

## SOLUTIONS

## Learning Goal 18

## Multiple Choice

1. c FIFO puts the oldest costs into cost of goods sold and in a period of rising prices the oldest costs will be lowest costs. This leaves the latest and highest costs in the ending inventory.
2. a
3. d LIFO puts the most recent costs into cost of goods sold and in a period of decreasing prices the most recent costs will be lowest costs. This leaves the oldest and highest costs in the ending inventory.
4. c Using the gross profit method, we can estimate cost of goods sold as  $100\% - 30\% = 70\%$ , and then multiply:  $\$100,000 \times .7 = \$70,000$  cost of goods sold. The difference between cost of goods available for sale and cost of goods sold is the ending inventory:  $\$10,000 + \$80,000 - \$70,000 = \$20,000$ .
5. d FIFO assigns the oldest costs to cost of goods sold, so this leaves the most recent costs for ending inventory.
6. a LIFO assigns the most recent costs to cost of goods sold, so this leaves the oldest costs for ending inventory. Whether or not this results in the highest cost of goods sold depends on whether prices have been increasing or decreasing.
7. d For a and b, LIFO and FIFO should be reversed, and weighted average is simply an average of all costs.
8. d Remember the basic inventory formula:  $BI + \text{net P} - EI = C \text{ of GS}$ , which still applies regardless of how costs are assigned. Put some simple numbers into the formula, and you can see that errors in either beginning inventory (BI) or net purchases (net P) result in the same amount of error in cost of goods sold.
9. a Another review of the basic formula. Put some simple numbers into the formula, and you can see that an error in ending inventory (EI) results in the opposite error in cost of goods sold.
10. c As you recall, event analysis refers to the elements of: (a) classification of items affected, (b) valuation of items affected, and (c) timing of the event. Significant loss of asset value is an event that GAAP requires be recognized in the accounting period in which it occurred.
11. d
12. a  $\$350,000 \times .6 = \$210,000$  estimated cost of goods sold. Cost of goods available is  $\$220,000$ . The difference between the cost of what was available and the cost of what was sold is the ending inventory.
13. d A perpetual inventory requires daily attention to inventory purchases and sales. Analyzing cost of goods sold for sudden and/or unexplained increases or decreases is a way to detect fraud. For example, unexplained increases in cost of goods sold can mean that either inventory is disappearing or that sales are not being recorded (so cash can be stolen). Unexplained decreases can indicate financial reporting fraud as sales are overstated or as accounts payable and inventory purchases are written off, or otherwise “disappear.”
14. d The person who has access to the accounting records should not have access to assets. If one person controls all purchasing or selling activities, excess purchases can occur or unrecorded sales can occur.
15. b This happens because the last purchases always go into cost of goods sold.
16. d An error students frequently make with the periodic method is forgetting that FIFO or LIFO doesn't refer to what is left over (ending inventory) but rather *what goes into cost of goods sold*. So, if you are calculating the *ending inventory*, be sure to remember that this is the cost of *what is still there*.
17. c Cost of ending inventory consists of the last layer of 900 units @ \$7 plus 100 units of the previous layer @ \$6. FIFO inventory consists of the most recent cost layers because the first cost layers have gone into cost of goods sold.

## SOLUTIONS

## Learning Goal 18, continued

18. d Cost of ending inventory consists of the first layer of 700 units @ \$4 plus 300 units from the next layer @ \$6, for a total of \$4,600. LIFO inventory consists of the oldest cost layers because the most recent costs have gone into cost of goods sold.
19. a  $\$24,100$  cost of goods available divided by 4,100 units available =  $\$5.878$  per unit. 1,000 units of ending inventory times  $\$5.878 = \$5,878$ .
20. d

## Discussion Questions and Brief Exercises

1. System (a) is a description of the perpetual inventory system. The calculation is done continuously during an accounting period. Each time there is a sale, the cost of the merchandise sold is identified and becomes cost of goods sold. Then the cost of goods sold is subtracted from the inventory to determine the new balance of remaining inventory. (b) is a description of the periodic inventory system. This calculation is done at the end of an accounting period for all inventory items. The result is the ending inventory at the end of the period and the cost of goods sold for the entire period. Using the same data, these methods result in different answers except for the FIFO method.
2. Your choices are between using a periodic or perpetual system, and applying the FIFO, LIFO, average, or possibly specific-identification methods. The periodic system is less expensive to operate; however, it does not provide up-to-date financial information or good inventory control as does the perpetual system.

In an environment of increasing costs, FIFO results in lower cost of goods sold and greater reported income because older (cheaper) costs are the first to flow into cost of goods sold. The balance sheet will report greater current assets because the most recent (highest) costs are still in ending inventory. As well, higher reported net income results in higher taxes. LIFO gives the opposite result from FIFO. In addition, LIFO is also subject to more potential manipulation and the possibility of LIFO liquidation. Averaging methods are a compromise between FIFO and LIFO and are easier to calculate because there are no cost layers to track. Specific identification can only be used in limited cases in which specific inventory items are easy to identify and are preferably high-value items.

3. Using the formula  $BI + \text{net P} - EI = C \text{ of GS}$ :  $120,000 + 200,000 - EI = 275,000$   
 $EI = 45,000$

4.

Effect	Error in Beginning Inventory and Purchases	Error in Ending Inventory
Periods affected	One period: only the current period in which the error is made.	Two periods: the current period in which the error is made and the next period
Effect on cost of goods sold	If the items are overstated, cost of goods sold is overstated. If the items are understated, cost of goods sold is understated.	<ul style="list-style-type: none"> <li>■ Current period: If ending inventory is overstated, cost of goods sold is understated. If ending inventory is understated, cost of goods sold is overstated.</li> <li>■ Next period: The effect on cost of goods sold will be the opposite of the current period. The error in ending inventory carries over to beginning inventory next period.</li> </ul>

**SOLUTIONS****Learning Goal 18, continued**

5. Historical cost is determined by how inventory costs are assigned to inventory. This depends on whether the periodic or perpetual system is used, and whether FIFO, LIFO, average, or other method is applied. Finally, the lower of cost or market requirement also affects historical cost. If a lower of cost or market valuation results in changing the inventory to a lower market value, then historical cost is no longer being used. The value that results from the selection and application of these methods is the value that will appear on the balance sheet.
6. The Internal Revenue Service (IRS) requires LIFO to be used on financial statements if LIFO is used to on income tax returns to determine income tax.
7. When the average method is used with the periodic inventory system, the average cost is calculated at the end of a period. The average is calculated by adding the cost of the beginning inventory to the cost of all the purchases for the period and then dividing by the number of units available. This average is then used to calculate ending inventory and the cost of goods sold for the entire period.

When the average method is used with the perpetual inventory system, the average cost is recalculated each time there is a new purchase of inventory during the period. The average is calculated by dividing the total cost of the inventory available by the total units available. This average cost is then used to calculate cost of goods sold for each sale until there is another purchase.

8. Understating ending inventory will overstate cost of goods sold. You can visualize this by using the formula  $BI + \text{net P} - EI = C \text{ of GS}$ . Overstating cost of goods sold by \$5,000 will understate net income by \$5,000.
9. Cost of goods available for sale:  $\$185,000 + \$745,000 = \$930,000$   
 Estimated cost of goods sold:  $\$1,500,000 \times (1 - .4) = \underline{900,000}$   
 Estimated ending inventory:  $\underline{\underline{\$30,000}}$

10. When assigning cost to inventory, the objective consists of two parts: (1) determine the cost of ending inventory and (2) determine the cost of goods sold. For determining the cost of ending inventory, the key accounting principle applied is the historical cost principle. Historical cost is determined by selecting the inventory system (periodic or perpetual) and the method applied (FIFO, LIFO, etc.). However, this principle may be superseded by a valuation adjustment when applying the lower of cost or market rule.

For determining the cost of goods sold, the key principle is the matching principle. The cost matched against revenue is also affected by the selection of the inventory system (periodic or perpetual) and the method applied (FIFO, LIFO, etc.).

11. LIFO liquidation occurs when most or all of inventory is sold and old layers of cost flow into cost of goods sold and are matched against current period revenues. If the old costs are much higher or much lower than current costs, a large distortion of net income can result—net income will be very high or very low.

LIFO can be used to manipulate income because the cost of the most recent purchases are the first costs to flow into cost of goods sold. Therefore, at the end of a period, purchases can be either accelerated or deferred for the purpose of manipulating the amount of cost of goods sold and net income.

## SOLUTIONS

## Learning Goal 18, continued

12. Lower of cost or market when a company uses FIFO requires that the lower of FIFO cost or current selling price be used to value the inventory. In this example, inventory would be reduced to a value of \$8,800, which is what would appear on the balance sheet.
13. a. No, physical flow and cost flow are different. FIFO is the closest cost flow approximation to physical flow, which is how the units are taken by the customers.  
b. No, FIFO, LIFO, and average refer only to assumed cost flow.  
c. This is a common confusion. FIFO and LIFO refer to cost flow *into cost of goods sold*, not ending inventory.
14. Gross profit method. The gross profit method is an *estimate* of ending inventory and is only done when the ending inventory cannot be counted.
15. A company cannot switch methods from year to year. A company can only change an accounting method, such as LIFO or FIFO, when the company can justify that the new method results in more accurate GAAP reporting than the previous method. For practical purposes, this limits most companies to a one-time change over a long period of time. However, different inventory methods can be used for different types of inventory.
16. Important internal control procedures for inventory include the following:
- Separation of duties: Anyone with access to the accounting records should never have access to inventory. Related purchasing activities should be done by different people. This includes ordering merchandise, receiving the merchandise, and payment. Related sales activities should be done by different people. This includes making the sale, shipping the inventory, billing, and cash receipts.
  - Physical control: Inventory should have physical security and limited access such as locked rooms, and surveillance.
  - Physical count: Inventory should be counted at least once per year. High-value or special inventory should be subject to surprise counts more frequently.
  - Perpetual inventory system: A perpetual inventory system provides better inventory control than a periodic system.
  - Other controls: Procedures that identify and compare goods received to goods ordered, regular calculation and analysis of the cost of goods sold percentage, and use of a computer system to apply additional controls and limit access.
17. Merchandise inventory is a current asset. The footnotes to the financial statements must indicate how cost is determined (periodic or perpetual FIFO, LIFO, or average) and the application of lower-of-cost-or-market valuation.
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**SOLUTIONS****Learning Goal 18, continued****Reinforcement Problems****LG 18-1.**

- a. To compute the cost of the ending inventory, first determine the number of units of ending inventory. Do this by subtracting the number of units sold from the number of units available:  
 $105 - 97 = 8$  units of ending inventory.  
 FIFO cost:  $\$9 \times 8 \text{ units} = \$72$   
 LIFO cost:  $\$5 \times 8 \text{ units} = \$40$
- b. First, notice that in this example the prices are rising, so the oldest costs are the lowest and the most recent costs are the highest. FIFO uses up the oldest costs first and attaches the most recent costs to ending inventory. LIFO uses up the most recent costs first and attaches the oldest costs to ending inventory. Therefore, FIFO has the highest ending inventory cost because it has allocated the highest cost to ending inventory.
- c. To compute the cost of goods sold, you must determine the total cost of goods available for sale. Then subtract the ending inventory from the cost of goods available for sale.  
 FIFO cost of goods sold:  $\$710 - \$72 = \$638$   
 LIFO cost of goods sold:  $\$710 - \$40 = \$670$
- LIFO has the highest cost of goods sold. The lowest (oldest) costs have gone into ending inventory, so the highest (most recent) costs have gone into cost of goods sold.

**LG 18-2.**

- a. The business is using the periodic method. We know this because there is no information about the units sold; the only information is about the units purchased. If you have information that shows timing and amounts of both units purchased and units sold, then you can apply either the periodic or the perpetual method.
- b.

	<b>FIFO</b>	<b>LIFO</b>	<b>W.A.</b>
Beginning inventory	\$ 450	\$ 450	\$ 450
Purchases	<u>8,724</u>	<u>8,724</u>	<u>8,724</u>
Cost of goods available	9,174	9,174	9,174
Ending inventory	<u>2,019</u>	<u>1,685</u>	<u>1,855</u>
Cost of goods sold	<u>\$7,155</u>	<u>\$7,489</u>	<u>\$7,319</u>

FIFO end inventory:  $120 \text{ units} \times \$11.20 = \$1,344$       LIFO end. inventory.:  $50 \text{ units} \times \$9 = \$ 450$   
 $60 \text{ units} \times \$11.25 = \underline{675}$        $130 \text{ units} \times \$9.50 = \underline{1,235}$   
 (last-in, still-there) 180 units      \$2,019      (first-in, still-there) 180 units      \$1,685

Weighted average end inventory:  $\$9,174/890 \text{ units} = \$10.308$  average cost;  $180 \times \$10.308 = \$1,855$ .

- c. This is calculating cost of goods sold the "slow" way. There were 890 units available, of which 180 units are still in ending inventory, so we have to assign cost to  $890 - 180 = 710$  units.

<b>FIFO</b>		<b>LIFO</b>	
50 units @ \$9 =	\$ 450	120 units @ \$11.20 =	\$1,344
320 units @ \$9.50 =	3,040	100 units @ \$11.25 =	1,125
200 units @ \$10.50 =	2,100	100 units @ \$11.15 =	1,115
100 units @ \$11.15 =	1,115	200 units @ \$10.50 =	2,100
40 units @ \$11.25 =	<u>450</u>	190 units @ \$9.50 =	<u>1,805</u>
Total	<u>\$7,155</u>		<u>\$7,489</u>

## SOLUTIONS

## Learning Goal 18, continued

## LG 18-3.

a. FIFO

Event	Purchase	Cost of Goods Sold	Balance
Beg. Inv.			5 pair @ \$50 = \$250
Purchase 1	10 pair @ \$55 = \$550		5 pair @ \$50 = \$250 10 pair @ \$55 = \$550
Sale 1		5 pair @ \$50 = \$250 6 pair @ \$55 = \$330	4 pair @ \$55 = \$220
Purchase 2	12 pair @ \$65 = \$780		4 pair @ \$55 = \$220 12 pair @ \$65 = \$780
Sale 2		4 pair @ \$55 = \$220 6 pair @ \$65 = \$390	6 pair @ \$65 = \$390
Purchase 3	8 pair @ \$70 = \$560		6 pair @ \$65 = \$390 8 pair @ \$70 = \$560
Sale 3		5 pair @ \$65 = \$325	1 pair @ \$65 = \$ 65 8 pair @ \$70 = \$560
		Total cost of goods sold: \$1,515	Ending inventory on balance sheet: \$625

b. LIFO

Event	Purchase	Cost of Goods Sold	Balance
Beg. Inv.			5 pair @ \$50 = \$250
Purchase 1	10 pair @ \$55 = \$550		5 pair @ \$50 = \$250 10 pair @ \$55 = \$550
Sale 1		10 pair @ \$55 = \$550 1 pair @ \$50 = \$ 50	4 pair @ \$50 = \$200
Purchase 2	12 pair @ \$65 = \$780		4 pair @ \$50 = \$200 12 pair @ \$65 = \$780
Sale 2		10 pair @ \$65 = \$650	4 pair @ \$50 = \$200 2 pair @ \$65 = \$130
Purchase 3	8 pair @ \$70 = \$560		4 pair @ \$50 = \$200 2 pair @ \$65 = \$130 8 pair @ \$70 = \$560
Sale 3		5 pair @ \$70 = \$350	4 pair @ \$50 = \$200 2 pair @ \$65 = \$130 3 pair @ \$70 = \$210
		Total cost of goods sold: \$1,600	Ending inventory on balance sheet: \$540

**SOLUTIONS****Learning Goal 18, continued****LG 18-3, continued**

c. Moving average

Event	Purchase	Cost of Goods Sold	Balance
Beg. Inv.			5 pair @ \$50 = \$250
Purchase 1	10 pair @ \$55 = \$550		15 pair @ \$53.33 = \$800
Sale 1		11 pair @ \$53.33 = \$587	4 pair @ \$53.33 = \$213
Purchase 2	12 pair @ \$65 = \$780		16 pair @ \$62.06 = \$993
Sale 2		10 pair @ \$62.06 = \$621	6 pair @ \$62.06 = \$372
Purchase 3	8 pair @ \$70 = \$560		14 pair @ \$66.57 = \$932
Sale 3		5 pair @ \$66.57 = \$333	9 pair @ \$66.57 = \$599
		Total cost of goods sold: \$1,541	Ending inventory on balance sheet: \$599

d.

Date	Account	Post. Ref.	Dr.	Cr.
Pur. 1	Inventory		550	
	Accounts Payable			550
Sale 1	Accounts Receivable		1,925	
	Sales			1,925
	Cost of Goods Sold		580	
	Inventory			580
Pur. 2	Inventory		780	
	Accounts Payable			780
Sale 2	Accounts Receivable		1,750	
	Sales			1,750
	Cost of Goods Sold		610	
	Inventory			610
Pur. 3	Inventory		560	
	Accounts Payable			560
Sale 3	Accounts Receivable		875	
	Sales			875
	Cost of Goods Sold		325	
	Inventory			325

**SOLUTIONS****Learning Goal 18, continued****LG 18-4.**

- a. Total units available:  $(100 + 1,300 + 2,400 + 300) = 4,100$ ;  $(4,100 - 3,600 \text{ sold}) = 500$  units ending inventory.
- b. Periodic system. There is no information about when units were sold.

	<b>FIFO</b>	<b>LIFO</b>	<b>Average</b>
Cost of goods available	\$15,410	\$15,410	\$15,410
Less: Ending inventory	<u>2,150</u>	<u>1,580</u>	<u>1,880</u>
Cost of goods sold	13,260	13,830	13,530

- c. Ending inventory: 300 units @ \$4.50 = \$1,350  
 200 units @ \$4.00 = 800  
 Total \$2,150
- d. Ending inventory: 100 units @ \$3.00 = \$ 300  
 400 units @ \$3.20 = 1,280  
 Total \$1,580
- e. Ending inventory: Average cost is total cost divided by total units:  $\$15,410/4,100 = \$3.759$  per unit;  
 $500 \text{ units} \times \$3.759 = \$1,879.50$ .

*Note:* Cost of goods available is the cost of beginning inventory plus the cost of all the purchases.

**LG 18-5.**

- a. The company can use either periodic or perpetual because there is a record of both purchases and sales.
- b. FIFO

<b>Event</b>	<b>Purchase</b>	<b>Cost of Goods Sold</b>	<b>Balance</b>
Beg. Inv.			80 units @ \$50 = \$ 4,000
June 9	150 units @ \$60 = \$9,000		80 units @ \$50 = \$ 4,000 150 units @ \$60 = \$ 9,000
June 12		80 units @ \$50 = \$4,000 40 units @ \$60 = \$2,400	110 units @ \$60 = \$ 6,600
June 15	200 units @ \$65 = \$13,000		110 units @ \$60 = \$ 6,600 200 units @ \$65 = \$13,000
June 29		110 units @ \$60 = \$6,600 100 units @ \$65 = \$6,500	100 units @ \$65 = \$ 6,500
Balance	Total Purchases: \$22,000	Cost of Goods Sold: \$19,500	Ending Inventory: \$6,500



**SOLUTIONS****Learning Goal 18, continued****LG 18-5, continued**

c. LIFO

Event	Purchase	Cost of Goods Sold	Balance
Beg. Inv.			80 units @ \$50 = \$ 4,000
June 9	150 units @ \$60 = \$9,000		80 units @ \$50 = \$ 4,000 150 units @ \$60 = \$ 9,000
June 12		120 units @ \$60 = \$7,200	80 units @ \$50 = \$ 4,000 30 units @ \$60 = \$ 1,800
June 15	200 units @ \$65 = \$13,000		80 units @ \$50 = \$ 4,000 30 units @ \$60 = \$ 1,800 200 units @ \$65 = \$13,000
June 29		200 units @ \$65 = \$13,000 10 units @ \$60 = \$600	80 units @ \$50 = \$ 4,000 20 units @ \$60 = \$ 1,200
Balance	Total Purchases: \$22,000	Cost of Goods Sold: \$20,800	Ending Inventory: \$5,200

d. Moving average

Event	Purchase	Cost of Goods Sold	Balance
Beg. Inv.			80 units @ \$50 = \$ 4,000
June 9	150 units @ \$60 = \$9,000		\$13,000/230 units = \$56.522
June 12		120 @ \$56.522 = \$6,783	110 units @ \$56.522 = \$ 6,217
June 15	200 units @ \$65 = \$13,000		\$19,217/310 units = \$ 61.99
June 29		210 @ \$61.99 = \$13,018	100 units @ \$61.99 = \$ 6,199
Balance	Total Purchases: \$22,000	Cost of Goods Sold: \$19,801	Ending Inventory: \$6,199

**LG 18-6.**

- 3,500 units in beginning inventory plus purchases of (7,800 + 12,000 + 5,000) units equals 28,300 units available. Subtract ending inventory of 7,000 units. Therefore 21,300 units were sold.
- The cost of beginning inventory of \$42,000, plus the cost of purchases of (\$97,500 + \$168,000 + \$71,000) is a total cost of all goods available for sale of \$378,500.
- With FIFO, the oldest costs go to cost of goods sold first, so ending inventory is assigned costs from the most recent cost layers. We begin with the most recent layer and continue until we reach 7,000 units.

Ending Inventory		Cost of Goods Sold	
5,000 units @ \$14.20 =	\$71,000	Cost of goods available	\$378,500
2,000 units @ \$14.00 =	<u>28,000</u>	Less: Ending inventory	<u>99,000</u>
Total 7,000 units	\$99,000	Cost of goods sold	\$279,500

**SOLUTIONS****Learning Goal 18, continued****LG 18-6, continued**

- d. Calculating cost of goods directly means that we have to calculate the cost of each cost layer sold for a total of 21,300 units sold. We start with beginning inventory, which is the first cost layer, and continue until we reach a total of 21,300 units.

<b>Cost of Goods Sold</b>		<b>Ending Inventory</b>	
3,500 units	\$ 42,000	Cost of goods available	\$378,500
7,800 units @ \$12.50 =	97,500	Less: Cost of goods sold	<u>279,500</u>
10,000 units @ \$14.00 =	<u>140,000</u>	Ending inventory	\$ 99,000
Total 21,300 units	\$279,500		

The first method is easier and faster. That is why it is used most of the time.

- e. With LIFO the latest costs go to cost of goods sold first, so ending inventory is assigned costs from the oldest cost layers. Using the preferred method, we begin with the oldest layer and continue until we reach 7,000 units:

<b>Ending Inventory</b>		<b>Cost of Goods Sold</b>	
3,500 units @ \$12.00 =	\$42,000	Cost of goods available	\$378,500
3,500 units @ \$12.50 =	<u>43,750</u>	Less: Ending inventory	<u>85,750</u>
Total 7,000 units	\$85,750	Cost of goods sold	\$292,750

Proving the answers by calculating cost of goods sold directly we begin at the last cost layer and continue until we reach 21,300 units.

<b>Cost of Goods Sold</b>		<b>Ending Inventory</b>	
5,000 units @ \$14.20	\$ 71,000	Cost of goods available	\$378,500
12,000 units @ \$14.00	168,000	Less: Cost of goods sold	<u>292,750</u>
4,300 units @ \$12.50	<u>53,750</u>	Ending inventory	\$ 85,750
Total 21,300 units	\$292,750		

**LG 18-7.**

- a. The numbers in **bold** are the corrected amounts.

	<b>2016</b>	<b>2017</b>	<b>2018</b>
Beginning inventory	\$3,500	<b>\$6,500</b>	<b>\$15,000</b>
Net purchases + freight-in	21,000	19,000	28,000
Cost of goods available	24,500	<b>25,500</b>	<b>43,000</b>
Ending inventory	<b>6,500</b>	<b>15,000</b>	5,000
Cost of goods sold	<b>18,000</b>	<b>10,500</b>	<b>38,000</b>

- b.

2016: The cost of goods sold is \$2,000 higher because ending inventory is \$2,000 lower.

2017: The cost of goods sold is \$7,000 lower because beginning inventory is \$2,000 lower and ending inventory is \$5,000 higher.

2018: The cost of goods sold is \$5,000 higher because beginning inventory is \$5,000 higher.

**SOLUTIONS****Learning Goal 18, continued****LG 18-8.**

a. FIFO calculation

Date	Transaction	Cost of Goods Sold	Inventory Balance
May 1	Balance: 120 units @ \$17.50		120 units @ \$17.50 = \$2,100
May 2	Sold 90 units	90 units @ \$17.50 = \$1,575	30 units @ \$17.50 = \$ 525
May 9	Purchased 150 units @ \$19.20		30 units @ \$17.50 = \$ 525 150 units @ \$19.20 = \$2,880
May 16	Sold 50 units	30 units @ \$17.50 = \$ 525 20 units @ \$19.20 = \$ 384	130 units @ \$19.20 = \$2,496
May 19	Sold 90 units	90 units @ \$19.20 = \$1,728	40 units @ \$19.20 = \$ 768
May 27	Purchased 250 units @ \$23.00		40 units @ \$19.20 = \$ 768 250 units @ \$23. = \$5,750
May 28	Sold 210 units	40 units @ \$19.20 = \$ 768 170 units @ \$23 = \$3,910	80 units @ \$23 = \$1,840
May 31	Purchased 125 units @ \$24		80 units @ \$23. = \$1,840 125 units @ \$24. = \$3,000
	Final Balances	Cost of goods sold: \$8,890	Ending inventory: \$4,840

b. LIFO calculation—notice how this method tends to build more layers and that old cost layers tend to build up. Here, ending inventory is less than FIFO and cost of goods sold is more than FIFO because prices were increasing.

Date	Transaction	Cost of Goods Sold	Inventory Balance
May 1	Balance: 120 units @ \$17.50		120 units @ \$17.50 = \$2,100
May 2	Sold 90 units	90 units @ \$17.50 = \$1,575	30 units @ \$17.50 = \$ 525
May 9	Purchased 150 units @ \$19.20		30 units @ \$17.50 = \$ 525 150 units @ \$19.20 = \$2,880
May 16	Sold 50 units	50 units @ \$19.20 = \$ 960	30 units @ \$17.50 = \$ 525 100 units @ \$19.20 = \$1,920
May 19	Sold 90 units	90 units @ \$19.20 = \$1,728	30 units @ \$17.50 = \$ 525 10 units @ \$19.20 = \$ 192
May 27	Purchased 250 units @ \$23.00		30 units @ \$17.50 = \$ 525 10 units @ \$19.20 = \$ 192 250 units @ \$23. = \$5,750
May 28	Sold 210 units	210 units @ \$23. = \$4,830	30 units @ \$17.50 = \$ 525 10 units @ \$19.20 = \$ 192 40 units @ \$23. = \$ 920
May 31	Purchased 125 units @ \$24		30 units @ \$17.50 = \$ 525 10 units @ \$19.20 = \$ 192 40 units @ \$23. = \$ 920 125 units @ \$24. = \$3,000
	Final Balances	Cost of goods sold: \$9,093	Ending inventory: \$4,637

**SOLUTIONS**

**Learning Goal 18, continued**

**LG 18-8, continued**

c. Moving average calculation—recalculate the average with each new purchase. Totals are rounded.

Date	Transaction	Cost of Goods Sold	Inventory Balance
May 1	Balance: 120 units @ \$17.50		120 units @ \$17.50 = \$2,100
May 2	Sold 90 units	90 units @ \$17.50 = \$1,575	30 units @ \$17.50 = \$525
May 9	Purchased 150 units @ \$19.20		\$3,405/180 units = \$18.917/unit
May 16	Sold 50 units	50 units @ \$18.917 = \$946	130 units @ \$18.917 = \$2,459
May 19	Sold 90 units	90 units @ \$18.917 = \$1,703	40 units @ \$18.917 = \$756
May 27	Purchased 250 units @ \$23.00		\$6,506/290 units = \$22.435/unit
May 28	Sold 210 units	210 units @ \$22.435 = \$4,711	80 units @ \$22.435 = \$1,795
May 31	Purchased 125 units @ \$24		\$4,795/205 units = \$23.39/unit
	Final Balances	Cost of goods sold: \$8,935	Ending inventory: \$4,795

	FIFO	LIFO	M.A.
Sales revenue . . . . .	\$15,000	\$15,000	\$15,000
Cost of goods sold:			
Beginning inventory . . . . .	\$ 2,100	\$ 2,100	\$ 2,100
Net purchases . . . . .	<u>11,630</u>	<u>11,630</u>	<u>11,630</u>
Cost of goods available. . . . .	13,730	13,730	13,730
Less: Ending inventory . . . . .	<u>4,840</u>	<u>4,637</u>	<u>4,795</u>
Cost of goods sold . . . . .	<u>8,890</u>	<u>9,093</u>	<u>8,935</u>
Gross profit . . . . .	6,110	5,907	6,065
Operating expenses . . . . .	<u>2,500</u>	<u>2,500</u>	<u>2,500</u>
Operating income . . . . .	<u>\$ 3,610</u>	<u>\$ 3,407</u>	<u>\$ 3,565</u>

- c. By comparing the inventory schedules, you can see that each time there is a sale LIFO assigns the most current cost to cost of goods sold, leaving the oldest costs in inventory. FIFO assigns the oldest costs to cost of goods sold, leaving the most current costs in inventory.
- d. Virtually all sellers try to sell the oldest items first, so FIFO cost assignment follows the actual physical flow of merchandise most closely.
- e. At a 30% tax rate, income tax on the operating incomes is: FIFO, \$1,083; LIFO, \$1,022; M.A., \$1,070. For the month of May, LIFO would add an additional \$61 in cash compared to FIFO and an additional \$48 compared to moving average. However, if prices stop increasing, the LIFO tax advantage would not continue. Also, a LIFO liquidation would create additional taxes.

**SOLUTIONS**

**Learning Goal 18, continued**

**LG 18-9.**

a. Ending inventory: 205 units

<b>FIFO Ending Inventory</b>		<b>LIFO Ending Inventory</b>	
125 units @ \$24	\$3,000	120 units @ \$17.50	\$2,100
80 units @ \$23	<u>1,840</u>	85 units @ \$19.20	<u>1,632</u>
Total	<u>\$4,840</u>	Total	<u>\$3,732</u>

Weighted Average Cost: Total Cost Available \$13,730/Total Units Available 645 = \$21.287;  
 205 units × \$21.287 = \$4,364.

b.

	<b>FIFO</b>	<b>LIFO</b>	<b>W.A.</b>
Sales revenue . . . . .	\$15,000	\$15,000	\$15,000
Cost of goods sold:			
Beginning inventory . . . . .	\$ 2,100	\$ 2,100	\$ 2,100
Net purchases . . . . .	<u>11,630</u>	<u>11,630</u>	<u>11,630</u>
Cost of goods available . . .	13,730	13,730	13,730
Less: Ending inventory . . .	<u>4,840</u>	<u>3,732</u>	<u>4,364</u>
Cost of goods sold . . . . .	<u>8,890</u>	<u>9,998</u>	<u>9,366</u>
Gross profit . . . . .	6,110	5,002	5,634
Operating expenses . . . . .	<u>2,500</u>	<u>2,500</u>	<u>2,500</u>
Operating income . . . . .	<u>\$3,610</u>	<u>\$2,502</u>	<u>\$3,134</u>

Perpetual and periodic results are the same for FIFO, which always leaves the very last costs in ending inventory. Perpetual and periodic results are different for LIFO, because periodic LIFO always uses the most recent costs possible, which are from the end of the period, whereas perpetual LIFO uses the most recent costs available at the time of each sale. Perpetual moving average and periodic weighted average show different results because moving average is calculated with the costs available at the time of each sale, whereas weighted average calculates one average for all units and costs available for the entire time period.

- c. LIFO always assigns the most current cost to cost of goods sold, leaving the oldest costs in inventory. FIFO assigns the oldest costs to cost of goods sold, leaving the most current costs in inventory.
- d. Virtually all sellers try to sell the oldest items first, so FIFO cost assignment follows the actual physical flow of merchandise most closely, and the results are the same for both periodic and perpetual.
- e. At a 30% tax rate, income tax on the operating incomes are: FIFO, \$1,083; LIFO, \$751; W.A., \$940. For the month of May periodic LIFO would add an additional \$332 in cash compared to periodic and perpetual FIFO and an additional \$189 compared to weighted average. However, if prices stop increasing, the LIFO tax advantage would not continue. Also, a LIFO liquidation could create higher income and higher taxes.

**SOLUTIONS****Learning Goal 18, continued****LG 18-10.**

a. Kearney: (increasing prices)

FIFO		LIFO	
Cost of goods available	\$10,650	Cost of goods available	\$10,650
Ending inventory:		Ending inventory:	
200 units @ \$10.50	\$2,100	100 units @ \$5.00	\$ 500
100 units @ \$9.00	<u>900</u>	200 units @ \$6.25	<u>1,250</u>
Total ending inventory	<u>3,000</u>	Total ending inventory	<u>1,750</u>
Cost of goods sold	7,650	Cost of goods sold	8,900

b. Omaha: (decreasing prices)

FIFO		LIFO	
Cost of goods available	\$10,650	Cost of goods available	\$10,650
Ending inventory:		Ending inventory:	
200 units @ \$5.00	\$1,000	100 units @ \$10.50	\$1,050
100 units @ \$6.25	<u>625</u>	200 units @ \$9.00	<u>1,800</u>
Total ending inventory	<u>1,625</u>	Total ending inventory	<u>2,850</u>
Cost of goods sold	9,025	Cost of goods sold	7,800

c. You can see that increasing and decreasing prices produce very similar results for opposite methods. For example, for rising prices FIFO will put the lowest (oldest) costs into cost of goods sold, and for decreasing prices LIFO will also put the lowest (most recent) costs into cost of goods sold. For rising prices LIFO will put the highest (most recent) costs into cost of goods sold and for decreasing prices FIFO will also put the highest (oldest) costs into cost of good sold.

**LG 18-11.**

July: Beginning inventory that is understated by \$5,800 understated the cost of goods sold, and ending inventory that is understated by \$700 overstated the cost of goods sold. Net effect for July: cost of goods sold is understated by  $\$5,800 - \$700 = \$5,100$ . Therefore, net income is overstated by \$5,100; it should be a \$300 loss.

August: The ending inventory of July becomes the beginning inventory of August. Because this inventory is understated by \$700, the August cost of goods sold will be understated by \$700, thereby overstating net income by \$700, which should be \$2,900.

**SOLUTIONS**

**Learning Goal 18, continued**

**LG 18-12.**

- a. The periodic system appears to be used because there is no information about the amount and date of units sold.
- b.

	<b>FIFO</b>	<b>LIFO</b>
Sales revenue . . . . .	\$297,000	\$297,000
Cost of goods sold:		
Beginning inventory . . . . .	\$ 18,200	\$ 18,200
Net purchases . . . . .	<u>157,200</u>	<u>157,200</u>
Cost of goods available . . . . .	175,400	175,400
Less: Ending inventory . . . . .	<u>56,700</u>	<u>41,075</u>
Cost of goods sold . . . . .	<u>118,700</u>	<u>134,325</u>
Gross profit . . . . .	178,300	162,675
Operating expenses . . . . .	<u>105,800</u>	<u>105,800</u>
Operating income . . . . .	72,500	56,875
Income tax expense . . . . .	<u>14,500</u>	<u>11,375</u>
Net income . . . . .	\$58,000	\$45,500

<b>FIFO Ending Inventory</b>	<b>LIFO Ending Inventory</b>
8,000 units @ \$4.10 = \$32,800	6,500 units @ \$2.80 = \$18,200
4,000 units @ \$4.00 = 16,000	7,500 units @ \$3.05 = 22,875
2,000 units @ \$3.95 = 7,900	Total 14,000 units: \$41,075
Total 14,000 units: \$56,700	

- c. The difference in gross profit is \$15,625. This is the difference in cost of goods sold caused by the difference in costs assigned to the ending inventory. The difference in net income is \$12,500. This is not the same as the difference in gross profit because LIFO results in a lower tax expense because the operating income is smaller.

The difference in tax expense is  $(\$72,500 - \$56,875) \times .2 = \$3,125$ . To summarize,  $\$15,625 - \$3,125 = \$12,500$  difference in net income.

- d. Yes, there will be a difference in cash from operations. LIFO results in an additional \$3,125 cash because of the tax savings. Notice that the difference in gross profit of \$15,625 has no effect on cash flow. This is because the gross profit difference results from the difference in cost of goods sold. The cost of goods sold difference is simply the result of assigning different costs to ending inventory—a “paper difference” but not a cash difference.

**SOLUTIONS**

**Learning Goal 18, continued**

**LG 18-13.**

a. The correct cost of goods sold based on actual purchases is (in \$000's):

Beginning inventory	\$ 100	
Purchases	<u>1,265</u>	
Cost of goods available	1,365	
Less: Ending inventory	<u>100</u>	(20 units × \$5)
Cost of goods sold	\$1,265	

The falsified cost of goods sold (in \$000's):

Beginning inventory	\$ 100	
Purchases	<u>1,100</u>	(last layer of \$165 eliminated)
Cost of goods available	1,200	
Less: ending inventory	<u>100</u>	(20 units × \$5)
Cost of goods sold	\$1,100	

- b. The recorded purchases are reduced by the amount of the last purchase that is omitted. The reduction in the amount of recorded purchases is  $\$11 \times 15 = \$165$ . Because purchases are reduced by \$165, cost of goods available is reduced by this amount. Finally, because the cost of goods available is reduced by \$165, cost of goods sold is reduced by this same amount. (You can also visualize this by the formula:  $BI + P - EI = C \text{ of GS.}$ ) To summarize: The ending inventory remains the same, but in one case the cost of goods available for sale is understated.
- c. Purchases in the next period will be overstated, thereby overstating cost of goods available and cost of goods sold in the next period. This is an example of using LIFO to defer an end of period cost and replacing that cost with lower-priced earlier unit costs for cost of goods sold. The last purchase cost is moved into the next period, so in reality the cost has just been shifted into the next accounting period.

**LG 18-14.** The owner is confusing cost flow with physical flow. The physical flow will certainly be FIFO as she is saying. However, we can assign costs to flow into cost of goods sold in any manner that is acceptable by GAAP. Cost flow “on the books” is simply a matter of calculation, whereas the physical flow of merchandise remains as first-in, first-out.

**LG 18-15.**

Description	Method
a. Highest gross profit in a period of rising prices . . . . .	a
b. Lowest gross profit in a period of rising prices . . . . .	b
c. Highest gross profit in a period of decreasing prices . . . . .	b
d. Lowest gross profit in a period of decreasing prices . . . . .	a
e. Easiest method to use . . . . .	c
f. Matches the physical flow of merchandise sold . . . . .	a
g. Matches oldest costs with current period revenue . . . . .	a
h. Matches most recent costs with current period revenues . . . . .	b
i. Results in a balance sheet inventory value with the most current costs . . . . .	a
j. Results in cost of goods sold with the most current costs . . . . .	b
k. Moderates both inventory cost and cost of goods sold; does not produce extreme results . . . . .	c



**SOLUTIONS****Learning Goal 18, continued**

**LG 18-16.** First, we need to calculate the historical gross percentage, because this is not given in the problem.

**Operating Results to July 31:**

Net sales revenue . . . . .		\$800,000
Cost of goods sold:		
January 1 inventory . . . . .	\$ 120,000	
Net purchases to July 31 . . . . .	<u>413,000</u>	
Cost of goods available . . . . .	533,000	
Less: July 31 inventory . . . . .	<u>197,000</u>	
Cost of goods sold . . . . .		<u>336,000</u>
Gross profit . . . . .		464,000

The gross profit percentage is  $464,000/800,000 = .58$  or 58%. Therefore, the cost of goods sold percentage is 42%.

To estimate the inventory loss:

**Operating Results in August:**

Net sales revenue . . . . .		\$32,000
Cost of goods sold:		
August 1 inventory . . . . .	\$ 197,000	
August 1–8 net purchases . . . . .	<u>15,300</u>	
Cost of goods available . . . . .	212,300	
Less: August 8 inventory . . . . .	?	
August 1–8 cost of goods sold . . .		13,440
(Estimated as $32,000 \times .42$ )		

The estimated ending inventory (inventory destroyed) is the difference between the cost of goods that were available and the estimated cost of goods sold up to August 8:  $\$212,300 - \$13,440 = \$198,860$ .