

CHAPTER 11

Product Costing in Service and Manufacturing Entities

LEARNING OBJECTIVES

After you have mastered the material in this chapter you will be able to:

- 1** Describe the nature and treatment of product cost information for manufacturing and service companies.
- 2** Demonstrate the flow of materials and labor costs for a manufacturing company.
- 3** Assign estimated overhead costs to inventory and cost of goods sold.
- 4** Account for completion and sale of products.
- 5** Prepare a schedule of cost of goods manufactured and sold.
- 6** Prepare financial statements for a manufacturing company.
- 7** Distinguish between absorption and variable costing.

CHAPTER OPENING

Service and product costing systems supply information about the cost of providing services or making products. Organizations need service and product cost information for financial reporting, managerial accounting, and contract negotiations.

For *financial reporting*, companies are required by generally accepted accounting principles (GAAP) to report service and product costs in their published financial statements. For example, product costs for manufacturing companies must be allocated between inventory (reported on the balance sheet) and cost of goods sold (reported on the income statement). Similarly, service companies must match on their income statements the costs of providing services with the revenues generated from the services provided.

For *managerial accounting*, managers need to know the cost of providing services or making products so they can plan company operations. For example, companies could not prepare budgets without knowing the cost of services or products. Service and product costing is also needed for cost control. Managers compare expected costs with actual costs to identify problems that need correcting. Service and product cost information may be used for pricing and other short-term decisions. For example, the cost of a service or product may be used in special order, outsourcing, or product elimination decisions.

Service and product costing information may be used by governmental agencies to regulate rates for public service entities such as utility companies or hospitals. Service and product costs are also used in determining the amount due on contracts that compensate companies for the costs they incur plus a reasonable profit (cost-plus contracts). For example, many governmental defense contracts are negotiated on a cost-plus basis. Cost-plus pricing may also be used by private companies. For example, many builders of custom homes charge customers based on cost-plus contracts. Cost information is therefore necessary for contract negotiations. This chapter shows how manufacturing companies determine the cost of the products they make.

The Curious Accountant

Northwestern Aviation is a small company in Kotzebue, Alaska, that provides bush flying services to persons wanting to travel into the arctic to go fishing, canoeing, hiking, or who wish to do flight-seeing trips to wilderness areas such as Kobuk Valley National Park. Given the climate, the company does most of its business during the summer months.

Northwestern incurs a variety of costs. Some of these costs, such as the cost of aviation gasoline, vary with the number and type of trips. Recently, when aviation fuel was selling for around \$5 per gallon in the lower 48 states, it was priced at \$7 per gallon in Kotzebue, due to its remote location. The Cessna 206 airplane that Northwestern uses consumes around 15 gallons of fuel per hour, creating a fuel cost of \$105 for each hour flown. Other costs go up with increased activity but may not be incurred on a per trip basis. For example, the Cessna 206 needs a major engine overhaul about every 1,400 operating hours. Finally, there are costs that are fixed; they must be paid for regardless of the number of trips the company flies each year. For example, a new Cessna 206 cost around \$500,000 and payments on airplanes must be made regardless of the amount of revenue they earn. Costs for facilities, such as airport space, also do not depend on how much, or how little, business is done in a given season. As you have learned in earlier chapters, the higher the level of activity, the lower the fixed cost per unit of activity will be.

These cost behaviors present a problem for Northwestern. Potential clients contact the company months in advance to book trips, and they want to know the price they will be charged. The company, however, does not know what it will actually cost to provide the trip in question since the final cost depends on its level of activity, and it does not know how many trips it will provide in the upcoming season until the season is over. Nevertheless, prices must be quoted, in advance, on a per hour basis.

How can a company with significant fixed costs, such as Northwestern Aviation, know what to charge customers when it will not know the real cost of any one trip until the season is over? (Answer on page 494.)



LO 1

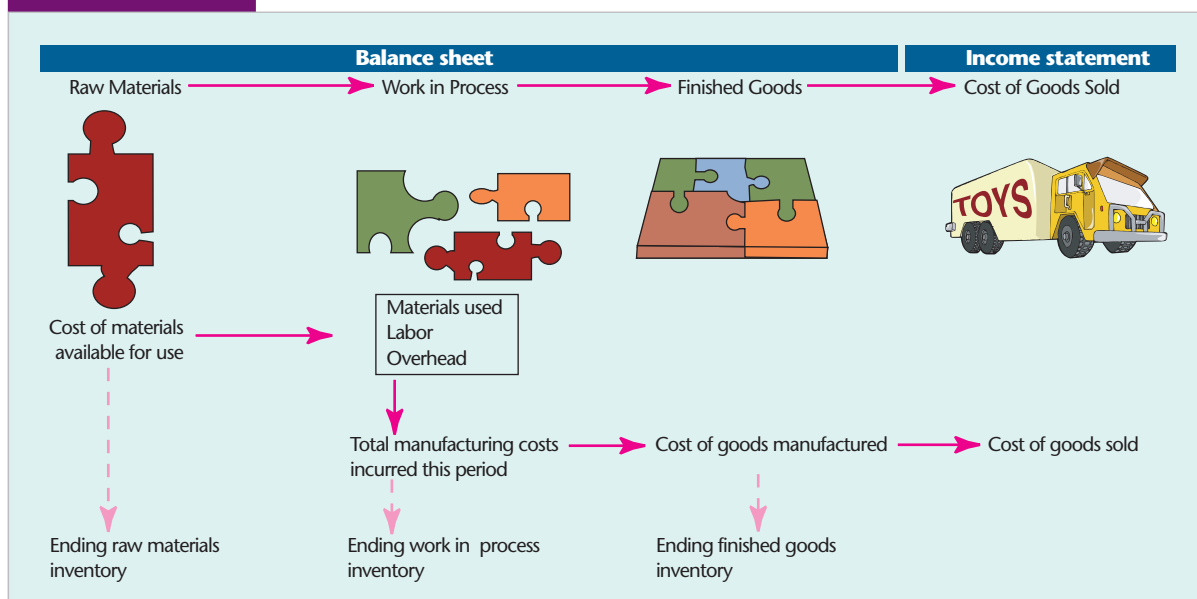
Describe the nature and treatment of product cost information for manufacturing and service companies.

COST FLOW IN MANUFACTURING COMPANIES

In previous chapters, we assumed all inventory started during an accounting period was also completed during that accounting period. All product costs (materials, labor, and manufacturing overhead) were either in inventory or expensed as cost of goods sold. At the end of an accounting period, however, most real-world companies have raw materials on hand, and manufacturing companies are likely to have in inventory items that have been started but are not completed. Most manufacturing companies accumulate product costs in three distinct inventory accounts: (1) **Raw Materials Inventory**, which includes lumber, metals, paints, and chemicals that will be used to make the company's products; (2) **Work in Process Inventory**, which includes partially completed products; and (3) **Finished Goods Inventory**, which includes completed products that are ready for sale.

The cost of materials is first recorded in the Raw Materials Inventory account. The cost of materials placed in production is then transferred from the Raw Materials Inventory account to the Work in Process Inventory account. The costs of labor and overhead are added to the Work in Process Inventory account. The cost of the goods completed during the period is transferred from the Work in Process Inventory account to the Finished Goods Inventory account. The cost of the goods that are sold during the accounting period is transferred from the Finished Goods Inventory account to the Cost of Goods Sold account. The balances that remain in the Raw Materials, Work in Process, and Finished Goods Inventory accounts are reported on the balance sheet. The amount of product cost transferred to the Cost of Goods Sold account is expensed on the income statement. Exhibit 11.1 shows the flow of manufacturing costs through the accounting records.

EXHIBIT 11.1



COST FLOW IN SERVICE COMPANIES

Like manufacturing companies, many service companies purchase raw materials and transform them through production stages such as work in process, finished goods, and cost of goods sold. For example, a **McDonald's** hamburger starts with raw materials (meat, bun, and condiments), goes through work in process (is cooked, assembled, and wrapped), becomes a finished product, and is sold to a customer. Why then is McDonald's considered a *service* rather than a *manufacturing* company? The

distinguishing feature is that products from McDonald's are consumed immediately. In general, services cannot be stored and sold later. Service companies do not have Work in Process and Finished Goods Inventory accounts for collecting costs before transferring them to a Cost of Goods Sold account. At the end of the day, McDonald's has no work in process or finished goods inventory.

Is a retail company such as **Toys "R" Us** a service company or a manufacturing company? Because wholesale and retail companies have large inventories, it may seem odd to think of them as service companies. Consider, however, what employees of a wholesale or retail company do. Their efforts cannot be stored and used later. The services of a salesperson are consumed as customers are assisted. Other service organizations include insurance companies, banks, cleaning establishments, airlines, law firms, hospitals, hotels, and governmental agencies.

Even though service companies do not collect costs in inventory accounts for financial reporting purposes, they do accumulate cost information for decision making. For example, a hotel manager needs to know the cost of providing a room to assess whether the pricing policy is appropriate. A private school may compare the expected and actual cost of offering a course to ensure that costs are controlled. Airline executives need to know the cost of serving a specific route to decide whether to maintain or eliminate the route. Measuring the cost of providing services is just as necessary as measuring the cost of making products whether the cost is collected in an inventory account or charged directly to the income statement.



MANUFACTURING COST FLOW ILLUSTRATED

To illustrate how manufacturing costs flow through ledger accounts, consider Ventra Manufacturing Company, which makes mahogany jewelry boxes that it sells to department stores. The account balances in Exhibit 11.2 were drawn from the company's accounting records as of January 1, 2012.

Ventra Manufacturing's 2012 accounting events are explained here. The effects of the events are summarized in the T-accounts in Exhibit 11.4 on page 495. Study the entries in Exhibit 11.4 as you read the event descriptions in the following section of this chapter. The illustration assumes Ventra determines the cost of making its jewelry boxes on a monthly basis. Accounting events for January are described next.

LO 2

Demonstrate the flow of materials and labor costs for a manufacturing company.



EXHIBIT 11.2

Trial Balance as of January 1, 2012

| | | |
|---------------------------|------------------|------------------|
| Cash | \$ 64,500 | |
| Raw materials inventory | 500 | |
| Work in process inventory | 0 | |
| Finished goods inventory | 836 | |
| Manufacturing equipment | 40,000 | |
| Accumulated depreciation | | \$ 10,000 |
| Common stock | | 76,000 |
| Retained earnings | | 19,836 |
| Totals | <u>\$105,836</u> | <u>\$105,836</u> |

Events Affecting Manufacturing Cost Flow in January

EVENT 1 Ventra Manufacturing paid \$26,500 cash to purchase raw materials.

The effects of the materials purchase on the company's financial statements are shown in the following horizontal financial statements model.¹

| Assets | | | | | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|----------|---|-------------------------|---|----|---|-------------|---|--------|---------|----|----------|----|------------|
| Cash | + | Raw Materials Inventory | | | | | | | | | | | |
| (26,500) | + | 26,500 | = | NA | + | NA | | NA | - | NA | = | NA | |

This event is an asset exchange. One asset—cash—decreases, and another asset—raw materials inventory—increases. Neither total assets reported on the balance sheet nor any revenues or expenses on the income statement are affected. Raw materials costs are only one component of total manufacturing (product) costs. The raw materials costs will be included in the cost of goods sold (expense) recognized when completed jewelry boxes are sold to customers.

EVENT 2 Ventra placed \$1,100 of raw materials into production in the process of making jewelry boxes.

This event is also an asset exchange. One asset—raw materials inventory—decreases, and another asset—work in process inventory—increases. Total assets reported on the balance sheet are not affected. The income statement is not affected. The effects on the company's financial statements of using the raw materials follow.

| Assets | | | | | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|-------------------------|---|---------------------------|---|----|---|-------------|---|--------|---------|----|----------|----|------------|
| Raw Materials Inventory | + | Work in Process Inventory | | | | | | | | | | | |
| (1,100) | + | 1,100 | = | NA | + | NA | | NA | - | NA | = | NA | |

Ventra's raw materials are *direct* inputs to the production process. They are accounted for using the *perpetual inventory method*. Because the raw materials are traced directly to products, it is easy to match the cost flow with the physical flow. Every time direct raw materials are moved from storage to work in process, their cost is transferred in the accounting records as well.

EVENT 3 Ventra paid \$2,000 cash to purchase production supplies (glue, nails, sandpaper).

This event is also an asset exchange. One asset—cash—decreases, and another asset—production supplies—increases. Total assets reported on the balance sheet are not affected. Net income is not affected. The effects of this event on the company's financial statements follow.

| Assets | | | | | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|---------|---|---------------------|---|----|---|-------------|---|--------|---------|----|----------|----|------------|
| Cash | + | Production Supplies | | | | | | | | | | | |
| (2,000) | + | 2,000 | = | NA | + | NA | | NA | - | NA | = | NA | |

¹The horizontal model arranges the major financial statement elements horizontally across a single page. Reading from left to right, balance sheet elements are presented first, followed by income statement elements.

The production supplies are recorded in a separate asset account because Ventra finds it more practical to account for them using the *periodic inventory method*. Production supplies are *indirect* inputs. Such small quantities are used on each jewelry box that it is not worth the trouble to track the actual costs as the materials are used. Nobody wants to stop to make a journal entry every time several drops of glue are used. *Instead of recognizing production supplies usage as it occurs (perpetually), Ventra determines at the end of the accounting period (periodically) the cost of supplies used.* The record-keeping procedures for including the cost of production supplies in the flow of manufacturing costs are described in the explanation of the Manufacturing Overhead account described shortly.

EVENT 4 Ventra paid production workers \$1,400 cash.

These wages are *not* classified as salary expense. Because the labor was used to make jewelry boxes, the cost is added to the Work in Process Inventory account. This event is yet another asset exchange. Ventra exchanged cash for the value added by making the inventory. One asset—cash—decreases, and another asset—work in process inventory—increases. Total assets reported on the balance sheet are not affected. The income statement is not affected. The effects on the company’s financial statements of incurring production labor costs follow.

| Assets | | | | = | Liabilities | | + | Equity | | Revenue | - | Expenses | = | Net Income |
|---------|---|---------------------------|--|---|-------------|--|---|--------|--|---------|---|----------|---|------------|
| Cash | + | Work in Process Inventory | | | | | | | | | | | | |
| (1,400) | + | 1,400 | | = | NA | | + | NA | | NA | - | NA | = | NA |

REALITY BYTES

Like manufacturing companies, service companies must use predetermined overhead rates to make timely decisions, such as determining what price to charge customers. Consider **National Technical Systems, Inc.**, a large technical services company headquartered in Calabasas, California. In its 2009 fiscal year, the E&E segment generated over \$120 million in revenues.

According to the company’s 2009 annual report, it “provides highly trained technical personnel for product certification, product safety testing, and product evaluation . . .” including “. . . performing structural testing and analysis . . . of large articles such as entire airframes.” Fixed pricing is one method the company uses to price its goods.

Since the company has a lot of fixed overhead costs that include, among other things, depreciation of its testing facilities and equipment, it does not know the actual cost of completing a job until the end of the year. However, it cannot wait until then to give the customer a price for a test to be performed in March. How does it determine the price to charge? According to the company’s annual report, “At the time the Company enters into a contract that includes multiple tasks, the Company **estimates** the amount of actual labor *and other costs* that will be required to complete each task based on historical experience.” (Emphasis supplied.) These cost estimates are used to establish a price to be charged.

The company also notes, “To the extent management does not accurately forecast the level of effort required to complete a contract, or individual tasks within a contract . . . the Company may incur losses on individual contracts.”



Source: the Company’s annual report.

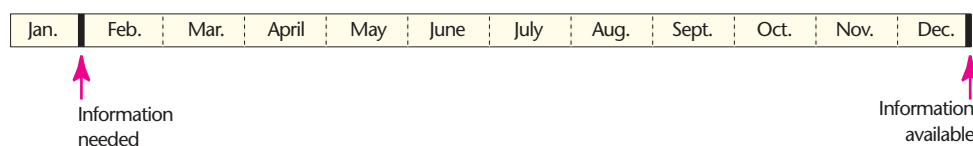
LO 3

Assign estimated overhead costs to inventory and cost of goods sold.

Flow of Overhead Costs

Assume Ventra made 500 jewelry boxes during January. What is the cost per jewelry box? Why does management need to know this cost? If Ventra uses a cost-plus pricing strategy, management must know the cost per jewelry box to determine what price to charge for each one. Product cost information is also used to control costs and evaluate managerial performance. By comparing current production costs with historical or standard costs, management can evaluate whether performance meets expectations and take appropriate action to ensure the company accomplishes its goals. Ventra has many reasons for needing to know in January the cost of products made in January.

The *direct costs* of making the 500 jewelry boxes in January are \$1,100 for materials and \$1,400 for labor. The *actual indirect overhead costs* are unknown. Ventra will not know the exact amount of some of these indirect costs until the end of the year. For example, Ventra uses the periodic inventory method to determine the cost of production supplies consumed. The actual cost of supplies consumed is unknown until the end of the year when Ventra counts any unused supplies. Similarly, the actual cost for 2012 of taxes, insurance, landscaping, supervisory bonuses, and other indirect costs may be unknown in January. Ventra cannot delay making managerial decisions until actual cost data become available. Ventra needs information on January 31 that will not be available until December 31. This dilemma is depicted in the following graphic.



To solve the problem of needing cost information before it is available, Ventra records *estimated costs* in its accounting system *during the accounting period*. To illustrate, assume the accountant estimated Ventra will incur total indirect overhead costs of \$40,320 during 2012. This *estimate* of overhead cost includes \$1,600 for the cost of production supplies Ventra will use, \$10,000 of depreciation cost, and \$28,720 of other costs such as supervisory salaries, rent on the manufacturing facility, utilities, and maintenance. How much of the \$40,320 *estimated* overhead cost should Ventra allocate to the units produced in January? Ventra must first identify the most appropriate allocation base. Assuming the goods (jewelry boxes) are homogeneous (the jewelry boxes are identical), it makes sense to use number of units as the allocation base, assigning an equal amount of overhead cost to each box.

Suppose Ventra's accountant expected Ventra to produce 12,000 jewelry boxes during the year. Based on this estimate, the allocation rate is \$3.36 per unit ($\$40,320 \div 12,000$ units). Because the overhead allocation rate is determined before the actual overhead costs are known, it is called a **predetermined overhead rate**. Using the \$3.36 predetermined overhead rate, Ventra allocated \$1,680 of overhead cost to the 500 jewelry boxes made in January ($\$3.36 \times 500$ boxes).

Manufacturing Overhead Account

How are overhead costs recorded in the accounting records? Estimated overhead costs are *applied* (assigned) to work in process inventory *at the time goods are produced*. As shown in Event 5, for January Ventra Manufacturing would apply (transfer) \$1,680 of overhead cost to the Work in Process Inventory account. Actual overhead costs may be incurred at different times from when goods are made. For example, Ventra may recognize depreciation or supplies use at year-end. Actual and estimated overhead costs are therefore recorded at different times during the accounting period.

At the time estimated overhead is added (a debit) to the Work in Process Inventory account, a corresponding entry is recorded on the credit side of a *temporary* account called *Manufacturing Overhead*. This credit entry in the Manufacturing Overhead account is **applied overhead**. Think of the **Manufacturing Overhead account** as a temporary asset account. Recognizing estimated overhead can be viewed as an asset exchange transaction. When estimated overhead is recognized, the temporary account, Manufacturing Overhead, decreases and the Work in Process Inventory account increases.

Actual overhead costs are recorded as increases (debits) in the Manufacturing Overhead account. For example, at the end of the year, Ventra will reduce the Production Supplies account and increase the Manufacturing Overhead account by the actual amount of supplies used. The balance in the Production Supplies account will be decreased and the balance in the Manufacturing Overhead account will be increased. When Ventra pays monthly rent cost for the manufacturing facilities, it will increase Manufacturing Overhead and decrease cash. Other actual overhead costs are recorded the same way.

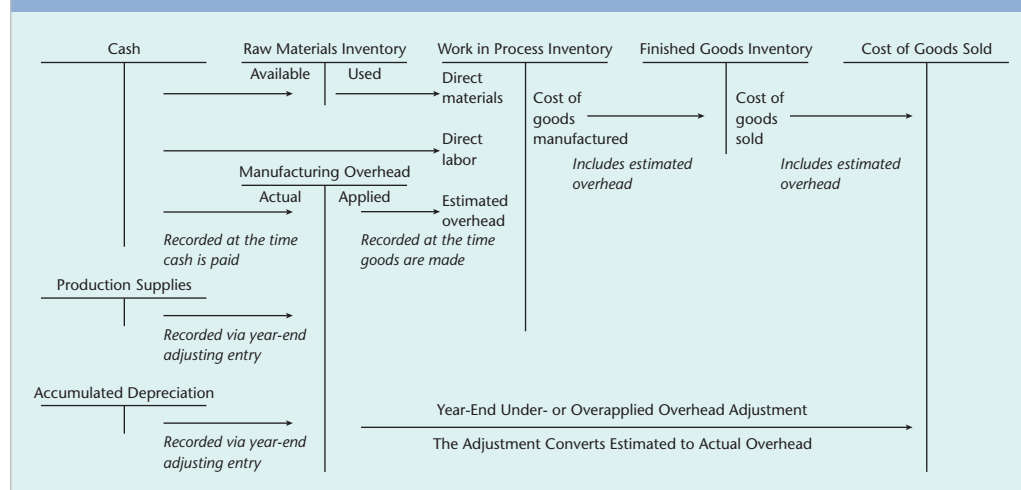
Since differences normally exist between estimated and actual overhead costs, the Manufacturing Overhead account is likely to have a balance at the end of the year. If more overhead has been applied than was actually incurred, the account balance represents the amount of **overapplied overhead**. If less overhead was applied than was incurred, the account balance is **underapplied overhead**. Overapplied overhead means the amount of estimated overhead cost recorded in the Work in Process Inventory account exceeded the actual overhead cost incurred. Underapplied overhead means the amount of estimated overhead cost recorded in the Work in Process Inventory account was less than the actual overhead cost incurred.

Because costs flow from Work in Process Inventory to Finished Goods Inventory and then to Cost of Goods Sold, these accounts will also be overstated or understated relative to actual costs. If the amount of overapplied or underapplied overhead is significant, it must be allocated proportionately at the end of the year to the Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold accounts so these accounts will reflect actual, rather than estimated, amounts for financial reporting.

In most cases, over- or underapplied overhead is not significant and companies may allocate it in any convenient manner. In these circumstances, companies normally assign the total amount of the overhead correction directly to Cost of Goods Sold. We have adopted this simplifying practice throughout the text and in the end-of-chapter exercises and problems. Exhibit 11.3 shows the flow of product costs, including actual and applied overhead. To illustrate using a Manufacturing Overhead account, return to Ventra Manufacturing Company.

EXHIBIT 11.3

Flow of Product Costs



EVENT 5 Ventra recognized \$1,680 of estimated manufacturing overhead costs at the end of January (see previous section entitled Flow of Overhead Costs to review computing this amount).

This event is another asset exchange. Total assets reported on the balance sheet, net income, and cash flow are not affected. The temporary asset account Manufacturing Overhead decreases, and the asset account Work in Process Inventory increases. The effects of this event on the company's financial statements follow.

| Assets | | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|------------------------|---|---------------------------|-------------|----|--------|---------|---|----------|---|------------|
| Manufacturing Overhead | + | Work in Process Inventory | | | | | | | | |
| (1,680) | + | 1,680 | = | NA | + | NA | | NA | = | NA |

LO 4

Account for completion and sale of products.

EVENT 6 Ventra transferred the total cost of the 500 jewelry boxes made in January (\$1,100 materials + \$1,400 labor + \$1,680 estimated overhead = \$4,180 cost of goods manufactured) from work in process to finished goods.

This event is an asset exchange. Total assets reported on the balance sheet, net income, and cash flow are not affected. The asset account Work in Process Inventory decreases, and the asset account Finished Goods Inventory increases. The effects of this event on the company's financial statements follow.

| Assets | | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|---------------------------|---|--------------------------|-------------|----|--------|---------|---|----------|---|------------|
| Work in Process Inventory | + | Finished Goods Inventory | | | | | | | | |
| (4,180) | + | 4,180 | = | NA | + | NA | | NA | = | NA |

EVENT 7 Ventra transferred the cost of 400 sold jewelry boxes from finished goods inventory to cost of goods sold.

Recall that Ventra made 500 jewelry boxes costing \$4,180 during January. Also, the beginning balance in the Finished Goods Inventory account was \$836. Assume this balance represented 100 jewelry boxes that had been made in 2011. Therefore, 600 units (100 + 500) of finished goods costing \$5,016 (\$836 + \$4,180) were available for sale. If Ventra sold 400 units, it had 200 units in finished goods inventory at the end of January. The cost of the 600 boxes available (\$5,016) must be allocated between the Finished Goods Inventory account and the Cost of Goods Sold account. The allocation is based on the cost per unit of jewelry boxes. Given that 600 boxes cost \$5,016, the cost per unit is \$8.36 (\$5,016 ÷ 600). Based on this cost per unit, Ventra transferred \$3,344 (\$8.36 × 400 boxes) from finished goods inventory to cost of goods sold, leaving an ending balance of \$1,672 (\$8.36 × 200 boxes) in the Finished Goods Inventory account.

Transferring cost from finished goods inventory to cost of goods sold is an asset use event. Both total assets and stockholders' equity reported on the balance sheet decrease. The asset finished goods inventory decreases, and the expense cost of goods sold increases, decreasing stockholders' equity (retained earnings). Net income decreases. The sales transaction encompasses two events. The following horizontal model shows the effects of the expense recognition. The effects of the corresponding revenue recognition are discussed separately as Event 8.

| Assets | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|--------------------------|---|-------------|---|-------------------|---------|---|----------|---|------------|
| Finished Goods Inventory | | | | Retained Earnings | | | | | |
| (3,344) | = | NA | + | (3,344) | NA | - | 3,344 | = | (3,344) |

Knowing the cost per jewelry box is useful for many purposes. For example, the amount of the allocation between the ending Finished Goods Inventory and the Cost of Goods Sold accounts is needed for the financial statements. Ventra must compute the cost per unit data if it wishes to prepare interim (monthly or quarterly) financial reports. The cost per unit for the month of January also could be compared to the cost per unit for the previous accounting period or to standard cost data to evaluate cost control and managerial performance. Finally, the cost per unit data are needed for setting the price under a cost-plus pricing strategy. Assume Ventra desires to earn a gross margin of \$5.64 per jewelry box. It would therefore charge \$14 (\$8.36 cost + \$5.64 gross margin) per unit for each jewelry box. When recording the effects of recognizing revenue for the 400 boxes sold, we assume that Ventra charges its customers \$14 per unit.

EVENT 8 Ventra recognized \$5,600 (\$14 per unit × 400 units) of sales revenue for the cash sale of 400 jewelry boxes.

Recognizing revenue is an asset source transaction. The asset cash increases and stockholders' equity (retained earnings) increases. Net income increases. These effects are shown here.

| Assets | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|--------|---|-------------|---|--------|---------|---|----------|---|------------|
| 5,600 | = | NA | + | 5,600 | 5,600 | - | NA | = | 5,600 |

EVENT 9 Ventra paid \$1,200 cash for manufacturing overhead costs including indirect labor, utilities, and rent.

Paying for actual overhead costs is an asset exchange event. Ventra transfers cost from the asset account Cash to the temporary asset account Manufacturing Overhead. Total assets on the balance sheet and net income are unaffected. These effects follow.

| Assets | = | Liabilities | + | Equity | Revenue | - | Expenses | = | Net Income |
|---------|---|------------------------|---|--------|---------|----|----------|----|------------|
| Cash | + | Manufacturing Overhead | | | | | | | |
| (1,200) | + | 1,200 | = | NA | + | NA | = | NA | |

Recall that \$1,680 of overhead cost was applied to the January work in process inventory. This amount is significantly more than the \$1,200 of actual overhead costs paid for above. These amounts differ because the estimated (applied) overhead includes several costs that have not yet been recognized. For example, the amount of supplies used and depreciation expense are not recognized until Ventra records adjusting entries on December 31. Although these costs are not recognized until December, a portion of them must be included in the cost of products made in January. Otherwise, all of the supplies cost and depreciation cost would be assigned to products made in December.

Answers to The Curious Accountant

Obviously, an enterprise such as Northwest Aviction cannot stay in business if it cannot give customers a price for the services it is selling. As the chapter has explained, manufacturers estimate the overhead cost of a job based on a predetermined overhead rate. Although these estimates will not be perfect, they do allow the companies to price their goods or services before they are produced. If the company does not do a reasonably good job of estimating the costs it will incur to complete a job, then it will suffer by either pricing its goods too high, which will cause it to lose business to its competitors, or pricing its goods too low, which will cause it to not make a profit adequate to stay in business.

The manufacturing equipment and supplies are actually used throughout the year. Assigning the total cost of these resources to December alone would overstate the cost of December production and understate the cost of production during other months. Such distortions in measuring product cost could mislead managers making decisions based on the reported costs. By using *estimated* overhead costs during the accounting period, management reduces the distortions that using actual monthly costs would create. The difference between actual and estimated overhead is corrected in a *year-end adjusting entry*. Companies do not adjust for these differences on an interim basis.



CHECK YOURSELF 11.1

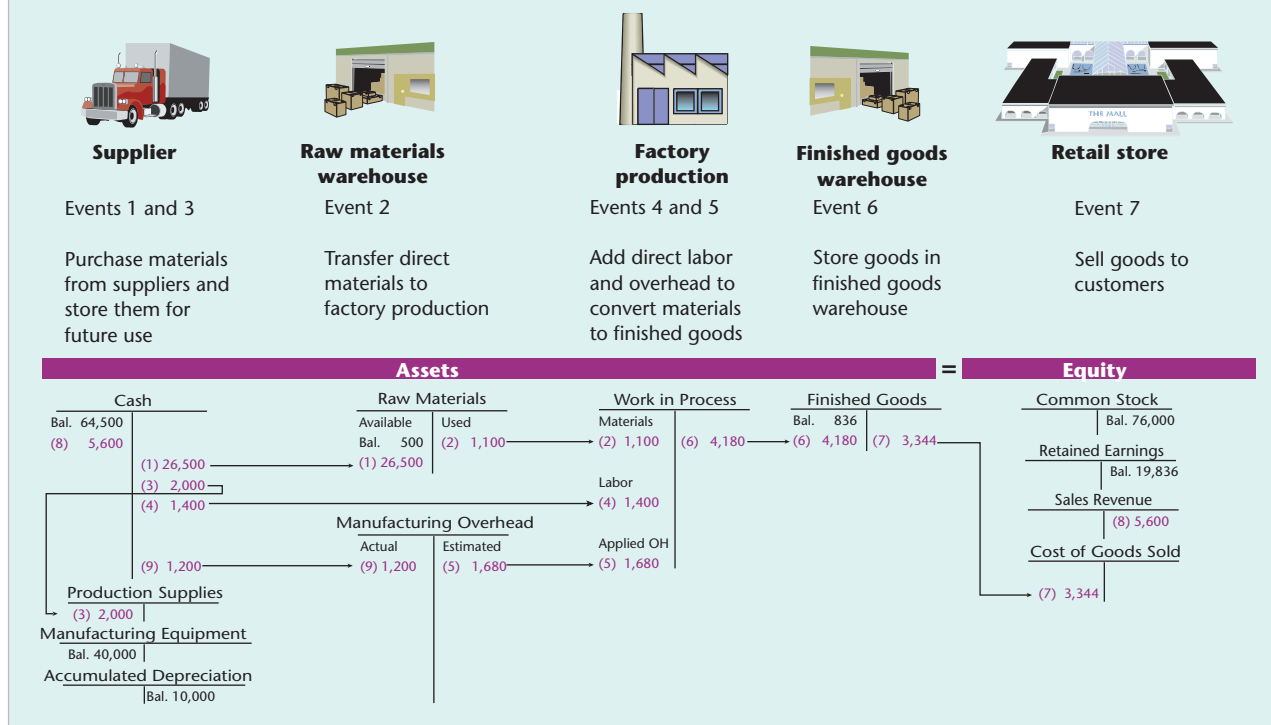
Candy Manufacturing Company had a beginning balance of \$24,850 in its Work in Process Inventory account. Candy added the following costs to work in process during the accounting period: direct materials, \$32,000; direct labor, \$46,000; manufacturing overhead, \$39,900. If the ending balance in the Work in Process Inventory account was \$22,100, what was the amount of the Cost of Goods Manufactured (cost of goods transferred to Finished Goods Inventory)?

Answer

| | |
|--|------------------|
| Beginning work in process inventory | \$ 24,850 |
| Manufacturing costs added | |
| Direct materials | 32,000 |
| Direct labor | 46,000 |
| Manufacturing overhead | <u>39,900</u> |
| Total work in process | 142,750 |
| Less: Ending work in process inventory | <u>(22,100)</u> |
| Cost of goods manufactured | <u>\$120,650</u> |

Summary of January Events

Exhibit 11.4 summarizes the events that occurred during January. The upper section of the exhibit illustrates the *physical flow* of the resources used to make the jewelry boxes. The lower section shows the product *cost flow* through Ventra's ledger accounts. The exhibit illustrates Events 1 through 9. The January balances in the Finished

EXHIBIT 11.4**Flow of Product Costs for Ventra Manufacturing Company's January Production**

Goods Inventory and Cost of Goods Sold accounts include the cost of materials, labor, and an *estimated* amount of overhead. Estimated overhead cost is applied to work in process inventory throughout the year. Actual overhead costs are accumulated in the Manufacturing Overhead account as they are incurred. The accounts are adjusted at year-end to reconcile the difference between the estimated and actual overhead costs.

Manufacturing Cost Flow Events for February through December

Ventra Manufacturing Company's accounting events for February through December are summarized here. The sequence of events continues from the January activity. Since nine events occurred in January, the first February event is Event 10. The events for the remainder of 2012 follow.

- Ventra used \$24,860 of raw materials.
- The company paid production workers \$31,640 cash.
- Ventra started production of an additional 11,300 jewelry boxes. Ventra applied overhead of \$37,968 (11,300 units \times the predetermined overhead rate of \$3.36 per unit) to work in process inventory.
- The company completed 10,300 units and transferred \$86,108 of cost of goods manufactured from work in process inventory to finished goods inventory.
- Ventra sold 9,600 units and recorded \$80,256 of cost of goods sold.
- The company recognized \$134,400 of cash revenue for the products sold in Event 14.
- The company paid \$30,500 cash for overhead costs including indirect labor, rent, and utilities.

17. The year-end count of production supplies indicated \$300 of supplies were on hand at December 31. Ventra recognized \$1,700 (\$2,000 supplies available – \$300 ending balance) of indirect materials cost for supplies used during the year. This entry reflects year-end recognition of an actual overhead cost.
18. Ventra recognized \$10,000 of actual overhead cost for depreciation of manufacturing equipment.
19. The company paid \$31,400 cash for general, selling, and administrative expenses.
20. A year-end review of the Manufacturing Overhead account disclosed that overhead cost was underapplied by \$3,752. Actual overhead (\$43,400) was higher than estimated overhead (\$39,648). Because estimated overhead cost passes through the ledger accounts from Work in Process Inventory to Finished Goods Inventory and ultimately to Cost of Goods Sold, the balance in the Cost of Goods Sold account is understated. Ventra recorded the adjusting entry to close the Manufacturing Overhead account and increase the balance in the Cost of Goods Sold account.

Exhibit 11.5 shows the flow of the 2012 costs through the ledger accounts. The January entries are shown in blue to distinguish them from the entries for the remainder of the year. The product cost flows are highlighted with black arrows. Trace the effects of each transaction to the exhibit before reading further.

Analyzing Underapplied Overhead

What caused overhead to be underapplied by \$3,752? Recall that the predetermined overhead rate is based on two estimates, the estimated total overhead cost and the estimated total annual production volume. At the beginning of 2012, Ventra estimated total overhead cost would be \$40,320, but actual overhead costs were \$43,400, indicating Ventra spent \$3,080 more than expected for overhead cost. This \$3,080 is a *spending variance*. The remaining \$672 of the underapplied overhead ($\$3,752 - \$3,080$) results from the difference between the actual and estimated volume of activity; it is called a *volume variance*. Recall that Ventra estimated production volume would be 12,000 units, but actual volume was only 11,800 units (500 units made in January + 11,300 units made from February through December).² The predetermined overhead rate of \$3.36 per unit was applied to 200 fewer units (12,000 units – 11,800 units) than expected, resulting in a volume variance of \$672 ($\$3.36 \text{ predetermined overhead rate} \times 200 \text{ units}$). The combination of the spending and volume variances³ explains the total underapplied overhead ($\$3,080 + \$672 = \$3,752$).

Because the actual cost is higher than the expected cost, the spending variance is unfavorable. The volume variance is also unfavorable because actual volume is less than expected, suggesting the manufacturing facilities were not utilized to the extent anticipated. In other words, fixed costs such as depreciation, rent, and supervisory salaries were spread over fewer units of product than expected, thereby increasing the cost per unit of product. If the variances are significant, estimated product costs could have been understated enough to have distorted decisions using the data. For example, products may have been underpriced, adversely affecting profitability. Making estimates as accurately as possible is critically important. Nevertheless, some degree of inaccuracy is inevitable. No one knows precisely what the future will bring. Managers seek to improve decision making. Although managers cannot make exact predictions, the more careful the estimates, the more useful will be the resulting information for timely decision making.

²There were 11,800 units placed into production. There were 10,800 units completed, leaving an ending work in process inventory balance of 1,000 units.

³The predetermined overhead rate in this chapter represents the standard cost and quantity of both variable and fixed inputs. As discussed in Chapter 8, companies may establish separate standards for variable costs and fixed costs. In this chapter, we assume the variable cost variances are insignificant and focus the discussion on the effects of fixed cost variances only.

✓ CHECK YOURSELF 11.2

At the beginning of the accounting period, Nutrient Manufacturing Company estimated its total manufacturing overhead cost for the coming year would be \$124,000. Furthermore, the company expected to use 15,500 direct labor hours during the year. Nutrient actually incurred overhead costs of \$128,500 for the year and actually used 15,800 direct labor hours. Nutrient allocates overhead costs to production based on direct labor hours. Would overhead costs be overapplied or underapplied? What effect will closing the overhead account have on cost of goods sold?

Answer

Predetermined overhead rate = Total expected overhead cost ÷ Allocation base

Predetermined overhead rate = \$124,000 ÷ 15,500 hours = \$8 per direct labor hour

Applied overhead = Predetermined overhead rate × Actual direct labor hours

Applied overhead = \$8 × 15,800 = \$126,400

Since the applied overhead (\$126,400) is less than the actual overhead (\$128,500), the overhead is underapplied. Closing the overhead account will increase Cost of Goods Sold by \$2,100 (\$128,500 – \$126,400).

PREPARING THE SCHEDULE OF COST OF GOODS MANUFACTURED AND SOLD

LO 5

Prepare a schedule of cost of goods manufactured and sold.

In practice, a general ledger system like that shown in Exhibit 11.5 may capture millions of events. Analyzing operations with such vast numbers of transactions is exceedingly difficult. To help managers analyze manufacturing results, companies summarize the ledger data in a *schedule* that shows the overall cost of goods manufactured and sold. The schedule is an internal document which is not presented with a company's published financial statements. Only the final total on the schedule (cost of goods sold) is disclosed; it is reported on the income statement. Exhibit 11.6 illustrates Ventra's 2012 **schedule of cost of goods manufactured and sold**.

EXHIBIT 11.6

VENTRA MANUFACTURING COMPANY Schedule of Cost of Goods Manufactured and Sold For the Year Ended December 31, 2012

| | |
|---|------------------|
| Beginning raw materials inventory | \$ 500 |
| Plus: Purchases | 26,500 |
| Raw materials available for use | 27,000 |
| Less: Ending raw materials inventory | (1,040) |
| Direct raw materials used | 25,960 |
| Direct labor | 33,040 |
| Overhead (actual overhead cost) | 43,400 |
| Total manufacturing costs | 102,400 |
| Plus: Beginning work in process inventory | 0 |
| Total work in process inventory | 102,400 |
| Less: Ending work in process inventory | (8,360) |
| Cost of goods manufactured | 94,040 |
| Plus: Beginning finished goods inventory | 836 |
| Cost of goods available for sale | 94,876 |
| Less: Ending finished goods inventory | (7,524) |
| Cost of goods sold | <u>\$ 87,352</u> |

The schedule in Exhibit 11.6 reflects the transaction data in the ledger accounts. Confirm this relationship by comparing the information in the Raw Materials Inventory account in Exhibit 11.5 with the computation of the cost of direct raw materials used in the schedule in Exhibit 11.6. The beginning raw materials inventory, purchases, and ending raw materials inventory amounts in the ledger account agree with the schedule. The schedule, however, presents various amounts in summary form. For example, in the schedule the amount of direct raw materials used is \$25,960. In Exhibit 11.5 this same amount is shown as two separate entries (\$1,100 + \$24,860) in the T-account. Similarly, the \$33,040 shown as direct labor in the schedule represents the total of the two amounts (\$1,400 + \$31,640) of labor cost entered in the Work in Process Inventory account in Exhibit 11.5. In practice, one number in the schedule may represent thousands of individual events captured in the ledger accounts. The schedule simplifies analyzing manufacturing cost flow data for decision-making purposes.

The schedule of cost of goods manufactured and sold includes the *actual* amount of overhead cost. Data for financial statement reports are summarized at the end of the year when actual cost data are available. Although companies use estimated costs for internal records and decision making during the year, they use actual historical cost data in this schedule prepared at the end of the year.

FINANCIAL STATEMENTS

LO 6

Prepare financial statements for a manufacturing company.

The final total on the schedule of cost of goods manufactured and sold is reported as the single line item *cost of goods sold* on the company's income statement. Cost of goods sold is subtracted from sales revenue to determine gross margin. Selling and administrative expenses are subtracted from gross margin to reach net income. Exhibit 11.7 shows Ventra Manufacturing's 2012 income statement; Exhibit 11.8 shows the year-end balance sheet. In Exhibit 11.8 we show the three inventory accounts (Raw Materials, Work in Process, and Finished Goods) separately for teaching purposes. In practice, these accounts are frequently combined and reported as a single amount (Inventories) on the balance sheet. Study each statement, tracing the information from the T-accounts in Exhibit 11.5 to the exhibits to see how companies gather the information they report to the public in their published financial statements.

EXHIBIT 11.7

VENTRA MANUFACTURING COMPANY

Income Statement

For the Year Ended December 31, 2012

| | |
|-------------------------------------|------------------|
| Sales revenue | \$140,000 |
| Cost of goods sold | <u>(87,352)</u> |
| Gross margin | 52,648 |
| Selling and administrative expenses | <u>(31,400)</u> |
| Net income | <u>\$ 21,248</u> |

EXHIBIT 11.8

VENTRA MANUFACTURING COMPANY

Balance Sheet

As of December 31, 2012

| | |
|--|------------------|
| Assets | |
| Cash | \$ 79,860 |
| Raw materials inventory | 1,040 |
| Work in process inventory | 8,360 |
| Finished goods inventory | 7,524 |
| Production supplies | 300 |
| Manufacturing equipment | 40,000 |
| Accumulated depreciation—manufac. equip. | <u>(20,000)</u> |
| Total assets | <u>\$117,084</u> |
| Stockholders' equity | |
| Common stock | \$ 76,000 |
| Retained earnings | <u>41,084</u> |
| Total stockholders' equity | <u>\$117,084</u> |

MOTIVE TO OVERPRODUCE

Absorption Costing versus Variable Costing

LO 7

Distinguish between absorption and variable costing.

As discussed previously, managers frequently separate product manufacturing costs into variable and fixed categories based on how the costs behave. For example, the cost of materials, labor, and supplies usually increases and decreases in direct proportion to the number of units produced. Other product costs, such as rent, depreciation, and supervisory salaries are fixed; they remain constant regardless of the number of products made. Generally accepted accounting principles require that *all* product costs, both variable and fixed, be reported as inventory until the products are sold, when the product costs are expensed as cost of goods sold. This practice is called **absorption (full) costing**.⁴ To illustrate, assume Hokai Manufacturing Company incurs the following costs to produce 2,000 units of inventory.

| Inventory Costs | Cost per Unit | × | Units | = | Total |
|--------------------------------------|---------------|---|-------|---|-----------------|
| Variable manufacturing costs | \$9 | × | 2,000 | = | \$18,000 |
| Fixed overhead | | | | = | 12,000 |
| Total (full absorption product cost) | | | | = | <u>\$30,000</u> |

Suppose Hokai sells all 2,000 units of inventory for \$20 per unit (sales = 2,000 × \$20 = \$40,000). Gross margin is therefore \$10,000 (\$40,000 sales – \$30,000 cost of goods sold). What happens to reported profitability if Hokai increases production without also increasing sales? Profitability increases because cost of goods sold decreases. Overproducing spreads the fixed cost over more units, thereby reducing the cost per unit and the amount charged to cost of goods sold. Exhibit 11.9 illustrates this effect; it shows the cost per unit at production levels of 2,000, 3,000, and 4,000 units.

EXHIBIT 11.9

Cost per Unit Absorption Costing

Inventory Costs

| | | | |
|---------------------------------------|--------------|--------------|--------------|
| Fixed overhead (a) | \$12,000 | \$12,000 | \$12,000 |
| Number of units (b) | 2,000 | 3,000 | 4,000 |
| Fixed overhead per unit (a ÷ b) | \$ 6 | \$ 4 | \$ 3 |
| Variable manufacturing costs | 9 | 9 | 9 |
| Full absorption product cost per unit | <u>\$ 15</u> | <u>\$ 13</u> | <u>\$ 12</u> |

Exhibit 11.10 illustrates for Hokai alternate income statements assuming sales of 2,000 units and production levels of 2,000, 3,000, and 4,000 units, the first using absorption costing and the second using variable costing.

Suppose Hokai's management is under pressure to increase profitability but cannot control sales because customers make buying decisions. Management may

⁴Since all manufacturing costs are classified as product costs under absorption costing, absorption costing is also called *full costing*.

EXHIBIT 11.10**Absorption Costing Income Statements at Different Levels of Production with Sales Held Constant at 2,000 Units**

| Level of Production | 2,000 | | 3,000 | | 4,000 |
|--|-----------------|-------------------------|-----------------|-------------------------|-----------------|
| Sales (\$20 per unit \times 2,000 units) | \$40,000 | | \$40,000 | | \$40,000 |
| Cost of goods sold (\$15 \times 2,000) = | <u>30,000</u> | (\$13 \times 2,000) = | <u>26,000</u> | (\$12 \times 2,000) = | <u>24,000</u> |
| Gross margin | <u>\$10,000</u> | | <u>\$14,000</u> | | <u>\$16,000</u> |

be tempted to increase reported profitability by increasing production. What is wrong with increasing production without also increasing sales? The problem lies in inventory accumulation. Notice inventory increases 1,000 units when 3,000 units are produced but only 2,000 are sold. Likewise, inventory rises 2,000 units when 4,000 are produced but 2,000 are sold. Holding excess inventory entails considerable risks and costs. Inventory is subject to obsolescence, damage, theft, or destruction by fire, weather, or other disasters. Furthermore, holding inventory requires expenditures for warehouse space, employee handling, financing, and insurance coverage. These risks and costs reduce a company's profitability. Overproducing inventory is a poor business practice. To motivate managers to increase profitability without tempting them to overproduce, many companies use *variable costing* for internal reporting.

Variable Costing

Under **variable costing**, inventory includes only *variable* product costs. The income statement is presented using the contribution margin approach, with variable product costs subtracted from sales revenue to determine the contribution margin. Fixed costs are then subtracted from the contribution margin to determine net income.

Fixed manufacturing costs are expensed in the period in which they are incurred (the period in which the resource is used) regardless of when inventory is sold. Using variable costing, increases in production have no effect on the amount of reported profit, as shown in the income statements in Exhibit 11.11.

Although managers may still overproduce under variable costing, at least they are not tempted to do so by the lure of reporting higher profits. The variable costing reporting format encourages management to make business decisions that have a more favorable impact on long-term profitability. Variable costing can be used only for internal reporting because generally accepted accounting principles prohibit its use in external financial statements.

EXHIBIT 11.11**Variable Costing Income Statements at Different Levels of Production with Sales Held Constant at 2,000 Units**

| Level of Production | 2,000 | | 3,000 | | 4,000 |
|--|-----------------|------------------------|-----------------|------------------------|-----------------|
| Sales (\$20 per unit \times 2,000 units) | \$40,000 | | \$40,000 | | \$40,000 |
| Variable cost of goods sold (\$9 \times 2,000) = | <u>(18,000)</u> | (\$9 \times 2,000) = | <u>(18,000)</u> | (\$9 \times 2,000) = | <u>(18,000)</u> |
| Contribution margin | 22,000 | | 22,000 | | 22,000 |
| Fixed manufacturing costs | <u>(12,000)</u> | | <u>(12,000)</u> | | <u>(12,000)</u> |
| Net income | <u>\$10,000</u> | | <u>\$10,000</u> | | <u>\$10,000</u> |

 **CHECK YOURSELF 11.3**

If production exceeds sales, will absorption or variable costing produce the higher amount of net income? Which method (absorption or variable costing) is required for external financial reporting?

Answer Absorption costing produces a higher amount of net income when production exceeds sales. With absorption costing, fixed manufacturing costs are treated as inventory and remain in inventory accounts until the inventory is sold. In contrast, all fixed manufacturing costs are expensed with variable costing. Therefore, with absorption costing, some fixed manufacturing costs will be in inventory rather than in expense accounts, so expenses will be lower and net income will be higher than with variable costing (when production exceeds sales). Generally accepted accounting principles require companies to use absorption costing for external financial reporting purposes.

 **A Look Back**

Most manufacturing companies accumulate product costs in three inventory accounts. The *Raw Materials Inventory account* is used to accumulate the cost of direct *raw materials* purchased for use in production. The *Work in Process Inventory account* includes the cost of partially completed products. Finally, the *Finished Goods Inventory account* contains the costs of fully completed products that are ready for sale. When direct materials are purchased, their costs are first recorded in raw materials inventory. The costs of the materials used in production are transferred from raw materials inventory to work in process inventory. The cost of direct labor and overhead are added to work in process inventory. As goods are completed, their costs are transferred from work in process inventory to finished goods inventory. When goods are sold, their cost is transferred from finished goods inventory to cost of goods sold. The ending balances in the Raw Materials, Work in Process, and Finished Goods Inventory accounts are reported in the balance sheet. The product cost in the Cost of Goods Sold account is subtracted from sales revenue on the income statement to determine gross margin.

The actual amounts of many indirect overhead costs incurred to make products are unknown until the end of the accounting period. Examples of such costs include the cost of rent, supplies, utilities, indirect materials, and indirect labor. Because many managerial decisions require product cost information before year-end, companies frequently estimate the amount of overhead cost. The estimated overhead costs are assigned to products using a *predetermined overhead rate*.

Actual and applied overhead costs are accumulated in the temporary asset account *Manufacturing Overhead*. Differences between actual and applied overhead result in a balance in the Manufacturing Overhead account at the end of the accounting period. If actual overhead exceeds applied overhead, the account balance represents *underapplied overhead*. If actual overhead is less than applied overhead, the balance represents *overapplied overhead*. If the amount of over- or underapplied overhead is insignificant, it is closed directly to cost of goods sold through a year-end adjusting entry.

Manufacturing cost information is summarized in a report known as a *schedule of cost of goods manufactured and sold*. This schedule shows how the amount of cost of goods sold reported on the income statement was determined. Actual, rather than applied, overhead cost is used in the schedule.

Generally accepted accounting principles require all product costs (fixed and variable) to be included in inventory until the products are sold. This practice is called *absorption costing*. Results reported under absorption costing may tempt management

to increase profitability by producing more units than the company can sell (overproducing). Overproducing spreads fixed costs over more units, reducing the cost per unit and the amount charged to cost of goods sold. Overproducing has the adverse effect of reducing profitability in the long term by increasing the risks and costs of inventory accumulation. To eliminate the temptation to overproduce, for internal reporting many companies determine product cost using *variable costing*. Under variable costing, only the variable product costs are included in inventory. Fixed product costs are expensed in the period they are incurred, regardless of when products are sold. As a result, overproduction does not decrease the product cost per unit and managers are not tempted to overproduce to increase profitability.

A Look Forward



Would you use the same product cost system to determine the cost of a bottle of Pepsi as to determine the cost of a stealth bomber? We answer this question in the next chapter, which expands on the basic cost flow concepts introduced in this chapter. You will be introduced to job-order, process, and hybrid cost systems. You will learn to identify the types of services and products that are most appropriate for each type of cost system.

A step-by-step audio-narrated series of slides is provided on the text website at www.mhhe.com/edmonds2011.



SELF-STUDY REVIEW PROBLEM



Tavia Manufacturing Company's first year of operation is summarized in the following list. All transactions are cash transactions unless otherwise indicated.

1. Acquired cash by issuing common stock.
2. Purchased administrative equipment.
3. Purchased manufacturing equipment.
4. Purchased direct raw materials.
5. Purchased indirect materials (production supplies).
6. Used direct raw materials in making products.
7. Paid direct labor wages to manufacturing workers.
8. Applied overhead costs to Work in Process Inventory.
9. Paid indirect labor salaries (production supervisors).
10. Paid administrative and sales staff salaries.
11. Paid rent and utilities on the manufacturing facilities.
12. Completed work on products.
13. Sold completed inventory for cash (revenue event only).
14. Recognized cost of goods sold.
15. Recognized depreciation on manufacturing equipment.
16. Recognized depreciation on administrative equipment.
17. Recognized the amount of production supplies that had been used during the year.
18. Closed the Manufacturing Overhead account. Overhead had been underapplied during the year.

Required

- Use the horizontal statements model to show how each event affects the balance sheet and the income statement.
- Identify the accounts affected by each event and indicate whether they increased or decreased as a result of the event.

Solution to Requirement a

| Event No. | Assets | = | Liab. | + | Equity | Rev. | - | Exp. | = | Net Inc. |
|-----------|--------|---|-------|---|--------|------|---|------|---|----------|
| 1 | + | | n/a | | + | n/a | | n/a | | n/a |
| 2 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 3 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 4 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 5 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 6 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 7 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 8 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 9 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 10 | - | | n/a | | - | n/a | | + | | - |
| 11 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 12 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 13 | + | | n/a | | + | + | | n/a | | + |
| 14 | - | | n/a | | - | n/a | | + | | - |
| 15 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 16 | - | | n/a | | - | n/a | | + | | - |
| 17 | - | + | n/a | | n/a | n/a | | n/a | | n/a |
| 18 | - | | n/a | | - | n/a | | + | | - |

Solution to Requirement b

| Event No. | Account Title | Increase/ Decrease | Account Title | Increase/ Decrease |
|-----------|---------------------------|-----------------------|---------------------------|-----------------------|
| 1 | Cash | + | Common Stock | + |
| 2 | Administrative Equipment | + | Cash | - |
| 3 | Manufacturing Equipment | + | Cash | - |
| 4 | Raw Materials Inventory | + | Cash | - |
| 5 | Production Supplies | + | Cash | - |
| 6 | Work in Process Inventory | + | Raw Materials Inventory | - |
| 7 | Work in Process Inventory | + | Cash | - |
| 8 | Work in Process Inventory | + | Manufacturing Overhead | - |
| 9 | Manufacturing Overhead | + | Cash | - |
| 10 | Salary Expense | + | Cash | - |
| 11 | Manufacturing Overhead | + | Cash | - |
| 12 | Finished Goods Inventory | + | Work in Process Inventory | - |
| 13 | Cash | + | Sales Revenue | + |
| 14 | Cost of Goods Sold | + | Finished Goods Inventory | - |
| 15 | Manufacturing Overhead | + | Accumulated Depreciation | + |
| 16 | Depreciation Expense | + | Accumulated Depreciation | + |
| 17 | Manufacturing Overhead | + | Production Supplies | - |
| 18 | Cost of Goods Sold | + | Manufacturing Overhead | - |

KEY TERMS

| | | |
|--------------------------------------|------------------------------------|-----------------------------|
| Absorption (full) costing 500 | Predetermined overhead | Underapplied |
| Applied overhead 491 | rate 490 | overhead 491 |
| Finished Goods Inventory 486 | Raw Materials Inventory 486 | Variable costing 501 |
| Manufacturing Overhead | Schedule of cost of goods | Work in Process |
| account 491 | manufactured | Inventory 486 |
| Overapplied overhead 491 | and sold 498 | |

QUESTIONS

1. What is the difference between direct and indirect raw materials costs?
2. Direct raw materials were purchased on account, and the costs were subsequently transferred to Work in Process Inventory. How would the transfer affect assets, liabilities, equity, and cash flows? What is the effect on the income statement? Would your answers change if the materials had originally been purchased for cash?
3. How do manufacturing costs flow through inventory accounts?
4. Goods that cost \$2,000 to make were sold for \$3,000 on account. How does their sale affect assets, liabilities, and equity? What is the effect on the income statement?
5. At the end of the accounting period, an adjusting entry is made for the accrued wages of production workers. How would this entry affect assets, liabilities, and equity? What is the effect on the income statement?
6. X Company recorded the payment for utilities used by the manufacturing facility by crediting Cash and debiting Manufacturing Overhead. Why was the debit made to Manufacturing Overhead instead of Work in Process Inventory?
7. Why is the salary of a production worker capitalized while the salary of a marketing manager expensed?
8. Al Carmon says that his company has a difficult time establishing a predetermined overhead rate because the number of units of product produced during a period is difficult to measure. What are two measures of production other than the number of units of product that Mr. Carmon could use to establish a predetermined overhead rate?
9. What do the terms *overapplied overhead* and *underapplied overhead* mean?
10. What are *product costs* and *selling, general, and administrative costs*? Give examples of product costs and of selling, general, and administrative costs.
11. How does the entry to close an insignificant amount of overapplied overhead to the Cost of Goods Sold account affect net income?
12. Why are actual overhead costs not used in determining periodic product cost?
13. Because of seasonal fluctuations, Buresch Corporation has a problem determining the unit cost of its products. For example, high heating costs during the winter months cause the cost per unit to be higher than the per-unit cost in the summer months even when the same number of units of product is produced. Suggest how Buresch can improve the computation of per-unit cost.
14. What is the purpose of the Manufacturing Overhead account?
15. For what purpose is the schedule of cost of goods manufactured and sold prepared? Do all companies use the statement?
16. How does the variable costing approach differ from the absorption costing approach? Explain the different income statement formats used with each approach.
17. How is profitability affected by increases in productivity under the variable and absorption costing approaches?
18. Under what circumstance is a variable costing statement format used? What potential problem could it eliminate?



MULTIPLE-CHOICE QUESTIONS

Multiple-choice questions are provided on the text website at www.mhhe.com/edmonds2011.





EXERCISES—SERIES A

All applicable Exercises in Series A are available with McGraw-Hill's *Connect Accounting*.

LO 2, 3, 4, 5

Exercise 11-1A Product cost flow and financial statements

Joiner Manufacturing Company was started on January 1, 2011. The company was affected by the following events during its first year of operation.

1. Acquired \$1,600 cash from the issue of common stock.
2. Paid \$500 cash for direct raw materials.
3. Transferred \$400 of direct raw materials to work in process.
4. Paid production employees \$600 cash.
5. Paid \$300 cash for manufacturing overhead costs.
6. Applied \$245 of manufacturing overhead costs to work in process.
7. Completed work on products that cost \$1,000.
8. Sold products that cost \$800 for \$1,400 cash.
9. Paid \$400 cash for selling and administrative expenses.
10. Made a \$50 cash distribution to the owners.
11. Closed the Manufacturing Overhead account.

Required

- a. Record these events in a horizontal statements model. The first event is shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|-----|---|--------|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 1,600 | + | NA | + | NA | + | NA | + | NA | = | 1,600 | + | NA | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold.

LO 2, 3, 4, 5, 6

Exercise 11-2A Recording events in T-accounts and preparing financial statements



Pruitt Manufacturing Company was started on January 1, 2011, when it acquired \$2,000 cash from the issue of common stock. During the first year of operation, \$800 of direct raw materials was purchased with cash, and \$600 of the materials was used to make products. Direct labor costs of \$1,000 were paid in cash. Pruitt applied \$640 of overhead cost to the Work in Process account. Cash payments of \$640 were made for actual overhead costs. The company completed products that cost \$1,600 and sold goods that had cost \$1,200 for \$2,000 cash. Selling and administrative expenses of \$480 were paid in cash.

Required

- a. Open T-accounts and record the events affecting Pruitt Manufacturing. Include closing entries.
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet.
- c. Explain the difference between net income and cash flow from operating activities.

LO 2, 3, 4

Exercise 11-3A Effect of accounting events on financial statements

Required

Use a horizontal statements model to indicate how each of the following independent accounting events affects the elements of the balance sheet and the income statement. Indicate whether the event increases (I), decreases (D), or does not affect (NA) each element of the statements. The first two transactions are shown as examples.

- a. Paid cash to purchase raw materials.
- b. Recorded cash sales revenue.
- c. Paid cash for actual manufacturing overhead cost.

- d. Closed the Manufacturing Overhead account when overhead was overapplied.
- e. Transferred cost of completed inventory to finished goods.
- f. Paid cash for wages of production workers.
- g. Paid cash for salaries of selling and administrative personnel.
- h. Recorded adjusting entry to recognize amount of manufacturing supplies used (the company uses the periodic inventory method to account for manufacturing supplies).

| Event No. | Balance Sheet | | | | Income Statement | | |
|-----------|---------------|---------|----------|------------|------------------|--------|------------|
| | Assets | = Liab. | + C. Stk | + Ret Ear. | Rev. | - Exp. | = Net Inc. |
| a. | ID | NA | NA | NA | NA | NA | NA |
| b. | I | NA | NA | I | I | NA | I |

Exercise 11-4A *Preparing financial statements*

LO 2, 3, 4, 5, 6

Cooper Corporation began fiscal year 2011 with the following balances in its inventory accounts.

| | |
|-----------------|----------|
| Raw Materials | \$56,000 |
| Work in Process | 84,000 |
| Finished Goods | 28,000 |

During the accounting period, Cooper purchased \$240,000 of raw materials and issued \$248,000 of materials to the production department. Direct labor costs for the period amounted to \$324,000, and manufacturing overhead of \$48,000 was applied to Work in Process Inventory. Assume that there was no over- or underapplied overhead. Goods costing \$612,000 to produce were completed and transferred to Finished Goods Inventory. Goods costing \$602,000 were sold for \$800,000 during the period. Selling and administrative expenses amounted to \$72,000.

Required

- a. Determine the ending balance of each of the three inventory accounts that would appear on the year-end balance sheet.
- b. Prepare a schedule of cost of goods manufactured and sold and an income statement.

Exercise 11-5A *Missing information in a schedule of cost of goods manufactured*

LO 5

Required

Supply the missing information on the following schedule of cost of goods manufactured.

| DEWBERRY CORPORATION | | |
|---|--------------------|--------------------|
| Schedule of Cost of Goods Manufactured | | |
| For the Year Ended December 31, 2011 | | |
| Raw materials | | |
| Beginning inventory | \$ | ? |
| Plus: Purchases | <u>120,000</u> | |
| Raw materials available for use | \$148,000 | |
| Minus: Ending raw materials inventory | <u> ?</u> | |
| Cost of direct raw materials used | | \$124,000 |
| Direct labor | | ? |
| Manufacturing overhead | | <u>24,000</u> |
| Total manufacturing costs | | 310,000 |
| Plus: Beginning work in process inventory | | <u> ?</u> |
| Total work in process | | ? |
| Minus: Ending work in process inventory | | <u>46,000</u> |
| Cost of goods manufactured | | <u>\$306,000</u> |

LO 5**Exercise 11-6A** *Cost of goods manufactured and sold*

The following information pertains to Pandey Manufacturing Company for March 2012. Assume actual overhead equaled applied overhead.

| March 1 | |
|----------------------------------|-----------|
| Inventory balances | |
| Raw materials | \$125,000 |
| Work in process | 120,000 |
| Finished goods | 78,000 |
| March 31 | |
| Inventory balances | |
| Raw materials | \$ 85,000 |
| Work in process | 145,000 |
| Finished goods | 80,000 |
| During March | |
| Costs of raw materials purchased | \$120,000 |
| Costs of direct labor | 100,000 |
| Costs of manufacturing overhead | 63,000 |
| Sales revenues | 350,000 |

Required

- Prepare a schedule of cost of goods manufactured and sold.
- Calculate the amount of gross margin on the income statement.

LO 3**Exercise 11-7A** *Calculating applied overhead*

Avery, Inc., estimates manufacturing overhead costs for the 2012 accounting period as follows.

| | |
|------------------------|-----------|
| Equipment depreciation | \$192,000 |
| Supplies | 21,000 |
| Materials handling | 34,000 |
| Property taxes | 15,000 |
| Production setup | 21,000 |
| Rent | 45,000 |
| Maintenance | 40,000 |
| Supervisory salaries | 132,000 |

The company uses a predetermined overhead rate based on machine hours. Estimated hours for labor in 2012 were 200,000 and for machines were 125,000.

Required

- Calculate the predetermined overhead rate.
- Determine the amount of manufacturing overhead applied to Work in Process Inventory during the 2012 period if actual machine hours were 140,000.

LO 3**Exercise 11-8A** *Treatment of over- or underapplied overhead*

Lindburg Company estimates that its overhead costs for 2011 will be \$270,000 and output in units of product will be 300,000 units.

Required

- Calculate Lindburg's predetermined overhead rate based on expected production.
- If 24,000 units of product were made in March 2011, how much overhead cost would be allocated to the Work in Process Inventory account during the month?
- If actual overhead costs in March were \$21,000, would overhead be overapplied or underapplied and by how much?

Exercise 11-9A *Recording overhead costs in T-accounts***LO 3**

Kent Company and Trent Company both apply overhead to the Work in Process Inventory account using direct labor hours. The following information is available for both companies for the year.

| | Kent Company | Trent Company |
|-------------------------------|--------------|---------------|
| Actual manufacturing overhead | \$120,000 | \$240,000 |
| Actual direct labor hours | 20,000 | 24,000 |
| Underapplied overhead | | 12,000 |
| Overapplied overhead | 24,000 | |

Required

- Compute the predetermined overhead rate for each company.
- Using T-accounts, record the entry to close the overapplied or underapplied overhead at the end of the accounting period for each company, assuming the amounts are immaterial.

Exercise 11-10A *Treatment of over- or underapplied overhead***LO 3**

Belmont Company and Delmont Company assign manufacturing overhead to Work in Process Inventory using direct labor cost. The following information is available for the companies for the year:

| | Belmont Company | Delmont Company |
|---------------------------------------|-----------------|-----------------|
| Actual direct labor cost | \$145,000 | \$120,000 |
| Estimated direct labor cost | 150,000 | 100,000 |
| Actual manufacturing overhead cost | 56,000 | 92,000 |
| Estimated manufacturing overhead cost | 60,000 | 80,000 |

Required

- Compute the predetermined overhead rate for each company.
- Determine the amount of overhead cost that would be applied to Work in Process Inventory for each company.
- Compute the amount of overapplied or underapplied manufacturing overhead cost for each company.

Exercise 11-11A *Recording manufacturing overhead costs in T-accounts***LO 3**

Gill Corporation manufactures model airplanes. The company purchased for \$170,000 automated production equipment that can make the model parts. The equipment has a \$10,000 salvage value and a 10-year useful life.

Required

- Assuming that the equipment was purchased on January 1, record in T-accounts the adjusting entry that the company would make on December 31 to record depreciation on equipment.
- In which month would the depreciation costs be assigned to units produced?

LO 2, 3, 4**Exercise 11-12A** *Missing information in T-accounts*

Kline Manufacturing recorded the following amounts in its inventory accounts in 2011.

| | | | |
|---------------------------------|--------|----------------------------------|-------|
| Raw Materials Inventory | | Work in Process Inventory | |
| 30,000 | (a) | 16,000 | 8,000 |
| 8,000 | | 12,000 | |
| Finished Goods Inventory | | (c) | |
| 8,000 | (d) | | |
| 1,000 | | Cost of Goods Sold | |
| Manufacturing Overhead | | | |
| (b) | 12,000 | (e) | |
| 1,000 | | | |

Required

Determine the dollar amounts for (a), (b), (c), (d), and (e). Assume that underapplied and overapplied overhead is closed to Cost of Goods Sold.

LO 7**Exercise 11-13A** *Variable costing versus absorption costing*

Lange Company incurred manufacturing overhead cost for the year as follows.

| | |
|--------------------------------------|------------|
| Direct materials | \$40/unit |
| Direct labor | \$28/unit |
| Manufacturing overhead | |
| Variable | \$ 12/unit |
| Fixed (\$20/unit for 1,500 units) | \$ 30,000 |
| Variable selling and admin. expenses | \$ 8,000 |
| Fixed selling and admin. expenses | \$16,000 |

The company produced 1,500 units and sold 1,000 of them at \$180 per unit. Assume that the production manager is paid a 2 percent bonus based on the company's net income.

Required

- Prepare an income statement using absorption costing.
- Prepare an income statement using variable costing.
- Determine the manager's bonus using each approach. Which approach would you recommend for internal reporting and why?

LO 1, 2, 3**Exercise 11-14A** *Smoothed unit cost*

Wagner Manufacturing estimated its product costs and volume of production for 2012 by quarter as follows.

| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|-------------------------|------------------|------------------|------------------|------------------|
| Direct raw materials | \$ 80,000 | \$ 40,000 | \$120,000 | \$ 60,000 |
| Direct labor | 48,000 | 24,000 | 72,000 | 36,000 |
| Manufacturing overhead | 80,000 | 124,000 | 160,000 | 92,000 |
| Total production costs | <u>\$208,000</u> | <u>\$188,000</u> | <u>\$352,000</u> | <u>\$188,000</u> |
| Expected units produced | 16,000 | 8,000 | 24,000 | 12,000 |

Wagner Company sells a souvenir item at various resorts across the country. Its management uses the product's estimated quarterly cost to determine the selling price of its product. The company expects a large variance in demand for the product between quarters due to its seasonal

nature. The company does not expect overhead costs, which are predominately fixed, to vary significantly as to production volume or with amounts for previous years. Prices are established by using a cost-plus pricing strategy. The company finds variations in short-term unit cost confusing to use. Unit cost variations complicate pricing decisions and many other decisions for which cost is a consideration.

Required

- Based on estimated total production cost, determine the expected quarterly cost per unit for Wagner's product.
- How could overhead costs be estimated each quarter to solve the company's unit cost problem? Calculate the unit cost per quarter based on your recommendation.

PROBLEMS—SERIES A

All applicable Problems in Series A are available with McGraw-Hill's *Connect Accounting*.



Problem 11-15A *Manufacturing cost flow across three accounting cycles*

LO 2, 3, 4, 5, 6

The following accounting events affected Massey Manufacturing Company during its first three years of operation. Assume that all transactions are cash transactions.

CHECK FIGURE

- b. Cost of goods sold for
2010: \$578;
NI for 2010: \$152

Transactions for 2010

- Started manufacturing company by issuing common stock for \$3,000.
- Purchased \$1,200 of direct raw materials.
- Used \$800 of direct raw materials to produce inventory.
- Paid \$400 of direct labor wages to employees to make inventory.
- Applied \$250 of manufacturing overhead cost to Work in Process Inventory.
- Finished work on inventory that cost \$900.
- Sold goods that cost \$600 for \$1,100.
- Paid \$370 for selling and administrative expenses.
- Actual manufacturing overhead cost amounted to \$228 for the year.

Transactions for 2011

- Acquired additional \$800 of cash from common stock.
- Purchased \$1,200 of direct raw materials.
- Used \$1,300 of direct raw materials to produce inventory.
- Paid \$600 of direct labor wages to employees to make inventory.
- Applied \$320 of manufacturing overhead cost to Work in Process Inventory.
- Finished work on inventory that cost \$1,800.
- Sold goods that cost \$1,600 for \$2,800.
- Paid \$500 for selling and administrative expenses.
- Actual manufacturing overhead cost amounted to \$330 for the year.

Transactions for 2012

- Paid a cash dividend of \$700.
- Purchased \$1,400 of direct raw materials.
- Used \$1,200 of direct raw materials to produce inventory.
- Paid \$440 of direct labor wages to employees to make inventory.
- Applied \$290 of manufacturing overhead cost to work in process.
- Finished work on inventory that cost \$2,000.
- Sold goods that cost \$2,200 for \$3,500.
- Paid \$710 for selling and administrative expenses.
- Annual manufacturing overhead costs were \$280 for the year.

Required

- a. Record the preceding events in a horizontal statements model. Close overapplied or underapplied overhead to Cost of Goods Sold. The first event is shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|-----|---|--------|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 3,000 | + | NA | + | NA | + | NA | + | NA | = | 3,000 | + | NA | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet as of the close of business on December 31, 2010.
 c. Close appropriate accounts.
 d. Repeat Requirements *a* through *c* for years 2011 and 2012.

LO 2, 3, 4, 5, 6**Problem 11-16A** *Manufacturing cost flow for monthly and annual accounting periods***CHECK FIGURES**

- b. Cost of goods sold: \$12,198;
 Total assets: \$34,078

Dorothy Huddle started Huddle Manufacturing Company to make a universal television remote control device that she had invented. The company's labor force consisted of part-time employees. The following accounting events affected Huddle Manufacturing Company during its first year of operation. (Assume that all transactions are cash transactions unless otherwise stated.)

Transactions for January 2011, First Month of Operation

1. Issued common stock for \$10,000.
2. Purchased \$420 of direct raw materials and \$60 of production supplies.
3. Used \$240 of direct raw materials.
4. Used 80 direct labor hours; production workers were paid \$9.60 per hour.
5. Expected total overhead costs for the year to be \$3,300, and direct labor hours used during the year to be 1,000. Calculate an overhead rate and apply the appropriate amount of overhead costs to Work in Process Inventory.
6. Paid \$144 for salaries to administrative and sales staff.
7. Paid \$24 for indirect manufacturing labor.
8. Paid \$210 for rent and utilities on the manufacturing facilities.
9. Started and completed 100 remote controls during the month; all costs were transferred from the Work in Process Inventory account to the Finished Goods Inventory account.
10. Sold 75 remote controls at a price of \$21.60 each.

Transactions for Remainder of 2011

11. Acquired an additional \$18,000 by issuing common stock.
12. Purchased \$3,900 of direct raw materials and \$900 of production supplies.
13. Used \$3,000 of direct raw materials.
14. Paid production workers \$9.60 per hour for 900 hours of work.
15. Applied the appropriate overhead cost to Work in Process Inventory.
16. Paid \$1,560 for salaries of administrative and sales staff.
17. Paid \$240 of indirect manufacturing labor cost.
18. Paid \$2,400 for rental and utility costs on the manufacturing facilities.
19. Transferred 950 additional remote controls that cost \$12.72 each from the Work in Process Inventory account to the Finished Goods Inventory account.
20. Determined that \$168 of production supplies was on hand at the end of the accounting period.
21. Sold 850 remote controls for \$21.60 each.
22. Determine whether the overhead is over- or underapplied. Close the Manufacturing Overhead account to the Cost of Goods Sold account.
23. Close the revenue and expense accounts.

Required

- Open T-accounts and post transactions to the accounts.
- Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for 2011.

Problem 11-17A *Manufacturing cost flow for one-year period*

LO 2, 3, 4, 5, 6

Fulton Manufacturing started 2011 with the following account balances.

CHECK FIGURE

b. NI: \$538

| | |
|--|---------|
| Cash | \$5,000 |
| Common stock | 4,500 |
| Retained earnings | 4,500 |
| Raw materials inventory | 1,200 |
| Work in process inventory | 800 |
| Finished goods inventory (320 units @\$6.25) | 2,000 |

Transactions during 2010

- Purchased \$2,880 of raw materials with cash.
- Transferred \$3,750 of raw materials to the production department.
- Incurred and paid cash for 180 hours of direct labor @ \$16 per hour.
- Applied overhead costs to the Work in Process Inventory account. The predetermined overhead rate is \$16.50 per direct labor hour.
- Incurred actual overhead costs of \$3,000 cash.
- Completed work on 1,200 units for \$6.40 per unit.
- Paid \$1,400 in selling and administrative expenses in cash.
- Sold 1,200 units for \$9,600 cash revenue (assume FIFO cost flow).

Fulton charges overapplied or underapplied overhead directly to Cost of Goods Sold.

Required

- Record the preceding events in a horizontal statements model. The beginning balances are shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|-----|---|--------|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 5,000 | + | NA | + | 1,200 | + | 800 | + | 2,000 | = | 4,500 | + | 4,500 | NA | - | NA | = | NA |

- Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for 2011.

Problem 11-18A *Manufacturing cost for one accounting cycle*

LO 2, 3, 4, 5, 6

The following trial balance was taken from the records of Wheaton Manufacturing Company at the beginning of 2012.



CHECK FIGURE

b. NI: \$3,974

| | | |
|--------------------------------|-----------------|-----------------|
| Cash | \$ 9,400 | |
| Raw materials inventory | 750 | |
| Work in process inventory | 1,200 | |
| Finished goods inventory | 2,100 | |
| Property, plant, and equipment | 7,500 | |
| Accumulated depreciation | | \$ 3,000 |
| Common stock | | 7,800 |
| Retained earnings | | 10,150 |
| Total | <u>\$20,950</u> | <u>\$20,950</u> |

Transactions for the Accounting Period

1. Wheaton purchased \$5,700 of direct raw materials and \$300 of indirect raw materials on account. The indirect materials are capitalized in the Production Supplies account. Materials requisitions showed that \$5,400 of direct raw materials had been used for production during the period. The use of indirect materials is determined at the end of the year by physically counting the supplies on hand.
2. By the end of the year, \$5,250 of the accounts payable had been paid in cash.
3. During the year, direct labor amounted to 950 hours recorded in the Wages Payable account at \$10.50 per hour.
4. By the end of the year, \$9,000 of wages payable had been paid in cash.
5. At the beginning of the year, the company expected overhead cost for the period to be \$6,300 and 1,000 direct labor hours to be worked. Overhead is allocated based on direct labor hours, which, as indicated in Event 3, amounted to 950 for the year.
6. Selling and administrative expenses for the year amounted to \$900 paid in cash.
7. Utilities and rent for production facilities amounted to \$4,650 paid in cash.
8. Depreciation on the plant and equipment used in production amounted to \$1,500.
9. There was \$12,000 of goods completed during the year.
10. There was \$12,750 of finished goods inventory sold for \$18,000 cash.
11. A count of the production supplies revealed a balance of \$89 on hand at the end of the year.
12. Any over- or underapplied overhead is considered to be insignificant.

Required

- a. Open T-accounts with the beginning balances shown in the preceding list and record all transactions for the year including closing entries in the T-accounts. (*Note:* Open new T-accounts as needed.)
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet.

LO 2, 3, 4, 5, 6**Problem 11-19A** *Manufacturing cost flow for multiple accounting cycles***CHECK FIGURES**

- b. NI for 2010: \$22,860
NI for 2011: \$33,040

The following events apply to Caldwell Manufacturing Company. Assume that all transactions are cash transactions unless otherwise indicated.

Transactions for the 2010 Accounting Period

1. The company was started on January 1, 2010, when it acquired \$162,000 cash by issuing common stock.
2. The company purchased \$36,000 of direct raw materials with cash and used \$2,430 of these materials to make its products in January.
3. Employees provided 900 hours of labor at \$5.70 per hour during January. Wages are paid in cash.
4. The estimated manufacturing overhead costs for 2010 were \$64,800. Overhead is applied on the basis of direct labor hours. The company expected to use 12,000 direct labor hours during 2010. Calculate an overhead rate and apply the overhead for January to work in process inventory.
5. The employees completed work on all inventory items started in January. The cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in January, assuming that a total of 1,800 units of product were started and completed during the month.
6. The company used an additional \$31,050 of direct raw materials and 11,500 hours of direct labor at \$5.70 per hour during the remainder of 2010. Overhead was allocated on the basis of direct labor hours.
7. The company completed work on inventory items started between February 1 and December 31, and the cost of the completed inventory was transferred to the Finished Goods Inventory account. Determine the cost per unit for goods produced between February 1 and December 31, assuming that 23,000 units of inventory were produced. If the company desires to earn a gross profit of \$2.70 per unit, what price per unit must it charge for the merchandise sold?

8. The company sold 22,000 units of inventory for cash at \$9.60 per unit. Determine the number of units in ending inventory and the cost per unit incurred for this inventory.
9. Actual manufacturing overhead costs paid in cash were \$65,700.
10. The company paid \$37,800 cash for selling and administrative expenses.
11. Close the Manufacturing Overhead account.
12. Close the revenue and expense accounts.

Transactions for the 2011 Accounting Period

1. The company purchased \$40,500 of direct raw materials with cash and used \$2,280 of these materials to make products in January.
2. Employees provided 950 hours of labor at \$5.70 per hour during January.
3. On January 1, 2011, Caldwell hired a production supervisor at an expected cost of \$1,080 cash per month. The company paid cash to purchase \$4,500 of manufacturing supplies; it anticipated that \$4,140 of these supplies would be used by year-end. Other manufacturing overhead costs were expected to total \$64,800. Overhead is applied on the basis of direct labor hours. Caldwell expected to use 14,000 hours of direct labor during 2011. Based on this information, determine the total expected overhead cost for 2011. Calculate the predetermined overhead rate and apply the overhead cost for the January production.
4. The company recorded a \$1,080 cash payment to the production supervisor.
5. The employees completed work on all inventory items started in January. The cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in January, assuming that 1,900 units of product were started and completed during the month.
6. During February 2011, the company used \$2,850 of raw materials and 1,000 hours of labor at \$5.70 per hour. Overhead was allocated on the basis of direct labor hours.
7. The company recorded a \$1,080 cash payment to the production supervisor for February.
8. The employees completed work on all inventory items started in February; the cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in February, assuming that 2,000 units of product were started and completed during the month.
9. The company used an additional \$34,200 of direct raw materials and 12,000 hours of direct labor at \$5.70 per hour during the remainder of 2011. Overhead was allocated on the basis of direct labor hours.
10. The company recorded \$10,800 of cash payments to the production supervisor for work performed between March 1 and December 31.
11. The company completed work on inventory items started between March 1 and December 31. The cost of the completed goods was transferred to the Finished Goods Inventory account. Compute the cost per unit of this inventory, assuming that there were 24,000 units of inventory produced.
12. The company sold 26,000 units of product for \$9.90 cash per unit. Assume that the company uses the FIFO inventory cost flow method to determine the cost of goods sold.
13. The company paid \$38,700 cash for selling and administrative expenses.
14. As of December 31, 2011, \$450 of production supplies was on hand.
15. Actual cost of other manufacturing overhead was \$63,020 cash.
16. Close the Manufacturing Overhead account.
17. Close the revenue and expense accounts.

Required

- a. Open T-accounts and record the effects of the preceding events.
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for each year.

Problem 11-20A *Comprehensive review problem*

LO 1, 2, 3, 4

During their senior year at Quentin College, two business students, Josh Tanner and Christy Chase, began a part-time business making personal computers. They bought the various

CHECK FIGURE

- c. Cost per computer with 2,000 units produced: \$289.80

components from a local supplier and assembled the machines in the basement of a friend's house. Their only cost was \$360 for parts; they sold each computer for \$630. They were able to make three machines per week and to sell them to fellow students. The activity was appropriately called Tanner Chase Computers (TCC). The product quality was good, and as graduation approached, orders were coming in much faster than TCC could fill them.

A national CPA firm made Ms. Chase an attractive offer of employment, and a large electronics company was ready to hire Mr. Tanner. Students and faculty at Quentin College, however, encouraged the two to make TCC a full-time venture. The college administration had decided to require all students in the schools of business and engineering to buy their own computers beginning in the coming fall term. It was believed that the quality and price of the TCC machines would attract the college bookstore to sign a contract to buy a minimum of 1,000 units the first year for \$500 each. The bookstore sales were likely to reach 2,000 units per year, but the manager would not make an initial commitment beyond 1,000.

The prospect of \$500,000 in annual sales for TCC caused the two young entrepreneurs to wonder about the wisdom of accepting their job offers. Before making a decision, they decided to investigate the implications of making TCC a full-time operation. Their study provided the following information relating to the production of their computers.

| | |
|----------------------------|----------------------|
| Components from wholesaler | \$ 240 per computer |
| Assembly labor | 15 per hour |
| Manufacturing space rent | 2,250 per month |
| Utilities | 450 per month |
| Janitorial services | 360 per month |
| Depreciation of equipment | 2,880 per year |
| Labor | 2 hours per computer |

The two owners expected to devote their time to the sales and administrative aspects of the business.

Required

- Classify each cost item into the categories of direct materials, direct labor, and manufacturing overhead.
- Classify each cost item as either variable or fixed.
- What is the cost per computer if TCC produces 1,000 units per year? What is the cost per unit if TCC produces 2,000 units per year?
- If the job offers for Mr. Tanner and Ms. Chase totaled \$96,000, would you recommend that they accept the offers or proceed with plans to make TCC a full-time venture?

LO 7**CHECK FIGURES**

- a. NI: \$98,000
b. NI: \$88,000

Problem 11-21A Absorption versus variable costing

Ellis Manufacturing Company makes a product that sells for \$74 per unit. Manufacturing costs for the product amount to \$26 per unit variable, and \$80,000 fixed. During the current accounting period, Ellis made 4,000 units of the product and sold 3,500 units. Selling and administrative expenses were zero.

Required

- Prepare an absorption costing income statement.
- Prepare a variable costing income statement.
- Explain why the amount of net income on the absorption costing income statement differs from the amount of net income on the variable costing income statement. Your answer should include the amount of the inventory balance that would exist under the two costing approaches.

LO 7**Problem 11-22A Absorption versus variable costing**

Stowe Glass Company makes stained glass lamps. Each lamp that it sells for \$315 per lamp requires \$18 of direct materials and \$72 of direct labor. Fixed overhead costs are expected to be \$202,500 per year. Stowe Glass expects to sell 1,000 lamps during the coming year. Selling and administrative expenses were zero.

Required

- Prepare income statements using absorption costing, assuming that Stowe Glass makes 1,000, 1,250, and 1,500 lamps during the year.
- Prepare income statements using variable costing, assuming that Stowe Glass makes 1,000, 1,250, and 1,500 lamps during the year.
- Explain why Stowe Glass may produce income statements under both absorption and variable costing formats. Your answer should include an explanation of the advantages and disadvantages associated with the use of the two reporting formats.

CHECK FIGURES

- NI when 1,000 lamps were produced: \$22,500
- NI when 1,500 lamps were produced: \$22,500

Problem 11-23A *Absorption and variable costing*

Thornell Manufacturing pays its production managers a bonus based on the company's profitability. During the two most recent years, the company maintained the same cost structure to manufacture its products.

LO 7**eXcel****CHECK FIGURES**

- NI for 2011: \$24,000
- \$138,000

| Year | Units Produced | Units Sold |
|--|----------------|-------------------|
| Production and Sales | | |
| 2011 | 4,000 | 4,000 |
| 2012 | 6,000 | 4,000 |
| Cost Data | | |
| Direct materials | | \$15 per unit |
| Direct labor | | \$24 per unit |
| Manufacturing overhead—variable | | \$12 per unit |
| Manufacturing overhead—fixed | \$108,000 | |
| Variable selling and administrative expenses | | \$9 per unit sold |
| Fixed selling and administrative expenses | \$60,000 | |

(Assume that selling & administrative expenses are associated with goods sold.)

Thornell sells its products for \$108 a unit.

Required

- Prepare income statements based on absorption costing for 2011 and 2012.
- Since Thornell sold the same number of units in 2011 and 2012, why did net income increase in 2012?
- Discuss management's possible motivation for increasing production in 2012.
- Determine the costs of ending inventory for 2012. Comment on the risks and costs associated with the accumulation of inventory.
- Based on your answers to Requirements *b* and *c*, suggest a different income statement format. Prepare income statements for 2011 and 2012 using your suggested format.

EXERCISES—SERIES B**Exercise 11-1B** *Product cost flow and financial statements***LO 2, 3, 4, 5**

Murray Manufacturing began business on January 1, 2012. The following events pertain to its first year of operation.

- Acquired \$3,000 cash by issuing common stock.
- Paid \$600 cash for direct raw materials.
- Transferred \$500 of direct raw materials to Work in Process Inventory.
- Paid production employees \$700 cash.
- Applied \$325 of manufacturing overhead costs to Work in Process Inventory.
- Completed work on products that cost \$1,100.
- Sold products for \$1,600 cash.
- Recognized cost of goods sold from Event No. 7 of \$875.

9. Paid \$450 cash for selling and administrative expenses.
10. Paid \$350 cash for actual manufacturing overhead costs.
11. Made a \$200 cash distribution to owners.
12. Closed the Manufacturing Overhead account.

Required

- a. Record the preceding events in a horizontal statements model. The first event is shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|-----|---|--------|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 3,000 | + | NA | + | NA | + | NA | + | NA | = | 3,000 | + | NA | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold.

LO 2, 3, 4, 5, 6 **Exercise 11-2B** *Recording events in T-accounts and preparing financial statements*

Hinnop Manufacturing Company was started on January 1, 2012, when it acquired \$1,500 cash by issuing common stock. During its first year of operation, it purchased \$480 of direct raw materials with cash and used \$360 of the materials to make products. Hinnop paid \$640 of direct labor costs in cash. The company applied \$464 of overhead costs to Work in Process Inventory. It made cash payments of \$464 for actual overhead costs. The company completed products that cost \$1,040 to make. It sold goods that had cost \$824 to make for \$1,360 cash. It paid \$320 of selling and administrative expenses in cash.

Required

- a. Open the necessary T-accounts and record the 2012 events in the accounts. Include closing entries.
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet.

LO 2, 3, 4 **Exercise 11-3B** *Effect of accounting events on financial statements*

Required

Use a horizontal statements model to show how each of the following independent accounting events affects the elements of the balance sheet and the income statement. Indicate whether the event increases (I), decreases (D), or does not affect (NA) each element of the financial statements. The first two transactions are shown as examples.

- a. Paid cash to purchase raw materials.
- b. Recorded cash sales revenue.
- c. Applied overhead to Work in Process Inventory based on the predetermined overhead rate.
- d. Closed the Manufacturing Overhead account when overhead was underapplied.
- e. Recognized cost of goods sold.
- f. Recognized depreciation expense on manufacturing equipment.
- g. Purchased manufacturing supplies on account.
- h. Sold fully depreciated manufacturing equipment for the exact amount of its salvage value.

| Event No. | Balance Sheet | | | | | Income Statement | | | | | | |
|-----------|---------------|---|-------|----|--------|------------------|----------|------|----|------|----|----------|
| | Assets | = | Liab. | + | C. Stk | + | Ret Ear. | Rev. | - | Exp. | = | Net Inc. |
| a. | I | D | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| b. | I | | NA | NA | I | | | I | | NA | | I |

Exercise 11-4B *Preparing financial statements***LO 2, 3, 4, 5, 6**

Morris Manufacturing Company started 2011 with the following balances in its inventory accounts: Raw Materials, \$2,800; Work in Process, \$2,800; Finished Goods, \$3,300. During 2011 Morris purchased \$17,000 of raw materials and issued \$16,500 of materials to the production department. It incurred \$19,000 of direct labor costs and applied manufacturing overhead of \$18,700 to Work in Process Inventory. Assume there was no over- or underapplied overhead at the end of the year. Morris completed goods costing \$52,500 to produce and transferred them to finished goods inventory. During the year, Morris sold goods costing \$50,700 for \$76,900. Selling and administrative expenses for 2011 were \$18,000.

Required

- Using T-accounts, determine the ending balance Morris would report for each of the three inventory accounts that would appear on the December 31, 2011, balance sheet.
- Prepare the 2011 schedule of cost of goods manufactured and sold and the 2011 income statement.

Exercise 11-5B *Missing information in a schedule of cost of goods manufactured and sold***LO 5****Required**

Supply the missing information on the following schedule of cost of goods manufactured and sold.

| TORBERT CORPORATION | | |
|---|--|------------------|
| Schedule of Cost of Goods Manufactured and Sold | | |
| For the Year Ended December 31, 2011 | | |
| Raw materials | | |
| Beginning inventory | | \$ 20,000 |
| Plus: Purchases | | ? |
| Raw materials available for use | | 160,000 |
| Minus: Ending raw materials inventory | | ? |
| Cost of direct raw materials used | | 145,000 |
| Direct labor | | 120,000 |
| Manufacturing overhead | | ? |
| Total manufacturing costs | | 375,000 |
| Plus: Beginning work in process inventory | | ? |
| Total work in process during the year | | 393,000 |
| Minus: Ending work in process inventory | | (20,500) |
| Cost of goods manufactured | | ? |
| Plus: Beginning finished goods inventory | | ? |
| Finished goods available for sale | | 399,000 |
| Minus: Ending finished goods inventory | | ? |
| Cost of goods sold | | <u>\$378,000</u> |

Exercise 11-6B *Cost of goods manufactured and sold***LO 5**

The following information was drawn from the accounting records of Connor Manufacturing Company.

| | Beginning | Ending |
|---------------------------|-----------|---------|
| Raw materials inventory | \$4,000 | \$4,600 |
| Work in process inventory | 6,200 | 5,000 |
| Finished goods inventory | 6,800 | 5,800 |

During the accounting period, Connor paid \$16,000 to purchase raw materials, \$15,000 for direct labor, and \$11,000 for overhead costs. Assume that actual overhead equaled applied overhead.

Required

- Determine the amount of raw materials used.
- Determine the amount of cost of goods manufactured (the amount transferred from Work in Process Inventory to Finished Goods Inventory).
- Assuming sales revenue of \$76,800, determine the amount of gross margin.

LO 3**Exercise 11-7B** *Calculating applied overhead*

Salazar Enterprises' budget included the following estimated costs for the 2012 accounting period.

| | |
|---|----------|
| Depreciation on manufacturing equipment | \$17,200 |
| Cost of manufacturing supplies | 3,000 |
| Direct labor cost | 86,400 |
| Rent on manufacturing facility | 7,600 |
| Direct materials cost | 74,000 |
| Manufacturing utilities cost | 6,000 |
| Maintenance cost for manufacturing facility | 5,200 |
| Administrative salaries cost | 30,500 |

The company uses a predetermined overhead rate based on machine hours. It estimated machine hour usage for 2012 would be 30,000 hours.

Required

- Identify the manufacturing overhead costs Salazar would use to calculate the predetermined overhead rate.
- Calculate the predetermined overhead rate.
- Explain why the rate is called "predetermined."
- Assuming Salazar actually used 29,200 machine hours during 2012, determine the amount of manufacturing overhead it would have applied to Work in Process Inventory during the period.

LO 3**Exercise 11-8B** *Treatment of over- or underapplied overhead*

On January 1, 2011, Grey Company estimated that its total overhead costs for the coming year would be \$306,000 and that it would make 34,000 units of product. Grey actually produced 34,600 units of product and incurred actual overhead costs of \$303,200 during 2011.

Required

- Calculate Grey's predetermined overhead rate based on expected costs and production.
- Determine whether overhead was overapplied or underapplied during 2011.
- Explain how the entry to close the Manufacturing Overhead account will affect the Cost of Goods Sold account.

LO 3**Exercise 11-9B** *Recording overhead costs in a T-account*

Gann Manufacturing Company incurred actual overhead costs of \$149,000 during 2011. It uses direct labor dollars as the allocation base for overhead costs. In 2011, actual direct labor costs were \$210,000, and overhead costs were underapplied by \$2,000.

Required

- Calculate the predetermined overhead rate for 2011.
- Open T-accounts for Manufacturing Overhead and Cost of Goods Sold. Record the overhead costs and the adjusting entry to close Manufacturing Overhead in these accounts.
- Explain how the entry to close the Manufacturing Overhead account at the end of 2011 would affect the amount of net income reported on the 2011 income statement.

Exercise 11-10B *Treatment of over- or underapplied overhead*

LO 3



Kay Company and Way Company base their predetermined overhead rates on machine hours. The following information pertains to the companies' most recent accounting periods.

| | Kay | Way |
|--|----------|-----------|
| Actual machine hours | 12,300 | 19,500 |
| Estimated machine hours | 12,000 | 20,000 |
| Actual manufacturing overhead costs | \$68,000 | \$138,000 |
| Estimated manufacturing overhead costs | \$67,200 | \$139,200 |

Required

- Compute the predetermined overhead rate for each company.
- Determine the amount of overhead cost that would be applied to work in process for each company and compute the amount of overapplied or underapplied manufacturing overhead cost for each company.
- Explain how closing the Manufacturing Overhead account would affect the Cost of Goods Sold account for each company.

Exercise 11-11B *Recording manufacturing overhead costs*

LO 3

DeCastro Manufacturing Company incurred the following actual manufacturing overhead costs: (1) cash paid for plant supervisor's salary, \$58,000; (2) depreciation on manufacturing equipment, \$27,000; and (3) manufacturing supplies used, \$2,300 (DeCastro uses the periodic inventory method for manufacturing supplies). Applied overhead amounted to \$88,000.

Required

- Open the appropriate T-accounts and record the manufacturing overhead costs described.
- Record the entry DeCastro would make to close the Manufacturing Overhead account to Cost of Goods Sold.

Exercise 11-12B *Missing information in inventory T-accounts*

LO 2, 3, 4

The following incomplete T-accounts were drawn from the records of Chilton Manufacturing Company:

| | | | |
|---------------------------------|-----|----------------------------------|--|
| Raw Materials Inventory | | Work in Process Inventory | |
| 25,000 | (a) | 52,000 | |
| 1,200 | | 15,600 | |
| | | (b) | |
| Finished Goods Inventory | | Cost of Goods Sold | |
| (c) | | | |
| 5,000 | | (d) | |
| Manufacturing Overhead | | | |
| 17,000 | (e) | | |
| | 800 | | |

Required

Determine the dollar amounts for (a), (b), (c), (d), and (e). Assume that underapplied and overapplied overhead is closed to Cost of Goods Sold.

LO 7**Exercise 11-13B** *Variable costing versus absorption costing*

The following information was drawn from the records of Daffin Company:

| Variable costs (per unit) | | Fixed costs (in total) | |
|----------------------------|------|----------------------------|----------|
| Direct materials | \$16 | Manufacturing overhead | \$48,000 |
| Direct labor | 20 | Selling and administrative | 49,600 |
| Manufacturing overhead | 6 | | |
| Selling and administrative | 14 | | |

During the most recent month Daffin produced 4,000 units of product and sold 3,800 units of product at a sales price of \$98 per unit.

Required

- Prepare an income statement for the month using absorption costing.
- Prepare an income statement for the month using variable costing.
- Explain why a company might use one type of income statement for external reporting and a different type for internal reporting.

LO 1, 2, 3**Exercise 11-14B** *Smoothing unit cost*

Unit-level (variable) manufacturing costs for Dunmyer Manufacturing Company amount to \$4. Fixed manufacturing costs are \$4,500 per month. Production workers provided 800 hours of direct labor in January and 1,400 hours in February. Dunmyer expects to use 12,000 hours of labor during the year. It actually produced 1,200 units of product in January and 2,100 units of product in February.

Required

- For each month, determine the total product cost and the per-unit product cost, assuming that actual fixed overhead costs are charged to monthly production.
- Use a predetermined overhead rate based on direct labor hours to allocate the fixed overhead costs to each month's production. For each month, calculate the total product cost and the per-unit product cost.
- Dunmyer employs a cost-plus pricing strategy. Would you recommend charging production with actual or allocated fixed overhead costs? Explain.

PROBLEMS—SERIES B**LO 2, 3, 4, 5, 6****Problem 11-15B** *Manufacturing cost flow across three accounting cycles*

The following accounting events affected Gitau Manufacturing Company during its first three years of operation. Assume that all transactions are cash transactions.

Transactions for 2010

- Started manufacturing company by issuing common stock for \$1,440.
- Purchased \$576 of direct raw materials.
- Used \$432 of direct raw materials to produce inventory.
- Paid \$360 of direct labor wages to employees to make inventory.
- Applied \$360 of manufacturing overhead to Work in Process Inventory.
- Actual manufacturing overhead costs amounted to \$366.
- Finished work on inventory that cost \$648.
- Sold goods that cost \$432 for \$576.
- Paid \$36 for selling and administrative expenses.

Transactions for 2011

- Acquired additional \$720 of cash from issuance of common stock.
- Purchased \$576 of direct raw materials.
- Used \$504 of direct raw materials to produce inventory.

4. Paid \$432 of direct labor wages to employees to make inventory.
5. Applied \$384 of manufacturing overhead to Work in Process Inventory.
6. Actual manufacturing overhead costs amounted to \$378.
7. Finished work on inventory that cost \$1,080.
8. Sold goods that cost \$1,008 for \$1,152.
9. Paid \$72 for selling and administrative expenses.

Transactions for 2012

1. Purchased \$360 of direct raw materials.
2. Used \$576 of direct raw materials to produce inventory.
3. Paid \$216 of direct labor wages to employees to make inventory.
4. Applied \$300 of manufacturing overhead to Work in Process Inventory.
5. Actual manufacturing overhead costs amounted to \$312.
6. Finished work on inventory that cost \$1,188.
7. Sold goods that cost \$1,296 for \$1,584.
8. Paid \$144 for selling and administrative expenses.
9. Paid a cash dividend of \$288.

Required

- a. Record the preceding events in a horizontal statements model. Close overapplied or underapplied overhead to Cost of Goods Sold. The first event is shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|-----|---|--------|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 1,440 | + | NA | + | NA | + | NA | + | NA | = | 1,440 | + | NA | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet as of the close of business on December 31, 2010.
- c. Close appropriate accounts to the Retained Earnings account.
- d. Repeat Requirements *a* through *c* for years 2011 and 2012.

Problem 11-16B *Manufacturing cost for one accounting cycle*

LO 2, 3, 4, 5, 6

The following trial balance was taken from the records of Jemison Manufacturing Company at the beginning of 2011.

| | | |
|--------------------------------|-----------------|-----------------|
| Cash | \$ 5,000 | |
| Raw materials inventory | 200 | |
| Work in process inventory | 600 | |
| Finished goods inventory | 400 | |
| Property, plant, and equipment | 7,000 | |
| Accumulated depreciation | | \$ 2,000 |
| Common stock | | 5,000 |
| Retained earnings | | 6,200 |
| Total | <u>\$13,200</u> | <u>\$13,200</u> |

Transactions for the Accounting Period

1. Jemison purchased \$4,600 of direct raw materials and \$500 of indirect raw materials on account. The indirect materials are capitalized in the Production Supplies account. Materials requisitions showed that \$4,000 of direct raw materials had been used for production during the period. The use of indirect materials is determined at the end of the period by physically counting the supplies on hand at the end of the year.
2. By the end of the accounting period, \$3,500 of the accounts payable had been paid in cash.
3. During the year, direct labor amounted to 1,200 hours recorded in the Wages Payable account at \$6 per hour.

4. By the end of the accounting period, \$6,500 of the Wages Payable account had been paid in cash.
5. At the beginning of the accounting period, the company expected overhead cost for the period to be \$5,500 and 1,250 direct labor hours to be worked. Overhead is applied based on direct labor hours, which, as indicated in Event 3, amounted to 1,200 for the year.
6. Administrative and sales expenses for the period amounted to \$1,400 paid in cash.
7. Utilities and rent for production facilities amounted to \$3,000 paid in cash.
8. Depreciation on the plant and equipment used in production amounted to \$2,000.
9. Assume that \$15,000 of goods were completed during the period.
10. Assume that \$10,000 of finished goods inventory was sold for \$14,000 cash.
11. A count of the production supplies revealed a balance of \$150 on hand at the end of the accounting period.
12. Any over- or underapplied overhead is considered to be insignificant.

Required

- a. Open T-accounts with the beginning balances shown in the preceding list and record all transactions for the period including closing entries in the T-accounts. (*Note:* Open new T-accounts as needed.)
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet.

LO 2, 3, 4, 5, 6 Problem 11-17B Manufacturing cost flow for one-year period

Burnside Manufacturing started 2011 with the following account balances.

| | |
|---|---------|
| Cash | \$3,000 |
| Common stock | 2,500 |
| Retained earnings | 1,200 |
| Raw materials inventory | 300 |
| Work in process inventory | 220 |
| Finished goods inventory (50 units @ \$3.60/unit) | 180 |

Transactions during 2011

1. Purchased \$750 of raw materials with cash.
2. Transferred \$500 of raw materials to the production department.
3. Incurred and paid cash for 80 hours of direct labor at \$7.50 per hour.
4. Applied overhead costs to Work in Process Inventory. The predetermined overhead rate is \$7.50 per direct labor hour.
5. Incurred actual overhead costs of \$650 cash.
6. Completed work on 300 units for \$3.60 per unit.
7. Paid \$200 in selling and administrative expenses in cash.
8. Sold 200 units for \$1,500 cash revenues. (Assume LIFO cost flow.)

Burnside charges overapplied or underapplied overhead directly to Cost of Goods Sold.

Required

- a. Record the preceding events in a horizontal statements model. The beginning balances are shown as an example.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|--------|---|--------|---|-----|---|-----|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | Raw M. | + | MOH | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 3,000 | + | 300 | + | NA | + | 220 | + | 180 | = | 2,500 | + | 1,200 | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for 2011.

Problem 11-18B *Manufacturing cost flow for monthly and annual accounting periods* **LO 2, 3, 4, 5, 6**

York Manufacturing Company manufactures puzzles that depict the works of famous artists. The company rents a small factory and uses local labor on a part-time basis. The following accounting events affected York during its first year of operation. (Assume that all transactions are cash transactions unless otherwise stated.)

Transactions for First Month of Operation 2011

1. Issued common stock for \$45,000.
2. Purchased \$5,000 of direct raw materials and \$600 of indirect raw materials. Indirect materials are recorded in a Production Supplies account.
3. Used \$3,896 of direct raw materials.
4. Used 700 direct labor hours; production workers were paid \$6 per hour.
5. Expected total overhead costs for the year to be \$16,800 and direct labor hours used during the year to be 9,600. Calculate an overhead rate and apply the appropriate amount of overhead costs to Work in Process.
6. Paid \$800 for salaries to administrative and sales staff.
7. Paid \$700 for indirect manufacturing labor.
8. Paid \$600 for rent and utilities on the manufacturing facilities.
9. Started and completed 956 puzzles; all costs were transferred from the Work in Process Inventory account to the Finished Goods Inventory account.
10. Sold 800 puzzles at a price of \$12 each.

Transactions for Remainder of 2011

11. Acquired an additional \$150,000 by issuing common stock.
12. Purchased \$46,000 of direct raw materials and \$4,000 of indirect raw materials.
13. Used \$41,050 of direct raw materials.
14. Paid production workers \$6 per hour for 9,800 hours of work.
15. Applied the appropriate overhead cost to Work in Process Inventory.
16. Paid \$8,800 for salaries of administrative and sales staff.
17. Paid \$7,700 for the salary of the production supervisor.
18. Paid \$6,600 for rental and utility costs on the manufacturing facilities.
19. Transferred 12,000 additional puzzles that cost \$9.75 each from Work in Process Inventory to Finished Goods Inventory accounts.
20. Determined that \$3,200 of production supplies was on hand at the end of the accounting period.
21. Sold 8,000 puzzles for \$12 each.
22. Determine whether overhead is over- or underapplied. Close the Manufacturing Overhead account to Cost of Goods Sold.
23. Close the revenue and expense accounts.

Required

- a. Open T-accounts and post transactions to the accounts.
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for 2011.

Problem 11-19B *Manufacturing cost flow for multiple accounting cycles* **LO 2, 3, 4, 5, 6**

The following events apply to Wilkinson Manufacturing Company. Assume that all transactions are cash transactions unless otherwise indicated.

Transactions for the 2011 Accounting Period

1. The company was started on January 1, 2011, when it acquired \$700,000 cash by issuing common stock.
2. The company purchased \$300,000 of direct raw materials with cash and used \$26,000 of these materials to make its products in January.

3. Employees provided 1,500 hours of labor at \$8 per hour during January. Wages are paid in cash.
4. The estimated manufacturing overhead costs for 2011 are \$650,000. Overhead is applied on the basis of direct labor costs. The company expected \$130,000 of direct labor costs during 2011. Record applied overhead for January.
5. By the end of January, the employees completed work on all inventory items started in January. The cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in January, assuming that a total of 10,000 units of product were started and completed during the month.
6. The company used an additional \$234,000 of direct raw materials and 13,500 hours of direct labor at \$8 per hour during the remainder of 2011. Overhead was allocated on the basis of direct labor cost.
7. The company completed work on inventory items started between February 1 and December 31, and the cost of the completed inventory was transferred to the Finished Goods Inventory account. Determine the cost per unit for goods produced between February 1 and December 31, assuming that 90,000 units of inventory were produced. If the company desires to earn a gross profit of \$6 per unit, what price per unit must it charge for the merchandise sold?
8. The company sold 60,000 units of inventory for cash at \$12.80 per unit. Determine the number of units in ending inventory and the cost per unit of this inventory.
9. Actual manufacturing overhead costs paid in cash were \$610,000.
10. The company paid \$150,000 cash for selling and administrative expenses.
11. Close the Manufacturing Overhead account.
12. Close the revenue and expense accounts.

Transactions for the 2012 Accounting Period

1. The company acquired \$350,000 cash from the owners.
2. The company purchased \$200,000 of direct raw materials with cash and used \$20,800 of these materials to make products in January.
3. Employees provided 1,200 hours of labor at \$8 per hour during January.
4. On January 1, 2012, Wilkinson expected the production facilities to cost \$1,500 cash per month. The company paid cash to purchase \$7,000 of manufacturing supplies, and it anticipated that \$7,000 of these supplies would be used by year-end. Other manufacturing overhead costs were expected to total \$455,000. Overhead is applied on the basis of direct labor costs. Wilkinson expects direct labor costs of \$80,000 during 2012. Based on this information, determine the total expected overhead cost for 2012. Calculate the predetermined overhead rate and apply the overhead cost for the January production. Also, record the purchase of manufacturing supplies.
5. The company recorded a \$1,500 cash payment for production facilities in January.
6. On January, the employees completed work on all inventory items started in January. The cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in January assuming that a total of 8,000 units of product was started and completed during the month.
7. During February 2012, the company used \$15,600 of raw materials and 900 hours of labor at \$8 per hour. Overhead was allocated on the basis of direct labor cost.
8. The company recorded a \$1,500 cash payment for production facilities in February.
9. In February, the employees completed work on all inventory items started in February; the cost of this production was transferred to the Finished Goods Inventory account. Determine the cost per unit of product produced in February, assuming that 6,000 units of product were started and completed during the month.
10. The company used an additional \$143,000 of direct raw materials and 8,250 hours of direct labor at \$8 per hour during the remainder of 2012. Overhead was allocated on the basis of direct labor cost.
11. The company recorded \$15,000 of cash payments for production facilities for the period between March 1 and December 31.
12. The company completed work on inventory items started between March 1 and December 31. The cost of the completed goods was transferred to the Finished Goods Inventory account. Compute the cost per unit of this inventory, assuming that 55,000 units of inventory were produced.

13. The company sold 90,000 units of product for \$14 per unit cash. Assume that the company uses the FIFO inventory cost flow method to determine the cost of goods sold.
14. The company paid \$130,000 cash for selling and administrative expenses.
15. As of December 31, 2012, \$1,200 of production supplies was on hand.
16. Actual cost of other manufacturing overhead was \$461,000 cash.
17. Close the Manufacturing Overhead account.
18. Close the revenue and expense accounts.

Required

- a. Open T-accounts and record the effects of the preceding events.
- b. Prepare a schedule of cost of goods manufactured and sold, an income statement, and a balance sheet for each year.

Problem 11-20B *Comprehensive review problem***LO 1, 2, 3, 4**

Anita Rowley has worked as the plant manager of Gambrell Corporation, a large manufacturing company, for 10 years. The company produces stereo CD players for automotive vehicles and sells them to some of the largest car manufacturers in the country. Ms. Rowley has always toyed with the idea of starting her own car stereo manufacturing business. With her experience and knowledge, she is certain that she can produce a superior stereo at a low cost. Ms. Rowley's business strategy would be to market the product to smaller, more specialized car manufacturers. Her potential market is car manufacturers who sell at a lower volume to discriminating customers. She is confident that she could compete in this market that values low-cost quality production. She would not compete with Gambrell or the other large stereo producers that dominate the market made up of the largest automotive producers.

Ms. Rowley already has firm orders for 800 stereos from several automotive producers. Based on the contacts that she has made working for Gambrell, Ms. Rowley is confident that she can make and sell 2,000 stereos during the first year of operation. However, before making a final decision, she decides to investigate the profitability of starting her own business. Relevant information follows.

| | |
|---------------------------------|---------------------|
| Components from wholesaler | \$36.00 per stereo |
| Assembly labor | \$8.40 per hour |
| Rent of manufacturing buildings | \$9,600.00 per year |
| Utilities | \$240.00 per month |
| Sales salaries | \$480.00 per month |
| Depreciation of equipment | \$1,600.00 per year |
| Labor | 3 hours per stereo |

During the first year, Ms. Rowley expects to be able to produce the stereos with only two production workers and a part-time salesperson to market the product. Ms. Rowley expects to devote her time to the administrative aspects of the business and to provide back-up support in the production work. She has decided not to pay herself a salary but to live off the profits of the business.

Required

- a. Classify each cost item into the categories of direct materials, direct labor, and manufacturing overhead.
- b. Classify each cost item as either variable or fixed.
- c. What is the cost per stereo if Ms. Rowley's company produces 800 units per year? What is the unit cost if the company produces 2,000 units per year?
- d. If Ms. Rowley's job presently pays her \$12,000 a year, would you recommend that she proceed with the plans to start the new company if she could sell stereos for \$96 each?

Problem 11-21B *Absorption versus variable costing***LO 7**

Hattaway Manufacturing Company makes a product that sells for \$50 per unit. Manufacturing costs for the product amount to \$24 per unit variable, and \$160,000 fixed. During the current accounting period, Hattaway made 8,000 units of the product and sold 7,600 units. Selling and administrative expenses were zero.



Required

- Prepare an absorption costing income statement.
- Prepare a variable costing income statement.
- Explain why the amount of net income on the absorption costing income statement differs from the amount of net income on the variable costing income statement. Your answer should include the amount of the inventory balance that would exist under the two costing approaches.

LO 7**Problem 11-22B** *Absorption versus variable costing*

Alvarez Company makes leather chairs that it sells for \$200 per chair. Each chair requires \$28 of direct materials and \$72 of direct labor. Fixed overhead costs are expected to be \$120,000 per year. Alvarez expects to sell 1,500 chairs during the coming year. Selling and administrative expenses were zero.

Required

- Prepare income statements using absorption costing, assuming that Alvarez makes 1,500, 2,000, and 2,500 chairs during the year.
- Prepare income statements using variable costing, assuming that Alvarez makes 1,500, 2,000, and 2,500 chairs during the year.
- Explain why Alvarez may produce income statements under both absorption and variable costing formats. Your answer should include an explanation of the advantages or disadvantages associated with the use of the two reporting formats.

LO 7**Problem 11-23B** *Absorption and variable costing*

Moncier Manufacturing pays its production managers a bonus based on the company's profitability. During the two most recent years, the company maintained the same cost structure to manufacture its products.

| Year | Units Produced | Units Sold |
|--|----------------|-------------------|
| Production and Sales | | |
| 2011 | 4,000 | 4,000 |
| 2012 | 6,000 | 4,000 |
| Cost Data | | |
| Direct materials | | \$8 per unit |
| Direct labor | | \$12 per unit |
| Manufacturing overhead—variable | | \$4 per unit |
| Manufacturing overhead—fixed | | \$72,000 |
| Variable selling and administrative expenses | | \$4 per unit sold |
| Fixed selling and administrative expenses | | \$30,000 |

(Assume that selling and administrative expenses are associated with goods sold.)

Moncier's sales revenue for both years was \$230,000.

Required

- Prepare income statements based on absorption costing for the years 2011 and 2012.
- Since Moncier sold the same amount in 2011 and 2012, why did net income increase in 2012?
- Discuss management's possible motivation for increasing production in 2012.
- Determine the costs of ending inventory for 2012. Comment on the risks and costs associated with the accumulation of inventory.
- Based on your answers to Requirements *b* and *c*, suggest a different income statement format and prepare income statements for 2011 and 2012 using your suggested format.

ANALYZE, THINK, COMMUNICATE

ATC 11-1 Business Applications Case *Predetermined overhead rate*

Airline Meal Services (AMS) makes prepared meals that it sells to regional airlines. The average materials cost per meal is \$3.90, and the average labor cost is \$2.40. AMS incurs approximately \$720,000 of fixed manufacturing overhead costs annually. The marketing department estimated that AMS would sell approximately 300,000 meals during the coming year. Unfortunately, AMS has experienced a steady decline in sales even though the airline industry has had a steady increase in the number of meals sold. The chief accountant, Michelle Winters, was overheard saying that when she calculated the predetermined overhead rate, she deliberately lowered the estimated number of meals expected to be sold because she had lost faith in the marketing department's ability to deliver on its estimated sales numbers. Ms. Winters explained, "This way, our actual cost is always below the estimated cost. It is about the only way we continue to make a profit." Indeed, the company had a significant amount of over-applied overhead at the end of each year.



Required

- Explain how the overapplied overhead affects the determination of year-end net income.
- Assume that Ms. Winters used 280,000 meals as the estimated sales to calculate the predetermined overhead rate. Determine the difference in expected cost per meals she calculated and the cost per meals that would result if the marketing department's estimate (300,000 units) had been used.
- Assuming that AMS uses a cost-plus pricing policy, speculate how Ms. Winters' behavior could be contributing to the decline in sales.

ATC 11-2 Group Assignment *Schedule of cost of goods manufactured and sold*

The following information is from the accounts of Depree Manufacturing Company for 2010.



Required

- Divide the class into groups of four or five students per group and organize the groups into three sections. Assign Task 1 to the first section of groups, Task 2 to the second section, and Task 3 to the third section.

Group Tasks

- The ending balance in the Raw Materials Inventory account was \$208,000. During the accounting period, Depree used \$2,348,900 of raw materials inventory and purchased \$2,200,000 of raw materials. Determine the beginning raw materials inventory balance.
 - During the accounting period, Depree used \$2,348,900 of raw materials inventory and \$2,780,200 of direct labor. Actual overhead costs were \$3,300,000. Ending work in process inventory amounted to \$450,000, and cost of goods manufactured amounted to \$8,389,100. Determine the beginning balance in the Work in Process Inventory account.
 - The cost of goods manufactured was \$8,389,100, and the cost of goods sold was \$8,419,100. Ending finished goods inventory amounted to \$360,000. Determine the beginning balance in the Finished Goods Inventory account.
- Select a spokesperson from each section. Use input from the three spokespersons to prepare a schedule of cost of goods manufactured and sold. The spokesperson from the first section should provide information for the computation of the beginning balance in the raw materials account. The spokesperson from the second section should provide information for the determination of the beginning balance in the Work-in-Process Inventory account. The spokesperson from the third section should provide information for the determination of the beginning balance in the Finished Goods Inventory account.

ATC 11-3 Research Assignment *Distinction between service and manufacturing companies*

Electronic Arts, Inc., more commonly known as EA Sports, develops and markets games for Sony's PlayStation 3 and Microsoft's Xbox. Using either the company's March 31, 2009, Form 10-K or its annual report, answer the following questions. Access the company's website





to obtain the Form 10-K or use the EDGAR system by following the instructions in Appendix A. An interactive version of the company's annual report is available on its website.

Required

- Read the "Overview" subsection of the "Business" section of the company's 10-K or annual report. The business section is near the beginning of the documents. Based on this information, is EA Sports a service or a manufacturing business? Explain.
- Based on your response to Requirement *a*, what types of inventory do you expect EA Sports to have? Review the information in Note (9) of the company's financial statements. Does the company have any inventory? If so, what is (are) the type(s) and dollar amounts of any inventory that EA Sports has? Does the information in Note (9) lead you to rethink your answer to Requirement *a*?
- What are some cost drivers EA Sports might use to allocate common costs to the various games it markets?

ATC 11-4 Writing Assignment *Inventory cost flow in manufacturing environment*



Barret Cameron, a student in Professor Wagner's managerial accounting course, asked the following question. "In the first accounting course, the teacher said inventory costs flow on a FIFO, LIFO, or weighted average pattern. Now you are telling us inventory costs flow through raw materials, to work in process, and then to finished goods. Is this manufacturing stuff a new cost flow method or what?"

Required

Assume that you are Professor Wagner. Write a brief memo responding to Mr. Cameron's question.

ATC 11-5 Ethical Dilemma *Absorption costing*



Cliff Dennis may become a rich man. He is the creative force behind Amazing Drives, a new company. Amazing makes external drives that permit computer users to store large amounts of information on small floppy diskettes. Amazing has experienced tremendous growth since its inception three years ago. Investors have recognized the company's potential, and its stock is currently selling at 60 times projected earnings. More specifically, the company's 2009 earnings forecast shows estimated income to be \$0.30 per share and the current market price is \$18 per share ($\0.30×60). Mr. Dennis has stock options permitting him to buy 2,000,000 shares of stock for \$12 per share on January 1, 2010. This means that he could earn \$6 per share on the options. In other words, he would buy the stock at \$12 per share and sell it at \$18 per share. As a result, Mr. Dennis would earn \$12,000,000 ($\$6 \times 2,000,000$ shares).

Unfortunately, weak economies in foreign countries have caused low demand for Amazing's products in international markets. Company insiders are painfully aware that Amazing Drives is going to be unable to meet its projected income numbers. If actual earnings fall short of the projected earnings, the market will manifest its disappointment by discounting the stock price. Mr. Dennis is concerned that the value of his stock options could plummet.

At its inception three years ago, Amazing invested heavily in manufacturing equipment. Indeed, expecting dramatic growth, the company purchased a significant amount of excess capacity. As a result, the company incurs approximately \$28,800,000 in fixed manufacturing costs annually. If Amazing continues to produce at its current level, it will make and sell approximately 800,000 drives during 2009. In the face of declining sales, Mr. Dennis has issued a puzzling order to his production manager. Specifically, he has told the production manager to increase production so that 1,200,000 drives will be completed during 2009. Mr. Dennis explained that he believes the economies in foreign countries will surge ahead in 2010 and that he wants Amazing to have the inventory necessary to satisfy the demand.

Required

- Suppose that actual earnings for 2009 are \$0.18 per share. The market becomes disappointed, and the price-earnings ratio falls to 40 times earnings. What is the value of Mr. Dennis's stock options under these circumstances?
- Determine the impact on income reported in 2009 if production is 800,000 units versus 1,200,000 units.

- c. Why would Mr. Dennis order the increase in production?
- d. Does Mr. Dennis's behavior violate any of the standards of ethical conduct in Exhibit 1.15 of Chapter 1?
- e. Identify the features described in this case that could motivate criminal and ethical misconduct. (It may be helpful to reread the fraud triangle in Chapter 1 before attempting to satisfy this requirement.)

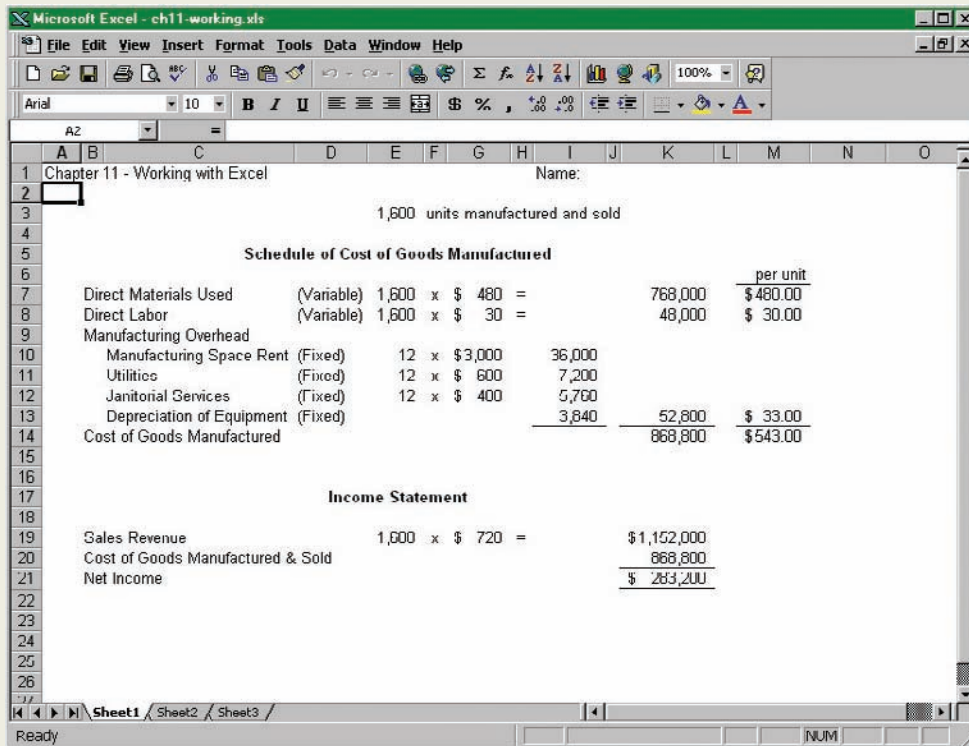
ATC 11-6 Spreadsheet Assignment Using Excel

Manning Cassey Computers (MCC) plans to produce and sell 1,600 computers for \$720 each in the next fiscal year. The company's cost data follow.

| | |
|----------------------------|--------------------|
| Components from wholesaler | \$480 per computer |
| Assembly labor | \$15 per hour |
| Manufacturing space rent | \$3,000 per month |
| Utilities | \$600 per month |
| Janitorial services | \$480 per month |
| Depreciation of equipment | \$3,840 per year |
| Labor time per computer | 2 hours |

Required

- a. Construct a spreadsheet to calculate the cost of goods manufactured and the cost per unit for MCC. Use formulas in the schedule so that the cost of goods manufactured will automatically be calculated as you change the number of units sold.
- b. Add an abbreviated income statement to your spreadsheet that incorporates the cost from Requirement a.



Spreadsheet Tip

Build the spreadsheet so that the number of units in cell E3 can be changed and cost of goods manufactured and net income will be recalculated automatically.

ATC 11-7 Spreadsheet Assignment *Mastering Excel*

Stanley Manufacturing Company, which sold 16,000 units of product at \$20 per unit, collected the following information regarding three different levels of production.

| Inventory Costs | | | |
|-------------------------------|-----------|-----------|-----------|
| Fixed overhead | \$100,000 | \$100,000 | \$100,000 |
| Number of units produced | 16,000 | 20,000 | 25,000 |
| Fixed overhead per unit | \$6.25 | \$5.00 | \$4.00 |
| Variable manufacturing costs | \$12.00 | \$12.00 | \$12.00 |
| Full absorption cost per unit | \$18.25 | \$17.00 | \$16.00 |

Required

- Construct a spreadsheet that includes the preceding data in the top of the spreadsheet. The rows for fixed overhead per unit and full absorption cost per unit should be based on formulas.
- Include absorption costing income statements at these three levels of production like those in Exhibit 11.10. Use formulas so that the number of units produced in the preceding table can be changed and net income will be recalculated automatically.
- Include variable costing income statements at these three levels of production like those in Exhibit 11.11. Use formulas so that the number of units produced in the preceding table can be changed and net income will be recalculated automatically.

COMPREHENSIVE PROBLEM

Magnificent Modems, Inc., acquired a subsidiary named Anywhere, Inc. (AI). AI manufactures a wireless modem that enables users to access the Internet through cell phones. The following trial balance was drawn from the accounts of the subsidiary.

| | | |
|---------------------------|------------------|------------------|
| Cash | \$200,000 | |
| Raw materials inventory | 4,000 | |
| Work in process inventory | 6,000 | |
| Finished goods inventory | 7,000 | |
| Common stock | | \$129,000 |
| Retained earnings | | <u>88,000</u> |
| Totals | <u>\$217,000</u> | <u>\$217,000</u> |

The subsidiary completed the following transactions during 2011.

- Paid \$60,000 cash for direct raw materials.
- Transferred \$50,000 of direct raw materials to work in process.
- Paid production employees \$80,000 cash.
- Applied \$53,000 of manufacturing overhead costs to work in process.
- Completed work on products that cost \$163,000.
- Sold products that cost \$143,000 for \$182,000 cash. Record the recognition of revenue in a row labeled 6a and the cost of goods sold in a row labeled 6b.
- Paid \$20,000 cash for selling and administrative expenses.
- Actual overhead costs paid in cash amounted to \$55,000.
- Closed the Manufacturing Overhead account. The amount of over- or underapplied overhead was insignificant (immaterial).
- Made a \$5,000 cash distribution to the owners.

Required

- a. For Anywhere, Inc., record the events in the financial statements model like the one shown below.

| Assets | | | | | | = | Equity | | | | | | | | | | |
|---------|---|-----|---|--------|---|-------|--------|----------|---|---------|---|-----------|------|---|------|---|----------|
| Cash | + | MOH | + | Raw M. | + | WIP | + | F. Goods | = | C. Stk. | + | Ret. Ear. | Rev. | - | Exp. | = | Net Inc. |
| 200,000 | + | 0 | + | 4,000 | + | 6,000 | + | 7,000 | = | 129,000 | + | 88,000 | NA | - | NA | = | NA |

- b. Prepare a schedule of cost of goods manufactured and sold.
 c. Prepare an income statement and a balance sheet.