1. One advantage of a perpetual inventory system is that a physical inventory does not need to be taken at year end, because a continuous record of inventory transactions is provided in the accounting records.  
Answer: False
While it is possible to account for inventory without taking a physical inventory using the perpetual method, all companies must take a physical inventory to verify the accuracy of their inventory records.

2. The balance of the Merchandise Inventory account on a mid-period trial balance for a company that uses a periodic inventory system is the beginning merchandise inventory.  
Answer: True
In a periodic inventory system the Merchandise Inventory account is only updated when a physical inventory is conducted.

3. The finished goods inventory reported on the financial statements of a manufacturing company includes applied factory overhead.  
Answer: True
The finished goods inventory includes the same three components as the Work in Process inventory; (1) raw materials; (2) direct labor; and (3) factory overhead. The difference is that these items are combined in the finished goods inventory into a single cost per unit.

4. The company receiving consigned goods is the consignor.  
Answer: False
The company receiving consigned goods is called the consignee. The company that furnishes consigned goods is called the consignor.

5. Goods under the economic control of a company are included in inventory, even if the goods are in transit.  
Answer: True
The basic criterion for including items in inventory is economic control. Therefore, if a company has economic control of goods, they should be included in that company’s inventory.

6. A company that uses the gross price method records purchases discounts in its accounting system only if the discounts are taken.  
Answer: True
The general meaning of the word “gross” in accounting means “prior to something being deducted,” while the term “net” generally means “after a deduction.” Therefore, a company that uses the gross price method of recording purchases records these purchases at full price and only records the purchase discounts when they are actually taken. (Explanation only makes sense if “not” is removed from the statement.)

7. The Purchases Discounts Lost account is treated as a financial expense for the period if the net price method is used.  
Answer: True
The correct inventory cost is the invoice price less all available discounts. Therefore, the cost of not taking purchase discounts (Purchase Discounts Lost) should not be included as inventory cost and instead are a part the financing cost of the inventory.
8. The inventory of a merchandising company normally includes raw materials, goods in process, and finished goods.  

Answer: False  
A merchandising company purchases goods to resell and does not change the physical form of the products it purchases. As such it only needs one category for inventory that is usually called merchandise inventory. A manufacturing company, however, will use the three categories of raw materials, work in process, and finished goods to account for inventory in various stages of completion.

9. The specific identification method is a practical inventory method that is useful in preventing manipulation of profits.  

Answer: False  
Management can easily manipulate profits under the specific identification method by selectively choosing which items to include in cost of goods sold based on the item’s cost.

10. If the FIFO cost flow assumption is used, the ending inventory consists of the latest costs incurred.  

Answer: True  
Using the FIFO system, the cost of the first goods purchased are assigned to the cost of goods sold, therefore the cost of the latest items purchased are assigned to ending inventory.

11. FIFO periodic and FIFO perpetual usually result in different ending inventory values.  

Answer: False  
Because FIFO uses the costs of the first units assigned to cost of goods sold, the cost of the last units are included in ending inventory. Because of this the costs associated with ending inventory will not differ under either the periodic or perpetual inventory method.

12. A new average cost per unit is calculated after each purchase if the average cost method is used under a perpetual inventory system.  

Answer: True  
When a company uses the average cost method in a perpetual inventory system, a new average price is calculated after each purchase. This new average price is used for subsequent sales until new purchases are made.

13. The LIFO perpetual and LIFO periodic methods usually result in different ending inventory values if sales and purchases are made throughout the month.  

Answer: True  
Under the periodic method the whole accounting period is treated as a single period with all sales assumed to occur after all purchases. Therefore the cost of goods sold reflects the costs of the most recent items purchased for the entire month. Under the perpetual system the cost of goods sold are calculated after each sale and consist of the cost of the most recent purchases at that time, not for the entire month. This results in different items being used for cost of goods sold under the two different systems.
14. When the FIFO cost flow assumption is used, holding gains are included in net income.  

Answer: True  

A holding gain occurs when there is a difference between the replacement cost and the purchase or historical cost of an item. Because FIFO matches the earliest costs with revenues, all of these holding gains are included in income for the period.

15. International standards specify LIFO as the “benchmark” inventory method.  

Answer: False  

LIFO is not allowed as an acceptable inventory cost flow method by the IASB. This is mainly based on inconsistencies between LIFO and the normal physical flow of the inventory.

16. Dollar-value LIFO simplifies LIFO recordkeeping and eliminates LIFO liquidations resulting from fluctuations in the numbers of similar inventory items.  

Answer: True  

By using current costs and cost indexes, dollar-value LIFO simplifies recordkeeping. Because companies usually create several pools to account for inventory, instead of each individual item, it is more difficult to liquidate a pool even though some individual items within the pool may be liquidated.

Multiple Choice Questions

Select the one best answer for each of the following questions.

1. Which one of the following is true for periodic inventory but not true for perpetual?  
   (a) A physical inventory count should be made at least once a year.  
   (b) The Merchandise Inventory account in the year-end trial balance represents ending inventory.  
   (c) The Inventory account in the year-end trial balance represents beginning inventory.  
   (d) Material freight-in costs should be treated as an inventory cost.  

Answer: (c) The Inventory account in the year-end trial balance represents beginning inventory.  

Under a periodic inventory system new purchases are recorded in a Purchase account and not in the inventory account, therefore the inventory account is not affected throughout the year and the balance in the year-end trial balance will be the same as the beginning balance. Answer (a) is incorrect because a physical inventory should be conducted each year under both systems to verify the accuracy of the accounting records. Answer (b) is incorrect because ending inventory takes into account all purchases and sales made throughout the year. Under the periodic system the inventory account is not used to update amounts on hand. Answer (d) is incorrect because freight-in costs are treated as inventory costs under both the periodic and perpetual systems.
2. Which one of the following should not be included in the ending inventory of the Dayton Company?
   (a) Dayton goods in transit to Kent Company shipped FOB Kent factory
   (b) goods in transit to Dayton Company that were shipped FOB shipping point
   (c) goods sold by the Dayton Company and segregated in Dayton's warehouse while awaiting pickup by the Kent Company
   (d) inventory shipped by Dayton Company on consignment basis and held by the consignee at the balance sheet date

   \textbf{Answer: (c)} goods sold by the Dayton Company and segregated in Dayton's warehouse while awaiting pickup by the Kent Company

   Economic control is what determines which items are to be included on a company's inventory. In answer (c) Dayton has passed the economic control, although not the physical possession, of the goods to their customer. The goods are segregated and can be picked up at anytime by the customer. Answer (a) is incorrect because the goods are still in transit; economic control will not be passed to the Kent company until the goods reach the Kent factory. Answer (b) is incorrect because Dayton acquired economic control of these items when they were picked up at the shipping point. Answer (d) is incorrect because items that are held for consignment remain under the economic control of the consignor (Dayton), not the consignee.

3. Under the gross price method, (a) purchases discounts are assumed to be taken and recorded when the purchase is made.
   (b) the correct inventory cost is recorded regardless of whether purchases discounts are taken.
   (c) purchases discounts are recorded only when not taken.
   (d) inventory purchases are recorded at gross prices and discounts are recorded when taken.

   \textbf{Answer: (d)} inventory purchases are recorded at gross prices and discounts are recorded when taken.

   In the gross price method of recording inventory purchases, all purchases are recorded at gross prices and purchase discounts are recorded only when they are actually taken. Answer (a) is incorrect because this describes the net price method. Answer (b) is incorrect because the inventory cost should record the inventory cost less all available discounts. Under the gross price method, discounts lost are not removed from inventory costs. Answer (c) is incorrect because purchase discounts that are not taken are not recorded.

4. Which of the following is not considered inventory?
   (a) Material used to make products for resale
   (b) Finished goods awaiting shipment to customers
   (c) Equipment used to manufacture products for resale
   (d) All of these items are considered inventory.

   \textbf{Answer: (c)} Equipment used to manufacture products for resale

   Equipment that is used to manufacture products for resale is not intended to be sold to customers, therefore it is not inventory. This equipment would most likely be considered a long-term asset. Answer (a) is incorrect because materials that are used to make products for resale are called raw materials and are a component of inventory. Answer (b) is incorrect because finished goods are a component of inventory. Answer (d) is incorrect because choice (c) is not considered to be inventory.
5. In a period of decreasing prices, which cost flow assumption will result in the lowest income?
   (a) FIFO periodic
   (b) weighted average
   (c) dollar value LIFO
   (d) LIFO perpetual

   Answer: (a) FIFO periodic
   The method that will result in the lowest income is the method that generates the highest cost of goods sold. When prices are decreasing, the most expensive items are the ones that were purchased first, therefore the method that will generate the highest cost of goods sold is the method that uses the first items purchased; FIFO. Answer (b) is incorrect because weighted average always generates a value in between LIFO and FIFO when prices are changing. Answers (c) and (d) are incorrect because LIFO uses the most recently purchased items for cost of goods sold and the most recently purchased items are the less expensive items.

6. Which of the following statements concerning foreign currency transactions is true?
   (a) An exchange gain occurs when the exchange rate increases between the date a payable is recorded and the date of cash payment.
   (b) An exchange loss occurs when the exchange rate declines between the date a receivable is recorded and the date of cash receipt.
   (c) An exchange gain occurs when the exchange rate declines between the date a receivable is recorded and the date of cash receipt.
   (d) An exchange loss occurs when the exchange rate declines between the date a payable is recorded and the date of cash payment.

   Answer: (b) An exchange loss occurs when the exchange rate declines between the date a receivable is recorded and the date of cash receipt.
   An exchange loss or gain results when the exchange rate changes between the date a transaction is recorded and actual payment is made. An exchange loss will occur when the exchange rate declines between the date a receivable is recorded and the date actual payment is received because the amount of cash received is less than the amount of receivable recorded. Answer (a) is incorrect because a company would have to pay more to settle the payable than what they recorded on the transaction date, therefore this represents an exchange loss. Answer (c) is incorrect because this will represent a loss, not a gain, because less cash is received by the company recording the receivable. Answer (d) is incorrect because this would result in an exchange gain since the company would be required to pay less in cash than the amount they originally recorded as a payable.

7. Which of the following systems requires that cost of goods sold be updated each time a sale is made?
   (a) periodic
   (b) perpetual
   (c) both perpetual and periodic
   (d) neither perpetual or periodic

   Answer: (b) Perpetual
   In a perpetual system the amount in inventory is continually updated as sales are made. After each sale the inventory account is reduced to properly reflect the new amount in inventory while the cost of goods sold account is increased to reflect the cost of the items sold. Answer (a) is incorrect because in a periodic system cost of goods sold are only updated when a physical inventory is conducted. Both answers (c) and (d) are incorrect based on the above information.
8. 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 LIFO periodic method is less than the cost of goods sold when inventory is valued using the FIFO periodic method?
(a) Prices decreased.
(b) Prices were unchanged.
(c) Prices increased.
(d) Price trend cannot be determined from the information given.

Answer: (a) Prices decreased.

Under the LIFO method the cost of goods sold is made up of the latest units purchased. Under the FIFO method the cost of goods sold is made up of the first units purchased. If the cost of goods sold under LIFO is less than under FIFO then prices must be declining because the most recent purchases are less than the first purchases. Answer (b) is incorrect because with prices unchanged LIFO and FIFO costs of goods sold would be identical. Answer (c) is incorrect because if prices increased LIFO cost of goods sold would exceed FIFO cost of goods sold. Answer (d) is incorrect. Although it is not possible to give exact measures of cost of goods sold without more information it is possible to determine trends.

9. A company had the following information for the current year:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning inventory</td>
<td>$50,000</td>
</tr>
<tr>
<td>Purchases</td>
<td>45,000</td>
</tr>
<tr>
<td>Purchase returns</td>
<td>3,000</td>
</tr>
<tr>
<td>Freight-in</td>
<td>2,000</td>
</tr>
<tr>
<td>Freight-out</td>
<td>1,000</td>
</tr>
<tr>
<td>Ending inventory</td>
<td>$37,000</td>
</tr>
</tbody>
</table>

The amount of cost of goods sold for the current year is:

(a) $55,000.
(b) $56,000.
(c) $57,000.
(d) $58,000.

Answer: (c) $57,000.

Cost of goods sold can be calculated as follows:

\[
\begin{align*}
\text{Beginning inventory} & \quad 50,000 \\
\text{Purchases} & \quad 45,000 \\
\text{Purchase returns} & \quad -3,000 \\
\text{Freight-in} & \quad 2,000 \\
\text{Freight-out} & \quad -1,000 \\
\text{Ending inventory} & \quad -37,000 \\
\hline
\text{Goods available for sale} & \quad 94,000 \\
\text{Cost of goods sold} & \quad 57,000
\end{align*}
\]

Answer (a) is incorrect because it includes freight-out in the cost of goods sold calculation. Freight-out is a selling expense but is not a cost of the inventory because it is not required to acquire and make the inventory ready for sale. Answer (b) is incorrect because it does not include freight-in.

Freight-in, unlike freight-out, is a part of cost of goods sold because it is required in order to acquire and make the inventory ready for sale. Answer (d) is incorrect because it does not include freight-in and purchase returns. Purchase returns should not be counted in cost of goods sold because these items were returned and are not available to sell.
10. Which inventory cost flow method more closely matches the current cost of replacing inventory with the cost of goods sold when prices are changing?
   (a) LIFO
   (b) FIFO
   (c) Weighted Average Cost
   (d) Not enough information to determine.

Answer: (a) LIFO
Because LIFO uses the most recent items purchased for determining cost of goods sold, it provides a closer match of cost of goods sold to the replacement costs for inventory. Answer (b) is incorrect because FIFO uses the first units purchased to calculate cost of goods sold. The first units purchased are least likely to approximate the replacement cost for inventory. Answer (c) is incorrect because it uses all costs, both the most recent and most distant, to calculate cost of goods sold. Answer (d) is incorrect because we do not need the direction or amount of price changes to show that the most recent purchases will be the ones used to calculate cost of goods sold.

11. Which inventory cost flow method more closely matches the current cost of inventory with the value of ending inventory when prices are changing?
   (a) LIFO
   (b) FIFO
   (c) Weighted Average Cost
   (d) Not enough information to determine.

Answer: (b) FIFO
Because FIFO uses the most recent items purchased for determining ending inventory, it provides a closer match of ending inventory to the current cost for inventory. Answer (a) is incorrect because LIFO uses the first units purchased to calculate ending inventory. The first units purchased are least likely to match the current cost for inventory. Answer (c) is incorrect because it uses all costs, both the most recent and most distant, to calculate ending inventory. Answer (d) is incorrect because we do not need the direction or amount of price changes to show that the most recent purchases will be the ones used to calculate ending inventory.

12. In a periodic inventory system, to what account are purchases debited?
   (a) Inventory
   (b) Cost of goods sold
   (c) Purchases
   (d) Accounts payable

Answer: (c) Purchases
In a periodic inventory system a company debits purchases into a purchase account. Answer (a) is incorrect because debiting purchases in the inventory account would overstate the inventory account because there is no provision for reducing the inventory account when sales are made. Answer (b) is incorrect because a company that uses a periodic inventory system does not account for cost of goods sold as items are purchased or sold, but only at the end of a reporting period when a physical inventory is conducted. Answer (d) is incorrect because accounts payable would be credited, not debited when inventory is purchased on account.
13. The LIFO conformity rule requires that:
(a) all companies use LIFO for tax purposes.
(b) companies that use LIFO for tax purposes must also use LIFO for financial reporting purposes.
(c) companies cannot use LIFO for both tax and financial reporting.
(d) if LIFO is used for one class of inventory it must be used for all inventory.

Answer: (b) companies that use LIFO for tax purposes must also use LIFO for financial reporting purposes.

The Internal Revenue Code requires that a company that uses LIFO for tax reporting purposes must also use LIFO for its financial statements. Answer (a) is incorrect because companies are allowed to choose which inventory costing method they wish to use. Answer (c) is incorrect because companies that use LIFO for tax reporting must use LIFO for financial reporting. Answer (d) is incorrect because companies can use different methods for different classes of inventory.

14. The managers at a company are paid bonuses based on the company’s net income. This year the cost of inventory items have been consistently rising. If the managers could choose any inventory cost flow method, which would they choose?
(a) LIFO
(b) FIFO
(c) Weighted Average
(d) Cannot be determined.

Answer: (b) FIFO

The managers will want to use the system that produces the highest net income to ensure they receive the highest bonus. The only component of the income statement that will change based on the choice of inventory cost flow method is cost of goods sold (COGS). Because COGS is subtracted from sales to arrive at gross profit, the lower the COGS, the higher the gross profit. The higher the gross profit the higher the net income and the higher the bonus to the managers. In a period of continuously rising prices, the method that uses the older items to value COGS would produce the lowest value for COGS. Because the older items are used to calculate the COGS under FIFO, it would produce the lowest COGS. Therefore the managers would prefer FIFO.

Answer (a) is incorrect because LIFO uses the most recent, and therefore costliest, items in COGS producing the lowest gross profit. Answer (c) is incorrect because weighted average will always produce a COGS and ending inventory valuation that is in between LIFO and FIFO. While no numbers are given, they are not needed to determine which method produces the lowest or highest COGS. All that is needed to be known is the direction of costs (rising) and the motivation for choosing a method (larger net income); therefore, answer (d) is incorrect.
15. The rule that requires that assumed cost flows be related to actual costs flows is:
(a) the LIFO conformity rule.
(b) the FIFO conformity rule.
(c) the cost flow-physical flow rule.
(d) nonexistent. There is no rule requiring that cost flow and physical flow be related.

**Answer:** (d) nonexistent. There is no rule requiring that cost flow and physical flow be related.

There is no rule requiring that cost flow assumptions be related to physical flow assumptions. It is perfectly acceptable to use one method to manage actual inventory and another to account for cost flows.

Answer (a) is incorrect because the LIFO conformity rule requires that if you use LIFO cost flow assumptions for income tax purposes you must also use LIFO for financial accounting. Both of these situations deal with cost flow assumptions and not physical flow. Answers (b) and (c) are not actual rules.

16. 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 were unchanged.
(c) Prices increased.
(d) Price trend cannot be determined from the information given. This question is identical to #8.

**Answer:** (a) Prices decreased.

Using FIFO, the COGS is calculated from the oldest items (the first ones "in") while LIFO uses the most recent items in determining COGS. Therefore, if the COGS under FIFO is greater than the COGS under LIFO, the older items cost more than the most recent items, therefore prices have decreased.

Answer (b) is incorrect because the COGS under FIFO and LIFO would be the same if prices were unchanged. Answer (c) is incorrect because prices increasing would cause LIFO COGS to exceed FIFO COGS. Answer (d) is incorrect because you can determine the direction of prices based on the information provided.

**Problem-Solving Strategies**

**Items to Be Included in Inventory**

A physical count of the inventory of Boone Hardware on December 31 was determined to be $45,800 without considering any of the following items. After consideration of the following items, determine the correct amount of inventory for Boone Hardware.

1. A purchase of $4,000 shipped FOB shipping point was still in transit on December 31. Transportation charges on this shipment were $150 and paid by the buyer.
2. Boone Hardware had merchandise worth $3,500 in its store that was on consignment from Tweetsie, Inc.
3. A purchase of $7,000 shipped FOB destination was still in transit on December 31. Transportation charges on this shipment were $450 and paid by the seller.
4. A sale of $1,750 shipped FOB destination was still in transit on December 31. Transportation charges on this shipment were $75 and paid by the seller.
5. A sale of $2,500 shipped FOB shipping point was still in transit on December 31. Transportation charges on this shipment were $200 and paid by the buyer.
**Strategy:** Remember, the cost of inventory includes the direct costs to acquire the items as well as any indirect costs associated with bringing the item to existing condition and location. However, indirect costs associated with the selling of inventory are not included in inventory costs but are accounted for as selling expenses.

**Strategy:** The transportation terms determine when economic control of shipped items transfer. Economic control of items shipped FOB destination will not transfer until the items have arrived at the destination and should be appropriately accounted for as inventory of the seller. On the other hand, economic control of items shipped FOB shipping point will transfer when they leave the shipping point and should be appropriately accounted for as inventory of the buyer.

**Strategy:** Items on consignment remain the property of the consignor and are excluded from the consignee's inventory.

**Strategy:** Make sure that you read the question carefully and understand the initial assumptions. Do the initial assumptions already include the items in question, or are these items excluded from the assumptions? Is the question asking for the changes in inventory based on the items or does it ask for the total inventory cost? Correctly reading and answering what the question asks is half the battle.

**Strategy:** Make sure you understand the terms sale and purchase. If the question is referring to a particular company then the term “purchase” would denote items that the company in the question has purchased from another company. Whereas the term “sale” would denote items that the company is or has sold to another company.

The best approach to answer this problem is to address each of the five items separately. After that is completed, you can add the ones that are appropriately considered inventory costs to arrive at the final inventory costs.

1. A purchase of $4,000 shipped FOB shipping point was still in transit on December 31. Transportation charges on this shipment were $150 and paid by the buyer.

   Boone Hardware, the company in question, has purchased this item from another company. Although the item has not arrived it is still possible that the item could be included in Boone Hardware’s inventory, based on the shipping terms. Because the terms are FOB shipping point, economic control passed to Boone Hardware when the item left the seller’s shipping point. Since the item is in Boone Hardware’s economic control on December 31, it should be included as a cost of inventory. The shipping charges, paid by Boone Hardware, are an indirect cost to obtain the inventory item and should also be included as an inventory cost. Therefore the inventory account must be increased by $4,000 + $150 = $4,150.

2. Boone Hardware had merchandise worth $3,500 in its store that was on consignment from Tweetsie, Inc.

   Because items on consignment are properly accounted for as inventory in the consignor’s accounting records, these items should not be included in Boone Hardware’s inventory costs. They should remain as inventory on the records of Tweetsie, Inc.
3. A purchase of $7,000 shipped FOB destination was still in transit on December 31. Transportation charges on this shipment were $450 and paid by the seller.

This is an item that Boone Hardware has purchased from another company. Because the terms are FOB destination, and the items have not reached the destination, they should not be included in Boone Hardware’s inventory. The shipping charges, paid by the seller and not by Boone Hardware, are also not included as inventory costs for Boone Hardware.

4. A sale of $1,750 shipped FOB destination was still in transit on December 31. Transportation charges on this shipment were $75 and paid by the seller.

This is an item that Boone Hardware has sold to another company. Because the terms are FOB destination, and the items have not reached the destination, they should be included in Boone Hardware’s inventory. The shipping charges, even though paid by Boone Hardware, should not be included as inventory costs. The shipping charges would be accounted for as a selling expense, not an inventory costs, because they were not required to acquire the inventory. Therefore the inventory account must be increased by $1,750.

5. A sale of $2,500 shipped FOB shipping point was still in transit on December 31. Transportation charges on this shipment were $200 and paid by the buyer.

This is an item that Boone Hardware has sold to another company. Because the terms are FOB shipping point, and the items have left the shipping point, economic control has been transferred to the buyer. Therefore they should not be included in Boone Hardware’s inventory costs. The shipping charges, paid by the buyer and not by Boone Hardware, are also not included as inventory costs for Boone Hardware.

Despite all the work, we have still not answered the question. The question asks us to determine the correct amount of inventory for Boone Hardware after we consider the items above.

The correct amount of inventory includes the original physical count plus any of items 1 through 5 that should be counted. Therefore the correct amount would be:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical count</td>
<td>$45,800</td>
</tr>
<tr>
<td>+ Item #1</td>
<td>4,150</td>
</tr>
<tr>
<td>+ Item #4</td>
<td>1,750</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$51,700</strong></td>
</tr>
</tbody>
</table>

Examples of Cost Flow Calculations

The following information is provided for a new company just starting business on January 1 of the current year. The following inventory transactions occurred during the first year of operations, in the sequence listed:
Strategic Plan: Before beginning this question we need to determine how many units are in ending inventory. When a periodic inventory system is used, the formula is:

\[ \text{Available - Sold} = \text{Ending} \]

\[ 10,000 - 3,200 = 6,800 \]

**Strategy:** Remember that under the periodic system we are not concerned about when purchases and sales occur during the month. We are only concerned about the total purchases and sales. In the perpetual system, however, we must calculate the cost of goods sold after each sale.

1) FIFO, periodic

   a) Cost of Goods Sold (COGS)

   We sold 3,200 units. Because FIFO assigns the cost of the first units purchased (First-In) to the COGS for the first units sold (First-Out), the COGS will come from our initial purchase of inventory for $10 per unit. Therefore,
   
   \[ \text{Cost of Goods Sold} = 3,200 \times 10 = 32,000 \]

   b) Cost of Ending Inventory

   We sold 3,200 units; therefore we have 6,800 units in ending inventory. Because FIFO assigns the cost of the first units purchased (First-In) to the COGS for the first units sold (First-Out), the cost of the ending inventory will come from the last purchases made. Therefore,
   
   \[ \begin{align*}
   1,800 \times 10 &= 18,000 \\
   2,000 \times 11 &= 22,000 \\
   3,000 \times 12 &= 36,000 \\
   6,800 \times 12 &= 76,000
   \end{align*} \]
   
   \[ \text{Cost of Ending Inventory} = 76,000 \]
Strategy: Make sure that you check your answer to both parts of the FIFO problem. You should notice that the cost of ending inventory ($76,000) plus the cost of goods sold ($32,000) equals the total cost of goods available for sale ($108,000). This comes from the equation we discussed above for periodic inventory systems:

Available - Sold = Ending

This equation can be rearranged to give us the amount sold if we know available and ending:

Available - Ending = Sold

Strategy: Based on these equations it should be obvious that going through the calculation process for both ending inventory and cost of goods sold was unnecessary. We only have to solve for one of these items and then substitute that answer into the equation to get the other term. In other words, when we calculated cost of goods sold to be $32,000, we could have used this value to determine the value of ending inventory.

Available - Sold = Ending

$108,000 - $32,000 = $76,000

1) FIFO, perpetual
   a) Cost of Goods Sold (COGS)

\[
\begin{align*}
1,000 \times $10 &= $10,000 \\
2,200 \times $10 &= \text{22,000} \\
3,200 \times $10 &= \text{32,000}
\end{align*}
\]

Cost of Goods Sold = $32,000

b) Cost of Ending Inventory

\[
\begin{align*}
*1,800 \times $10 &= $18,000 \\
2,000 \times $11 &= 22,000 \\
3,000 \times $12 &= 36,000 \\
6,800 \times \text{22,000}
\end{align*}
\]

* (5,000 - 1,000 - 2,200) = 1,800 units

Cost of Ending Inventory = $76,000

Strategy: FIFO costs are the same for both a periodic and perpetual inventory system. This is true because the most recent costs incurred are always included in the ending inventory. However, the results for periodic and perpetual systems for both LIFO and average cost are not the same.

3) LIFO, periodic
   a) Cost of Goods Sold (COGS)

We sold 3,200 units. Because LIFO assigns the cost of the last units purchased to the COGS for the first units sold, the COGS will come from our last purchases of inventory. Therefore,
200 × $11 = $2,200
3,000 × $12 = $36,000
3,200 × $12 = $38,200

Cost of Goods Sold = (this math is incorrect so omit it) = $38,200

b) Cost of Ending Inventory

We sold 3,200 units; therefore we have 6,800 units in ending inventory. Because LIFO assigns the cost of the last units purchased (Last-In) to the COGS for the first units sold (First-Out), the cost of the ending inventory will come from the first purchases that we made. Therefore,

\[
\begin{align*}
5,000 \times \$10 &= \$50,000 \\
* 1,800 \times \$11 &= 19,800 \\
6,800 \times \$69,800 &
\end{align*}
\]

* (2,000 - 200) = 1,800 units

Cost of Ending Inventory = $69,800

4) LIFO, perpetual

**Strategy:** For perpetual inventory systems it is helpful to set up the solution in a chronological order. This allows you to see when sales and purchases occur. In this setup a balance is calculated after each transaction; therefore, the value of the ending inventory will be the last balance calculated in the month. For cost of goods sold, it is necessary to add up the cost for each individual sale.

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase #1</td>
<td>5,000 @ $10 = $50,000</td>
<td>5,000 @ $10 = $50,000</td>
<td></td>
</tr>
<tr>
<td>Sale #1</td>
<td></td>
<td>1,000 @ $10 = $10,000</td>
<td>4,000 @ $10 = $40,000</td>
</tr>
<tr>
<td>Purchase #2</td>
<td>2,000 @ $11 = $22,000</td>
<td>4,000 @ $10 = $40,000</td>
<td>2,000 @ $11 = $22,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,000</td>
<td>$62,000</td>
</tr>
<tr>
<td>Sale #2</td>
<td>2,000 @ $11 = $22,000</td>
<td>3,800 @ $10 = $38,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 @ $10 = $2,000</td>
<td>3,000 @ $12 = $36,000</td>
<td>6,800 @ $12 = $74,000</td>
</tr>
</tbody>
</table>

a) Cost of Goods Sold (COGS) = * $34,000

* $10,000 + $24,000

b) Cost of Ending Inventory = * $74,000

* [(3,800 @ $10) + (3,000 @ $12)]

5) Weighted Average Cost, periodic

Before calculating either the cost of goods sold or cost of ending inventory in the weighted average cost flow assumption, we must first calculate the weighted average unit cost:
Strategy: When you are calculating averages make sure that the answers you get make sense. For example, if you calculate an average of $10 per unit, and the individual prices per unit are $12, $15, and $20, you know that a mistake has been made. If you are averaging two or more different numbers the average must fall somewhere between the largest and smallest number.

Weighted Average Unit Cost = total cost/total units = $108,000/10,000 = $10.80 per unit

a) Cost of Goods Sold (COGS) = $34,560
   * 3,200 × $10.80 = $34,560

b) Cost of Ending Inventory = $73,440
   * 6,800 × $10.80 = $73,440

6) Moving average, perpetual

Strategy: As mentioned above, it is helpful to set up the solution in a chronological order for perpetual inventory systems like moving average. This allows you to see when sales and purchases occur. In this setup a balance is calculated after each transaction; therefore, the value of the ending inventory will be the last balance calculated in the month. For cost of goods sold it is necessary to add up the cost for each individual sale.

<table>
<thead>
<tr>
<th>Transaction</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase #1</td>
<td>5,000 @ $10 = $50,000</td>
<td></td>
<td>5,000 @ $10 = $50,000</td>
</tr>
<tr>
<td>Sale #1</td>
<td></td>
<td>1,000 @ $10 = $10,000</td>
<td>4,000 @ $10 = $40,000</td>
</tr>
<tr>
<td>Purchase #2</td>
<td>2,000 @ $11 = $22,000</td>
<td>6,000 @ $10.33‡ = $62,000</td>
<td></td>
</tr>
<tr>
<td>Sale #2</td>
<td>2,200 @ $10.33 = $22,726</td>
<td>3,800 @ $10.33‡ = $39,274</td>
<td></td>
</tr>
<tr>
<td>Purchase #3</td>
<td>3,000 @ $12 = $36,000</td>
<td>6,800 @ $11.07‡ = $75,274</td>
<td></td>
</tr>
</tbody>
</table>

* 4,000 × $10 = $40,000
  2,000 × $11 = $22,000
  6,000 × $12 = $72,000

62,000 ÷ 6,000 = $10.33‡
75,274 ÷ 6,800 = $11.07‡

‡ = Numbers have been rounded

Strategy: A new moving average cost is only computed after a purchase is made.
Example of Dollar-Value LIFO Calculations

**Strategy:** The key point to remember in completing dollar value LIFO (DVL) problems is to convert the ending inventory at current-year costs into a base-year value. Once this is done you can compare the current-year inventory in base-year amounts to the previous years ending inventory in base-year amounts. This will allow you to see if we have added a new layer of inventory or if we have used up some of the old layer.

**Strategy:** A simple analogy for DVL is to think of a layer cake. The base year constitutes the first layer of the cake. With each succeeding year we either add another layer to our cake or cut into a previous layer. Just like with a cake, once a layer is used it can never be replaced, but new layers can be placed on the older layers.

**Strategy:** A cost index is necessary when working with DVL. This cost index is usually expressed as a percentage of a base-year index. Remember from mathematics that a percentage can be expressed in two ways: (1) as a whole number, and (2) as a number and decimal. For instance, if we wanted to use a cost index that is 10% more than the base year we could express this cost index as either 110% or as 1.10. These two terms are the same mathematically.

The following steps are used in the dollar-value LIFO calculations:

**Step 1.** Convert the ending inventory at current-year costs to base-year costs. This is accomplished by the following equation:

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

**Step 2.** Compare the ending inventory at base-year costs with the beginning inventory valued at base-year costs. If there is an increase then a new layer has been added. If there has been a decrease a portion of the previous inventory layer has been depleted.

**Step 3.** Each layer that remains is then priced using the cost index for the year it was acquired. This will allow us to obtain the DVL cost.

Let’s now work an example.

Using the following information, calculate the cost of ending inventory using dollar-value LIFO.

<table>
<thead>
<tr>
<th>Year</th>
<th>Ending inventory at current year costs</th>
<th>Cost Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$100,000</td>
<td>1.00</td>
</tr>
<tr>
<td>2008</td>
<td>$126,000</td>
<td>1.05</td>
</tr>
<tr>
<td>2009</td>
<td>$137,500</td>
<td>1.10</td>
</tr>
<tr>
<td>2010</td>
<td>$145,000</td>
<td>1.25</td>
</tr>
<tr>
<td>2011</td>
<td>$180,000</td>
<td>1.20</td>
</tr>
</tbody>
</table>

**Steps 1 and 2.** Convert ending inventory to base-year cost and determine if a new layer has been added or an old layer depleted. We determine the change in layer by comparing the current year’s base-year cost with the previous year’s base-year cost. For instance, in the table below in 2008 the base-year cost was $120,000 while the previous year (2007) base year cost was $100,000, therefore there was a change of +$20,000 from 2007 to 2008, which represents a new layer of inventory added to the base-year layer.
### Chapter 8  Inventories:  Cost Measurement and Flow Assumptions

#### Current-year Cost and Base-year Cost

<table>
<thead>
<tr>
<th>Year</th>
<th>Current-year Cost</th>
<th>Cost Index</th>
<th>Base-year Cost</th>
<th>Change in Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
<td>N/A</td>
</tr>
<tr>
<td>2008</td>
<td>$126,000</td>
<td>1.05</td>
<td>$120,000</td>
<td>+$20,000</td>
</tr>
<tr>
<td>2009</td>
<td>$137,500</td>
<td>1.10</td>
<td>$125,000</td>
<td>+ 5,000</td>
</tr>
<tr>
<td>2010</td>
<td>$145,000</td>
<td>1.25</td>
<td>$116,000</td>
<td>- 9,000</td>
</tr>
<tr>
<td>2011</td>
<td>$180,000</td>
<td>1.20</td>
<td>$150,000</td>
<td>+$34,000</td>
</tr>
</tbody>
</table>

#### Step 3.
We must now convert the prices of each layer into their current price based on the cost index of the year in which they were added.

<table>
<thead>
<tr>
<th>Year</th>
<th>Layers</th>
<th>Cost Index</th>
<th>DVL Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
</tr>
<tr>
<td>2008</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
</tr>
<tr>
<td></td>
<td>20,000</td>
<td>1.05</td>
<td>21,000</td>
</tr>
<tr>
<td></td>
<td>$120,000</td>
<td></td>
<td>$121,000</td>
</tr>
<tr>
<td>2009</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
</tr>
<tr>
<td></td>
<td>20,000</td>
<td>1.05</td>
<td>21,000</td>
</tr>
<tr>
<td></td>
<td>5,000</td>
<td>1.10</td>
<td>5,500</td>
</tr>
<tr>
<td></td>
<td>$125,000</td>
<td></td>
<td>$126,500</td>
</tr>
<tr>
<td>2010</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
</tr>
<tr>
<td></td>
<td>16,000</td>
<td>1.05</td>
<td>16,800</td>
</tr>
<tr>
<td></td>
<td>$116,000</td>
<td></td>
<td>$116,800</td>
</tr>
<tr>
<td>2011</td>
<td>$100,000</td>
<td>1.00</td>
<td>$100,000</td>
</tr>
<tr>
<td></td>
<td>16,000</td>
<td>1.05</td>
<td>16,800</td>
</tr>
<tr>
<td></td>
<td>34,000</td>
<td>1.20</td>
<td>40,800</td>
</tr>
<tr>
<td></td>
<td>$150,000</td>
<td></td>
<td>$157,600</td>
</tr>
</tbody>
</table>

**Strategy:** Notice that the DVL cost is calculated for each layer based on the cost index for the year in which this layer was first added.

**Strategy:** If a layer is not added during the year (as in 2010) then that cost index is not used in calculating the final DVL cost.

**Strategy:** Notice that when a layer is eliminated (as in 2010 when we eliminated the layer that had been added in 2009) that this layer is gone forever. Just as mentioned before with the analogy of a cake, once a layer has been eaten it cannot reappear. New layers added after the elimination of a layer are priced at the cost index for the year in which they are added as was done with the addition of a new layer in 2011, which used the cost index for 2011.
Test Your Knowledge

8-1. Indicate by a check mark which of the following material items should be included as inventory in the financial statements for Labrador Company. Assume the company uses a calendar year reporting period.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Include</th>
<th>Do Not Include</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Labrador paid $500 for insurance on inventory that was shipped to the company.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Labrador shipped a product (FOB destination) to a customer that was in transit at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>Labrador purchased merchandise (FOB shipping point) that was in transit at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>Labrador purchased merchandise (FOB destination) that was in transit at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5)</td>
<td>Labrador paid a $2,000 transportation charge for inventory it owned at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6)</td>
<td>Labrador shipped a product (FOB shipping point) to a customer that was in transit at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7)</td>
<td>Labrador paid $400 freight charges to ship a product to a customer. The product was in transit (FOB shipping point) to the customer at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8)</td>
<td>Labrador delivered on a consignment basis a product with a cost of $1,000 to another company. The inventory is still for sale with the other company at year-end.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9)</td>
<td>Labrador paid $15,000 in sales commissions during the year to sell inventory.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10)</td>
<td>Labrador’s raw materials that had not been used in the production process by year-end.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8-2. The Toledo Merchandising Company started business on August 1 of the current year. The following purchases were made during August on the dates indicated:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 10 2,500</td>
<td>$10</td>
</tr>
<tr>
<td>August 15 12,500</td>
<td>11</td>
</tr>
<tr>
<td>August 27 4,000</td>
<td>$14</td>
</tr>
</tbody>
</table>

The company made the following sales during August:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 20 6,000</td>
</tr>
<tr>
<td>August 31 5,000</td>
</tr>
</tbody>
</table>
Determine the cost of goods sold and the cost of ending inventory based on each of
the following methods of inventory valuation.

(1) Weighted Average, periodic

(2) Moving Average Perpetual

(3) FIFO Periodic

(4) FIFO Perpetual

(5) LIFO Periodic
8-3. The following information on inventory was taken from the records of the Dallas Retail Company:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance 8/1</td>
<td>100</td>
</tr>
<tr>
<td>Purchase 8/5</td>
<td>150</td>
</tr>
<tr>
<td>Purchase 8/11</td>
<td>200</td>
</tr>
<tr>
<td>Sales 8/4</td>
<td>60</td>
</tr>
<tr>
<td>Sales 8/14</td>
<td>100</td>
</tr>
<tr>
<td>Sales 8/17</td>
<td>210</td>
</tr>
</tbody>
</table>

Determine the cost of goods sold and the cost of ending inventory based on each of the following methods of inventory valuation.

(1) Weighted Average, periodic

(2) Moving Average Perpetual

(3) FIFO Periodic
(4) FIFO Perpetual

(5) LIFO Periodic

(6) LIFO Perpetual
8-4. The Miami Company adopted the dollar-value LIFO method of pricing ending inventory on December 31, 2011. The cost index for each of the indicated years is listed below along with the ending inventory valued at current costs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Ending inventory at current year costs</th>
<th>Cost Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$40,000</td>
<td>1.00</td>
</tr>
<tr>
<td>2009</td>
<td>46,200</td>
<td>1.05</td>
</tr>
<tr>
<td>2010</td>
<td>47,300</td>
<td>1.10</td>
</tr>
<tr>
<td>2011</td>
<td>$55,200</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Compute the ending inventory based on the dollar-value LIFO method for each year, taking into consideration the cost index at the end of the particular year.

(1) 2008

(2) 2009

(3) 2010

(4) 2011
Test Your Knowledge Answers

8-1.

(1) Labrador paid $500 for insurance on inventory that was shipped to the company.

This cost should be included as inventory in the financial statements of Labrador Company. Insurance paid for items to be shipped to the company are indirect costs associated with bringing the inventory to Labrador’s location.

(2) Labrador shipped a product (FOB destination) to a customer that was in transit at year-end.

This item should be included as inventory in the financial statements of Labrador Company. The control of a product shipped FOB destination does not transfer until the item arrives at its destination. Because the item is still in transit, control has not shifted to the customer.

(3) Labrador purchased merchandise (FOB shipping point) that was in transit at year-end.

This item should be included as inventory in the financial statements of Labrador Company. The control of a product shipped FOB shipping point transfers when the item leaves the shipping point. Because the item has left the shipping point, control has shifted to Labrador.

(4) Labrador purchased merchandise (FOB destination) that was in transit at year-end.

This item should not be included as inventory in the financial statements of Labrador Company. The control of a product shipped FOB destination does not transfer until the item arrives at its destination. Because the item is still in transit, control has not shifted to Labrador.

(5) Labrador paid a $2,000 transportation charge for inventory it owned at year-end.

This cost should be included as inventory in the financial statements of Labrador Company. Transportation charges (also known as Freight-In) paid for items to be shipped to the company are indirect costs associated with bringing the inventory to Labrador’s location.

(6) Labrador shipped a product (FOB shipping point) to a customer that was in transit at year-end.

This item should not be included as inventory in the financial statements of Labrador Company. The control of a product shipped FOB shipping point transfers when the item leaves the shipping point. Because the item has left the shipping point, control has shifted to the customer.

(7) Labrador paid $400 freight charges to ship a product to a customer. The product was in transit (FOB shipping point) to the customer at year-end. (Note: This question is asking whether the freight charges should be included in Labrador’s inventory costs, not the actual product.)

This item should not be included as inventory in the financial statements of Labrador Company. The freight charges should be accounted for by Labrador as selling costs, not inventory costs, because they are not associated with bringing the products to Labrador.
(8) Labrador delivered on a consignment basis a product with a cost of $1,000 to another company. The inventory is still for sale with the other company at year-end.

This item should be included as inventory in the financial statements of Labrador Company. The control of a product in consignment remains with the consignor (Labrador) and not with the consignee.

(9) Labrador paid $15,000 in sales commissions during the year to sell inventory.

This item should not be included as inventory in the financial statements of Labrador Company. The sales commissions should be accounted for by Labrador as selling costs, not inventory costs, because they are not associated with bringing the products to Labrador.

(10) Labrador’s raw materials that had not been used in the production process by year-end.

This item should be included as inventory in the financial statements of Labrador Company. These materials should be accounted for as part of the raw materials inventory.

8-2. The Toledo Merchandising Company started business on August 1 of the current year. The following purchases were made during August on the dates indicated:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 10</td>
<td>2,500</td>
</tr>
<tr>
<td>August 15</td>
<td>12,500</td>
</tr>
<tr>
<td>August 27</td>
<td>4,000</td>
</tr>
</tbody>
</table>

The company made the following sales during August:

<table>
<thead>
<tr>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 20</td>
</tr>
<tr>
<td>August 31</td>
</tr>
</tbody>
</table>

Determine the cost of goods sold and the cost of ending inventory based on each of the following methods of inventory valuation.

Purchases:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 10</td>
<td>2,500</td>
<td>$10</td>
</tr>
<tr>
<td>August 15</td>
<td>12,500</td>
<td>$11</td>
</tr>
<tr>
<td>August 27</td>
<td>4,000</td>
<td>$14</td>
</tr>
<tr>
<td>Totals</td>
<td>19,000</td>
<td></td>
</tr>
</tbody>
</table>

Total Sales = 6,000 + 5,000 = 11,000

Ending inventory = 19,000 - 11,000 = 8,000
(1) Weighted Average, periodic

Weighted Average Unit Cost = total cost/total units = $218,500/19,000 = $11.50 per unit
Total Cost = $25,000 + $137,500 + $56,000 = $218,500
Total Units Available = 2,500 + 12,500 + 4,000 = 19,000

a) Cost of Goods Sold (COGS) = * $126,500
* 11,000 × $11.50 = $126,500

b) Cost of Ending Inventory = * $92,000
* 8,000 × $11.50 = $92,000

(2) Moving Average Perpetual

<table>
<thead>
<tr>
<th>Date</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/10</td>
<td>2,500 @ $10 = $25,000</td>
<td>2,500 @ $10 = $25,000</td>
<td></td>
</tr>
<tr>
<td>8/15</td>
<td>12,500 @ $11 = $137,500</td>
<td>15,000 @ $10.83* = $162,500‡</td>
<td></td>
</tr>
<tr>
<td>8/20</td>
<td>6,000 @ $10.83 = $65,000‡</td>
<td>9,000 @ $10.83 = $97,500‡</td>
<td></td>
</tr>
<tr>
<td>8/27</td>
<td>4,000 @ $14 = $56,000</td>
<td>13,000 @ $11.81^ = $153,500‡</td>
<td></td>
</tr>
<tr>
<td>8/31</td>
<td>5,000 @ $11.81 = $59,038‡</td>
<td>8,000 @ $11.81 = $94,462‡</td>
<td></td>
</tr>
</tbody>
</table>

* 2,500 × $10 = $25,000  ^ 9,000 Units after last sale $ 97,500
12,500 × $11 = $137,500  4,000 Units from purchase $ 56,000
15,000 $162,500  13,000 $153,500

$162,500 ÷ 15,000 = $10.83‡  $153,500 ÷ 13,000 = $11.81‡

‡ = Numbers have been rounded

Cost of Goods Sold = $65,000 + $59,038 = $124,038
Ending Inventory = $94,462

(3) FIFO Periodic

(a) Cost of Goods Sold = $63,500 + $55,000 = $118,500

Sale #1  2,500 × $10 = $25,000
3,500 × $11 = $38,500
$63,500

Sale #2  5,000 × $11 = $55,000

(b) Cost of Ending Inventory = $100,000
4,000 × $11 = $44,000
4,000 × $14 = $56,000
$100,000

Chapter 8  Inventories:  Cost Measurement and Flow Assumptions  8-29
(4) FIFO Perpetual

FIFO perpetual and FIFO periodic always produce the same COGS and ending inventory totals.

(5) LIFO Periodic

(a) Cost of Goods Sold = $78,000 + $55,000 = $133,000

Sale #1
4,000 × $14 = $56,000
2,000 × $11 = 22,000
$78,000

Sale #2
5,000 × $11 = $55,000

(b) Cost of Ending Inventory = $85,500

2,500 × $10 = $25,000
5,500 × $11 = 60,500
$85,500

(6) LIFO Perpetual

<table>
<thead>
<tr>
<th>Date</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/10</td>
<td>2,500 @ $10 = $25,000</td>
<td>2,500 @ 10 = $25,000</td>
<td></td>
</tr>
<tr>
<td>8/15</td>
<td>12,500 @ 11 = 137,500</td>
<td>2,500 @ 10 = 25,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12,500 @ 11 = 137,500</td>
<td>15,000 = 162,500</td>
</tr>
<tr>
<td>8/20</td>
<td>6,000 @ $11 = 66,000</td>
<td>2,500 @ 10 = 25,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,500 @ 11 = 71,500</td>
<td>9,000 = 96,500</td>
</tr>
<tr>
<td>8/27</td>
<td>4,000 @ 14 = 56,000</td>
<td>2,500 @ 10 = 25,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,500 @ 11 = 71,500</td>
<td>4,000 @ 14 = 56,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13,000 = 152,500</td>
<td></td>
</tr>
<tr>
<td>8/31</td>
<td>4,000 @ $14 = 56,000</td>
<td>2,500 @ 10 = 25,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,000 @ $11 = 11,000</td>
<td>5,500 @ 11 = 60,500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5,000</td>
<td>8,000 = 85,500</td>
<td></td>
</tr>
</tbody>
</table>

(a) Cost of Goods Sold = $66,000 + $67,000 = $133,000

(b) Cost of Ending Inventory = $85,500 (from 8/31 balance)

8-3. The following information on inventory was taken from the records of the Dallas Retail Company:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance 8/1</td>
<td>100</td>
</tr>
<tr>
<td>Purchase 8/5</td>
<td>150</td>
</tr>
<tr>
<td>Purchase 8/11</td>
<td>200</td>
</tr>
</tbody>
</table>
Determine the cost of goods sold and the cost of ending inventory based on each of the following methods of inventory valuation.

### Goods available:

<table>
<thead>
<tr>
<th>Units</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 10</td>
<td>100</td>
<td>$25</td>
</tr>
<tr>
<td>August 15</td>
<td>150</td>
<td>$30</td>
</tr>
<tr>
<td>August 27</td>
<td>200</td>
<td>$35</td>
</tr>
<tr>
<td>Totals</td>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>

Total Sales = 60 + 100 + 210 = 370

Ending inventory = 450 - 370 = 80

#### (1) Weighted Average, periodic

Weighted Average Unit Cost = total cost/total units = $14,000/450 = $31.11 (rounded)

Total Cost = $2,500 + $4,500 + $7,000 = $14,000

Total Units Available = 100 + 150 + 200 = 450

**a)** Cost of Goods Sold (COGS) = $11,511

370 × $31.11 = $11,511 (rounded)

**b)** Cost of Ending Inventory = $2,489

80 × $31.11 = $2,489 (rounded)

#### (2) Moving Average Perpetual

<table>
<thead>
<tr>
<th>Date</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beg.</td>
<td></td>
<td>100 @ $25</td>
<td>$2,500</td>
</tr>
<tr>
<td>8/4</td>
<td>60 @ $25</td>
<td>40 @ 25</td>
<td>1,000</td>
</tr>
<tr>
<td>8/5</td>
<td>150 @ $30</td>
<td>6,000 @ $11</td>
<td>66,000</td>
</tr>
<tr>
<td>8/11</td>
<td>200 @ $35</td>
<td>390 @ 32.05</td>
<td>12,500‡^</td>
</tr>
<tr>
<td>8/14</td>
<td>100 @ $32.05</td>
<td>290 @ 32.05^</td>
<td>9,295‡</td>
</tr>
<tr>
<td>8/17</td>
<td>210 @ $32.05^</td>
<td>80 @ $32.05^</td>
<td>$2,564‡</td>
</tr>
</tbody>
</table>

‡ Number has been rounded

* 40 × $25 = $1,000
150 × $30 = 4,500
190 × $32.05 = $5,500
190 @ 32.05 = 6,000
190 Units after last sale
90 Units from purchase
90 Balances

Cost of Goods Sold = $1,500 + $3,205 + $6,731 = $11,436

Ending Inventory = $2,564
(3) FIFO Periodic

(a) Cost of Goods Sold = $1,500 + $2,800 + $6,900 = $11,200

Sale #1
60 × $25 = $1,500

Sale #2
40 × $25 = 1,000
60 × $30 = 1,800
$2,800

Sale #3
90 × $30 = $2,700
120 × $35 = 4,200
$6,900

(b) Cost of Ending Inventory = $2,800

80 × $35 = $2,800

(4) FIFO Perpetual

FIFO perpetual and FIFO periodic always produce the same COGS and ending inventory totals.

(5) LIFO Periodic

(a) Cost of Goods Sold = $2,100 + $3,500 + $6,400 = $12,000

Sale #1
60 × $35 = $2,100

Sale #2
100 × $35 = $3,500

Sale #3
40 × $35 = $1,400
150 × $30 = 4,500
20 × $25 = 500
$6,400

(b) Cost of Ending Inventory = $2,000

80 × $25 = $2,000
### (6) LIFO Perpetual

<table>
<thead>
<tr>
<th>Date</th>
<th>Purchased</th>
<th>Sold</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beg.</td>
<td></td>
<td>100 @ $25 = $2,500</td>
<td></td>
</tr>
<tr>
<td>8/4</td>
<td></td>
<td>60 @ $25 = 1,500</td>
<td>40 @ $25 = 1,000</td>
</tr>
<tr>
<td>8/5</td>
<td>150 @ $30 = 4,500</td>
<td>40 @ $25 = 1,000</td>
<td>150 @ $30 = 4,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>190</td>
<td>5,500</td>
</tr>
<tr>
<td>8/11</td>
<td>200 @ $35 = 7,000</td>
<td>40 @ $25 = 1,000</td>
<td>150 @ $30 = 4,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 @ $35 = 7,000</td>
<td>390</td>
</tr>
<tr>
<td>8/14</td>
<td></td>
<td>100 @ $35 = 3,500</td>
<td>40 @ $25 = 1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>290</td>
<td>9,000</td>
</tr>
<tr>
<td>8/17</td>
<td></td>
<td>100 @ $35 = 3,500</td>
<td>40 @ $25 = 1,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>210</td>
<td>6,800</td>
</tr>
</tbody>
</table>

(a) Cost of Goods Sold = 1,500 + $3,500 + $6,800 = $11,800

(b) Cost of Ending Inventory = $2,200 (from 8/17 balance)

8-4. The Miami Company adopted the dollar-value LIFO method of pricing ending inventory on December 31, 2011. The cost index for each of the indicated years is listed below along with the ending inventory valued at current costs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Ending inventory at current year costs</th>
<th>Cost Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$40,000</td>
<td>1.00</td>
</tr>
<tr>
<td>2009</td>
<td>46,200</td>
<td>1.05</td>
</tr>
<tr>
<td>2010</td>
<td>47,300</td>
<td>1.10</td>
</tr>
<tr>
<td>2011</td>
<td>55,200</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Compute the ending inventory based on the dollar-value LIFO method for each year, taking into consideration the cost index at the end of the particular year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Current-year cost</th>
<th>Cost Index</th>
<th>Base-year cost</th>
<th>Change in Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$40,000</td>
<td>1.00</td>
<td>$40,000</td>
<td>N/A</td>
</tr>
<tr>
<td>2009</td>
<td>46,200</td>
<td>1.05</td>
<td>44,000</td>
<td>+4,000</td>
</tr>
<tr>
<td>2010</td>
<td>47,300</td>
<td>1.10</td>
<td>43,000</td>
<td>−1,000</td>
</tr>
<tr>
<td>2011</td>
<td>$55,200</td>
<td>1.20</td>
<td>$46,000</td>
<td>+$3,000</td>
</tr>
<tr>
<td>Year</td>
<td>Layers</td>
<td>Index</td>
<td>DVL Cost</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>-------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>$40,000</td>
<td>1.00</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>$40,000</td>
<td>1.05</td>
<td>4,200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,000</td>
<td>1.05</td>
<td>4,200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$44,000</td>
<td></td>
<td>$44,200</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>$40,000</td>
<td>1.00</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,000</td>
<td>1.05</td>
<td>3,150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$43,000</td>
<td></td>
<td>$43,150</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>$40,000</td>
<td>1.00</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,000</td>
<td>1.05</td>
<td>3,150</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,000</td>
<td>1.20</td>
<td>3,600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$46,000</td>
<td></td>
<td>$46,750</td>
<td></td>
</tr>
</tbody>
</table>