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Chapter 10

In a Set of Financial Statements, What Information Is Conveyed about Property and Equipment?

Video Clip

[\(click to see video\)](#)

In this video, Professor Joe Hoyle introduces the essential points covered in [Chapter 10 "In a Set of Financial Statements, What Information Is Conveyed about Property and Equipment?"](#).

10.1 The Reporting of Property and Equipment

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Recognize that tangible operating assets with lives of over one year (such as property and equipment) are initially reported at historical cost.
2. Understand the rationale for assigning the cost of these operating assets to expense over time if the item has a finite life.
3. Recognize that these assets are normally reported on the balance sheet at net book value, which is their cost less accumulated depreciation.
4. Explain the reason for not reporting property and equipment at fair value except in certain specified circumstances.

Initially Reporting Property and Equipment at Historical Cost

Question: The retail giant Walmart owns thousands of huge outlets and supercenters located throughout the United States as well as in many foreign countries. These facilities contain a wide variety of machinery, fixtures, and the like such as cash registers and shelving. On its January 31, 2011, balance sheet, Walmart reports “property and equipment, net” of over \$105 billion, a figure that made up almost 60 percent of the company’s total assets. This monetary amount was more than twice as large as any other asset reported by this business. Based on sheer size, the information conveyed about this group of accounts is extremely significant to any decision maker analyzing Walmart or another similar company. In creating financial statements, what is the underlying meaning of the monetary figure reported for property, equipment, and the like? What information is conveyed by the \$105 billion balance disclosed by Walmart?

Answer: Four accounts make up the property and equipment reported by **Walmart**:

- Land
- Buildings and improvements
- Fixtures and equipment
- Transportation equipment

These are common titles, but a variety of other names are also used to report similar asset groups such as property, plant, and equipment (PP&E), fixed assets, and plant assets. Regardless of the name that is applied, the starting basis in reporting property, equipment, and any other tangible operating assets with a life of over one year is **historical cost**¹.

This initial accounting is consistent with the recording process demonstrated previously for inventory. When available, accountants like historical cost because it is objective. Cost reflects the amount sacrificed to obtain land, machinery, buildings, furniture, and so forth. It can usually be determined when an arm's length acquisition takes place: a willing buyer and a willing seller, both acting in their own self-interests, agree on an exchange price.

Thus, the cost incurred to obtain property and equipment provides information to decision makers about management policy and decision making. Cost indicates the amount management chose to sacrifice in order to gain the use of a specific asset. Unless the seller was forced to dispose of the property in a hurry (because of an urgent need for funds, as an example), cost is likely to approximate fair value when purchased. However, after the date of acquisition, the figure reported on the balance sheet will probably never again reflect the actual value of the asset.

Subsequently, for each of these operating assets that has a finite life (and most pieces of property and equipment other than land do have finite lives), the matching principle necessitates that the historical cost be allocated to expense over the anticipated years of service. This **depreciation**² expense is recognized systematically each period as the company utilizes the asset to generate revenue.

For example, if equipment has a life of ten years, all (or most) of its cost is assigned to expense over that period. This accounting resembles the handling of a prepaid expense such as rent. The cost is first recorded as an asset and then moved to expense over time in some logical fashion as the utility is consumed. At any point, the reported net book value for the asset is the original cost less the portion of that amount that has been reclassified to expense. For example, **Walmart** actually reported property and equipment costing \$148 billion but then disclosed that \$43 billion of that figure had been moved to expense leaving the \$105 billion net asset balance. As the future value becomes a past value, the asset account shrinks to reflect the cost reclassified to expense.

1. All the normal and necessary amounts incurred to get an asset into the position and condition to help generate revenues; it is the starting basis for the balance sheet presentation of assets such as inventory, land, and equipment.
2. A mechanically derived pattern allocating the cost of long-lived assets such as buildings and equipment to expense over the expected number of years that they will be used by a company to help generate revenues.

The Reporting of Accumulated Depreciation

Question: The basic accounting for property and equipment resembles that utilized for prepaid expenses such as rent and insurance. Do any significant differences exist between

the method of reporting prepaid expenses and the handling of operating assets like machinery and equipment?

Answer: One important mechanical distinction does exist when comparing the accounting for prepayments and that used for property and equipment having a finite life. With a prepaid expense (such as rent), the asset is directly reduced over time as the cost is assigned to expense. Prepaid rent balances get smaller each day as the period of usage passes. This reclassification creates the rent expense reported on the income statement.

In accounting for property and equipment, the asset does not physically shrink. A seven-story building does not become a six-story building and then a five-story building. As the utility is consumed, buildings and equipment do not get smaller; they only get older. To reflect that reality, a separate **accumulated depreciation**³ accountAs discussed in the coverage of accounts receivable and the allowance for doubtful accounts, an account that appears with another but as a direct reduction is known as a contra account. Accumulated depreciation is a contra account that decreases the reported cost of property and equipment to reflect the portion of that cost that has now be assigned to expense. is created to represent the total amount of the asset's cost that has been reclassified to expense. Through this approach, information about the original cost continues to be available. For example, if equipment is reported as \$30,000 and the related accumulated depreciation currently holds a balance of \$10,000, the reader knows that the asset cost \$30,000, but \$10,000 of that amount has been expensed since the date of acquisition. If the asset has been used for two years to generate revenue, \$6,000 might have been moved to expense in the first year and \$4,000 in the second. The \$20,000 **net book value**⁴ appearing on the balance sheet is the cost that has not yet been expensed because the asset still has future value.

3. A contra-asset account created to measure the cost of a depreciable asset (such as buildings and equipment) that has been assigned to expense to date.

4. Original cost of a depreciable asset such as buildings and equipment less the total amount of accumulated depreciation to date; it is also called net book value or carrying value.

As indicated previously, land does not have a finite life and, therefore, remains reported at historical cost with no assignment to expense and no accumulated depreciation balance.

TEST YOURSELF

Question:

A company buys equipment for \$100,000 with a ten-year life. Three years later, the company produces financial statements and prepares a balance sheet. The asset is not impaired in any way. What figure is reported for this equipment?

- a. The fair value on that date.
- b. The resale value at the end of the third year.
- c. \$100,000 less the accumulated depreciation recorded for these three years.
- d. Fair value less accumulated depreciation for the most recent year.

Answer:

The correct answer is choice c: \$100,000 less the accumulated depreciation recorded for these three years.

Explanation:

The historical cost (\$100,000) serves as the beginning basis for the financial reporting of property and equipment. This monetary figure is then systematically transferred to expense over the life of the asset. The total amount of the expense recognized to date is recorded in an accumulated depreciation account. The book value to be shown on the balance sheet for this equipment is its historical cost less the accumulated depreciation to date.

Failure of Accounting to Reflect the Fair Value of Property and Equipment

Question: Walmart reports property and equipment with a net book value of \$105 billion. However, that figure has virtually nothing to do with the value of these assets. They might actually be worth hundreds of billions. Decision makers analyze financial statements in order to make decisions about an organization at the current moment. Are these decision makers not more interested in the fair value of these assets than in what remains of historical cost? Why are property and equipment not reported at fair value? Is fair value not a much more useful piece of information than cost minus accumulated depreciation when assessing the financial health and prospects of a business?

Answer: The debate among accountants, company officials, investors, creditors, and others over whether various assets should be reported based on historical cost or fair value has raged for many years. There is no easy resolution. Good points can be made on each side of the argument. As financial accounting has evolved over the decades, rules for reporting certain assets (such as many types of stock and debt investments where exact market prices can be readily determined) have been changed to abandon historical cost in favor of reflecting fair value. However, no such radical changes in U.S. GAAP have taken place for property and equipment. Reporting has remained relatively unchanged for many decades. Unless the value of one of these assets has been impaired or it is going to be sold in the near future, historical cost less accumulated depreciation remains the basis for balance sheet presentation.

The fair value of property and equipment is a reporting alternative preferred by some decision makers, but only if the amount is objective and reliable. That is where the difficulty begins. Historical cost is both an objective and a reliable measure, determined through a transaction between a willing buyer and a willing seller. In contrast, any gathering of “experts” could assess the value of a large building or an acre of land at widely differing figures with equal certitude. No definitive value can possibly exist until sold. What is the informational benefit of a number that is so subjective? Furthermore, the asset’s value might change radically on a daily basis rendering previous assessments useless. For that reason, historical cost, as adjusted for accumulated depreciation, remains the accepted method for reporting property and equipment on an owner’s balance sheet.

Use of historical cost is supported by the going concern assumption that has long existed as part of the foundation of financial accounting. In simple terms, a long life is anticipated for virtually all organizations. Officials expect operations to continue for the years required to fulfill the goals that serve as the basis for their decisions. They do not plan to sell property and equipment prematurely but rather to utilize these assets for their entire lives. Consequently, financial statements are constructed assuming that the organization will function until all of its assets are consumed. Unless impaired or a sale is anticipated in the near future, the fair value of property and equipment is not truly of significance to the operations of a business. It might be interesting information but it is not directly relevant if no sale is contemplated.

However, the estimated fair value of a company’s property and equipment is a factor that does influence the current price of ownership shares traded actively on a stock exchange. For example, the price of shares of **The Coca-Cola Company** is

certainly impacted by the perceived value of its property and equipment. A widely discussed calculation known as **market capitalization**⁵ is one method used to gauge the fair value of a business as a whole. Market capitalization is determined by multiplying the current price of a company's stock times the number of ownership shares outstanding. For example, approximately 2.3 billion shares of **The Coca-Cola Company** were in the hands of investors at December 31, 2010. Because the stock was selling for \$65.77 per share on that day, the company's market capitalization was about \$151 billion. This figure does not provide a direct valuation for any specific asset but does give a general idea as to whether fair value approximates net book value or is radically different.

Talking with an Independent Auditor about International Financial Reporting Standards (Continued)

Following is a continuation of our interview with Robert A. Vallejo, partner with the accounting firm **PricewaterhouseCoopers**.

Question: In U.S. GAAP, land, buildings, and equipment have traditionally been reported at historical cost less the accumulated depreciation recognized to date. Adjustment to fair value is prohibited unless the asset's value has been impaired. Because of the conservative nature of accounting, increases in value are ignored completely until proven through a disposal. Thus, land might be worth \$20 million but only shown on the balance sheet as \$400,000 if that amount reflects cost. According to IFRS, can increases in the fair value of these assets be reported?

Rob Vallejo: Under IFRS, a company can elect to account for all or specific types of assets using fair value. In that instance, the designated assets are valued each reporting period, adjusted up or down accordingly. Based on my experience working with companies reporting under IFRS, companies do not elect to account for fixed assets using fair value. This decision is primarily due to the administrative challenges of determining fair value each and every reporting period (quarterly for US listed companies) and the volatility that would be created by such a policy. Financial officers and the financial investors that follow their stocks rarely like to see such swings, especially those swings that cannot be predicted. However, in the right circumstances, using fair value might be a reasonable decision for some companies.

5. Figure computed by multiplying a company's current stock price times the number of ownership shares outstanding in the hands of the public; it is used to gauge the fair value of a business as a whole.

KEY TAKEAWAY

Land, buildings, and equipment are reported on a company's balance sheet at net book value, which is historical cost less any portion of that figure that has been assigned to expense. Over time, the cost balance is not directly reduced. Instead, the expensed amount is maintained in a separate contra asset account known as accumulated depreciation. Thus, the asset's cost remains readily apparent as well as net book value. Land and any other asset that does not have a finite life continue to be reported at cost. Unless the value of specific items has been impaired or an asset is to be sold in the near future, fair value is never used in reporting land, buildings, and equipment. It is not viewed as an objective or reliable amount. In addition, because such assets are usually not expected to be sold, fair value is of limited informational benefit to decision makers.

10.2 Determining Historical Cost and Depreciation Expense

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Make use of the guiding accounting rule to ascertain which costs are capitalized and which are expensed when acquiring property and equipment.
2. List the variables that impact the amount of depreciation to be expensed each period in connection with the property and equipment owned by a company.
3. Recognize that the straight-line method for assigning depreciation predominates in practice but any system that provides a rational approach can be used to create a pattern for this cost allocation.

Assets Classified as Property and Equipment

Question: Businesses hold numerous types of assets, such as receivables, inventory, cash, investments, and patents. Proper classification is important for the clarity of the reported information. In preparing a balance sheet, what requirements must be met for an asset to be included as part of a business's property and equipment?

Answer: To be classified within the property and equipment category, an asset must have tangible physical substance and be expected to help generate revenues for longer than a single year. In addition, it must function within the normal operating activities of the business. However, it cannot be held for immediate resale, like inventory.

A building used as a warehouse and machinery operated in the production of inventory both meet these characteristics. Other examples include computers, furniture, fixtures, and equipment. Conversely, land acquired as a future plant site and a building held for speculative purposes are both classified as investments (or, possibly, "other assets") rather than as property and equipment. Neither of these assets is being used at the current time to help generate operating revenues.

Determining Historical Cost

Question: The accounting basis for reporting property and equipment is historical cost. What amounts are included in determining the cost of such assets? Assume, for example, that Walmart purchases a parcel of land and then constructs a retail store on the site. Walmart also buys a new cash register to use at this outlet. Initially, such assets are reported at cost. For property and equipment, how is historical cost defined?

Answer: In the previous chapter, the cost of a company's inventory was identified as the sum of all normal and necessary amounts paid to get the merchandise into condition and position to be sold. Property and equipment are not bought for resale, so this rule must be modified slightly. All expenditures are included within the cost of property and equipment if the amounts are normal and necessary to get the asset into condition and position to assist the company in generating revenues. That is the purpose of assets: to produce profits by helping to create the sale of goods and services.

Land can serve as an example. When purchased, the various normal and necessary expenditures made by the owner to ready the property for its intended use are capitalized to arrive at reported cost. These amounts include payments made to attain ownership as well as any fees required to obtain legal title. If the land is acquired as a building site, money spent for any needed grading and clearing is also included as a cost of the land rather than as a cost of the building or as an expense. These activities readied the land for its ultimate purpose.

Buildings, machinery, furniture, equipment and the like are all reported in a similar fashion. For example, the cost of constructing a retail store includes money spent for materials and labor as well as charges for permits and any fees paid to architects and engineers. These expenditures are all normal and necessary to get the structure into condition and position to help generate revenues.

As another example, the cost of a new cash register might well include shipping charges, installation fees, and training sessions to teach employees to use the asset. These costs all meet the criterion for capitalization. They are normal and necessary payments to permit use of the equipment for its intended purpose. Hence, a new cash register bought at a price of \$4,100 might actually be reported as an asset by its owner at \$5,300 as follows:

Figure 10.1 Capitalized Cost of Equipment

Invoice Price—Charged by Seller	\$4,100
Shipping Costs from Manufacturer	300
Installation	400
Employee Training Sessions	500
Cost of Cash Register	<u>\$5,300</u>

TEST YOURSELF

Question:

On January 1, Year One, a company buys a plot of land and proceeds to construct a warehouse on that spot. One specific cost of \$10,000 was normal and necessary to the acquisition of the land. However, by accident, this charge was capitalized within the building account. Which of the following statements is not correct?

- a. The building account will always be overstated by \$10,000.
- b. The land will be understated by \$10,000 as long as the company owns it.
- c. For the next few years, net income will be understated.
- d. For the next few years, expenses will be overstated.

Answer:

The correct answer is choice a: The building account will always be overstated by \$10,000.

Explanation:

A building has a finite life. During its use, the cost is systematically moved to expense. The \$10,000 misstatement here overstates the building balance. However, the gradual expensing of that amount through depreciation reduces the overstatement over time. This error inflates the amount of expense reported each year understating net income. The land does not have a finite life. Therefore, its cost is not expensed, and the \$10,000 understatement remains intact as long as the land is held.

Straight-Line Method of Determining Depreciation

Question: If a company pays \$600,000 on January 1, Year One to rent a building to serve as a store for five years, a prepaid rent account (an asset) is established for that amount. Because the rented facility is used to generate revenues throughout this period, a portion of the cost is reclassified annually as expense to comply with the matching principle. At the end of Year One, \$120,000 (or one-fifth) of the cost is moved from the asset balance into rent expense by means of an adjusting entry. Prepaid rent shown on the balance sheet drops to \$480,000, the amount paid for the four remaining years. The same adjustment is required for each of the subsequent years as the time passes.

*If, instead, the company buys a building with an expected five-year life. The estimated lives of property and equipment will vary widely. For example, in notes to its financial statements as of January 31, 2011, and for the year then ended, **Walmart** disclosed that the expected lives of its buildings and improvements ranged from three years to forty. For \$600,000, the accounting is quite similar. The initial cost is capitalized to reflect the future economic benefit. Once again, at the end of each year, a portion of this cost is assigned to expense to satisfy the matching principle. This expense is referred to as depreciation. It is the cost of a long-lived asset that is recorded as expense each period. Should the Year One depreciation that is recognized in connection with this building also be \$120,000 (one-fifth of the total cost)? How is the annual amount of depreciation expense determined for reporting purposes?*

Answer: Depreciation is based on a mathematically derived system that allocates the asset's cost to expense over the expected years of use. It does not mirror the actual loss of value over that period. The specific amount of depreciation expense recorded each year for buildings, machinery, furniture, and the like is determined using four variables:

1. The historical cost of the asset
2. Its expected useful life
3. Any residual (or salvage) value anticipated at the end of the expected useful life
4. An allocation pattern

After total cost is computed, officials estimate the useful life based on company experience with similar assets or on other sources of information such as guidelines provided by the manufacturer. As mentioned previously, land does not have a finite life and is, therefore, not subjected to the recording of depreciation expense. In a similar fashion, officials arrive at the expected residual value—an estimate of the

likely worth of the asset at the end of its useful life. Both life expectancy and residual value can be no more than guesses.

To illustrate, assume a building is purchased by a company on January 1, Year One, for cash of \$600,000. Based on experience with similar properties, officials believe that this structure will be worth only \$30,000 at the end of an expected five-year life. U.S. GAAP does not require any specific computational method for determining the annual allocation of the asset's cost to expense. Over fifty years ago, the Committee on Accounting Procedure (the authoritative body at the time) issued Accounting Research Bulletin 43, which stated that any method could be used to determine annual depreciation if it provided an expense in a "systematic and rational manner." This guidance remains in effect today.

Consequently, a vast majority of reporting companies (including **Walmart**) have chosen to adopt the straight-line method to assign the cost of property and equipment to expense over their useful lives. The estimated residual value is subtracted from cost to arrive at the asset's depreciable base. This figure is then expensed evenly over the expected life. It is systematic and rational. **Straight-line depreciation**⁶ allocates an equal expense to each period in which the asset is used to generate revenue.

Straight-line method:

$(\text{cost} - \text{estimated residual value}) = \text{depreciable base}$

$\text{depreciable base} / \text{expected useful life} = \text{annual depreciation}$

$(\$600,000 - \$30,000) = \$570,000 / 5 \text{ years} = \text{depreciation expense of } \$114,000 \text{ per year}$

Recording Depreciation Expense

Question: An accountant determines depreciation for the current year based on the asset's cost and estimated life and residual value. After depreciation has been calculated, how is this allocation of the asset's cost to expense recorded within the company's accounting system?

6. Method used to calculate the annual amount of depreciation expense by subtracting any estimated residual value from cost and then dividing this depreciable base by the asset's estimated useful life; a majority of companies in the United States use this method for financial reporting purposes.

Answer: An adjusting entry is prepared at the end of each period to move the assigned cost from the asset account on the balance sheet to expense on the income statement. To reiterate, the building account is not directly reduced. A separate negative or contra account (accumulated depreciation) is created to reflect the total

amount of the cost that has been expensed to date. Thus, the asset's net book value as well as its original historical cost are both still in evidence.

The entries to record the cost of acquiring this building and the annual depreciation expense over the five-year life are shown in [Figure 10.2 "Building Acquisition and Straight-Line Depreciation"](#). The straight-line method is used here to determine each individual allocation to expense. Now that students are familiar with using debits and credits for recording, the number in parenthesis is included (where relevant to the discussion) to indicate the total account balance *after* the entry is posted. As has been indicated, revenues, expenses, and dividends are closed out each year. Thus, the depreciation expense reported on each income statement measures only the expense assigned to that period.

Figure 10.2 Building Acquisition and Straight-Line Depreciation

1/1/1	Building Cash	\$600,000 (\$600,000)	\$600,000
12/31/1	Depreciation Expense Accumulated Depreciation —Building	114,000 (114,000)	114,000 (114,000)
12/31/2	Depreciation Expense Accumulated Depreciation —Building	114,000 (114,000)	114,000 (228,000)
12/31/3	Depreciation Expense Accumulated Depreciation —Building	114,000 (114,000)	114,000 (342,000)
12/31/4	Depreciation Expense Accumulated Depreciation —Building	114,000 (114,000)	114,000 (456,000)
12/31/5	Depreciation Expense Accumulated Depreciation —Building	114,000 (114,000)	114,000 (570,000)

Because the straight-line method is applied, depreciation expense is a consistent \$114,000 each year. As a result, the net book value reported on the balance sheet drops during the asset's useful life from \$600,000 to \$30,000. At the end of the first year, it is \$486,000 (\$600,000 cost minus accumulated depreciation \$114,000). At the end of the second year, net book value is reduced to \$372,000 (\$600,000 cost minus accumulated depreciation of \$228,000). This pattern continues over the entire five years until the net book value equals the expected residual value of \$30,000.

TEST YOURSELF

Question:

On January 1, Year One, the Ramalda Corporation pays \$600,000 for a piece of equipment that will produce widgets to be sold to the public. The company expects the asset to carry out this function for ten years and then be sold for \$50,000. The straight-line method of depreciation is used. At the end of Year Two, company officials receive an offer to buy the equipment for \$500,000. They reject this offer because they believe the asset is actually worth \$525,000. What is the net reported balance for this equipment on the company's balance sheet as of December 31, Year Two?

- a. \$480,000
- b. \$490,000
- c. \$500,000
- d. \$525,000

Answer:

The correct answer is choice b: \$490,000.

Explanation:

Unless the value of property or equipment is impaired or the asset will be sold in the near future, fair value is ignored. Cost is the reporting basis. This equipment has a depreciable base of \$550,000 (\$600,000 cost less \$50,000 residual value). The asset is expected to generate revenues for ten years. Annual depreciation is \$55,000 (\$550,000/ten years). After two years, net book value is \$490,000 (\$600,000 cost less \$55,000 and \$55,000 or accumulated depreciation of \$110,000).

KEY TAKEAWAY

Tangible operating assets with lives of over a year are initially reported at historical cost. All expenditures are capitalized if they are normal and necessary to put the property into the position and condition to assist the owner in generating revenue. If the asset has a finite life, this cost is then assigned to expense over the years of expected use by means of a systematic and rational pattern. Many companies apply the straight-line method, which assigns an equal amount of expense to every full year of use. In that approach, the expected residual value is subtracted from cost to get the depreciable base. This figure is allocated evenly over the anticipated years of use by the company.

10.3 Recording Depreciation Expense for a Partial Year

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Understand the need to record depreciation for each period of use even when property and equipment are disposed of prior to the end of the year.
2. Construct the journal entry to record the disposal of property or equipment and the recognition of a gain or loss.
3. Explain the half-year convention and the reason that it is frequently used by companies for reporting purposes.

Recording the Disposal of Property or Equipment

Question: Property and equipment are occasionally sold before the end of their estimated lives. A company's operational needs might change or officials could want to gain the benefit of a newer or more efficient model. What accounting is necessary in the event that a piece of property or equipment is sold prior to the conclusion of its useful life? In the example illustrated in Figure 10.2 "Building Acquisition and Straight-Line Depreciation", assume that after the adjusting entry for depreciation is made on December 31, Year Two, the building is sold for \$290,000 cash. How is that transaction recorded?

Answer: Accounting for the disposal of property and equipment is relatively straightforward.

First, to establish account balances that are appropriate as of the date of sale, depreciation is recorded for the period of use during the current year. In this way, the expense is matched with the revenues earned in the current period.

Second, the amount received from the sale is recorded while the net book value of the asset (both its cost and accumulated depreciation) is removed. If the owner receives less for the asset than net book value, a loss is recognized for the

difference. If more is received than net book value, the excess is recorded as a gain so that net income increases.

Because the building is sold for \$290,000 on December 31, Year Two, when the net book value is \$372,000 (cost of \$600,000 less accumulated depreciation of \$228,000), a loss of \$82,000 is reported by the seller (\$372,000 net book value less \$290,000 proceeds). The journal entry shown in [Figure 10.3 "Sale of Building at a Loss"](#) is recorded after the depreciation adjustment for the period is made.

Figure 10.3 Sale of Building at a Loss

12/31/2	Cash	290,000	
	Accumulated Depreciation—Building	228,000	
	Loss on Sale of Building	82,000	
	Building		600,000

Conversely, if this building is sold on that same date for \$440,000 rather than \$290,000, the company receives \$68,000 more than net book value (\$440,000 less \$372,000) so that a gain of that amount is recognized. The entry under this second possibility is presented in [Figure 10.4 "Sale of Building at a Gain"](#).

Figure 10.4 Sale of Building at a Gain

12/31/2	Cash	440,00	
	Accumulated Depreciation—Building	228,000	
	Building		600,000
	Gain on Sale of Building		68,000

Although gains and losses such as these appear on the income statement, they are often shown separately from revenues and expenses. In that way, a decision maker can determine both the income derived from primary operations (revenues less expenses) and the amount that resulted from tangential activities such as the sale of a building or other property (gains less losses).

TEST YOURSELF

Question:

The Lombardi Company buys equipment on January 1, Year One, for \$2 million with an expected twenty-year life and a residual value of \$100,000. Company officials apply the straight-line method to determine depreciation expense. On December 31, Year Three, this equipment is sold for \$1.8 million. What gain is recognized on this sale?

- a. \$10,000
- b. \$85,000
- c. \$100,000
- d. \$185,000

Answer:

The correct answer is choice b: \$85,000.

Explanation:

The depreciable basis for this asset is \$1.9 million (\$2 million cost less \$100,000 estimated residual value). This amount is to be expensed over twenty years at a rate of \$95,000 per year ($\$1.9 \text{ million} / 20 \text{ years}$). After three years, accumulated depreciation is \$285,000 ($\$95,000 \times 3$) so net book value is \$1,715,000 (\$2 million cost less \$285,000 accumulated depreciation). The sale was for \$1.8 million. The company reports a gain of \$85,000 (\$1.8 million received less \$1,715,000 book value).

Recognizing Depreciation When Asset Is Used for a Partial Year

Question: In the previous reporting, the building was bought on January 1 and later sold on December 31 so that depreciation was always determined and recorded for a full year. However, in reality, virtually all such assets are bought and sold at some point within the year so that a partial period of use is more likely. What amount of depreciation is appropriate if property or equipment is held for less than twelve months during a year?

Answer: The recording of depreciation follows the matching principle. If an asset is owned for less than a full year, it does not help generate revenues for all twelve months. The amount of expense should be reduced accordingly. For example, if the building from the previous reporting is purchased on April 1, Year One, depreciation expense of only \$85,500 (9/12 of the full-year amount of \$114,000) is recognized on December 31, Year One. Similarly, if the asset is sold on a day other than December 31, less than a full year's depreciation is assigned to expense in the year of sale. Revenue is not generated for the entire period; therefore, depreciation must also be recognized proportionally.

To illustrate, assume the building was purchased on April 1 of Year One for \$600,000 and then sold for \$350,000 on September 1 of Year Three. As just calculated, depreciation for Year One is \$85,500 or 9/12 of the annual amount. In Year Three, depreciation for the final eight months that the property was used is \$76,000 (8/12 of \$114,000). The journal entries shown in Figure 10.5 "Acquisition, Depreciation, and Sale of Building" reduce the asset's net book value to \$324,500 (cost of \$600,000 less accumulated depreciation of \$275,500). Because cash of \$350,000 is collected from the sale, a gain of \$25,500 is recognized (\$350,000 less \$324,500).

Figure 10.5 Acquisition, Depreciation, and Sale of Building

4/1/1	Building Cash	\$600,000 (\$600,000)	\$600,000
12/31/1	Depreciation Expense Accumulated Depreciation —Building	85,500 (\$85,500)	85,500 (85,500)
12/31/2	Depreciation Expense Accumulated Depreciation —Building	114,000 (\$114,000)	114,000 (199,500)
9/1/3	Depreciation Expense Accumulated Depreciation —Building	76,000 (\$76,000)	76,000 (275,500)
9/1/3	Cash Accumulated Depreciation —Building Building Gain on Sale of Building	350,000 275,500	600,000 25,500

The Half-Year Convention

Question: Monitoring the specific days on which depreciable assets are bought and sold seems like a tedious process. For example, what happens when equipment is bought on August 8 or when a building is sold on April 24? In practice, how do companies assign depreciation to expense when a piece of property or equipment is held for less than a full year?

Answer: Most companies hold a great many depreciable assets, often thousands. Depreciation is nothing more than a mechanical cost allocation process. It is not an attempt to mirror current value. Cost is mathematically assigned to expense in a systematic and rational manner. Consequently, company officials often prefer not to invest the time and effort needed to keep track of the specific number of days or weeks of an asset's use during the years of purchase and sale.

As a result, depreciation can be calculated to the nearest month when one of these transactions is made. A full month of expense is recorded if an asset is held for fifteen days or more whereas no depreciation is recognized in a month where usage is less than fifteen days. No genuine informational value comes from calculating the depreciation of assets down to days, hours, and minutes. An automobile acquired on March 19, for example, is depreciated as if bought on April 1. A computer sold on November 11 is assumed to have been used until October 31.

As another accepted alternative, many companies apply the **half-year convention**⁷ (or some variation). When property or equipment is owned for any period less than a full year, a half year of depreciation is automatically assumed. The costly maintenance of exact records is not necessary. Long-lived assets are typically bought and sold at various times throughout each period so that, on the average, one-half year is a reasonable assumption. As long as such approaches are applied consistently, reported figures are viewed as fairly presented. Property and equipment bought on February 3 or sold on November 27 is depreciated for exactly one-half year in both situations.

7. Method of calculating depreciation for assets that are held for any period of time less than a year; automatically records one-half year of depreciation; it makes the maintenance of exact records as to the period of use unnecessary.

TEST YOURSELF

Question:

On August 12, Year One, the O'Connell Company buys a warehouse for \$1.2 million with a ten-year expected life and an estimated residual value of \$200,000. This building is eventually sold on March 18, Year Three, for \$1,080,000 in cash. The straight-line method of depreciation is used for allocation purposes along with the half-year convention. What gain should O'Connell recognize on the sale of the warehouse?

- a. \$80,000
- b. \$84,000
- c. \$108,000
- d. \$120,000

Answer:

The correct answer is choice a: \$80,000.

Explanation:

Annual depreciation is \$100,000: the depreciable basis of \$1 million (\$1.2 million less \$200,000) allocated over ten years. Because the half-year convention is used, \$50,000 is recorded in Years One and Three. The asset was used less than twelve months in each of these periods. When sold, accumulated depreciation is \$200,000 (\$50,000 + \$100,000 + \$50,000) and net book value is \$1 million (cost was \$1.2 million). Cash of \$1,080,000 was received so that a gain of \$80,000 must be recognized.

KEY TAKEAWAY

Depreciation expense is recorded for property and equipment at the end of each fiscal year and also at the time of an asset's disposal. To record a disposal, cost and the accumulated depreciation as of that date are removed. Any proceeds are recorded and the difference between the amount received and the net book value surrendered is recognized as a gain (if more than net book value is collected) or a loss (if less is collected). Many companies automatically record depreciation for one-half year for any period of use of less than a full year. The process is much simpler and, as a mechanical allocation process, no need for absolute precision is warranted.

10.4 Alternative Depreciation Patterns and the Recording of a Wasting Asset

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Explain the justification for accelerated methods of depreciation.
2. Compute depreciation expense using the double-declining balance method.
3. Realize that the overall impact on net income is not affected by a particular cost allocation pattern.
4. Describe the units-of-production method, including its advantages and disadvantages.
5. Explain the purpose and characteristics of MACRS.
6. Compute depletion expense for a wasting asset such as an oil well or a forest of trees.
7. Explain the reason that depletion amounts are not directly recorded as an expense.

Accelerated Depreciation

Question: Straight-line depreciation certainly qualifies as systematic and rational. The same amount of cost is assigned to expense during each period of an asset's use. Because no specific method is required by U.S. GAAP, do companies ever use other approaches to create different allocation patterns for depreciation? If so, how are these methods justified?

8. Any method of determining depreciation that assigns larger expenses to the initial years of an asset's service and smaller expenses to the later years; it is often justified by the assumption that newer assets generate more revenues than older assets do.

Answer: The most common alternative to the straight-line method is **accelerated depreciation**⁸, which records a larger expense in the initial years of an asset's service. The primary rationale for this pattern is that property and equipment frequently produce higher amounts of revenue earlier in their lives because they are newer. The matching principle would suggest that recognizing more depreciation in these periods is appropriate to better align the expense with the revenues earned.

A second justification for accelerated depreciation is that some types of property and equipment lose value more quickly in their first few years than they do in later years. Automobiles and other vehicles are a typical example of this pattern. Consequently, recording a greater expense in the initial years of use is said to better reflect reality.

Over the decades, a number of formulas have been invented to mathematically create an accelerated depreciation pattern—high expense at first with subsequent cost allocations falling each year throughout the life of the property. The most common is the **double-declining balance method (DDB)**⁹. When using DDB, annual depreciation is determined by multiplying the current net book value of the asset times two divided by the expected years of life. As the net book value drops, the annual expense drops. This formula has no internal logic except that it creates the desired pattern, an expense that is higher in the first years of operation and less after that. Although residual value is not utilized in this computation, the final amount of depreciation recognized must be manipulated to arrive at this ending balance.

Depreciation for the building bought above for \$600,000 with an expected five-year life and a residual value of \$30,000 is calculated as follows if DDB is applied. Note how different this cost allocation pattern is than that shown in [Figure 10.2 "Building Acquisition and Straight-Line Depreciation"](#) using the straight-line method.

$(\text{cost} - \text{accumulated depreciation}) \times 2/\text{expected life} = \text{depreciation expense for period}$

Year One:

$$(\$600,000 - \$0) = \$600,000 \times 2/5 = \$240,000 \text{ depreciation expense}$$

Year Two:

$$(\$600,000 - \$240,000) = \$360,000 \times 2/5 = \$144,000 \text{ depreciation expense}$$

Year Three:

$$(\$600,000 - \$384,000) = \$216,000 \times 2/5 = \$86,400 \text{ depreciation expense}$$

Year Four:

$$(\$600,000 - \$470,400) = \$129,600 \times 2/5 = \$51,840 \text{ depreciation expense}$$

9. A common accelerated depreciation method that computes expense each year by multiplying the asset's net book value (cost less accumulated depreciation) times two divided by the expected useful life.

Year Five:

$$(\$600,000 - \$522,240) = \$77,760,$$

so depreciation for Year Five must be set at \$47,760 to reduce the \$77,760 net book value to the expected residual value of \$30,000.

Note that the desired expense pattern for accelerated depreciation has resulted. The expense starts at \$240,000 and becomes smaller in each subsequent period as can be seen in the adjusting entries prepared in [Figure 10.6 "Building Acquisition and Double-Declining Balance Depreciation"](#).

Figure 10.6 *Building Acquisition and Double-Declining Balance Depreciation*

1/1/1	Building Cash	\$600,000 (\$600,000)	\$600,000
12/31/1	Depreciation Expense Accumulated Depreciation —Building	240,000 (240,000)	240,000 (240,000)
12/31/2	Depreciation Expense Accumulated Depreciation —Building	144,000 (144,000)	144,000 (384,000)
12/31/3	Depreciation Expense Accumulated Depreciation —Building	86,400 (86,400)	86,400 (470,400)
12/31/4	Depreciation Expense Accumulated Depreciation —Building	51,840 (51,840)	51,840 (522,240)
12/31/5	Depreciation Expense Accumulated Depreciation —Building	47,760 (47,760)	47,760 (570,000)

When applying an accelerated depreciation method, net book value falls quickly at first because of the high initial expense levels. Thus, if an asset is sold early in its life, a reported gain is more likely (the amount received will be greater than this lower net book value). For example, in [Figure 10.3 "Sale of Building at a Loss"](#), the building was depreciated using the straight-line method and sold after two years for \$290,000, creating a reported \$82,000 loss because the net book value was \$372,000. Net book value was high in comparison to the amount received.

With DDB, the accumulated depreciation will be \$384,000 after two years as shown in [Figure 10.6 "Building Acquisition and Double-Declining Balance Depreciation"](#). If the building is then sold on December 31, Year Two for \$290,000, a \$74,000 gain is reported because net book value has dropped all the way to \$216,000 (\$600,000 cost less \$384,000 accumulated depreciation). Accelerated depreciation creates a lower net book value, especially in the early years of ownership.

Figure 10.7 Building Sold after Two Years—Double-Declining Balance Method Used

12/31/2	Cash	290,000	
	Accumulated Depreciation—Building	384,000	
	Building		600,000
	Gain on Sale of Building		74,000

Although the annual amounts are quite different, the overall net income is never affected by the allocation pattern. In this example, a building was bought for \$600,000 and later sold after two years for \$290,000. Thus, net income for the entire period of use must be reduced by the \$310,000 difference regardless of the approach applied.

Figure 10.8 Depreciation Methods—Overall Impact on Net Income

	Straight-Line Method	Double-Declining Balance Method
Year One Depreciation Expense	(\$114,000)	(\$240,000)
Year Two Depreciation Expense	(114,000)	(144,000)
Loss on Sale for \$290,000	(82,000)	
Gain on Sale for \$290,000		+74,000
Overall Impact on Net Income	<u>(\$310,000)</u>	<u>(\$310,000)</u>

TEST YOURSELF

Question:

On April 1, Year One, Hayden Corporation buys machinery for \$30,000 and pays an additional \$4,000 to have it delivered to its factory and then assembled. Company officials believe this machinery will last for ten years and then have a \$2,000 remaining residual value. Depreciation is to be computed by applying the double-declining balance method. The half-year convention is utilized. The value of the asset actually declines at only a rate of 10 percent per year. On the company's balance sheet as of December 31, Year Three, what is reported as the net book value for this asset?

- a. \$18,432
- b. \$18,496
- c. \$19,584
- d. \$25,500

Answer:

The correct answer is choice c: \$19,584.

Explanation:

Cost of the asset is \$34,000, which is multiplied by $2/10$ to get \$6,800. Because of the half-year convention, \$6,800 is multiplied by $1/2$. Depreciation is \$3,400. For Year Two, book value is \$30,600 (\$34,000 less \$3,400). When multiplied by $2/10$, depreciation is \$6,120. The contra account rises to \$9,520 and book value falls to \$24,480. When multiplied by $2/10$, expense for the third year is \$4,896. Accumulated depreciation is now \$14,416 and book value is \$19,584 (\$34,000 less \$14,416).

Units-Of-Production Method

Question: The two methods demonstrated so far for establishing a depreciation pattern are based on time, five years to be precise. In most cases, though, it is the physical use of the asset rather than the passage of time that is actually relevant to this process. Use is the action that generates revenues. How is the depreciation of a long-lived tangible asset determined if usage can be measured?

For example, assume that a limousine company buys a new vehicle for \$90,000 to serve as an addition to its fleet. Company officials expect this limousine to be driven for 300,000 miles and then have no residual value. How is depreciation expense determined each period?

Answer: Depreciation does not have to be based on time; it only has to be computed in a systematic and rational manner. Thus, the **units-of-production method (UOP)**¹⁰ is another alternative that is occasionally encountered. UOP is justified because the periodic expense is matched with the work actually performed. In this illustration, the limousine's depreciation is based on the total number of miles expected. Then, the annual expense is computed using the number of miles driven in a year, an easy figure to determine.

$$(\$90,000 \text{ less } \$0) / 300,000 \text{ miles} = \$0.30 \text{ per mile}$$

Depreciation is recorded at a rate of \$0.30 per mile. The depreciable cost basis is allocated evenly over the miles that the vehicle is expected to be driven. UOP is a straight-line method but one that is based on usage (miles driven, in this example) rather than years. Because of the direct connection between the expense allocation and the work performed, UOP is a very appealing approach. It truly mirrors the matching principle. Unfortunately, measuring the physical use of most assets is rarely as easy as with a limousine.

To illustrate, assume this vehicle is driven 80,000 miles in Year One, 120,000 miles in Year Two, and 100,000 miles in Year Three, depreciation will be \$24,000, \$36,000, and \$30,000 when the \$0.30 per mile rate is applied. The annual adjusting entries are shown in Figure 10.9 "Depreciation—Units-of-Production Method".

10. A method of determining depreciation that is not based on the passage of time but rather on the level of actual usage during the period.

Figure 10.9 Depreciation—Units-of-Production Method

1/1/1	Vehicle Cash	\$90,000 (\$90,000)	\$90,000
12/31/1	Depreciation Expense Accumulated Depreciation —Vehicle	24,000 (24,000)	24,000 (24,000)
12/31/2	Depreciation Expense Accumulated Depreciation —Vehicle	36,000 (36,000)	36,000 (60,000)
12/31/3	Depreciation Expense Accumulated Depreciation —Vehicle	30,000 (30,000)	30,000 (90,000)

Estimations rarely prove to be precise reflections of reality. This vehicle will not likely be driven exactly 300,000 miles. If used for less and then retired, both the cost and accumulated depreciation are removed. A loss is recorded equal to the remaining net book value unless some cash or other asset is received. If driven more than the anticipated number of miles, depreciation stops at 300,000 miles. At that point, the cost of the asset will have been depreciated completely.

Although alternative methods such as the double-declining balance method and the units-of-production method are interesting theoretically, they are not very widely used in practice. Probably only about 5–10 percent of companies apply a method other than straight-line depreciation. However, as indicated later, accelerated depreciation is an important method when computing a company's taxable income.

TEST YOURSELF

Question:

On March 1, Year One, the Good Eating Company buys a machine to make donuts so that it can expand its menu. The donut maker cost the company \$22,000 but has an expected residual value of \$4,000. Officials believe this machine should be able to produce 100,000 dozen donuts over a ten-year period. In Year One, 7,000 dozen donuts are prepared and sold while in Year Two, another 11,000 dozen are made. However, the company is not satisfied with the profits made from selling donuts. Thus, on April 1, Year Three, after making 3,000 more dozen, the company sells the machine for \$19,000 in cash. If the units-of-production method is used to compute depreciation, what gain or loss should the company recognize on the sale of the donut maker?

- a. Gain of \$780
- b. Gain of \$320
- c. Loss of \$320
- d. Loss of \$780

Answer:

The correct answer is choice a: Gain of \$780.

Explanation:

The company expects to recognize an expense of \$18,000 (\$22,000 less \$4,000) as it makes 100,000 dozen. That is \$0.18 per dozen (\$18,000/100,000 dozen). While being used, 21,000 dozen donuts are prepared (7,000 + 11,000 + 3,000). At \$0.18 per dozen, total depreciation of \$3,780 is recognized (21,000 dozen at \$0.18 each). This expense reduces book value to \$18,220 (\$22,000 less \$3,780). If sold for \$19,000, the company reports a gain of \$780 based on the excess received (\$19,000 less \$18,220).

MACRS

Question: Companies use straight-line depreciation, accelerated depreciation, or units-of-production depreciation for financial reporting. What method of determining depreciation is applied when a business files its federal income tax return? Can one of these methods be selected or is a specific approach required?

Answer: In most cases, the government wants businesses to buy more machinery, equipment, and the like because such purchases help stimulate the economy and create jobs. Consequently, for federal income tax purposes, companies are required to use a designed method known as Modified Accelerated Cost Recovery System (MACRS). MACRS has several built-in tax incentives inserted to encourage businesses to acquire more depreciable assets. Greater depreciation expense is allowed, especially in the earlier years of use, so that the purchase reduces tax payments.

- Each depreciable asset must be placed into one of eight classes based upon its type and life. For example, a light truck goes into one class, but a typewriter is placed in another. Every asset within a class is depreciated by the same method and over the same life.
- For most of these classes, the number of years is relatively short so that the benefit of the expense is received quickly for tax purposes.
- Residual value is ignored completely. The entire cost can be expensed.
- For six of the eight classes, accelerated depreciation is required, which again creates more expense in the initial years.

Determining Depletion

Question: The cost of land is not depreciated because it does not have a finite life. However, land is often acquired solely for the natural resources that it might contain such as oil, timber, gold or the like. As the oil is pumped, the timber harvested or the gold extracted, a portion of the value is physically separated from the land. How is the reported cost of land affected when its natural resources are removed?

Answer: Oil, timber, gold, and the like are known as “wasting assets.” They are taken from land over time, a process referred to as **depletion**¹¹. Value is literally removed from the asset rather than being consumed through use as with the depreciation of property and equipment. The same mechanical calculation demonstrated above for the units-of-production (UOP) method is applied. The 2010 financial statements for **Alpha Natural Resources** state that “costs to obtain coal lands and leased mineral rights are capitalized and amortized to operations as depletion expense using the units-of-production method.”

11. A method of allocating the cost of a wasting asset (such as a gold mine or an oil well) to expense over the periods during which the value is removed from the property.

Because the value is separated rather than used up, depletion initially leads to the recording of inventory (such as oil or gold, for example). An expense is recognized only at the eventual point of sale.

As with other types of property and equipment, historical cost is the sum of all normal and necessary expenditures to get the wasting asset into condition and position to generate revenues. To illustrate, assume that at the beginning of Year One, land is acquired for \$1.6 million cash while another \$400,000 is spent to construct a mining operation. Total cost is \$2 million. The land is estimated to hold ten thousand tons of ore to be mined and sold. The land will be worth an estimated amount of only \$100,000 after all ore is removed. Depletion is \$190 per ton $([\$2,000,000 \text{ cost less } \$100,000 \text{ residual value}]/10,000 \text{ tons})$. It is a straight-line approach based on tons and not years, an allocation that follows the procedures of the units-of-production method.

Assume that 3,000 tons of ore are extracted in Year One and sold in Year Two for \$1 million cash. Another 3,600 tons are removed in the second year for sale at a later time. Depletion is \$570,000 in Year One $(\$190 \times 3,000 \text{ tons})$ and \$684,000 in Year Two $(\$190 \times 3,600 \text{ tons})$. Note in [Figure 10.10 "Depletion of Wasting Asset"](#) that the ore is initially recorded as inventory and only moved to expense (cost of goods sold) when sold in the subsequent period. For depreciation, expense is recognized immediately as the asset's utility is consumed. With depletion, no expense is recorded until the inventory is eventually sold.

Figure 10.10 Depletion of Wasting Asset

1/1/1	Land with Mineral Rights Cash	\$1,600,000	\$1,600,000
1/1/1	Land with Mineral Rights Cash	400,000 (2,000,000)	400,000
12/31/1	Inventory of Ore Accumulated Depletion	570,000	570,000 (570,000)
Year Two	Cash Revenue from Sale of Ore	1,000,000	1,000,000
	Cost of Goods Sold Inventory of Ore	570,000	570,000
12/31/2	Inventory Accumulated Depletion	684,000	684,000 (1,254,000)

After two years, this land is reported on the company's balance sheet at a net book value of \$746,000 based on its historical cost of \$2 million and accumulated depletion to date of \$1,254,000 $(\$570,000 + \$684,000)$. The remaining inventory of ore is reported as an asset at \$684,000 because it has not yet been sold.

Figure 10.11 Net Book Value of Land with Mineral Rights After Depletion

Land with Mineral Rights	\$2,000,000
Less: Accumulated Depletion	<u>1,254,000</u>
Net Book Value	<u>\$746,000</u>

TEST YOURSELF

Question:

When crude oil is selling for \$30 per barrel, the Ohio Oil Company buys an acre of land for \$3.2 million because it believes that a reserve of oil lies under the ground. The company spends another \$500,000 to set up the proper drilling apparatus. The company believes that 200,000 barrels of oil are in the ground at this location. Once the oil has been extracted, the land will have a resale value of only \$100,000. In both Years One and Two, 70,000 barrels are pumped out but only 50,000 are sold in Year One and another 40,000 in Year Two. The price of crude oil stays steady in Year One but jumps to \$39 per barrel during Year Two. What is the net book value of the land account at the end of Year Two?

- a. \$1,080,000
- b. \$1,180,000
- c. \$1,740,000
- d. \$2,340,000

Answer:

The correct answer is choice b: \$1,180,000.

Explanation:

The cost of this property is \$3.7 million (\$3.2 million plus \$500,000). Expected residual value is \$100,000 so \$3.6 million will be the total depletion (\$3.7 million minus \$100,000). The land holds an estimated 200,000 barrels; thus, the depletion rate is \$18 per barrel (\$3.6 million/200,000 barrels). Over the two years, 140,000 barrels are extracted so that total depletion is \$2.52 million ($18 \times 140,000$). Net book value is reduced to \$1.18 million (\$3.7 million less \$2.52 million).

KEY TAKEAWAY

Additional cost allocation patterns for determining depreciation exist beyond the straight-line method. Accelerated depreciation records more expense in the earlier years of use than in later periods. This pattern is sometimes considered a better matching of expenses with revenues and closer to actual drops in value. The double-declining balance method is the most common version of accelerated depreciation. Its formula was designed to create the appropriate allocation pattern. The units-of-production method can be used for property and equipment where the quantity of work performed is easily monitored. This approach is also used in recording the depletion of wasting assets such as oil wells and silver mines. For federal income tax purposes, the Modified Accelerated Cost Recovery System (MACRS) is required. It provides certain benefits for the acquisition of depreciable assets as a way of encouraging more purchases to help the economy grow. For example, residual values are ignored and the expense is computed for most assets using accelerated depreciation methods.

10.5 Recording Asset Exchanges and Expenditures That Affect Older Assets

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Record the exchange of one asset for another and explain the rationale for this method of accounting.
2. Explain when the fair value of an asset received must be used for recording an exchange rather than the fair value of the property surrendered.
3. Compute the allocation of cost between assets when more than one is acquired in a single transaction.
4. Determine which costs are capitalized when incurred in connection with an asset that has already been in use for some time and explain the impact on future depreciation expense calculations.

Exchanging One Asset for Another

*Question: Some items are acquired by a company through an **asset exchange**¹² instead of as the result of a purchase. For example, the limousine discussed earlier might well be traded away after two years for a newer model. Such transactions are common, especially with vehicles. How is the historical cost of a new asset measured if obtained through an exchange rather than an acquisition?*

To illustrate, assume that this limousine is traded to an automobile manufacturer for a new model on December 31, Year Two. By that time, as shown in [Figure 10.9 "Depreciation—Units-of-Production Method"](#), the net book value had fallen to \$30,000 (cost of \$90,000 less accumulated depreciation of \$60,000). However, because company employees have taken excellent care of the vehicle during its two years of use, its fair value is \$45,000. As has been discussed, net book value rarely equals fair value during the life of property and equipment. Assume that the vehicle being acquired is worth \$100,000 so the company also pays \$55,000 in cash (\$100,000 value received less \$45,000 value surrendered) to complete the trade. How is such an exchange recorded?

12. A trade of one asset for another in which the net book value of the old asset is removed from the records while the new asset is recorded at the fair value surrendered (if known); the difference between the recorded fair value and the previous net book value creates a gain or loss to be shown on the income statement.

Answer: In virtually all cases, fair value is the accounting basis used to record items received in an exchange. The net book value of the old asset is removed from the accounts and the new model is reported at fair value. Fair value is added; net book value is removed. A gain or loss is recognized for the difference.

In this example, the company surrenders two assets with a total fair value of \$100,000 (\$45,000 value for the old limousine plus \$55,000 in cash) to obtain the new vehicle. However, the assets given up have a total net book value of only \$85,000 (\$30,000 and \$55,000). A \$15,000 gain is recognized on the exchange (\$100,000 fair value less \$85,000 net book value). The gain results because the old limousine had not lost as much value as the depreciation process had expensed. The net book value was reduced to \$30,000 but the vehicle was worth \$45,000. Accounting rules are created through a slow and meticulous process to avoid unintended consequences. For example, assume that Company A and Company B buy identical antique limousines for \$30,000 that then appreciate in value to \$100,000 because of their scarcity. Based solely on the accounting rule described in this section, if the two companies exchange these assets, each reports a gain of \$70,000 while still retaining possession of an identical vehicle. This reporting is not appropriate because nothing has changed for either party. In reality, there was no gain since the companies retain the same financial position as before the trade. Thus, in creating the official guidance described previously, FASB held that an exchange must have commercial substance to justify using fair value. In simple terms, the asset acquired has to be different from the asset surrendered as demonstrated by the amount and timing of future cash flows. Without a difference, no rationale exists for making the exchange. If a trade does not have commercial substance, net book value is retained for the newly received asset and no gain is recognized. Based on the actual decline in value, too much expense had been recognized.

The journal entry to record this exchange of assets is presented in [Figure 10.12 "Recording Exchange of Assets"](#).

Figure 10.12 Recording Exchange of Assets

Vehicle (New)	100,000	
Accumulated Depreciation	60,000	
Vehicle (Old)		90,000
Cash		55,000
Gain on Exchange of Limousines		15,000

Determining the Fair Value to Record in an Exchange

Question: In the previous example, the value of the assets surrendered (\$45,000 plus \$55,000 or \$100,000) equals the value of the new limousine received (\$100,000). The trade was exactly even. Because one party might have better negotiating skills or a serious need for a quick trade, the two values can differ, at least slightly. For example, the limousine company could give up its old vehicle (worth \$45,000) and cash (\$55,000) and manage to convince the automobile manufacturer to hand over a new asset worth \$110,000. If the values are not equal in an exchange, which fair value is used for reporting the newly acquired asset? Should the new limousine be recorded at the \$100,000 value given up or the \$110,000 value received?

Answer: To stay consistent with the historical cost principle, the new asset received in a trade is recorded at the fair value of the item or items surrendered. Giving up the previously owned property is the sacrifice made to obtain the new asset. That is the cost to the new buyer.

Generally, the fair value of the items sacrificed equals the fair value of the items received. Most exchanges involve properties of relatively equal worth; a value of \$100,000 is surrendered to acquire a value of \$100,000. However, that is not always the case. Thus, if known, the fair value of the assets given up always serves as the basis for recording the asset received. Only if the value of the property traded away cannot be readily determined is the new asset recorded at its own fair value.

TEST YOURSELF

Question:

On January 1, Year One, a company spends \$39,000 to buy a new piece of machinery with an expected residual value of \$3,000 and a useful life of ten years. The straight-line method of depreciation is applied but not the half-year convention. On October 1, Year Three, the company wants to exchange this asset (which is now worth \$31,000) for a new machine worth \$40,000. To finalize the exchange, the company also pays cash of \$9,000. What is the gain or loss on the trade?

- a. Loss of \$600
- b. Loss of \$1,100
- c. Gain of \$1,300
- d. Gain of \$1,900

Answer:

The correct answer is choice d: Gain of \$1,900.

Explanation:

The new asset is recorded at \$40,000 (\$31,000 fair value + \$9,000 cash). Depreciation has been \$3,600 per year—cost less residual value (\$39,000 - \$3,000 or \$36,000) over a ten-year life. Depreciation in Year Three is \$2,700 (9/12 of \$3,600). Accumulated depreciation is \$9,900 (\$3,600 + \$3,600 + \$2,700); book value is \$29,100 (\$39,000 less \$9,900). If new asset is \$40,000 and book value surrendered is \$38,100 (\$29,100 plus \$9,000), the increase in financial position creates a gain of \$1,900.

Allocating a Purchase Price between Two Assets

Question: Occasionally, two or more assets are bought for a single purchase price. The most common example is the acquisition of a building along with the land on which it sits. As has been discussed, the portion of the cost assigned to the building is depreciated to expense over its useful life in some systematic and rational manner. However, land does not have a finite life. Its cost remains an asset so that this portion of the price has no impact on reported net income over time. How does an accountant separate the amount paid for land from the cost assigned to a building when the two assets are purchased together?

Assume a business pays \$5.0 million for three acres of land along with a five-story building. What part of this cost is attributed to the land and what part to the building? Does management not have a bias to assign more of the \$5.0 million to land and less to the building to reduce the future amounts reported as depreciation expense?

Answer: Companies commonly purchase more than one asset at a time. This is sometimes referred to as a **basket purchase**¹³. For example, a manufacturer might buy several machines in a single transaction. The cost assigned to each should be based on their relative values.

For this illustration, assume that the land and building bought for \$5.0 million have been appraised at \$4.5 million and \$1.5 million, respectively, for a total of \$6.0 million. Perhaps the owner needed cash immediately and was willing to accept a price of only \$5.0 million. For the buyer, the land makes up 75 percent of the value received (\$4.5 million/\$6.0 million) and the building the remaining 25 percent (\$1.5 million/\$6.0 million). The cost is simply assigned in those same proportions: \$3.75 million to the land (\$5.0 million × 75 percent) and \$1.25 million to the building (\$5.0 million × 25 percent). This allocation enables the buyer to make the journal entry presented in **Figure 10.13 "Allocation of Cost between Land and Building with Both Values Known"**.

Figure 10.13 Allocation of Cost between Land and Building with Both Values Known

Land	3,750,000	5,000,000
Building	1,250,000	
Cash		

Occasionally, in a basket purchase, the value can be determined for one of the assets but not for all. As an example, the land might be worth \$4.6 million, but no legitimate value is available for the building. Perhaps similar structures do not exist in this location for comparison purposes. In such cases, the known value is used for that asset with the remainder of the cost assigned to the other property. If the land is worth \$4.6 million but no reasonable value can be ascribed to the building, the excess \$400,000 (\$5,000,000 cost less \$4,600,000 assigned to the land) is arbitrarily assigned to the second asset.

13. The acquisition of more than one asset at a single cost; the cost is then allocated among those assets based on their relative values.

Figure 10.14 Allocation of Cost Based on Known Value for Land Only

Land	4,600,000	\$5,000,000
Building	400,000	
Cash		

Does the possibility of bias exist in these allocations? Accounting is managed by human beings and they always face a variety of biases. That potential problem is one of the primary reasons that independent auditors play such an important role in the financial reporting process. These outside experts work to ensure that financial figures are presented fairly without bias. Obviously, if the buyer assigns more of the cost of a basket purchase to land, future depreciation will be less and reported net income higher. In contrast, if more of the cost is allocated to the building, depreciation expense is higher and taxable income and income tax payments are reduced. That is also a tempting choice.

Thus, the independent auditor gathers sufficient evidence to provide reasonable assurance that such allocations are based on reliable appraisal values so that both the land and the building figures are fairly presented. However, a decision maker is naïve not to realize that potential bias does exist in any reporting process.

Subsequent Expenditures for Property and Equipment

Question: Assume that the building discussed earlier is assigned a cost of \$1,250,000 as shown in Figure 10.13 "Allocation of Cost between Land and Building with Both Values Known". Assume further that this asset has an expected life of twenty years and that straight-line depreciation is applied with no residual value. After eight years, accumulated depreciation is \$500,000 ($\$1,250,000 \times 8 \text{ years} / 20 \text{ years}$). At that point, when the building has a remaining life of 12 years, the owner spends an additional \$150,000 on this asset. Should a later expenditure made in connection with a piece of property or equipment that is already in use be capitalized (added to the asset account) or expensed immediately?

Answer: The answer to this question depends on the impact that this later expenditure has on the building. In many cases, additional money is spent simply to keep the asset operating with no change in expected life or improvement in future productivity. As shown in Figure 10.15 "Recording of Cost to Maintain or Repair Asset", such costs are recorded as maintenance expense if anticipated or repair expense if unexpected. For example, changing the oil in a truck at regular intervals

is a maintenance expense whereas fixing a dent from an accident is a repair expense. However, this distinction has no impact on reported net income.

Figure 10.15 Recording of Cost to Maintain or Repair Asset

Maintenance or Repair Expense	150,000	
Cash		150,000

Other possibilities do exist. If the \$150,000 expenditure increases the future operating capacity of the asset, the cost should be capitalized as shown in [Figure 10.16 "Cost Capitalized Because of Increase in Operating Capacity"](#). The building might have been made bigger, more efficient, more productive, or less expensive to operate. If the asset has been improved as a result of this expenditure, historical cost is raised.

Figure 10.16 Cost Capitalized Because of Increase in Operating Capacity

Building	150,000	
Cash		150,000

Assuming that no change in either the useful life of the building or its residual value occurs as a result of this work, depreciation expense will be \$75,000 in each of the subsequent twelve years. The newly increased net book value is simply allocated over the useful life that remains.

$$(\$1,250,000 + \$150,000 - \$500,000)/12 \text{ remaining years} = \$75,000$$

Another possibility does exist. The \$150,000 might extend the building's life without creating any other improvement. Because the building will now generate revenue for a longer period of time than previously expected, this cost is capitalized. A clear benefit has been gained from the amount spent. The asset is not physically bigger or improved but its estimated life has been extended. Consequently, the building is not increased directly, but instead, accumulated depreciation is reduced as shown in [Figure 10.17 "Cost Capitalized Because Expected Life Is Extended"](#). In effect, this expenditure has recaptured some of the previously expensed utility.

Figure 10.17 *Cost Capitalized Because Expected Life Is Extended*

Accumulated Depreciation	150,000	
Cash		150,000

Assuming that the \$150,000 payment extends the remaining useful life of the building from twelve to eighteen years with no accompanying change in residual value, depreciation expense will be \$50,000 in each of these remaining eighteen years. Once again, net book value has increased by \$150,000 but, in this situation, the life of the asset has also been lengthened.

reduced accumulated depreciation: $\$500,000 - \$150,000 = \$350,000$

adjusted net book value: $\$1,250,000 - \$350,000 = \$900,000$

annual depreciation: $\$900,000 / 18 \text{ years} = \$50,000$

TEST YOURSELF

Question:

The Hatcher Company buys a building on January 1, Year One for \$9 million. It has no anticipated residual value and should help generate revenues for thirty years. On December 31, Year Three, the company spends another \$500,000 to cover the entire structure in a new type of plastic that will extend its useful life for an additional sixteen years. On December 31, Year Four, what will Hatcher report as accumulated depreciation for this building?

- a. \$600,000
- b. \$820,930
- c. \$1,088,372
- d. \$1,100,000

Answer:

The correct answer is choice a: \$600,000.

Explanation:

Annual depreciation is \$300,000 (\$9 million/30 years) or \$900,000 after three years. The \$500,000 expenditure reduces that balance to \$400,000 because it extends the life (from twenty-seven years to forty-three) with no other increase in productivity. Book value is now \$8.6 million (\$9 million cost less \$400,000 accumulated depreciation), which is allocated over forty-three years at a rate of \$200,000 per year. Depreciation for Year Four raises accumulated depreciation from \$400,000 to \$600,000.

KEY TAKEAWAY

Assets are occasionally obtained through exchange. The reported cost for the new acquisition is based on the fair value of the property surrendered because that figure reflects the company's sacrifice. The asset received is only recorded at its own fair value if the value of the asset given up cannot be determined. The difference between the net book value removed and the fair value recorded is recognized as a gain or loss. When more than one asset is acquired in a single transaction, the cost allocation is based on the relative fair values of the items received. Any subsequent costs incurred in connection with property and equipment are capitalized if the asset has been made bigger or better in some way or is just more efficient. If the length of the remaining useful life is extended, capitalization is established by reducing accumulated depreciation.

10.6 Reporting Land Improvements and Impairments in the Value of Property and Equipment

LEARNING OBJECTIVES

At the end of this section, students should be able to meet the following objectives:

1. Identify assets that qualify as land improvements and understand that the distinction between land and land improvements is not always clear.
2. Perform the two tests used in financial accounting to determine the necessity of recognizing a loss because of an impairment in the value of a piece of property or equipment.
3. Explain the theoretical justification for capitalizing interest incurred during the construction of property and equipment.

Recognition of Land Improvements

Question: Land is not subjected to the recording of depreciation expense because it has an infinite life. Often, though, a parking lot, fence, sidewalk, or the like will be attached to land. Those assets do have finite lives. How are attachments to land—such as a sidewalk—reported in financial accounting? Is that cost added to the land account or is some other reporting more appropriate? Should these assets be depreciated?

*Answer: Any asset that is attached to land but has a finite life is recorded in a separate account, frequently referred to as **land improvements**¹⁴. This cost is then depreciated over the estimated life in the same way as equipment or machinery. The cost of a parking lot or sidewalk, for example, is capitalized and then reclassified to expense in a systematic and rational manner.*

In some cases, a distinction between land and improvements is difficult to draw. Accounting rules do not always provide clear guidance for every possible situation. Judgment is occasionally necessary. For example, trees, shrubbery, and sewer systems might be viewed as normal and necessary costs to get land into the condition and position to generate revenues rather than serving as separate assets. Is a sewer system a cost incurred so that land can be utilized or is it truly a distinct

14. Assets attached to land with a finite life such as a parking lot or sidewalk.

asset? U.S. GAAP does not provide absolute rules. Such costs may be carried within the land account and not depreciated or reported as land improvements subject to depreciation. Such flexibility in accounting is more prevalent than might be imagined.

Property and Equipment with Impaired Value

Question: Property and equipment acquisitions are recorded at historical cost, a figure which is depreciated over the asset's anticipated useful life. Land is an exception because it will last forever. These assets are eventually sold, traded, consumed, or disposed of in some other manner. While in use, their value may decline rather rapidly if adverse conditions arise. The economy as a whole or the local business environment might suffer a recession that reduces the worth of a wide array of assets. Or, some unexpected action could create a drop in the value of a specific asset.

In financial reporting, increases in the fair value of property and equipment are ignored because of the conservative nature of accounting, but what about decreases? If the value of property and equipment becomes impaired, is any accounting recognition made of that loss prior to disposal? Is historical cost always the basis for reporting such assets regardless of their worth? For example, as discussed previously, inventory is reported at the lower of cost or market whenever a decline in value has occurred. Is a similar treatment required in reporting property and equipment?

To illustrate, assume that a company constructs a plant for \$3 million to manufacture widgets. Shortly thereafter, the global market for widgets falls precipitously so that the owner of this structure has little use for it. Furthermore, no one else wants to own a manufacturing plant for widgets. Does historical cost continue to be reported for this asset even if the value has been damaged significantly?

Answer: Accounting is influenced by conservatism. Concern should always arise when any piece of property or equipment is thought to be worth less than its normal net book value. Because temporary swings in value can happen frequently and often have no long-term impact, they do not require accounting modification. Historical cost remains the reporting basis.

Permanent declines in the worth of an asset, though, are a problem for the owner that needs to be recognized in some appropriate manner. Consequently, two tests have been created by FASB to determine if the value of property or equipment has been impaired in such a serious fashion that a loss must be recognized.

If a possible impairment of the value of property or equipment is suspected, the owner must estimate the total amount of cash that will be generated by the asset during its remaining life. The resulting cash figure is then compared with the asset's current net book value (cost less accumulated depreciation). A reporting problem exists if the company does not anticipate receiving even enough cash to recover the net book value of the asset. At that point, the asset is a detriment to the company rather than a benefit. This **recoverability test**¹⁵ highlights situations that are so dire that immediate recognition of a loss must be considered.

If expected future cash flows exceed the current net book value of a piece of property or equipment, no reporting is necessary. The asset can still be used to recover its net book value. No permanent impairment has occurred according to the rules of U.S. GAAP.

Conversely, if an asset cannot even generate sufficient cash to recover its own net book value, the accountant performs a second test (the **fair value test**¹⁶) to determine the amount of loss, if any, to be reported. Net book value is compared to present fair value, the amount for which the asset could be sold. For property and equipment, the lower of these two figures is then reported on the balance sheet. Any reduction in the reported asset balance creates a loss to be recognized on the income statement. Mechanically, an impairment loss for property and equipment could be calculated in any one of several ways. FASB established these two tests. Thus, according to U.S. GAAP, the recoverability test and the fair value test must be used when impairment is suspected. Some might argue that this process is not the best method for determining an impairment loss. Standardization, though, helps to better ensure universal understanding of the figures being reported.

The recoverability test illustrated. Assume that the \$3.0 million building in the previous example has been used for a short time so that it now has a net book value of \$2.8 million. Also assume that because of the change in demand for its product, this building is now expected to generate a net positive cash flow of only \$200,000 during each of the next five years or a total of \$1.0 million. No amount of cash is expected after that time. This amount is far below the net book value of \$2.8 million. The company will not be able to recover the asset's net book value through these cash flows. Thus, the building has failed the recoverability test. The fair value test must now be applied to see if a reported loss is necessary.

The fair value test illustrated. Assuming that a real estate appraiser believes this building could be sold for only \$760,000, fair value is below net book value (\$2.8 million is obviously greater than \$760,000). Therefore, the asset account is reduced to this lower figure creating a reported loss of \$2,040,000 (\$2.8 million less \$760,000).

15. A test used to determine whether the value of a long-lived asset has been impaired; if expected future cash flows are less than present net book value, a fair value test is then performed to determine the amount of impairment.

16. A test to determine the amount, if any, by which the value of a long-lived asset has been impaired; if fair value is less than present net book value, this fair value becomes the new basis for reporting and an impairment loss is recorded.

Figure 10.18 *Loss on Impaired Value of Building*

Loss on Impaired Value of Building Building	2,040,000	2,040,000
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In its 2010 financial statements, the **Ford Motor Company** describes this process as follows:

We monitor our asset groups for conditions that may indicate a potential impairment of long-lived assets. These conditions include current-period operating losses combined with a history of losses and a projection of continuing losses, and significant negative industry or economic trends. When these conditions exist, we test for impairment. An impairment charge is recognized for the amount by which the carrying value of the asset group exceeds its estimated fair value.... Based upon the financial impact of rapidly-changing U.S. market conditions during the second quarter of 2008, we projected a decline in net cash flows for the *Ford* North America segment. As a result, in the second quarter of 2008 we tested the long-lived assets for impairment and recorded in Automotive cost of sales a pretax charge of \$5.3 billion.

Talking with an Independent Auditor about International Financial Reporting Standards

Following is more of our interview with Robert A. Vallejo, partner with the accounting firm **PricewaterhouseCoopers**.

Question: The impairment of operational assets is an important reporting issue for many companies because acquired property does not always achieve anticipated levels of profitability. Buildings can be constructed and machinery purchased that simply fail to be as productive as forecasted. According to U.S. GAAP, an asset of this type is viewed as impaired when the total of all future cash flows generated by the asset are expected to be less than its current net book value. At that point, the owner cannot recover the net book value of the asset through continued usage. Consequently, the amount reported for the operational asset is reduced to fair value and a loss recognized. Does IFRS handle this type of problem in the same way as U.S. GAAP?

Rob Vallejo: The need to record impairment losses is the same under IFRS but the measurement process is different. The international standards require companies to identify an asset's fair value by calculating the present value of the future cash flows. As will be demonstrated in [Chapter 11 "In a Set of Financial Statements, What Information Is Conveyed about Intangible Assets?"](#), present value is a method used to compute the current worth of a future stream of cash flows by removing the amount of those payments that can be mathematically attributed to interest. or its net realizable value (anticipated sales price less costs required to sell) if that figure is higher. The asset's value is said to be impaired if this fair value (rather than total cash flows) is below net book value. If so, a loss is reported for the reduction from net book value to fair value. Also, under IFRS, companies return previously impaired assets to original net book value if fair value subsequently increases. In contrast, U.S. GAAP does not allow a write up in value once an impairment has been recorded.

TEST YOURSELF

Question:

Multi-Co. Company owns a small retail clothing store in a shopping center in Houston, Maine. This store has been reporting a loss in recent years because it is in a relatively remote location. The store cost \$1.2 million but its book value has been reduced to \$500,000 as the result of depreciation over the years. Cash flows remain positive at \$40,000 per year. The store has several possible uses and it could be sold for \$530,000. Or the company could continue to hold it for twelve additional years until its utility is consumed. What loss, if any, should the company report at the current time because of the impairment to the value of this asset?

- a. Zero
- b. \$20,000
- c. \$30,000
- d. \$60,000

Answer:

The correct answer is choice a: Zero.

Explanation:

A possible impairment in the value of this store is indicated by the recoverability test. Book value is \$500,000 but all future cash flows only amount to \$480,000 (\$40,000 per year for twelve years). The fair value test then becomes relevant. A reduction is required if the fair value of the asset is below book value. Fair value (\$530,000) is above book value (\$500,000) so no loss is reported. If fair value had been less than \$500,000, the reported balance would be reduced and a loss recognized.

Capitalizing the Cost of Interest During Construction

Question: A company is considering buying a building for \$1.0 million on January 1, Year One so that a retail store can be opened immediately. The company can borrow the money from a bank that requires payment of \$100,000 in interest (an assumed annual rate of 10 percent) at the end of each year.

As a second possibility, the company can borrow the same \$1.0 million on the first day of the current year and use it to build a similar store to be completed and opened on December 31. Again, \$100,000 in interest (10 percent annual rate) must be paid every year, starting at the end of Year One. In both cases, the same amount of money is expended to acquire the structure. If money is borrowed and a building constructed, is the financial reporting the same as if the money had been spent to buy property that could be used immediately?

Answer: A payment of \$1 million is made in both cases for a building to serve as a retail store. Although the monetary cost is the same, the interest payments are handled differently from an accounting perspective. If a building is purchased, the structure can be used immediately to generate revenue. Borrowing the money and paying the \$100,000 interest for Year One allows the company to open the store and start making sales at the beginning of that year. There is no waiting. The matching principle requires this cost to be reported as interest expense for Year One. Expense is matched with the revenue it helps to create.

In contrast, if company officials choose to construct the building, no revenue is generated during Year One. Because of the decision to build rather than buy, revenues are postponed until Year Two. Without any corresponding revenues, expenses are not normally recognized. Choosing to build this structure means that the interest paid during Year One is a normal and necessary cost to get the building ready to use in Year Two. Thus, if the asset is constructed, all interest is **capitalized**¹⁷ rather than expensed until revenues are generated. The \$100,000 is reported as part of the building's historical cost. The cost is then expensed over the useful life—as depreciation—in the years when revenues are earned.

The key distinction is that buying enables the company to generate revenue right away whereas constructing the building means that no revenue will be earned during Year One.

To illustrate, assume that this building is expected to generate revenues for twenty years with no expected residual value and that the straight-method is used for depreciation purposes. Notice the difference in many of the reported figures.

17. Interest cost incurred during the construction of a long-lived asset; the interest is added to the historical cost of the asset rather than being recorded as interest expense; it is viewed as a normal and necessary expenditure to get the asset into position and condition to generate revenues.

Store Bought on January 1, Year One—Revenues Generated Immediately

- Historical cost: \$1 million
- Interest expense reported for Year One: \$100,000
- Interest expense reported for Year Two: \$100,000
- Depreciation expense reported for Year One: \$50,000 (\$1 million/20 years)
- Depreciation expense reported for Year Two: \$50,000
- Net book value at end of Year Two: \$900,000 (\$1 million less \$50,000 and \$50,000)

Store Constructed during Year One—No Revenues Generated until Year Two

- Historical cost: \$1.1 million (includes Year One interest)As discussed in intermediate accounting textbooks, the full amount of interest is not actually capitalized here because the borrowed money is only tied up during the construction gradually. Until added to the project, all remaining funds can be used to generate revenues. However, for this introductory textbook, focus is on the need to capitalize interest because the decision to build defers the earning of revenue until the project is completed. Complete coverage of the rules to be applied can be obtained in an intermediate accounting textbook.
- Interest expense reported for Year One: -0- (no revenues earned)
- Interest expense reported for Year Two: \$100,000
- Depreciation expense reported for Year One: Zero (no revenues earned)
- Depreciation expense reported for Year Two: \$55,000 (\$1.1 million/20 years)
- Net book value at end of Year Two: \$1,045,000 (\$1.1 million less \$55,000)

Fixed Asset Turnover

Question: In previous chapters, a number of vital signs were examined in analyzing receivables and inventory. These ratios and computations are computed by decision makers to help them evaluate the operations of a reporting entity. Are there any vital signs normally studied in connection with property and equipment that a decision maker calculates in analyzing the financial health of a business?

Answer: Ratios and other computed amounts are not as common with noncurrent assets as has been seen with current assets. However, the **fixed asset turnover**¹⁸ indicates the efficiency by which a company uses its property and equipment to generate sales revenues. If a company holds large amounts of fixed assets but fails to generate an appropriate amount of revenue, the ability of management to make good use of those assets should be questioned.

This figure is calculated by taking net sales for a period and dividing it by the average net book value of the company's property and equipment (fixed assets). For example, assume a company reports \$1 million in property and equipment on its balance sheet at the beginning of the year but \$1.2 million at the end. During the year, the company generates \$6.16 million in net sales. The average amount of the fixed assets for this period is \$1.1 million and the fixed asset turnover is 5.6 times for the year.

net sales/average net fixed assets

\$6,160,000/\$1,100,000

5.6 times

KEY TAKEAWAY

“Land improvements” is an asset category that includes property attached to land (such as a fence, sidewalk, or sewer system) that has a finite life and should be depreciated. Unfortunately, the distinction between land and land improvements is sometimes difficult to draw. The accountant must determine whether the cost of property, such as shrubbery, is a separate asset or a cost to get the land into the condition to be used to generate revenues. Over time, property and equipment can lose a significant amount of value for many reasons. If impairment of that value is suspected, a recoverability test is applied to determine whether sufficient cash will be generated by the asset to recover its current net book value. If not, a fair value test is then applied and the asset's net book value is reduced to fair value if that number is lower. During construction of property and equipment, interest is capitalized rather than expensed because revenues are not being generated. The matching principle requires that recognition of this expense be deferred until revenue is earned. For that reason, interest incurred during construction is added to the cost of the asset.

18. Ratio calculated by dividing net sales by the average of the net fixed assets reported for the period; it indicates the efficiency by which property and equipment have been used to generate sales revenues.

Talking with a Real Investing Pro (Continued)

Following is a continuation of our interview with Kevin G. Burns.

Question: On a company's balance sheet, the reporting of land, buildings, and equipment is based on historical cost unless the value is impaired in some manner. Consequently, reported figures often represent expenditures that were made decades ago. However, the fair value of such assets is a very subjective and ever-changing number. The debate over the most relevant type of property and equipment information to provide decision makers is ongoing. Do you think a move should be made to report land, buildings, and equipment at current fair values?

Kevin Burns: I am a value investor. I look for companies that are worth more than is reflected in the current price of their ownership shares. Therefore, I always like "discovering" little nuggets—like hidden land values—that are still carried at cost after decades of ownership. However in the interest of full disclosure and transparency, I think it would be fairer to the average investor to have some sort of appraisal done to estimate fair market value. This information could be reported or just disclosed. The difficulty is, of course, how often to appraise? In a perfect world, a revaluation would be made at least every five years or if a major event occurs that changes the value of the land, building, and equipment by a significant amount.

Video Clip

[\(click to see video\)](#)

Professor Joe Hoyle talks about the five most important points in [Chapter 10 "In a Set of Financial Statements, What Information Is Conveyed about Property and Equipment?"](#).

10.7 End-of-Chapter Exercises

QUESTIONS

1. The Ames Corporation reports property and equipment as \$19,300,000 on its balance sheet. What does that figure represent?
2. What is meant by the term “accumulated depreciation?”
3. In determining the historical cost of property and equipment, what amounts are included?
4. What is meant by the term “market capitalization?”
5. Why is property and equipment not reported on the balance sheet at fair value?
6. Why is the recording of depreciation expense necessary?
7. Why is the cost of land not subjected to depreciation?
8. A company is preparing to determine depreciation expense for a large piece of equipment. What information is needed to determine the amount to report in the current period?
9. Assume a machine is bought for \$300,000, and depreciation each year is \$25,000. What annual adjusting entry is recorded for this depreciation? What is reported as the net book value of the machine at the end of the second year? What expense is reported for the second year?
10. How does an asset qualify to be included as property and equipment on a company’s balance sheet?
11. How is straight-line depreciation determined?
12. Equipment with a five-year expected life is bought during Year One but is later sold on November 8, Year Four. What journal entries are necessary to record the sale?
13. What is the half-year convention? Why is the half-year convention considered acceptable in financial accounting?
14. What is meant by accelerated depreciation? How is the use of accelerated depreciation methods justified theoretically?
15. How does the double-declining balance method determine depreciation expense for each year? What pattern is created by double-declining balance depreciation?
16. When is a company most likely to use the units-of-production method to determine depreciation expense? The units-of-production method is often referred to as a straight-line method. Why is that?
17. Why is the units-of-production method not more widely used?
18. What is meant by MACRS?
19. What are some characteristics commonly associated with MACRS? Why does the government allow those characteristics?
20. What is depletion? How is depletion different from depreciation?
21. A company buys a large building with four acres of land. Why is the allocation of the cost between the building and the land important?

22. A company buys a large building with four acres of land. How is the acquisition cost allocated between these two assets?
23. A company has been using a building for six years to generate revenues. In the current year, the company spends \$900,000 on the building. How would the accountant determine whether this cost should be expensed or capitalized?
24. A company pays \$6 million for a parcel of land and then spends another \$500,000 to install a sewer system. The accountant is not sure whether this \$500,000 cost should be reported within the land account or as a land improvement. Why is that decision important?
25. A company owns a piece of equipment and its value appears to have been impaired. What two tests should the accountant apply? Under what condition is loss reported on an asset impairment?
26. A company constructs a large warehouse. Why is the interest incurred during construction capitalized rather than being expensed? How is the impact of that capitalization reflected in the financial reporting?
27. How does a decision maker calculate the fixed asset turnover for a company?

TRUE OR FALSE

1. ____ A machine is bought, and the price agreed on with the seller is \$13,250. The buyer must report this asset on its balance sheet on that date at \$13,250.
2. ____ The depreciation process is designed to keep the net book value of property and equipment aligned with the asset's fair value.
3. ____ The depreciation for an asset is \$10,000 in the first year, \$20,000 in the second year, and \$12,000 in the third year. On financial statements produced at the end of the third year, depreciation expense is \$12,000, whereas accumulated depreciation is \$42,000.
4. ____ Equipment is bought on October 9, Year One, for \$75,000. It has a five-year life and expected residual value of \$5,000. The half-year convention is used. If the straight-line method of depreciation is applied, accumulated depreciation at the end of Year Two is \$21,000.
5. ____ The Osborne Company sells a piece of equipment that it held for several years. The sale results in a reported loss. This information indicates that the company is more likely to have used the double-declining balance method of depreciation rather than the straight-line method.
6. ____ On January 1, Year One, a company buys a large machine for \$480,000. It has an expected life of eight years and residual value of \$40,000. The double-declining balance method is applied but not the half-year convention. The machine is sold on April 1, Year Three, for cash of \$280,000. The company should record a gain of \$26,875 on the sale.
7. ____ Equipment is bought with an expected life of ten years and no residual value. After two years of use, the net book value will be higher if the straight-line method of depreciation is used rather than the double-declining balance method.
8. ____ A company buys machinery on October 1, Year One, for \$500,000 with a \$100,000 estimated residual value and an expected useful life of ten years. The double-declining balance method is applied along with the half-year convention. The machinery is destroyed on May 1, Year Three, in a flood. The insurance company pays \$300,000 in cash to the company as settlement for the damages. The company will recognize a loss from the flood of \$27,000.
9. ____ Equipment is acquired for \$140,000 with a \$20,000 residual value. The double-declining balance method is used. At the end of its useful life, the asset is sold for \$19,000 in cash. A loss of \$1,000 should be recognized.
10. ____ Equipment is acquired with a cost of \$76,000 and an expected residual value of \$20,000. In applying MACRS, the residual value is

ignored. The primary reason that the government does not take residual value into consideration is to force businesses to pay more money in income taxes.

11. ____ Equipment is acquired for \$78,000 with an expected residual value of \$15,000. After the first year of use, depreciation recognized for financial reporting purposes will be larger than the figure expensed for federal income tax purposes.
12. ____ A company buys an oil well costing \$8 million under the assumption that the well holds one million barrels of oil. The oil well has no residual value. During the first year of ownership, 220,000 barrels of oil are pumped out of the well. Cost of \$1,760,000 must be expensed in that year.
13. ____ A piece of equipment with a cost of \$40,000 and accumulated depreciation of \$28,000 (and a fair value of \$15,000) is traded along with \$4,000 in cash for a similar piece of equipment valued at \$20,000. This new equipment will be reported by the buyer on its financial records at a cost of \$16,000.
14. ____ A piece of equipment with a cost of \$40,000 and accumulated depreciation of \$28,000 (and a fair value of \$15,000) is traded along with \$4,000 in cash for a similar piece of equipment valued at \$20,000. This new equipment will be reported by the buyer on its financial records at a cost of \$20,000.
15. ____ Equipment is bought by the Solomon Corporation for \$360,000 on January 1, Year One. It has an expected life of 10 years with a \$30,000 residual value. Straight-line depreciation is used, but the half-year convention is not applied. On January 1, Year Three, the equipment is traded for similar equipment with a value of \$288,000. However, the value of the equipment surrendered is unknown. The Solomon Corporation should not recognize either a gain or a loss on this exchange.
16. ____ Poston Corporation buys equipment for \$360,000 on January 1, Year One. It has an expected life of ten years and a residual value of \$30,000. Straight-line depreciation is used but not the half-year convention. On January 1, Year Three, the company spends \$39,000 on an improvement to this equipment that will enable it to last four years longer than originally expected. The expenditure has no impact on the estimated residual value. Depreciation expense for Year Three should be \$28,000.
17. ____ On January 1, Year One, the Epstein Corporation buys a plot of land with a four-story office building. The company believes the building is worth \$1.9 million and has an estimated life of twenty years (with no anticipated residual value). The straight-line method is used. The land has an assessed value of \$100,000. Because the seller was interested in a

quick sale, Epstein was able to buy this land and building for \$1.7 million. Depreciation expense to be recognized in Year One is \$80,750.

18. ____ A company buys a machine on October 1, Year One, for \$500,000 with a \$100,000 estimated residual value and an expected life of 10 years. The straight-line method of depreciation and the half-year convention are both used. On December 31, Year Three, company officials examine the machine and decide that it will only be able to generate \$406,000 in future cash flows over its remaining life. It has a fair value at that date of \$338,000. From an accounting perspective, the asset's value is not impaired, and no loss should be recognized.
19. ____ A company buys machinery for \$320,000 in Year One. It has an expected residual value of \$40,000 and a useful life of ten years. After three years, this machinery is sold for \$210,000 in cash. Over the three-year period, the double-declining balance method will reduce net income more than the straight-line method will.
20. ____ A building is being constructed by a company to use in its operations. Interest of \$55,000 is incurred during the construction process. This interest is not expensed but rather added to the capitalized cost of the building.
21. ____ A company has net sales in Year One of \$10 million. The company starts the year with net property and equipment on its balance sheet of \$1 million but ends the year with net property and equipment of \$2.4 million. The fixed asset turnover for Year One is 5.9 times.

MULTIPLE CHOICE

1. On January 1, Year One, the Rhode Island Redbirds organization purchased new workout equipment for its athletes. The equipment had a cost of \$15,600, transportation costs of \$450, and set-up costs of \$290. The Redbirds spent an additional \$350 training their athletes on the proper use of this equipment. The expected useful life is five years. No residual value is anticipated. How much accumulated depreciation should the Redbirds report after two years if the straight-line method is used?
 - a. \$6,240
 - b. \$6,420
 - c. \$6,536
 - d. \$6,676
2. Refer to the information in number 1. Assume the Redbirds decide to use the double-declining balance depreciation method instead of the straight-line method. What amount of accumulated depreciation is reported on the balance sheet at the end of Year Two?
 - a. \$9,890
 - b. \$10,214
 - c. \$10,682
 - d. \$10,918
3. Ace Company buys a machine on April 1, Year One, for \$50,000 in cash. It has a residual value of \$10,000 and an expected useful life of ten years. The straight-line method and the half-year convention are applied. The asset is sold on September 1, Year Three, for \$39,900. What loss should be reported on this sale?
 - a. \$100 loss
 - b. \$850 loss
 - c. \$1,767 loss
 - d. \$2,100 loss
4. The Timmons Company buys equipment on August 1, Year One, for a reported total amount of \$60,000. It has a residual value of \$10,000 and an expected useful life of five years. The straight-line

method and the half-year convention are applied. The company reports net income in Year One of \$70,000. However, an error was made. When this equipment was bought, a \$5,000 cost was capitalized when it should have been expensed. What was the appropriate amount of net income that Timmons should have reported?

- a. \$65,500
 - b. \$67,000
 - c. \$68,000
 - d. \$68,500
5. The Anna Corporation buys equipment on September 1, Year One, for \$80,000 with a ten-year expected life and an estimated residual value of \$10,000. The asset is depreciated using the double-declining balance method and the half-year convention. What is the net book value for this asset at the end of Year Three?
- a. \$40,320
 - b. \$46,080
 - c. \$48,840
 - d. \$51,220
6. The Larisa Company buys machinery on April 1, Year One, for \$50,000 with an expected life of ten years and residual value of \$10,000. The double-declining balance method is applied along with the half-year convention. The machinery is sold on September 1, Year Three, for \$32,400. What gain should be reported on this sale?
- a. \$0
 - b. \$667
 - c. \$4,965
 - d. \$6,480
7. Which of the following is a characteristic of the MACRS system that is used in computing a company's taxable income for federal income tax purposes?
- a. Assets are assigned especially long lives for tax purposes.

- b. An automatic residual value of 10 percent of cost is always assumed.
 - c. All assets are expensed by means of the straight-line method.
 - d. Especially large amounts of expense are recognized in the first few years of an asset's life.
8. The Greenville Company starts operations in Year One and buys several pieces of equipment. All of this equipment is expected to last for ten years and have a residual value equal to 25 percent of cost. MACRS is properly used for tax purposes while straight-line depreciation is applied for financial reporting purposes. Based solely on the expensing of this equipment in Year One, which of the following statements is true?
- a. Reported net income for financial accounting purposes will be higher than taxable income.
 - b. Reported net income for financial accounting purposes will be the same as taxable income.
 - c. Reported net income for financial accounting purposes is likely to be lower than taxable income.
 - d. Reported net income for financial accounting purposes must be lower than taxable income.
9. On January 3, Year One, Jewels Inc. purchases a South American mine (found to be rich in amethyst) for \$560,000. After all of the amethyst has been removed, the land is estimated to be worth only \$100,000. Experts predict that the mine contains 4,000 pounds of amethyst. Jewels plans on completing the extraction process in four years. In Year One, 400 pounds are dug from the mine. None of it has yet been sold. What should be reported as the net book value for the mine at the end of Year One?
- a. \$420,000
 - b. \$445,000
 - c. \$514,000
 - d. \$560,000
10. Kite Corporation wishes to trade equipment it owns for a vehicle owned by the Runner Corporation. Kite's equipment has a net book value of \$4,000 and a fair value of \$4,500. Runner's vehicle has a net book value and fair value of \$5,100. Kite agrees to pay

Runner \$600 in cash in addition to giving up the equipment.
What is Kite's reported gain or loss on this exchange?

- a. \$100
 - b. \$500
 - c. \$600
 - d. \$1,100
11. A company has equipment with a cost of \$50,000 and a net book value at present of \$15,000. The equipment is actually worth \$18,000. It is traded along with cash of \$12,000 for a truck that has a value of \$30,400. What is the company's reported gain or loss on this exchange?
- a. \$3,000 gain
 - b. \$3,000 loss
 - c. \$3,400 gain
 - d. \$3,400 loss
12. The Bristol Corporation buys equipment on January 1, Year One, for \$50,000. It has a ten-year life and an expected residual value of \$5,000. The double-declining balance method of determining depreciation is applied. The equipment actually loses exactly 10 percent of its initial value every year. On January 1, Year Three, this equipment is traded for some new machinery that has a fair value of \$42,000. At what amount should this new machinery be recorded by Bristol?
- a. \$28,800
 - b. \$32,000
 - c. \$40,000
 - d. \$42,000
13. At the beginning of Year Three, the Kelvin Company owned equipment that appeared on its balance sheet with a cost of \$7 million and accumulated depreciation of \$2 million. The equipment was purchased two years earlier and assigned a useful life of six years. The estimated residual value was \$1 million. At the beginning of Year Three, Kelvin made several modifications to the equipment that increased its remaining useful life from four years to five years. No other changes occurred as a result of

these modifications. Their cost was \$50,000. What is the balance in the accumulated depreciation account on December 31, Year Three?

- a. \$2,000,000
 - b. \$2,760,000
 - c. \$2,810,000
 - d. \$3,000,000
14. The Winslett Company buys a retail store on January 1, Year One, with a ten-year life and a cost of \$800,000. No residual value is anticipated. Straight-line depreciation is used. The building was bought because the company believed that it could generate post-cash flows of \$98,000 per year. On January 1, Year Four, a new road is opened in the area that takes much of the traffic away from the store. For the remainder of its life, the company only expects to generate a positive cash flow of \$82,000 per year. An appraisal is made that indicates the building has a fair value of only \$480,000. What recording should be made on that date for this building?
- a. No change should be made.
 - b. A loss of \$77,000 is recognized.
 - c. A loss of \$80,000 is recognized.
 - d. A loss of \$82,000 is recognized.
15. On January 1, Year One, the Capricorn Corporation borrows money on a loan paying 9 percent interest each year. The money is used to construct a new building, which takes exactly one year to complete. The building has a twenty-year expected life with no residual value. In determining net income for Year One, which of the following statements is true?
- a. Neither interest expense nor depreciation expense is recognized in Year One.
 - b. Both interest expense and depreciation expense are recognized in Year One.
 - c. Interest expense is recognized in Year One but not depreciation expense.
 - d. Depreciation expense is recognized in Year One but not interest expense.

VIDEO PROBLEMS

Professor Joe Hoyle discusses the answers to these two problems at the links that are indicated. After formulating your answers, watch each video to see how Professor Hoyle answers these questions.

1. Your roommate is an English major. The roommate's parents own a chain of ice cream shops throughout Florida. One day, while packing to go home on spring break, your roommate poses this question: "My parents have always rented their store locations. However, last year, they built their first standalone shop in Orlando. It has been doing great business, but I know they spent a lot of money to build it. They have been talking recently about the depreciation making the first-year results look bad for that shop. I am not sure what they are talking about. The shop looks better than ever. It hasn't depreciated at all. In fact, the value of that facility has probably gone up. What is this depreciation, and why has it hurt the reported results for the shop in Orlando?" How would you respond?

[\(click to see video\)](#)

2. Your uncle and two friends started a small office supply store several years ago. The company has expanded and now has several large locations. Your uncle knows that you are taking a financial accounting class and asks you the following question: "We bought one of our facilities too far from our other stores. We thought it was a good idea at the time. The store does well, but we have trouble managing it and keeping it stocked with merchandise because of the distance. It is a valuable asset, but it does not fit in with our future plans. Another company has come up to us and offered to trade a large warehouse near our headquarters for that store. The warehouse is actually worth slightly more than the store, but the other company would really like to have a store at that location. And, we could use the warehouse space. We are inclined to make the exchange, but we want to have a careful understanding of how this transaction might impact our financial statements. We don't want to do anything that would make us look bad. We don't want to scare our creditors. How would we record such a swap?" How would you respond?

[\(click to see video\)](#)

PROBLEMS

1. Equipment was bought by a company on January 1, Year One, for \$40,000. It had an expected useful life of five years and a \$5,000 residual value. Unfortunately, at the time of purchase, an error was made. The accountant debited supplies expense for \$40,000 and credited cash. No adjusting entry was ever made. At the end of Year One, the company reported net income of \$100,000 and total assets of \$300,000. What should those reported figures have been under each of the following situations?
 - a. The company uses the straight-line method to depreciate all equipment.
 - b. The company uses the double-declining balance method to depreciate all equipment.
2. Company X and Company Y are identical in every way except as follows. On August 1, Year One, both companies buy machinery with a cost of \$80,000 and an estimated residual value of \$10,000. The equipment has an expected useful life of ten years. Both companies use the half-year convention. Company X reported net income for Year One of \$160,000. Company X used the straight-line method of determining depreciation expense. What would have been the reported net income for Company Y if it applied the double-declining balance method?
3. On January 1, Year One, the Sanborn Corporation buys a donut maker for \$10,000 that has a ten-year estimated life and an estimated residual value of \$1,000. The donut maker is expected to produce a total of 100,000 dozen donuts over its life. In Year One, 13,000 dozen are produced and, in Year Two, 11,000 dozen are produced.
 - a. If the straight-line method of depreciation is applied, what appears in the Year One and in the Year Two financial statements in connection with this donut maker?
 - b. If the double-declining balance method of depreciation is applied, what appears in the Year One and in the Year Two financial statements in connection with this donut maker?
 - c. If the units-of-production method of depreciation is applied, what appears in the Year One and in the Year Two financial statements in connection with this donut maker?

- d. Based on the answers to the previous questions, what is the fair value of the donut maker at the end of Year Two?
 - e. Which of these depreciation methods provides the fairest representation of the donut maker and its use?
 - f. If the donut maker is sold on October 1, Year Three, depreciation must be recorded for the period from the beginning of the year until the sale. What are the two reasons that this recording is necessary?
 - g. Assume the straight-line method is used, and the donut maker is sold on October 1, Year Three, for \$7,100 in cash. What journal entry is recorded for the sale? Assume that the half-year convention is not in use.
 - h. How is the journal entry in problem 3.g. impacted if the half-year convention is being used for any period of time of less than a full year?
4. Company A and Company Z both bought buildings on January 1, Year One, for \$700,000 in cash. They each spent an additional \$60,000 in connection with their buildings. Company A believed the \$60,000 expenditure was normal and necessary to get the building into the condition to generate revenue. Company Z did not believe that cost was normal and necessary. Both companies use straight-line depreciation and believe the buildings have a ten-year life with a residual value of \$50,000. What will be the difference in the reported net income of these two companies for Year One? What will be the difference in the reported net income of these two companies for Year Two?
5. On April 1, Year One, Chang and Chang Inc. invested in a new machine to manufacture soccer balls. The machine is expected to manufacture 1.4 million soccer balls over its life of three years and then be scrapped. The machine cost \$50,000 including the normal and necessary costs of setting it up. The units-of-production method is used to depreciate the machine.
- a. Record depreciation for Year One and Year Two assuming that 450,000 soccer balls were manufactured and sold in Year One and 600,000 were manufactured and sold in Year Two.
 - b. On January 1, Year Three, Chang and Chang decides to get out of the soccer ball production business and sells the machine for \$15,000 in cash. Record this journal entry.
6. Springfield Corporation purchases a new machine on March 3, Year One, for \$35,600 in cash. It pays an additional \$3,400 to

transport and set up the machine. Springfield's accountant determines that the equipment has no residual value and that the useful life is five years. It is expected to generate 2.4 million units during its life. If applicable, assume that Springfield employs the half-year convention.

- a. Record the purchase of the machine.
 - b. Assume that Springfield uses the straight-line method of depreciation. Record depreciation expense for the first two years of the machine's life.
 - c. Assume that Springfield uses the double-declining balance method of depreciation. Record depreciation expense for the first two years of the machine's life.
 - d. Assume that Springfield uses the units-of-production method of depreciation. During Year One, the machine produces 600,000 units. During Year Two, the machine produces 578,000 units. Record depreciation expense for the first two years of the machine's life.
7. A company uses the half-year convention and buys equipment for \$200,000 on December 1, Year One. The equipment has an expected life of ten years and a \$40,000 anticipated residual value. The equipment is sold on March 1, Year Three, for \$165,000 in cash.
- a. Make all the entries from December 1, Year One, to March 1, Year Three, for this equipment assuming that the double-declining balance method is in use.
 - b. Make all the entries from December 1, Year One, to March 1, Year Three, for this equipment assuming that the straight-line method is in use.
8. The Huguenot Corporation buys equipment on October 1, Year One, for \$120,000. It has an expected residual value of \$30,000. The company expects to make use of it for ten years. The straight-line method of depreciation is applied but not the half-year convention. The equipment is sold on April 1, Year Three, for \$107,000.

What would have been the difference in reported net income for Year Three if the double-declining balance method had been used along with the half-year convention?

9. On January 1, Year One, the Oklahoma Corporation buys an oil well for \$2 million in cash. The company believes that this well holds 400,000 barrels in crude oil. However, the oil well will have no residual value after the oil has been removed. In Year One, the company pumps out 100,000 barrels and sells 70,000 barrels for \$19 per barrel. In Year Two, the company pumps out another 50,000 barrels but sells a total of 60,000 barrels for \$20 per barrel.

Make the necessary journal entries.

10. Markov Corporation owns forests that are harvested with the wood sold to papermaking companies. Markov purchases a new tract of forest on January 1, Year One, for \$360,000. Company officials estimate that 4,000 tons of wood can be harvested from the forest and sold. After that, the land will be worth about \$20,000.
- In Year One, 2,500 tons of wood are harvested, and 2,200 are sold for \$120 per ton. Make any necessary journal entries.
 - In Year Two, the remaining 1,500 tons of wood are harvested, and then 1,800 tons are sold for \$120 per ton. Make any necessary journal entries.
11. The Watson Company buys a truck on February 3, Year One, for \$53,000 with a six-year life and a \$5,000 estimated residual value. The half-year convention is used along with straight-line depreciation. On May 23, Year Three, the truck is traded for a different style of truck. The old truck had a fair value of \$40,000 at that time. The new truck had a fair value of \$41,000. Because the dealer really wanted to make the trade, the \$1,000 difference in the two fair values was ignored. What journal entry does the Watson Company make to record this trade?
12. The Ferrum Company acquired a large machine for \$360,000 in cash on January 1, Year One. Straight-line depreciation is going to be recorded over an expected life of ten years. The asset has an estimated residual value of \$20,000. In reality, this machine lost \$60,000 of its value each year. On the first day of Year Three, the asset was traded for another machine with a fair value of \$254,000. What journal entry does Ferrum prepare to record this exchange?

13. Gameplay Company operates in mall locations and sells videogame equipment and games. The company purchased furniture and fixtures to use in one of its stores for \$440,000 on January 1, Year One. The furniture and fixtures were being depreciated using the straight-line method over ten years with a residual value of \$10,000. Near the end of December, Year Five, Gameplay decided to close this location and entered into an exchange agreement with Allero Corporation. Allero agreed to give Gameplay vehicles with a fair value of \$200,000 and cash of \$50,000 in exchange for the furniture and fixtures from this store. The furniture and fixtures have an estimated fair value of \$250,000 on the date of exchange.
- Make the depreciation entry for the furniture and fixtures necessary in December Year Five, assuming that no entries have been made during the year.
 - Determine the net book value of the furniture and fixtures on the date of exchange.
 - Record the journal entry Gameplay makes to record this exchange.
14. The Milan Corporation owns a building that it has used for a number of years. At the start of the current year, the building has a cost of \$1.5 million and accumulated depreciation of \$600,000. Straight line depreciation has been used with no expected residual value. The asset was originally assumed to have a thirty-year life, and twelve years have now passed.

Assume that each of the following situations is entirely independent. For each, prepare the appropriate journal entry and determine the amount of depreciation expense that should be reported for the current year.

- The company spends \$22,000 in cash to paint the building. When the company bought the building originally, officials had anticipated that it would need to be painted periodically in order to last for thirty years.
- The company spends \$80,000 to add a new room at the back of the building.

- c. The company spends \$35,000 to fix a rotten space on the roof which was beginning to leak. Officials had not expected that the roof would rot.
 - d. The company spends \$30,000 on a new type of foundation improvement. Officials had not expected to do this but now believe the building will last for an additional five years because of this work.
15. The Monster Cookie Company buys a machine to make cookies on January 1, Year One. It costs \$500,000 but has a \$100,000 residual value and an expected life of ten years. Straight-line depreciation is to be applied. On January 1, Year Three, the company makes two changes to this machine. First, \$30,000 is spent to add an attachment so that the company can make two types of cookies rather than just one. Second, the company spends \$40,000 so that the machine will last five years longer than originally anticipated.

In connection with this machine, what figures are reported on the company's financial statements for Year Three?

16. The Romo Corporation buys equipment for \$190,000 on January 1, Year One. It has a twelve-year life and an expected residual value of \$40,000. Straight-line depreciation is being applied. At the start of Year Three, the company spends \$40,000 on this equipment to make it more effective at generating revenue (more widgets can be produced each period, and they will be of a better quality). This added cost did not extend the life of the asset or impact its residual value. Make all journal entries and adjusting entries for Year Three.
17. On June 30, Partyplace, a popular spot for receptions and other events, purchased a used limousine and a used Hummer from a car dealership. The company received a good deal because it was willing to buy both vehicles, paying a total of only \$75,000. The market values were \$45,000 for the limousine and \$40,000 for the Hummer.
- a. Record the purchase of the vehicles.
 - b. During the year, Partyplace performed maintenance on the vehicles (oil changes and the like) that amounted to \$600. Record this expenditure.

- c. During the year, Partyplace made some modifications to the limo that should make it more appealing to its customers, thus, in effect, increasing its ability to generate revenues. These modifications cost \$4,000. Record this expenditure.
18. An asset is bought for \$360,000 on the first day of Year One. The life of this asset is ten years. There is no expected residual value. Straight-line depreciation is used for this asset but not the half-year convention. Subsequently, on the first day of Year Three, the asset is worth \$240,000. On that day, company officials estimate that this asset will generate positive cash flows of \$35,000 per year for the rest of its useful life. At what net book value should the asset be reported at that time?
19. The Randolph Corporation owns a building in Waynesboro, Arkansas, that originally cost \$2 million. At the current time, this building has a net book value of \$900,000 and a remaining useful life of ten years with no expected residual value. However, the company no longer uses the building for manufacturing purposes, so its fair value has fallen to only \$576,000. To generate some revenue from the building, several rooms are rented out to other businesses as warehouse space. In each of the following questions, should the company recognize an impairment loss? If so, how much loss should be recognized?
 - a. The cash received from the rental income is \$86,000 per year and is expected to last for the remaining life of the building.
 - b. The cash received from the rental income is \$93,000 per year and is expected to last for the remaining life of the building.
20. Fairfield Inc. invested in a plant to manufacture “Jphones,” thinking these devices would be the next “big thing.” Unfortunately, things did not work out so well for the Jphone.
 - a. Fairfield purchased the plant on March 1, Year One, for \$46,790,000. Additional costs to get the facility up and running amounted to \$3,780,000. Fairfield assigned a thirty-year useful life to the asset. The expected residual value is \$4 million for the building. Fairfield uses the double-declining balance method. Record the acquisition of the plant and depreciation for the first three years, assuming that Fairfield does not use the half-year convention.

- b. On December 31, Year Three, Fairfield's auditors raise concerns that the plant's market value might be below its net book value due to the failure of the Iphone to gain market share. The auditors believe this decline is permanent and decide to test for impairment. The accountants and auditors agree that the plant will generate net cash flows of approximately \$2 million each year but only for the next fifteen years. Perform a test of recoverability on the plant.
 - c. Assume that the auditors determine that the plant's expected future cash flows are below its net book value. The company must now perform the fair value test. Several appraisers are called in, and the average fair value is \$15,600,000. Determine if Fairfield must record an impairment loss and, if so, determine the amount.
21. Company A borrows \$4 million on January 1, Year One, and uses the money to buy a retail store in Trenton, New Jersey. The store opens immediately and starts to make sales. The annual interest rate on the debt is 6 percent with payments made every December 31. The building has a twenty-year expected life and no residual value. Straight-line depreciation is used.

Company Z also borrows \$4 million on January 1, Year One, but uses the money to construct a store in Reno, Nevada, that is exactly like the store owned by Company A. Construction takes one year, and the store is opened for business on January 1, Year Two. The annual interest rate is 6 percent, and the building is expected to last twenty years with no anticipated residual value. Straight-line depreciation is used.

On Year Two financial statements, how will the balances be different between the reporting by Company A and the reporting by Company Z?

COMPREHENSIVE PROBLEM

This problem will carry through over several chapters to enable students to build their accounting skills using knowledge gained in previous chapters.

In Chapter 9 "Why Does a Company Need a Cost Flow Assumption in Reporting Inventory?", financial statements were prepared for Webworks for September 30, and the month then ended. Those financial statements are included here as a starting point for the financial reporting for October.

Figure 10.19

Webworks Income Statement As of September 30	
Revenue	\$11,400
Cost of Goods Sold	(5,315)
Gross Profit	<u>6,085</u>
Other Expenses	(3,435)
Earnings before Tax	<u>2,650</u>
Tax Expense	(795)
Net Income	<u>\$1,855</u>

Figure 10.20

Webworks Stmt. of Retained Earnings As of September 30	
Retained Earnings, September 1	\$2,790
Net Income	<u>1,855</u>
Retained Earnings, September 30	<u>\$4,645</u>

Figure 10.21

Webworks Balance Sheet September 30			
Assets		Liabilities	
Current		Current	
Cash	\$3,300	Accounts Payable	\$1,285
Accounts Receivable	1,750	Salaries Payable	300
Less Allowance for Doubtful Accounts	(175)	Unearned Revenue	100
Net Accounts Receivable	1,575		
Merchandise Inventory	1,385		
Supplies Inventory	70		
Total Current Assets	\$6,330	Total Current Liabilities	\$1,685
Noncurrent		Noncurrent	
Equipment	\$7,000	Notes Payable	\$5,000
		Owners' Equity	
		Capital Stock	\$2,000
		Retained Earnings	4,645
		Total Owners' Equity	\$6,645
Total Assets	\$13,330	Total Liabilities & Owners' Equity	\$13,330

The following events occur during October:

- a. Webworks purchases supplies worth \$100 on account.
- b. Webworks paid \$600 in rent for October, November, and December.
- c. At the beginning of October, Webworks had nine keyboards costing \$105 each and forty flash drives costing \$11 each. Webworks uses periodic FIFO to cost its inventory.
- d. On account, Webworks purchases fifty keyboards for \$110 each and 100 flash drives for \$12 each.
- e. Webworks starts and completes seven more sites and bills clients for \$3,900.
- f. Webworks pays Nancy Po \$700 for her work during the first three weeks of October.
- g. Webworks sells 50 keyboards for \$7,500 and 110 flash drives for \$2,200 cash.
- h. The Web site paid for in August and started in September was completed. The client originally paid the entire \$100 in advance.
- i. Webworks paid off the remainder of its note payable.
- j. Webworks collects \$4,000 in accounts receivable.
- k. Webworks pays off its salaries payable from September.

- l. Webworks pays off \$6,000 of its accounts payable.
- m. One Web site client is dissatisfied with the work done and refuses to pay his bill. Rather than incur the expense of taking the client to court, Webworks writes off the \$200 account as uncollectible.
- n. Webworks pays Leon Jackson (the owner of this business) a salary of \$2,000.
- o. Webworks purchased office furniture on account for \$1,000, including transportation and setup.
- p. Webworks pays taxes of \$868 in cash.

Required:

- a. Prepare journal entries for the previous events.
 - b. Post the journal entries to T-accounts.
 - c. Prepare an unadjusted trial balance for Webworks for October.
 - d. Prepare adjusting entries for the following and post them to your T-accounts.
- q. Webworks owes Nancy Po \$100 for her work during the last week of October.
 - r. Leon's parents let him know that Webworks owes \$300 toward the electricity bill. Webworks will pay them in November.
 - s. Webworks determines that it has \$50 worth of supplies remaining at the end of October.
 - t. Prepaid rent should be adjusted for October's portion.
 - u. Webworks is continuing to accrue bad debts at 10 percent of accounts receivable.
 - v. A CPA tells Leon that Webworks should be depreciating its equipment and furniture. The CPA recommends that Webworks use the straight-line method with a four-year life for the equipment and a five-year life for the furniture. Since Webworks is only generating these monthly statements for internal information, the CPA recommends that Leon just "catch up" the prior month's depreciation on the equipment this month. So when Webworks records October's equipment depreciation, it will also record the depreciation that should have been taken in July, August and September. The depreciation on the furniture should just be for one month. Round to the nearest whole number.
 - w. Record cost of goods sold.
- e. Prepare an adjusted trial balance.

- f. Prepare financial statements for October.

RESEARCH ASSIGNMENT

Assume that you take a job as a summer employee for an investment advisory service. One of the partners for that firm is currently looking at the possibility of investing in **DuPont** (official name is **E. I. Du Pont de Nemours and Company**). The partner knows that this manufacturing company has been in business for many years and wonders about the age of its property and equipment. The partner asks you to look at the 2011 financial statements for **DuPont** by following this path:

- Go to investors.dupont.com.
 - At the bottom of this screen, click on “SEC Filings.”
 - In the “Groupings Filter,” click on “Annual Filings.”
 - Scroll through the document tables until you find the 10-K form for 2011 (issued early in 2012).
 - Go to page F-5 and find the balance sheet for December 31, 2011.
 - Go to page F-9 and read the note to the financial statements titled “Property, Plant and Equipment.”
- a. Using the amounts reported on the 2011 balance sheet for property, plant, and equipment and accumulated depreciation, divide the net book value by the cost of the asset. What does the resulting percentage tell about the current age and utility of the company’s property, plant, and equipment?
 - b. Using the information disclosed on page F-9, what method of depreciation is being used by **DuPont**? What is the age used by the company for depreciation purposes?
 - c. Combine the information found in a. and b. to arrive at an estimation of the age of the property, plant, and equipment held by **DuPont**.