

Introduction to Accounting: The Language of Business

Lesson 8: Long-Term Operating Assets

Supplemental Textbook



Chapter 8: Part 1

Property, plant, and equipment

Learning objectives

After studying this section, you should be able to:

- List the characteristics of plant assets and identify the costs of acquiring plant assets.
- List the four major factors affecting depreciation expense.
- Describe the various methods of calculating depreciation expense.
- Distinguish between capital and revenue expenditures for plant assets.
- Describe the subsidiary records used to control plant assets.
- Analyze and use the financial results—rate of return on operating assets.

A company accountant's role in managing plant assets

Property, plant, and equipment (fixed assets or operating assets) compose more than one-half of total assets in many corporations. These resources are necessary for the companies to operate and ultimately make a profit. It is the efficient use of these resources that in many cases determines the amount of profit corporations will earn.

Accountants employed by a company are deeply involved in nearly all decisions regarding the company's fixed assets, from pre-acquisition planning to the ultimate disposal or sale of those assets. Companies do not view an asset acquisition as merely a purchase, but as an investment. For example, should your company or client purchase an airplane to visit clients? Accountants will investigate all the benefits, both financial and intangible, and compare these benefits to the costs. By determining whether or not the airplane will be a good investment for the company, the accountant can assist the company in making sound strategic business decisions.

Since these assets are so closely related to profits, good management is required. In accounting terms, a good return on operating assets is crucial to the success of the corporation. Many corporations have a staff of accountants whose primary task is to manage operating assets. This task involves making decisions concerning the purchase, use, and disposal of said assets. Once an asset has been acquired, accountants are responsible for determining the original value of the asset, the period over which it will extend benefits to the company, and its current market value while owned by the entity. The accountant must ultimately determine when and how to dispose of such an asset. The decision can range from trading the asset for a new asset to selling the asset to a salvage dealer.

Recently, The Williams Companies, Inc. had over USD 10 billion dollars in property, plant, and equipment. In addition, the company also had approximately USD 530 million in commitments for construction and acquisition of property, plant, and equipment. Managing a portfolio of assets of this magnitude takes both accounting knowledge and analytical skills. Successful management of these assets can be financially rewarding to both the company and the accountant.

On a classified balance sheet, the asset section contains: (1) current assets; (2) property, plant, and equipment; and (3) other categories such as intangible assets and long-term investments. Previous chapters discussed current assets. This chapter begins a discussion of property, plant, and equipment that is concluded in Chapter 8 Part 2 below. Property, plant, and equipment are often called **plant and equipment** or simply plant assets. Plant assets

are long-lived assets because they are expected to last for more than one year. Long-lived assets consist of tangible assets and intangible assets. **Tangible assets** have physical characteristics that we can see and touch; they include plant assets such as buildings and furniture, and natural resources such as gas and oil. **Intangible assets** have no physical characteristics that we can see and touch but represent exclusive privileges and rights to their owners.

Nature of plant assets

To be classified as a plant asset, an asset must: (1) be tangible, that is, capable of being seen and touched; (2) have a useful service life of more than one year; and (3) be used in business operations rather than held for resale. Common plant assets are buildings, machines, tools, and office equipment. On the balance sheet, these assets appear under the heading "Property, plant, and equipment".

Plant assets include all long-lived tangible assets used to generate the principal revenues of the business. Inventory is a tangible asset but not a plant asset because inventory is usually not long-lived and it is held for sale rather than for use. What represents a plant asset to one company may be inventory to another. For example, a business such as a retail appliance store may classify a delivery truck as a plant asset because the truck is used to deliver merchandise. A business such as a truck dealership would classify the same delivery truck as inventory because the truck is held for sale. Also, land held for speculation or not yet put into service is a long-term investment rather than a plant asset because the land is not being used by the business. However, standby equipment used only in peak or emergency periods is a plant asset because it is used in the operations of the business.

Accountants view plant assets as a collection of service potentials that are consumed over a long time. For example, over several years, a delivery truck may provide 100,000 miles of delivery services to an appliance business. A new building may provide 40 years of shelter, while a machine may perform a particular operation on 400,000 parts. In each instance, purchase of the plant asset actually represents the advance payment or prepayment for expected services. Plant asset costs are a form of prepaid expense. As with short-term prepayments, the accountant must allocate the cost of these services to the accounting periods benefited.

Accounting for plant assets involves the following four steps:

- Record the acquisition cost of the asset.
- Record the allocation of the asset's original cost to periods of its useful life through depreciation.
- Record subsequent expenditures on the asset.
- Account for the disposal of the asset.

In Exhibit 1, note how the asset's life begins with its procurement and the recording of its acquisition cost, which is usually in the form of a dollar purchase. Then, as the asset provides services through time, accountants record the asset's depreciation and any subsequent expenditures related to the asset. Finally, accountants record the disposal of the asset. We discuss the first three steps in this section and the disposal of an asset in Part 2 below. The last section in this chapter explains how accountants use subsidiary ledgers to control assets.

Remember that in recording the life history of an asset, accountants match expenses related to the asset with the revenues generated by it. Because measuring the periodic expense of plant assets affects net income, accounting for property, plant, and equipment is important to financial statement users.

Initial recording of plant assets

When a company acquires a plant asset, accountants record the asset at the cost of acquisition (historical cost). This cost is objective, verifiable, and the best measure of an asset's fair market value at the time of purchase. **Fair market value** is the price received for an item sold in the normal course of business (not at a forced liquidation sale). Even if the market value of the asset changes over time, accountants continue to report the acquisition cost in the asset account in subsequent periods.

The **acquisition cost** of a plant asset is the amount of cash or cash equivalents given up to acquire and place the asset in operating condition at its proper location. Thus, cost includes all normal, reasonable, and necessary expenditures to obtain the asset and get it ready for use. Acquisition cost also includes the repair and reconditioning costs for used or damaged assets. Unnecessary costs (such as traffic tickets or fines) that must be paid as a result of hauling machinery to a new plant are not part of the acquisition cost of the asset.

The next sections discuss which costs are capitalized (debited to an asset account) for: (1) land and land improvements; (2) buildings; (3) group purchases of assets; (4) machinery and other equipment; (5) self-constructed assets; (6) noncash acquisitions; and (7) gifts of plant assets.

The cost of land includes its purchase price and other costs such as option cost, real estate commissions, title search and title transfer fees, and title insurance premiums. Also included are an existing mortgage note or unpaid taxes (back taxes) assumed by the purchaser; costs of surveying, clearing, and grading; and local assessments for sidewalks, streets, sewers, and water mains. Sometimes land purchased as a building site contains an unusable building that must be removed. Then, the accountant debits the entire purchase price to Land, including the cost of removing the building less any cash received from the sale of salvaged items while the land is being readied for use.

Illustration 10.1 Recording the Life History of a Depreciable Asset

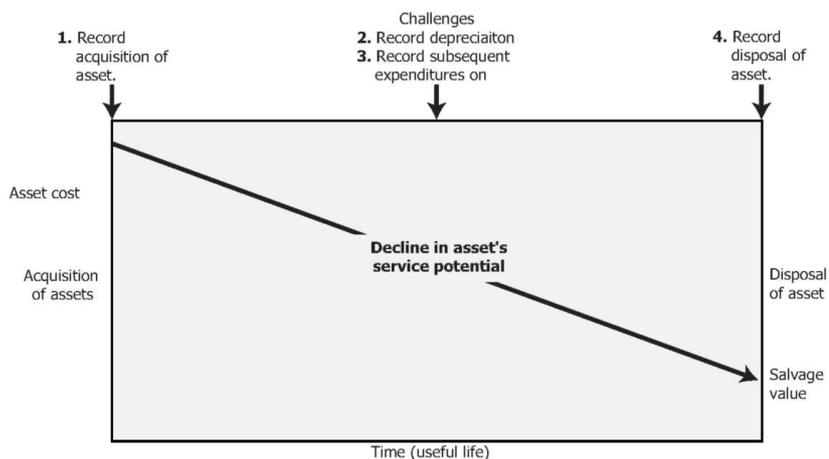


Exhibit 1: Recording the life history of a depreciable asset

To illustrate, assume that Spivey Company purchased an old farm on the outskirts of San Diego, California, USA, as a factory site. The company paid USD 225,000 for the property. In addition, the company agreed to pay unpaid property taxes from previous periods (called back taxes) of USD 12,000. Attorneys' fees and other legal costs relating to the purchase of the farm totaled USD 1,800. Spivey demolished (razed) the farm buildings at a cost of USD 18,000. The company salvaged some of the structural pieces of the building and sold them for USD 3,000.

Because the firm was constructing a new building at the site, the city assessed Spivey Company USD 9,000 for water mains, sewers, and street paving. Spivey computed the cost of the land as follows:

	Land
Cost of factory site	\$225,000
Back taxes	12,000
Attorneys' fees and other legal costs	1,800
Demolition	18,000
Sale of salvaged parts	(3,000)
City assessment	9,000
	\$262,800

Accountants assigned all costs relating to the farm purchase and razing of the old buildings to the Land account because the old buildings purchased with the land were not usable. The real goal was to purchase the land, but the land was not available without the buildings.

Land is considered to have an unlimited life and is therefore not depreciable. However, **land improvements**, including driveways, temporary landscaping, parking lots, fences, lighting systems, and sprinkler systems, are attachments to the land. They have limited lives and therefore are depreciable. Owners record depreciable land improvements in a separate account called Land Improvements. They record the cost of permanent landscaping, including leveling and grading, in the Land account.

When a business buys a building, its cost includes the purchase price, repair and remodeling costs, unpaid taxes assumed by the purchaser, legal costs, and real estate commissions paid.

Determining the cost of constructing a new building is often more difficult. Usually this cost includes architect's fees; building permits; payments to contractors; and the cost of digging the foundation. Also included are labor and materials to build the building; salaries of officers supervising the construction; and insurance, taxes, and interest during the construction period. Any miscellaneous amounts earned from the building during construction reduce the cost of the building. For example, an owner who could rent out a small completed portion during construction of the remainder of the building, would credit the rental proceeds to the Buildings account rather than to a revenue account.

Sometimes a company buys land and other assets for a lump sum. When land and buildings purchased together are to be used, the firm divides the total cost and establishes separate ledger accounts for land and for buildings. This division of cost establishes the proper balances in the appropriate accounts. This is especially important later because the depreciation recorded on the buildings affects reported income, while no depreciation is taken on the land.

Returning to our example of Spivey Company, suppose one of the farm buildings was going to be remodeled for use by the company. Then, Spivey would determine what portion of the purchase price of the farm, back taxes, and legal fees (USD 225,000 + USD 12,000 + USD 1,800 = USD 238,800) it could assign to the buildings and what portion to the land. (The net cost of demolition would not be incurred, and the city assessment would be incurred at a later time.) Spivey would assign the USD 238,800 to the land and the buildings on the basis of their appraised values. For example, assume that the land was appraised at USD 162,000 and the buildings at USD 108,000. Spivey would determine the cost assignable to each of these plant assets as follows:

Asset	Appraised Value	Per cent of Total Value	Cost Assigned
Land	\$162,000	60% (162/270)	
Buildings	108,000	40 (108/270)	
	\$270,000	100% (270/270)	
	Per cent of Total Value	X Purchase Price =	Cost Assigned
Land	60%	X \$238,800* =	\$ 143,280
Buildings	40	X \$238,800 =	95,520
			\$ 238,800

*The purchase price is the sum of the cash price, back taxes, and legal fees.

The journal entry to record the purchase of the land and buildings would be:

Land (+A)	143,280	
Buildings (+A)	95,520	
Cash (-A)		238,800
To record the purchase of land and buildings.		

When the city eventually assessed the charges for the water mains, sewers, and street paving, the company would still debit these costs to the Land account as in the previous example.

Often companies purchase machinery or other equipment such as delivery or office equipment. Its cost includes the seller's net invoice price (whether the discount is taken or not), transportation charges incurred, insurance in transit, cost of installation, costs of accessories, and testing and break-in costs. Also included are other costs needed to put the machine or equipment in operating condition in its intended location. The cost of machinery does not include removing and disposing of a replaced, old machine that has been used in operations. Such costs are part of the gain or loss on disposal of the old machine, as discussed in Chapter 8: Part 2 below.

To illustrate, assume that Clark Company purchased new equipment to replace equipment that it has used for five years. The company paid a net purchase price of USD 150,000, brokerage fees of USD 5,000, legal fees of USD 2,000, and freight and insurance in transit of USD 3,000. In addition, the company paid USD 1,500 to remove old equipment and USD 2,000 to install new equipment. Clark would compute the cost of new equipment as follows:

Net purchase price	\$150,000
Brokerage fees	5,000
Legal fees	2,000
Freight and insurance in transit	3,000
Installation costs	2,000
Total cost	\$162,000

If a company builds a plant asset for its own use, the cost includes all materials and labor directly traceable to construction of the asset. Also included in the cost of the asset are interest costs related to the asset and amounts paid for utilities (such as heat, light, and power) and for supplies used during construction. To determine how much of these indirect costs to capitalize, the company compares utility and supply costs during the construction period with those costs in a period when no construction occurred. The firm records the increase as part of the asset's cost. For example, assume a company normally incurred a USD 600 utility bill for June. This year, the company constructed a machine during June, and the utility bill was USD 975. Thus, it records the USD 375 increase as part of the machine's cost.

To illustrate further, assume that Tanner Company needed a new die-casting machine and received a quote from Smith Company for USD 23,000, plus USD 1,000 freight costs. Tanner decided to build the machine rather than buy it. The company incurred the following costs to build the machine: materials, USD 4,000; labor, USD 13,000; and indirect services of heat, power, and supplies, USD 3,000. Tanner would record the machine at its cost of USD 20,000 (USD 4,000 + USD 13,000 + USD 3,000) rather than USD 24,000, the purchase price of the machine. The USD 20,000 is the cost of the resources given up to construct the machine. Also, recording the machine at USD 24,000 would require Tanner to recognize a gain on construction of the assets. Accountants do not subscribe to the idea that a business can earn revenue (or realize a gain), and therefore net income, by dealing with itself.

You can apply the general guidelines we have just discussed to other plant assets, such as furniture and fixtures. The accounting methods are the same.

When a plant asset is purchased for cash, its acquisition cost is simply the agreed on cash price. However, when a business acquires plant assets in exchange for other noncash assets (shares of stock, a customer's note, or a tract of land) or as gifts, it is more difficult to establish a cash price. This section discusses three possible asset valuation bases.

The general rule on noncash exchanges is to value the noncash asset received at its fair market value or the fair market value of what was given up, whichever is more clearly evident. The reason for not using the book value of the old asset to value the new asset is that the asset being given up is often carried in the accounting records at historical cost or book value. Neither amount may adequately represent the actual fair market value of either asset. Therefore, if the fair market value of one asset is clearly evident, a firm should record this amount for the new asset at the time of the exchange.

Appraised value Sometimes, neither of the items exchanged has a clearly determinable fair market value. Then, accountants record exchanges of items at their appraised values as determined by a professional appraiser. An **appraised value** is an expert's opinion of an item's fair market price if the item were sold. Appraisals are used often to value works of art, rare books, and antiques.

Book value The **book value** of an asset is its recorded cost less accumulated depreciation. An old asset's book value is usually not a valid indication of the new asset's fair market value. If a better basis is not available, however, a firm could use the book value of the old asset.

Occasionally, a company receives an asset without giving up anything for it. For example, to attract industry to an area and provide jobs for local residents, a city may give a company a tract of land on which to build a factory. Although such a gift costs the recipient company nothing, it usually records the asset (Land) at its fair market value. Accountants record gifts of plant assets at fair market value to provide information on all assets owned by the company. Omitting some assets may make information provided misleading. They would credit assets received as gifts to a stockholders' equity account titled Paid-in Capital—Donations.

An accounting perspective:

Use of technology

How can CPA firms sell services on the Web other than by advertising their services? Ernst & Young has developed a website for nonaudit consulting clients in which they charge an annual fixed fee for nonaudit clients to obtain advice from the firm's consultants. The site is secure in that it can only be accessed by those who have paid the fee. The subscribers type in their questions on any business topic and get a response from an expert within two working days. Another firm, PricewaterhouseCoopers, has an on-line service for tax professionals to seek advice. The other large accounting firms undoubtedly have developed or are developing secure websites for providing similar types of services.

Depreciation of plant assets

Companies record depreciation on all plant assets except land. Since the amount of depreciation may be relatively large, depreciation expense is often a significant factor in determining net income. For this reason, most financial statement users are interested in the amount of, and the methods used to compute, a company's depreciation expense.

Depreciation is the amount of plant asset cost allocated to each accounting period benefiting from the plant asset's use. Depreciation is a process of allocation, not valuation. Eventually, all assets except land wear out or become so inadequate or outmoded that they are sold or discarded; therefore, firms must record depreciation on

every plant asset except land. They record depreciation even when the market value of a plant asset temporarily rises above its original cost because eventually the asset is no longer useful to its current owner.

Illustration 10.2 Factors Affecting Depreciation

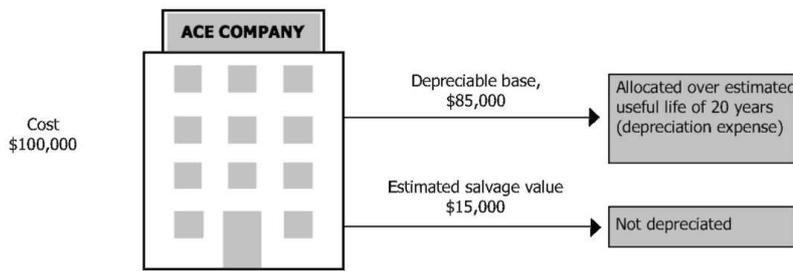


Exhibit 2: Factors affecting depreciation

Major causes of depreciation are (1) physical deterioration, (2) inadequacy for future needs, and (3) obsolescence. **Physical deterioration** results from the use of the asset—wear and tear—and the action of the elements. For example, an automobile may have to be replaced after a time because its body rusted out. The **inadequacy** of a plant asset is its inability to produce enough products or provide enough services to meet current demands. For example, an airline cannot provide air service for 125 passengers using a plane that seats 90. The **obsolescence** of an asset is its decline in usefulness brought about by inventions and technological progress. For example, the development of the xerographic process of reproducing printed matter rendered almost all previous methods of duplication obsolete.

The use of a plant asset in business operations transforms a plant asset cost into an operating expense. Depreciation, then, is an operating expense resulting from the use of a depreciable plant asset. Because depreciation expense does not require a current cash outlay, it is often called a noncash expense. The purchaser gave up cash in the period when the asset was acquired, not during the periods when depreciation expense is recorded.

To compute depreciation expense, accountants consider four major factors:

- Cost of the asset.
- Estimated salvage value of the asset. **Salvage value** (or scrap value) is the amount of money the company expects to recover, less disposal costs, on the date a plant asset is scrapped, sold, or traded in.
- Estimated useful life of the asset. **Useful life** refers to the time the company owning the asset intends to use it; useful life is not necessarily the same as either economic life or physical life. The economic life of a car may be 7 years and its physical life may be 10 years, but if a company has a policy of trading cars every 3 years, the useful life for depreciation purposes is 3 years. Various firms express useful life in years, months, working hours, or units of production. Obsolescence also affects useful life. For example, a machine capable of producing units for 20 years, may be expected to be obsolete in 6 years. Thus, its estimated useful life is 6 years—not 20. Another example, on TV you may have seen a demolition crew setting off explosives in a huge building (e.g. The Dunes Hotel and Casino in Las Vegas, Nevada, USA) and wondering why the owners decided to destroy what looked like a perfectly good building. The building was destroyed because it had reached the end of its economic life. The land on which the building stood could be put to better use, possibly by constructing a new building.

- Depreciation method used in depreciating the asset. We describe the four common depreciation methods in the next section.

Number of Companies

Method	2003	2002	2001	2000
Straight-line	580	579	579	576
Declining Balance	22	22	22	22
Sum of year's digits	5	5	6	7
Accelerated method-not specified	41	44	49	53
Units of production	30	32	32	34
Other	4	7	9	10

Source: Based on American Institute of Certified Public Accountants, Accounting Trends & Techniques (New York: AICPA, 2004), p. 409.

Exhibit 3: Depreciation method used

In Exhibit 2, note the relationship among these factors. Assume Ace Company purchased an office building for USD 100,000. The building has an estimated salvage value of USD 15,000 and a useful life of 20 years. The depreciable cost of the building is USD 85,000 (cost less estimated salvage value). Ace would allocate this depreciable base over the useful life of the building using the proper depreciation method under the circumstances.

Today, companies can use many different methods to calculate depreciation on assets.¹ This section discusses and illustrates the most common methods—straight-line, units-of-production, and accelerated depreciation method (double-declining-balance).

As is true for inventory methods, normally a company is free to adopt the most appropriate depreciation method for its business operations. According to accounting theory, companies should use a depreciation method that reflects most closely their underlying economic circumstances. Thus, companies should adopt the depreciation method that allocates plant asset cost to accounting periods according to the benefits received from the use of the asset. Exhibit 3 shows the frequency of use of these methods for 600 companies. You can see that most companies use the straight-line method for financial reporting purposes. Note that some companies use one method for certain assets and another method for other assets. In practice, measuring the benefits from the use of a plant asset is impractical and often not possible. As a result, a depreciation method must meet only one standard: the depreciation method must allocate plant asset cost to accounting periods in a systematic and rational manner. The following four methods meet this requirement.

An accounting perspective:

Business insight

Regardless of the method or methods of depreciation chosen, companies must disclose their depreciation methods in the footnotes to their financial statements. They include this information in the first footnote, which summarizes significant accounting policies.

The disclosure is generally straightforward: Sears, Roebuck & Co. operates department stores, paint and hardware stores, auto supply stores, and eye wear stores. Its annual report states simply that "depreciation is provided principally by the straight-line method". Companies may use different depreciation methods for different assets. General Electric Company is a highly diversified multinational corporation that develops, manufactures, and markets aerospace

1 Because depreciation expense is an estimate, calculations may be rounded to the nearest dollar.

products, major appliances, industrial products, and high-performance engineered plastics. It uses an accelerated method for most of its property, plant, and equipment; however, it depreciates some assets on a straight-line basis, while the company's mining properties are depreciated under the units-of-production method.

In the illustrations of the four depreciation methods that follow, we assume the following: On 2010 January 1, a company purchased a machine for USD 54,000 with an estimated useful life of 10 years, or 50,000 units of output, and an estimated salvage value of USD 4,000.

Straight-line method **Straight-line depreciation** has been the most widely used depreciation method in the United States for many years. To apply the straight-line method, a firm charges an equal amount of plant asset cost to each accounting period. The formula for calculating depreciation under the straight-line method is:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Number of accounting periods for estimated useful life}}$$

Using our example of a machine purchased for USD 54,000, the depreciation is:

$$\frac{\$54,000 - \$4,000}{10 \text{ years}} = \$5,000 \text{ per year}$$

In Exhibit 4, we present a schedule of annual depreciation entries, cumulative balances in the accumulated depreciation account, and the book (or carrying) values of the USD 54,000 machine.

Using the straight-line method for assets is appropriate where (1) time rather than obsolescence is the major factor limiting the asset's life and (2) the asset produces relatively constant amounts of periodic services. Assets that possess these features include items such as pipelines, fencing, and storage tanks.

Units-of-production (output) method The **units-of-production depreciation** method assigns an equal amount of depreciation to each unit of product manufactured or service rendered by an asset. Since this method of depreciation is based on physical output, firms apply it in situations where usage rather than obsolescence leads to the demise of the asset. Under this method, you would compute the depreciation charge per unit of output. Then, multiply this figure by the number of units of goods or services produced during the accounting period to find the period's depreciation expense. The formula is:

$$\text{Depreciation per unit} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Estimated total units of production (service) during useful life of asset}}$$

$$\text{Depreciation per period} = \text{Depreciation per unit} \times \text{Number of units of goods/services produced}$$

You would determine the depreciation charge for the USD 54,000 machine as:

$$\frac{\text{USD } 54,000 - \text{USD } 4,000}{50,000 \text{ units}} = \$1 \text{ per unit}$$

End of Year	Depreciation Expense Dr.; Accumulated Depreciation Cr.	Total Accumulated Depreciation	Book Value
			\$54,000
1	\$ 5,000	\$ 5,000	49,000
2	5,000	10,000	44,000
3	5,000	15,000	39,000
4	5,000	20,000	34,000
5	5,000	25,000	29,000
6	5,000	30,000	24,000
7	5,000	35,000	19,000
8	5,000	40,000	14,000
9	5,000	45,000	9,000
10	5,000	50,000	4,000*
	\$50,000		

* Estimated salvage value.

Exhibit 4: Straight-line depreciation schedule

If the machine produced 1,000 units in 2010 and 2,500 units in 2011, depreciation expense for those years would be USD 1,000 and USD 2,500, respectively.

Accelerated depreciation methods record higher amounts of depreciation during the early years of an asset's life and lower amounts in the asset's later years. A business might choose an accelerated depreciation method for the following reasons:

- The value of the benefits received from the asset decline with age (for example, office buildings).
- The asset is a high-technology asset subject to rapid obsolescence (for example, computers).
- Repairs increase substantially in the asset's later years; under this method, the depreciation and repairs together remain fairly constant over the asset's life (for example, automobiles).

The most common accelerated method of depreciation is the double-declining-balance (DDB) method.

End of Year	Depreciation Expense Dr.; Accumulated Depreciation Cr.	Total Accumulated Depreciation	Book Value
			\$54,000
1. (20% of \$54,000)	\$10,800	\$10,800	43,200
2. (20% of \$43,200)	8,640	19,440	34,560
3. (20% of \$34,560)	6,912	26,352	27,648
4. (20% of \$27,648)	5,530	31,882	22,118
5. (20% of \$22,118)	4,424	36,306	17,694
6. (20% of \$17,694)	3,539	39,845	14,155
7. (20% of \$14,155)	2,831	42,676	11,324
8. (20% of \$11,324)	2,265	44,941	9,059
9. (20% of \$9,059)	1,812	46,753	7,247
10. (20% of \$7,247)	1,449*	48,202	5,798

* This amount could be \$3,247 to reduce the book value to the estimated salvage value of \$4,000. Then, accumulated depreciation would be \$50,000.

Exhibit 5: Double-declining-balance (DDB) depreciation schedule

Double-declining-balance method To apply the **double-declining-balance (DDB)** method of computing periodic depreciation charges you begin by calculating the straight-line depreciation rate. To do this, divide 100 per cent by the number of years of useful life of the asset. Then, multiply this rate by 2. Next, apply the resulting double-declining rate to the declining book value of the asset. Ignore salvage value in making the calculations. At the point where book value is equal to the salvage value, no more depreciation is taken. The formula for DDB depreciation is:

$$\text{Depreciation per period} = 2 \times (\text{Straight-line rate}) \times (\text{Asset cost} - \text{Accumulated depreciation})$$

Method	Base	Calculation
Straight-line	Asset Estimated Cost - salvage value	Number of accounting periods in Base estimated useful life
Double-declining balance	Asset - Accumulated %Cost - Depreciation	Base X (2 X Straight-line rate)

Exhibit 6: Summary of depreciation methods

Look at the calculations for the USD 54,000 machine using the DDB method in Exhibit 5. The straight-line rate is 10 per cent (100 per cent/10 years), which, when doubled, yields a DDB rate of 20 per cent. (Expressed as fractions, the straight-line rate is 1/10, and the DDB rate is 2/10.) Since at the beginning of year 1 no accumulated depreciation has been recorded, cost is the basis of the calculation. In each of the following years, book value is the basis of the calculation at the beginning of the year.

In the 10th year, you could increase depreciation to USD 3,247 if the asset is to be retired and its salvage value is still USD 4,000. This higher depreciation amount for the last year (USD 3,247) would reduce the book value of USD 7,247 down to the salvage value of USD 4,000. If an asset is continued in service, depreciation should only be recorded until the asset's book value equals its estimated salvage value.

For a summary of the three depreciation methods, see Exhibit 6.

In Exhibit 7, we compare two of the depreciation methods just discussed—straight line and double-declining balance—using the same example of a machine purchased on 2010 January 1, for USD 54,000. The machine has an estimated useful life of 10 years and an estimated salvage value of USD 4,000.

An accounting perspective:

Uses of technology

Corporations are subject to corporate income taxes. Also, CPA firms hire many tax professionals to address the tax matters of their clients. If you have an interest in taxes, you may want to visit the following website to learn more about taxes:

<http://webcast.ey.com/thoughtcenter/default.aspx>

This site was created by the CPA firm, Ernst & Young, and has many interesting features. For instance, you can see highlights of what is new in the world of tax, accounting and legal issues.

So far we have assumed that the assets were put into service at the beginning of an accounting period and ignored the fact that often assets are put into service during an accounting period. When assets are acquired during an accounting period, the first recording of depreciation is for a partial year. Normally, firms calculate the depreciation for the partial year to the nearest full month the asset was in service. For example, they treat an asset purchased on or before the 15th day of the month as if it were purchased on the 1st day of the month. And they treat an asset purchased after the 15th of the month as if it were acquired on the 1st day of the following month.

To compare the calculation of partial-year depreciation, we use a machine purchased for USD 7,600 on 2010 September 1, with an estimated salvage value of USD 400, an estimated useful life of five years, and an estimated total units of production of 25,000 units.

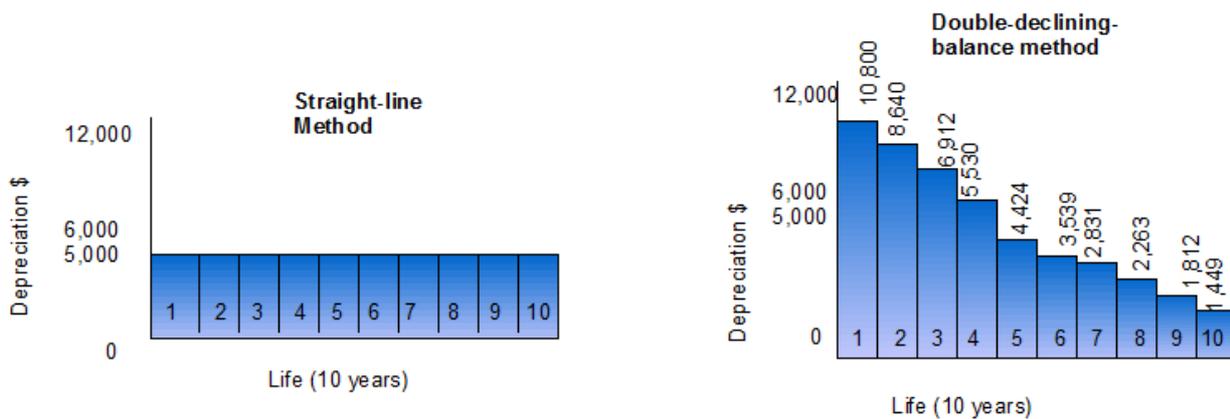


Exhibit 7: Comparison of straight-line and double-declining-balance depreciation methods

Straight-line method Partial-year depreciation calculations for the straight-line depreciation method are relatively easy. Begin by finding the 12-month charge by the normal computation explained earlier. Then, multiply this annual amount by the fraction of the year for which the asset was in use. For example, for the USD 7,600 machine purchased 2010 September 1 (estimated salvage value, USD 400; and estimated useful life, five years), the annual straight-line depreciation is $[(\text{USD } 7,600 - \text{USD } 400)/5 \text{ years}] = \text{USD } 1,440$. The machine would operate for four months prior to the end of the accounting year, December 31, or one-third of a year. The 2010 depreciation is $(\text{USD } 1,440 \times 1/3) = \text{USD } 480$.

Units-of-production method The units-of-production method requires no unusual computations to record depreciation for a partial year. To compute the partial-year depreciation, multiply the depreciation charge per unit by the units produced. The charge for a partial year would be less than for a full year because fewer units of goods or services are produced.

Double-declining-balance method Under the double-declining-balance method, it is relatively easy to determine depreciation for a partial year and then for subsequent full years. For the partial year, simply multiply the fixed rate times the cost of the asset times the fraction of the partial year. For example, DDB depreciation on the USD 7,600 asset for 2010 is $(\text{USD } 7,600 \times 0.4 \times 1/3) = \text{USD } 1,013$. For subsequent years, compute the depreciation using the regular procedure of multiplying the book value at the beginning of the period by the fixed rate. The 2011 depreciation would be $[(\text{USD } 7,600 - \text{USD } 1,013) \times 0.4] = \text{USD } 2,635$.

An accounting perspective:

Uses of technology

Most companies report property, plant, and equipment as one amount in the balance sheet in their annual report; however, that account is made up of many items. Computers and accounting software have simplified record keeping for all of a company's depreciable assets. When depreciable plant assets are purchased, employees enter in the computer the cost, estimated useful life, and estimated salvage value of the assets. In addition, they enter the method of depreciation

that the company decides to use on the assets. After processing this information, the computer calculates the company's depreciation expense and accumulates depreciation for each type of asset and each individual asset (e.g. a machine).

After depreciating an asset down to its estimated salvage value, a firm records no more depreciation on the asset even if continuing to use it. At times, a firm finds the estimated useful life of an asset or its estimated salvage value is incorrect before the asset is depreciated down to its estimated salvage value; then, it computes revised depreciation charges for the remaining useful life. These revised charges do not correct past depreciation taken; they merely compensate for past incorrect charges through changed expense amounts in current and future periods. To compute the new depreciation charge per period, divide the book value less the newly estimated salvage value by the estimated periods of useful life remaining.

For example, assume that a machine cost USD 30,000, has an estimated salvage value of USD 3,000, and originally had an estimated useful life of eight years. At the end of the fourth year of the machine's life, the balance in its accumulated depreciation account (assuming use of the straight-line method) was $(\text{USD } 30,000 - \text{USD } 3,000) \times 4/8 = \text{USD } 13,500$. At the beginning of the fifth year, a manager estimates that the asset will last six more years. The newly estimated salvage value is USD 2,700. To determine the revised depreciation per period:

Original cost	\$ 30,000
Less: Accumulated depreciation at end of 4 th year	13,500
Book value at the beginning of 5 th year	16,500
Less: Revised salvage value	2,700
Remaining depreciable cost	\$13,800
Revised depreciation per period	\$ 13,800/6 = \$2,300

Had this company used the units-of-production method, its revision of the life estimate would have been in units. Thus, to determine depreciation expense, compute a new per-unit depreciation charge by dividing book value less revised salvage value by the estimated remaining units of production. Multiply this per unit charge by the periodic production to determine depreciation expense.

Using the double-declining-balance method, the book value at the beginning of year 5 would be USD 9,492.19 (cost of USD 30,000 less accumulated depreciation of USD 20,507.81). Depreciation expense for year 5 would be twice the new straight-line rate times book value. The straight-line rate is $100 \text{ per cent}/6 = 16.67 \text{ per cent}$. So twice the straight-line rate is 33.33 per cent, or $1/3$. Thus, $1/3 \times \text{USD } 9,492.19 = \text{USD } 3,164.06$.

APB Opinion No. 12 requires that companies separately disclose the methods of depreciation they use and the amount of depreciation expense for the period in the body of the income statement or in the notes to the financial statements. Major classes of plant assets and their related accumulated depreciation amounts are reported as shown in Exhibit 8.

Showing cost less accumulated depreciation in the balance sheet gives statement users a better understanding of the percentages of a company's plant assets that have been used up than reporting only the book value (remaining undepreciated cost) of the assets. For example, reporting buildings at USD 75,000 less USD 45,000 of accumulated depreciation, resulting in a net amount of USD 30,000, is quite different from merely reporting buildings at USD 30,000. In the first case, the statement user can see that the assets are about 60 per cent used up. In the latter case, the statement user has no way of knowing whether the assets are new or old.

**Reed Company
Partial Balance Sheet
2010 June 30**

Property, plant, and equipment		
Land		\$ 30,000
Buildings	\$ 75,000	
Less: Accumulated depreciation	45,000	30,000
Equipment	\$ 9,000	
Less: Accumulated depreciation	1,500	7,500
Total property, plant, and equipment		\$ 67,500

Exhibit 8: Partial balance sheet

An accounting perspective:

Business insight

In their financial statements, companies often provide one amount for property, plant, and equipment that is net of accumulated depreciation. Nonetheless, notes (footnotes) actually provide the additional information regarding the separate types of assets. The Limited, Inc. is a world leader in the design and distribution of numerous lines of women's and men's clothing. For instance, its 2001 Feb 3, balance sheet showed property, plant, and equipment, net, equal to USD 1,394,619. In a note to the financial statements (slightly modified to clarify), management explained this amount as follows:

(Dollar amounts in thousands)

Property and Equipment, Net		
Property and Equipment, at cost	2000	1999
Land, buildings and improvements	\$ 362,997	\$ 390,121
Furniture, fixtures and equipment	2,079,567	2,020,651
Leaseholds and improvements	655,736	498,232
Construction in progress	46,748	35,823
Total	\$3,145,048	\$2,944,827
Less: accumulated depreciation and amortization	1,750,429	1,715,215
Property and equipment, net	\$1,394,619	\$1,229,612

A misconception Some mistaken financial statement users believe that accumulated depreciation represents cash available for replacing old plant assets with new assets. However, the accumulated depreciation account balance does not represent cash; accumulated depreciation simply shows how much of an asset's cost has been charged to expense. Companies use the plant asset and its contra account, accumulated depreciation, so that data on the total original acquisition cost and accumulated depreciation are readily available to meet reporting requirements.

Costs or market values in the balance sheet In the balance sheet, firms report plant assets at original cost less accumulated depreciation. One of the justifications for reporting the remaining undepreciated costs of the asset rather than market values is the going-concern concept. The going-concern concept assumes that the company will remain in business indefinitely, which implies the company will use its plant assets rather than sell them. Generally, analysts do not consider market values relevant for plant assets in primary financial statements, although they may be reported in supplemental statements.

A broader perspective:

Wolverine World Wide, Inc.

(Dollars in Thousands)	2002	2001
Total current assets	\$ 349,301	\$ 340,978
Property, Plant and Equipment		
Land	1,177	1,177
Buildings and improvements	64,848	63,006
Machinery and equipment	117,524	108,094
Software	29,217	22,097
	\$212,766	\$194,374
Less accumulated depreciation	96,483	83,239
Total plant assets	\$ 116,283	\$ 111,135
Other Assets		
Goodwill and other intangibles, less accumulated amortization (2002-\$3,565; 2001-\$2,447)	16,178	19,931
Cash value of life insurance	16,443	14,725
Prepaid pension costs	19,099	15,242
Assets held for exchange	7,706	7,942
Notes receivable	4,736	4,921
Other	4,649	6,604
Total other assets	\$ 68,811	\$ 69,365
Total Assets	\$534,395	\$521,478

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1 (In Part): Summary of Significant Accounting Policies

Property, Plant and Equipment

Property, plant and equipment are stated on the basis of cost and include expenditures for new facilities, major renewals, betterments and software. Normal repairs and maintenance are expensed as incurred.

Depreciation of plant, equipment and software is computed using the straight-line method. The depreciable lives for buildings and improvements range from five to forty years; from three to ten years for machinery and equipment; and from three to ten years for software.

As required, the Company adopted the American Institute of Certified Public Accountants Statement of Position (SoP) 98-1, Accounting for the Costs of Computer Software Developed and Obtained for Internal Use, in 1999. The SOP provides guidelines for determining whether costs should be expensed or capitalized for computer software developed or purchased for internal use. The Company's accounting policies for such items were already in substantial compliance with SOP 98-1 and, therefore, the adoption did not have a material effect on its 1999 consolidated financial position or results of operations.

Subsequent expenditures (capital and revenue) on assets

Companies often spend additional funds on plant assets that have been in use for some time. They debit these expenditures to: (1) an asset account; (2) an accumulated depreciation account; or (3) an expense account.

Expenditures debited to an asset account or to an accumulated depreciation account are **capital expenditures**. Capital expenditures increase the book value of plant assets. **Revenue expenditures**, on the other hand, do not qualify as capital expenditures because they help to generate the current period's revenues rather than future periods' revenues. As a result, companies expense these revenue expenditures immediately and report them in the income statement as expenses.

Betterments or **improvements** to existing plant assets are capital expenditures because they increase the quality of services obtained from the asset. Because betterments or improvements add to the service-rendering

ability of assets, firms charge them to the asset accounts. For example, installing an air conditioner in an automobile that did not previously have one is a betterment. The debit for such an expenditure is to the asset account, Automobiles.

Occasionally, expenditures made on plant assets extend the quantity of services beyond the original estimate but do not improve the quality of the services. Since these expenditures benefit an increased number of future periods, accountants capitalize rather than expense them. However, since there is no visible, tangible addition to, or improvement in, the quality of services, they charge the expenditures to the accumulated depreciation account, thus reducing the credit balance in that account. Such expenditures cancel a part of the existing accumulated depreciation; firms often call them **extraordinary repairs**.

To illustrate, assume that after operating a press for four years, a company spent USD 5,000 to recondition the press. The reconditioning increased the machine's life to 14 years instead of the original estimate of 10 years. The journal entry to record the extraordinary repair is:

Accumulated Depreciation-Machinery (+A)	5,000	
Cash (for Accounts Payable) (-A)		5,000

To record the cost of reconditioning a press.

Originally, the press cost USD 40,000, had an estimated useful life of 10 years, and had no estimated salvage value. At the end of the fourth year, the balance in its accumulated depreciation account under the straight-line method is $[(USD\ 40,000/10) \times 4] = USD\ 16,000$. After debiting the USD 5,000 spent to recondition the press to the accumulated depreciation account, the balances in the asset account and its related accumulated depreciation account are as shown in the last column:

	Before Extraordinary Repair	After Extraordinary Repair
Press	\$40,000	\$40,000
Accumulated depreciation	16,000	11,000
Book value (end of four years)	\$24,000	\$29,000

In effect, the expenditure increases the carrying amount (book value) of the asset by reducing its contra account, accumulated depreciation. Under the straight-line method, we would divide the new book value of the press, USD 29,000, equally among the 10 remaining years in amounts of USD 2,900 per year (assuming that the estimated salvage value is still zero).

As a practical matter, expenditures for major repairs not extending the asset's life are sometimes charged to accumulated depreciation. This avoids distorting net income by expensing these expenditures in the year incurred. Then, firms calculate a revised depreciation expense, and spread the cost of major repairs over a number of years. This treatment is not theoretically correct.

To illustrate, assume the same facts as in the previous example except that the USD 5,000 expenditure did not extend the life of the asset. Because of the size of this expenditure, the company still charges it to accumulated depreciation. Now, it would spread the USD 29,000 remaining book value over the remaining six years of the life of the press. Under the straight-line method, annual depreciation would then be $(USD\ 29,000/6) = USD\ 4,833$.

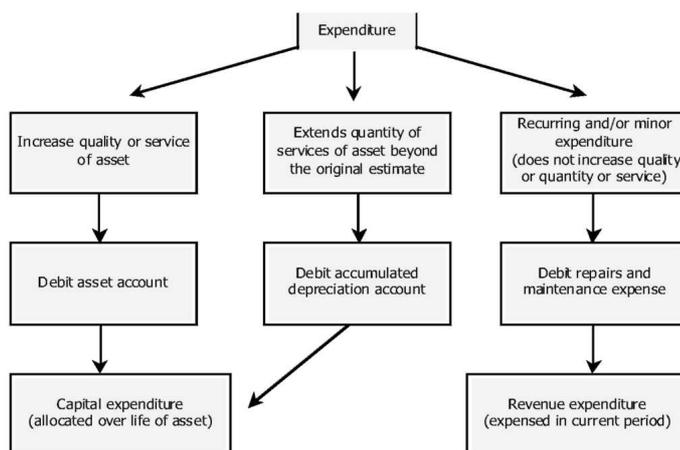


Exhibit 9: Expenditures on plant assets after acquisition

Accountants treat as expenses those recurring and/or minor expenditures that neither add to the asset's service-rendering quality nor extend its quantity of services beyond its original estimated useful life. Thus, firms immediately expense regular maintenance (lubricating a machine) and ordinary repairs (replacing a broken fan belt on an automobile) as revenue expenditures. For example, a company that spends USD 190 to repair a machine after using it for some time, debits Maintenance Expense or Repairs Expense.

Low-cost items Most businesses purchase **low-cost items** that provide years of service, such as paperweights, hammers, wrenches, and drills. Because of the small dollar amounts involved, it is impractical to use the ordinary depreciation methods for such assets, and it is often costly to maintain records of individual items. Also, the effect of low-cost items on the financial statements is not significant. Accordingly, it is more efficient to record the items as expenses when they are purchased. For instance, many companies charge any expenditure less than an arbitrary minimum, say, USD 100, to expense regardless of its impact on the asset's useful life. This practice of accounting for such low unit cost items as expenses is an example of the modifying convention of materiality. In Exhibit 9, we summarize expenditures on plant assets after acquisition.

In practice, it is difficult to decide whether to debit an expenditure to the asset account or to the accumulated depreciation account. For example, some expenditures seem to affect both the quality and quantity of services. Even if the wrong account were debited for the expenditure, the book value of the plant asset at that point would be the same amount it would have been if the correct account had been debited. However, both the asset and accumulated depreciation accounts would be misstated.

As an example of the effect of misstated asset and accumulated depreciation accounts, assume Watson Company had an asset that had originally cost USD 15,000 and had been depreciated to a book value of USD 6,000 at the beginning of 2010. At that time, Watson estimated the equipment had a remaining useful life of two years. The company spent USD 4,000 in early January 2010 to install a new motor in the equipment. This motor extended the useful life of the asset four years beyond the original estimate. Since the expenditure extended the life, the firm should capitalize it by a debit to the accumulated depreciation account. We show the calculations for depreciation

expense if the entry was made correctly and if the expenditure had been improperly charged (debited) to the asset account in Exhibit 10.

	2010 Jan 1	After Expenditure Entry	
		Correct	Incorrect
Cost	\$15,000	\$15,000	\$19,000 ^T
Accumulated depreciation	9,000	5,000*	9,000
Book value	\$ 6,000	\$10,000	\$10,000
Remaining life	2 years	6 years	6 years
Depreciation expense per year	\$ 3,000	\$ 1,667	\$1,667
* (\$9,000 - \$4,000)			
^T (\$15,000 + \$4,000)			

Exhibit 10: Expenditure extending plant asset life

If an expenditure that should be expensed is capitalized, the effects are more significant. Assume now that USD 6,000 in repairs expense is incurred for a plant asset that originally cost USD 40,000 and had a useful life of four years and no estimated salvage value. This asset had been depreciated using the straight-line method for one year and had a book value of USD 30,000 (USD 40,000 cost—USD 10,000 first-year depreciation) at the beginning of 2010. The company capitalized the USD 6,000 that should have been charged to repairs expense in 2010. The charge for depreciation should have remained at USD 10,000 for each of the next three years. With the incorrect entry, however, depreciation increases.

Regardless of whether the repair was debited to the asset account or the accumulated depreciation account, the firm would change the depreciation expense amount to USD 12,000 for each of the next three years [(USD 30,000 book value + USD 6,000 repairs expense)/3 more years of useful life]. These errors would cause net income for the year 2010 to be overstated USD 4,000: (1) repairs expense is understated by USD 6,000, causing income to be overstated by USD 6,000; and (2) depreciation expense is overstated by USD 2,000, causing income to be understated by USD 2,000. In 2011, the overstatement of depreciation by USD 2,000 would cause 2011 income to be understated by USD 2,000.

Note that the USD 6,000 recording error affects more than just the expense accounts and net income. Plant asset and Retained Earnings accounts on the balance sheet also reflect the impact of this error. To see the effect of incorrectly capitalizing the USD 6,000 to the asset account rather than correctly expensing it, look at Exhibit 11.

Subsidiary records used to control plant assets

Most companies maintain formal records (ranging from handwritten documents to computer tapes) to ensure control over their plant assets. These records include an asset account and a related accumulated depreciation account in the general ledger for each major class of depreciable plant assets, such as buildings, factory machinery, office equipment, delivery equipment, and store equipment.

Because the general ledger account has no room for detailed information about each item in a major class of depreciable plant assets, many companies use plant asset subsidiary ledgers. Subsidiary ledgers for Accounts Receivable and Accounts Payable were explained briefly in **An accounting perspective** in Chapter 4. A company may also use subsidiary ledgers for plant assets. For instance, assume a company has a general ledger account for office furniture. The subsidiary ledger for office furniture might contain four separate accounts entitled: Desks, Chairs, File Cabinets and Bookshelves. Alternatively, a company could even have a separate subsidiary account for each piece of furniture. The total of all the subsidiary account balances must equal the total of the general ledger "control" account for Office Furniture at the end of the accounting period. Each general ledger account for each class of depreciable asset, such as Buildings, Delivery Equipment, and so on, could have a subsidiary ledger backing

it up and showing information such as the description, cost, and purchase date for each asset. These subsidiary ledgers and detailed records provide more information and allow the company to maintain better control over plant and equipment.

	2010	
	Correctly Expensing	Incorrectly Expensing
Depreciation expense	\$10,000	\$12,000
Repair Expense	6,000	-0-
Net in come overstated by \$4,000, which affects retained earnings	\$16,000	\$12,000
Asset cost	\$40,000	\$46,000
Accumulated depreciation	20,000	22,000
Book value	\$20,000	\$24,000
	2011	
	Correctly Expensing	Incorrectly Expensing
Depreciation expense	\$10,000	\$12,000
Repair Expense	-0-	-0-
Net in come understated by \$2,000, which affects retained earnings	\$10,000	\$12,000
Asset cost	\$40,000	\$46,000
Accumulated depreciation	30,000	34,000
Book value	\$10,000	\$12,000

Exhibit 11: Effect of revenue expenditure treated as capital expenditure

When they are kept for each major class of plant and equipment, a company may have subsidiary ledgers for factory machinery, office equipment, and other classes of depreciable plant assets. Then there may be an additional subsidiary ledger for each type of asset within each category. For example, the subsidiary office equipment ledger may contain accounts for microcomputers, printers, fax machines, copying machines, and so on. Companies also keep a detailed record for each item represented in a subsidiary ledger account. For example, there may be a separate detailed record for each microcomputer represented in the Microcomputer subsidiary ledger account. Each detailed record should include a description of the asset, identification or serial number, location of the asset, date of acquisition, cost, estimated salvage value, estimated useful life, annual depreciation, accumulated depreciation, insurance coverage, repairs, date of disposal, and gain or loss on final disposal of the asset. Note the detailed record for one particular microcomputer as of 2010 December 31, in Exhibit 12.

To enhance control over plant and equipment, companies stencil on or attach the identification or serial number to each asset. Periodically, firms must take a physical inventory to determine whether all items in the accounting records actually exist, whether they are located where they should be, and whether they are still being used. A company that does not use detailed records and identification numbers or take physical inventories finds it difficult to determine whether assets have been discarded or stolen.

The general ledger control account balance for each major class of plant and equipment should equal the total of the amounts in the subsidiary ledger accounts for that class of plant assets. Also, the totals in the detailed records for a specific subsidiary ledger account (such as Microcomputers) should equal the balance of that account. Each time a plant asset is acquired, exchanged, or disposed of, the firm posts an entry to both a general ledger control account and the appropriate subsidiary ledger account. It also updates the detailed record for the items affected.

Item Dell Precision M40	Insurance coverage:
Id. No. Z-43806	United Ins. Co.
Location Rm. 403, Adm. bldg.	Pol. No. 0052-61481-24
Date acquired 2009 Jan. 1	Amt. \$3,000
Cost \$3,000	Repairs:
Estimated salvage value \$200	2010/6/13 \$140
Estimated useful life 4 yrs.	
Depreciation per year \$700	
Accumulated depreciation: '	Disposal date
2009/12/31 \$ 700	Gain or loss
2010/12/31 1,400	
2011/12/31	
2012/12/31	

Exhibit 12: Detailed record of a specific plant asset

DEMENT & PEERY, INC.
Consolidated Balance Sheets
2010 December 31 and 2009 (Dollars in millions)

	2010	2009
ASSETS		
Current Assets:		
Cash	\$ 121	\$ 192
Accounts receivable, net of allowance for doubtful accounts of \$15 in both 2010 and 2009	379	491
Inventories	247	175
Deposits, prepaid expenses and other	120	58
Total Current Assets	\$ 867	\$ 916
Investments		
Equity affiliates	170	277
Other assets	87	63
Property and Equipment - Net	4,153	3,919
Deferred Charges	164	154
Total Assets	\$5,441	\$5,329
Net Operating Earnings	\$ 560	\$ 433

Exhibit 13: Consolidated balance sheets

Analyzing and using the financial results—Rate of return on operating assets

Analyzing the ratios of income statement and balance sheet items from one year to the next can reveal important trends. Management uses these ratios to measure performance by establishing targets and evaluating results. As an example, look at Exhibit 13. Analysts use these figures to calculate the ratios and to explain the importance of this information to management and investors.

To determine the **rate of return on operating assets** for Dement & Peery for 2009 and 2010, use the following formula:

$$\text{Rate of return on operating assets} = \frac{\text{Net operating income}}{\text{Operating assets}}$$

2009: USD 433,000/USD 5,329,000 = 8.13 per cent

2010: USD 560,000/USD 5,441,000 = 10.29 per cent

Net operating income is also called net operating earnings or income before interest and taxes. In calculating Dement & Peery's ratio, we have assumed that all assets are operating assets used in producing operating revenues.

This ratio measures the profitability of the company in carrying out its primary business function. For Dement & Peery, these figures indicate a slight increase in the earning power of the company in 2010. Net operating income increased more than proportionately compared to the increase in operating assets. Perhaps this performance justifies the increase in operating assets.

In this section, you learned how to account for the acquisition of plant assets and depreciation. The next section (Part 2 below) discusses how to record the disposal of plant assets and how to account for natural resources and intangible assets.

Understanding the learning objectives

- To be classified as a plant asset, an asset must: (1) be tangible; (2) have a useful service life of more than one year; and (3) be used in business operations rather than held for resale.
- In accounting for plant assets, accountants must:
 - (a) Record the acquisition cost of the asset.
 - (b) Record the allocation of the asset's original cost to periods of its useful life through depreciation.
 - (c) Record subsequent expenditures on the asset.
 - (d) Account for the disposal of the asset.
- Accountants consider four major factors in computing depreciation: (1) cost of the asset; (2) estimated salvage value of the asset; (3) estimated useful life of the asset; and (4) depreciation method to use in depreciating the asset.

• **Straight-line method:** Assigns an equal amount of depreciation to each period. The formula for calculating straight-line depreciation is:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Number of accounting periods} \in \text{estimated useful life}}$$

• **Units-of-production method:** Assigns an equal amount of depreciation to each unit of product manufactured by an asset. The units-of-production depreciation formulas are:

$$\text{Depreciation per period} = \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Estimated total units of production (service) during useful life of asset}}$$

$$\text{Depreciation per period} = \text{Depreciation per unit} \times \text{Number of units of goods/services produced}$$

• **Double-declining-balance method:** DDB is an accelerated depreciation method. Salvage value is ignored in making annual calculations. The formula for DDB depreciation is:

$$\text{Depreciation per period} = (2 \times \text{straight-line rate}) \times (\text{Asset cost} - \text{Accumulated depreciation})$$

- Capital expenditures are debited to an asset account or an accumulated depreciation account and increase the book value of plant assets. Expenditures that increase the quality of services or extend the quantity of services beyond the original estimate are capital expenditures.
- Revenue expenditures are expensed immediately and reported in the income statement as expenses. Recurring and or minor expenditures that neither add to the asset's quality of service-rendering abilities nor extend its quantity of services beyond the asset's original estimated useful life are expenses.
- Plant asset subsidiary ledgers contain detailed information that cannot be maintained in the general ledger account about each item in a major class of depreciable plant assets.
- Control over plant and equipment is enhanced by plant asset subsidiary ledgers and other detailed records. Information in a detailed record may include a description of the asset, identification or serial number, location of the asset, date of acquisition, cost, estimated salvage value, estimated useful life, annual depreciation, accumulated depreciation, insurance coverage, repairs, date of disposal, and gain or loss on final disposal of the asset. A periodic physical inventory should be taken to determine whether items in accounting records actually exist and are still being used at the proper location.

- To calculate the rate of return on operating assets, divide net operating income by operating assets. This ratio helps management determine how effectively it used assets to produce a profit.

Demonstration problem

Demonstration problem A Cleveland Company purchased a 2-square-mile farm under the following terms: cash paid, USD 486,000; mortgage note assumed, USD 240,000; and accrued interest on mortgage note assumed, USD 6,000. The company paid USD 55,200 for brokerage and legal services to acquire the property and secure clear title. Cleveland planned to subdivide the property into residential lots and to construct homes on these lots. Clearing and leveling costs of USD 21,600 were paid. Crops on the land were sold for USD 14,400. A house on the land, to be moved by the buyer of the house, was sold for USD 5,040. The other buildings were torn down at a cost of USD 9,600, and salvaged material was sold for USD 10,080.

Approximately 6 acres of the land were deeded to the township for roads, and another 10 acres was deeded to the local school district as the site for a future school. After the subdivision was completed, this land would have an approximate value of USD 7,680 per acre. The company secured a total of 1,200 salable lots from the remaining land.

Present a schedule showing in detail the composition of the cost of the 1,200 salable lots.

Demonstration problem B Calvin Company acquired and put into use a machine on 2010 January 1, at a total cost of USD 45,000. The machine was estimated to have a useful life of 10 years and a salvage value of USD 5,000. It was also estimated that the machine would produce one million units of product during its life. The machine produced 90,000 units in 2010 and 125,000 units in 2011.

Compute the amounts of depreciation to be recorded in 2010 and 2011 under each of the following:

- Straight-line method.
- Units-of-production method.
- Double-declining-balance method.
- Assume 30,000 units were produced in the first quarter of 2010. Compute depreciation for this quarter under each of the three methods.

Solution to demonstration problem

Solution to demonstration problem A

CLEVELAND COMPANY			
Schedule of Cost of 1,200 Residential Lots			
Costs incurred:			
Cash paid	\$486,000		
Mortgage note assumed	240,000		
Interest accrued on mortgage note assumed	6,000		
Broker and legal services	55,200		
Clearing and leveling costs incurred	21,600		
Tearing down costs	9,600	\$818,400	
Less proceeds from sale of:			
Crops	\$ 14,400		
House	5,040		
Salvaged materials	10,080	29,520	
Net cost of land to be subdivided into 1,200 lots			\$788,880

Solution to demonstration problem B

- Straight-line method:

$$2010: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} = \text{USD } 4,000$$

$$2011: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} = \text{USD } 4,000$$

b. Units-of-production method:

$$2010: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{1,000,000} \times 90,000 = \text{USD } 3,600$$

$$2011: \frac{(\text{USD } 45,000 - \text{USD } 5,000)}{1,000,000} \times 125,000 = \text{USD } 5,000$$

c. Double-declining-balance method:

$$2010: \text{USD } 45,000 \times 20 \text{ per cent} = \text{USD } 9,000$$

$$2011: (\text{USD } 45,000 - \text{USD } 9,000) \times 20 \text{ per cent} = \text{USD } 7,200$$

d. Straight-line:
$$\frac{(\text{USD } 45,000 - \text{USD } 5,000)}{10} \times \frac{1}{4} = \text{USD } 1,000$$

Units-of-production: $(\text{USD } 30,000 - \text{USD } 0.04) = \text{USD } 1,200$

Double-declining-balance: $(\text{USD } 45,000 - \text{USD } 9,000 - \text{USD } 7,000) \times 0.2 \times \frac{1}{4} = \text{USD } 1,440$

Key terms

Accelerated depreciation methods Record higher amounts of depreciation during the early years of an asset's life and lower amounts in later years.

Acquisition cost Amount of cash and/or cash equivalents given up to acquire a plant asset and place it in operating condition at its proper location.

Appraised value An expert's opinion as to what an item's market price would be if the item were sold.

Betterments (improvements) Capital expenditures that are properly charged to asset accounts because they add to the service-rendering ability of the assets; they increase the quality of services obtained from an asset.

Book value An asset's recorded cost less its accumulated depreciation.

Capital expenditures Expenditures debited to an asset account or to an accumulated depreciation account.

Depreciation The amount of plant asset cost allocated to each accounting period benefiting from the plant asset's use. The **straight-line depreciation** method charges an equal amount of plant asset cost to each period. The **units-of-production depreciation** method assigns an equal amount of depreciation for each unit of product manufactured or service rendered by an asset. The **double-declining-balance (DDB)** method assigns decreasing amounts of depreciation to successive periods of time.

Double-declining-balance (DDB) depreciation See depreciation.

Extraordinary repairs Expenditures that cancel a part of the existing accumulated depreciation because they increase the quantity of services expected from an asset.

Fair market value The price that would be received for an item being sold in the normal course of business (not at a forced liquidation sale).

Inadequacy The inability of a plant asset to produce enough products or provide enough services to meet current demands.

Land improvements Attachments to land, such as driveways, landscaping, parking lots, fences, lighting systems, and sprinkler systems, that have limited lives and therefore are depreciable.

Low-cost items Items that provide years of service at a relatively low unit cost, such as hammers, paperweights, and drills.

Obsolescence Decline in usefulness of an asset brought about by inventions and technological progress.

Physical deterioration Results from use of the asset—wear and tear—and the action of the elements.

Plant and equipment A shorter title for property, plant, and equipment; also called plant assets. Included are land and manufactured or constructed assets such as buildings, machinery, vehicles, and furniture.

Rate of return on operating assets Net operating income/Operating assets. This ratio helps management determine how effectively it used assets to produce a profit.

Revenue expenditures Expenditures (on a plant asset) that are immediately expensed.

Salvage value The amount of money the company expects to recover, less disposal costs, on the date a plant asset is scrapped, sold, or traded in. Also called scrap value or residual value.

Straight-line depreciation See depreciation.

Tangible assets Assets that we can see and touch such as land, buildings, and equipment.

Units-of-production depreciation See depreciation.

Useful life Refers to the length of time the company owning the asset intends to use it.

Self-test

True-false

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

The cost of land includes its purchase price and other related costs, including the cost of removing an old unusable building that is on the land.

Depreciation is the process of valuation of an asset to arrive at its market value.

The purpose of depreciation accounting is to provide the cash required to replace plant assets.

Expenditures made on plant assets that increase the quality of services are debited to the accumulated depreciation account.

Plant asset subsidiary ledgers are used to increase control over plant assets.

Multiple-choice

Select the best answer for each of the following questions.

On 2010 January 1, Jackson Company purchased equipment for USD 400,000, and installation and testing costs totaled USD 40,000. The equipment has an estimated useful life of 10 years and an estimated salvage value of USD 40,000. If Jackson uses the straight-line depreciation method, the depreciation expense for 2010 is:

- a. USD 36,000.
- b. USD 40,000.
- c. USD 44,000.
- d. USD 80,000.
- e. USD 88,000.

In Question 1, if the equipment were purchased on 2010 July 1, and Jackson used the double-declining-balance method, the depreciation expense for 2010 would be:

- a. USD 88,000.
- b. USD 72,000.
- c. USD 36,000.
- d. USD 44,000.
- e. USD 40,000.

Hatfield Company purchased a computer on 2008 January 2, for USD 10,000. The computer had an estimated salvage value of USD 3,000 and an estimated useful life of five years. At the beginning of 2010, the estimated salvage value changed to USD 1,000, and the computer is expected to have a remaining useful life of two years. Using the straight-line method, the depreciation expense for 2010 is:

- a. USD 1,400.

- b. USD 1,750.
- c. USD 2,250.
- d. USD 1,800.
- e. USD 3,100.

The result of recording a capital expenditure as a revenue expenditure is an:

- a. Overstatement of current year's expense.
- b. Understatement of current year's expense.
- c. Understatement of subsequent year's net income.
- d. Overstatement of current year's net income.
- e. None of the above.

Now turn to "Answers to self-test" at the end of the chapter to check your answers.

Questions

- What is the main distinction between inventory and a plant asset?
- Which of the following items are properly classifiable as plant assets on the balance sheet?
 - Advertising that will appear in the future to inform the public about new energy-saving programs at a manufacturing plant.
 - A truck acquired by a manufacturing company to be used to deliver the company's products to wholesalers.
 - An automobile acquired by an insurance company to be used by one of its salespersons.
 - Adding machines acquired by an office supply company to be sold to customers.
 - The cost of constructing and paving a driveway that has an estimated useful life of 10 years.
- In general terms, what does the cost of a plant asset include?
- In what way does the purchase of a plant asset resemble the prepayment of an expense?
- Brown Company purchased an old farm with a vacant building as a factory site for USD 1,040,000. Brown decided to use the building in its operations. How should Brown allocate the purchase price between the land and the building? How should this purchase be handled if the building is to be torn down?
- Describe how a company may determine the cost of a self-constructed asset.
- In any exchange of noncash assets, the accountant's task is to find the most appropriate valuation for the asset received. What is the general rule for determining the most appropriate valuation in such a situation?
- Why should periodic depreciation be recorded on all plant assets except land?
- Define the terms inadequacy and obsolescence as used in accounting for depreciable plant assets.
- What four factors must be known to compute depreciation on a plant asset? How objective is the calculation of depreciation?
- A friend, Mindy Jacobs, tells you her car depreciated USD 5,000 last year. Explain whether her concept of depreciation is the same as the accountant's concept.
- What does the term accelerated depreciation mean? Give an example showing how depreciation is accelerated.

- Provide a theoretical reason to support using an accelerated depreciation method.
- Nancy Company purchased a machine that originally had an estimated eight years of useful life. At the end of the third year, Nancy determined that the machine would last only three more years. Does this revision affect past depreciation taken?
- What does the balance in the accumulated depreciation account represent? Does this balance represent cash that can be used to replace the related plant asset when it is completely depreciated?
- What is the justification for reporting plant assets on the balance sheet at undepreciated cost (book value) rather than market value?
- Distinguish between capital expenditures and revenue expenditures.
- For each of the following, state whether the expenditure made should be charged to an expense, an asset, or an accumulated depreciation account:
 - Cost of installing air-conditioning equipment in a building that was not air-conditioned.
 - Painting of an owned factory building every other year.
 - Cost of replacing the roof on a 10-year-old building that was purchased new and has an estimated total life of 40 years. The expenditure did not extend the life of the asset beyond the original estimate.
 - Cost of repairing an electric motor. The expenditure extended the estimated useful life beyond the original estimate.
- Indicate which type of account (asset, accumulated depreciation, or expense) would be debited for each of the following expenditures:
 - Painting an office building at a cost of USD 1,000. The building is painted every year.
 - Adding on a new plant wing at a cost of USD 24,000,000.
 - Expanding a paved parking lot at a cost of USD 144,000.
 - Replacing a stairway with an escalator at a cost of USD 20,000.
 - Replacing the transmission in an automobile at a cost of USD 1,600, thus extending its useful life two years beyond the original estimate.
 - Replacing a broken fan belt at a cost of USD 600.
- How do subsidiary records provide control over a company's plant assets?
- What advantages can accrue to a company that maintains plant asset subsidiary records?
- **Real world question** Based on the financial statements and the notes to those statements of The Limited, Inc., contained in the Annual report appendix, what was the 2000 ending net property and equipment balance? Did the company acquire any of these assets in 2000? What depreciation method did the company use?

Exercises

Exercise A Stephon Company paid USD 640,000 cash for a tract of land on which it plans to erect a new warehouse, and paid USD 8,000 in legal fees related to the purchase. Stephon also agreed to assume responsibility for USD 25,600 of unpaid taxes on the property. The company incurred a cost of USD 28,800 to remove an old apartment building from the land. Prepare a schedule showing the cost of the land acquired.

Exercise B Laural Company paid USD 840,000 cash for real property consisting of a tract of land and a building. The company intended to remodel and use the old building. To allocate the cost of the property acquired, Laural had the property appraised. The appraised values were as follows: land, USD 576,000, and office building, USD 384,000. The cost of clearing the land was USD 18,000. The building was remodeled at a cost of USD 76,800. The cost of a new identical office building was estimated to be USD 432,000. Prepare a schedule showing the cost of the assets acquired.

Exercise C Fine Company purchased a heavy machine to be used in its factory for USD 720,000, less a 2 per cent cash discount. The company paid a fine of USD 3,600 because an employee hauled the machine over city streets without securing the required permits. The machine was installed at a cost of USD 21,600, and testing costs of USD 7,200 were incurred to place the machine in operation. Prepare a schedule showing the recorded cost of the machine.

Exercise D A machine is acquired in exchange for 50 shares of Marley Corporation capital stock. The stock recently traded at USD 400 per share. The machine cost USD 30,000 three years ago. At what amount should the machine be recorded?

Exercise E Keely Company purchased some office furniture for USD 29,760 cash on 2009 March 1. It also paid USD 480 cash for freight costs incurred. The furniture is being depreciated over four years under the straight-line method, assuming a salvage value of USD 1,440. The company employs a calendar-year accounting period. On 2010 July 1, it spent USD 192 to refinish the furniture. Prepare journal entries for the Keely Company to record all of the data, including the annual depreciation adjustments through 2010.

Exercise F On 2009 January 2, a new machine was acquired for USD 900,000. The machine has an estimated salvage value of USD 100,000 and an estimated useful life of 10 years. The machine is expected to produce a total of 500,000 units of product throughout its useful life. Compute depreciation for 2009 and 2010 using each of the following methods:

- a. Straight line.
- b. Units of production (assume 30,000 and 60,000 units were produced in 2009 and 2010, respectively).
- c. Double-declining balance.

Exercise G Terrill Company finds its records are incomplete concerning a piece of machinery used in its plant. According to the company records, the machinery has an estimated useful life of 10 years and an estimated salvage value of USD 24,000. It has recorded USD 12,000 in depreciation each year using the straight-line method. If the accumulated depreciation account shows a balance of USD 72,000, what is the original cost of the machinery and how many years remain to be depreciated?

Exercise H Katherine Company purchased a machine on 2009 April 1, for USD 72,000. The machine has an estimated useful life of five years with no expected salvage value. The company's accounting year ends on December 31.

Compute the depreciation expense for 2009 and 2010 under the double-declining-balance method.

Exercise I Australia Company purchased a machine for USD 3,200 and incurred installation costs of USD 800. The estimated salvage value of the machine is USD 200. The machine has an estimated useful life of four years. Compute the annual depreciation charges for this machine under the double-declining-balance method.

Exercise J Regal Company acquired a delivery truck on 2009 January 2, for USD 107,200. The truck had an estimated salvage value of USD 4,800 and an estimated useful life of eight years. At the beginning of 2009, a

revised estimate shows that the truck has a remaining useful life of six years. The estimated salvage value changed to USD 1,600.

Compute the depreciation charge for 2009 and the revised depreciation charge for 2009 using the straight-line method.

Exercise K Assume that the truck described in the previous exercise was used 40 per cent of the time in 2010 to haul materials used in the construction of a building by Regal Company for its own use. (Remember that 2010 is before the revision was made on estimated life.) During the remaining time, Regal used the truck to deliver merchandise to its customers.

Prepare the journal entry to record straight-line depreciation on the truck for 2010.

Exercise L Vineland Company purchased a computer for USD 60,000 and placed it in operation on 2008 January 2. Depreciation was recorded for 2008 and 2009 using the straight-line method, a six-year life, and an expected salvage value of USD 2,400. The introduction of a new model of this computer in 2010 caused the company to revise its estimate of useful life to a total of four years and to reduce the estimated salvage value to zero.

Compute the depreciation expense on the computer for 2010.

Exercise M On 2009 January 2, a company purchased and placed in operation a new machine at a total cost of USD 60,000. Depreciation was recorded on the machine for 2009 and 2010 under the straight-line method using an estimated useful life of five years and no expected salvage value. Early in 2011, the machine was overhauled at a cost of USD 20,000. The estimated useful life of the machine was revised upward to a total of seven years.

Compute the depreciation expense on the machine for 2011.

Exercise N Lasky Company purchased a machine on 2009 January 3, at a cost of USD 50,000. It debited freight and installation charges of USD 10,000 to Repairs Expense. It recorded straight-line depreciation on the machine in 2009 and 2010 using an estimated life of 10 years and no expected salvage value.

Compute the amount of the error in net income for 2009 and 2010, and state whether net income is understated or overstated.

Exercise O Bragg Company owns a plant asset that originally cost USD 240,000 in 2006. The asset has been depreciated for three years assuming an eight-year useful life and no salvage value. During 2009, Bragg incorrectly capitalized USD 120,000 in repairs on the plant asset rather than expensing them. Describe the impact of this error on the asset's cost and Bragg's net income over the next five years.

Problems

Problem A Bolt Company purchased a machine for use in its operations that had an invoice price of USD 80,000 excluding sales tax. A 4 per cent sales tax was levied on the sale. Terms were net 30. The company estimated the total cost of hauling the machine from the dealer's warehouse to the company's plant at USD 5,600, which did not include a fine of USD 1,600 for failure to secure the necessary permits to use city streets in transporting the machine. In delivering the machine to its plant, a Bolt employee damaged the truck used; repairs cost USD 3,600. The machine was also slightly damaged with repair costs amounting to USD 1,600.

Bolt incurred installation costs of USD 32,000 that included the USD 4,000 cost of shoring up the floor under the machine. Testing costs amounted to USD 2,400. Safety guards were installed on the machine at a cost of USD 640, and the machine was placed in operation.

Prepare a schedule showing the amount at which the machine should be recorded in Bolt's accounts.

Problem B Pressler Company planned to erect a new factory building and a new office building in Atlanta, Georgia, USA. A report on a suitable site showed an appraised value of USD 180,000 for land and orchard and USD 120,000 for a building.

After considerable negotiation, the company and the owner reached the following agreement: Pressler Company was to pay USD 216,000 in cash, assume a USD 90,000 mortgage note on the property, assume the interest of USD 1,920 accrued on the mortgage note, and assume unpaid property taxes of USD 13,200. Pressler Company paid USD 18,000 cash for brokerage and legal services in acquiring the property.

Shortly after acquisition of the property, Pressler Company sold the fruit on the trees for USD 2,640, remodeled the building into an office building at a cost of USD 38,400, and removed the trees from the land at a cost of USD 9,000. Construction of the factory building was to begin in a week.

Prepare schedules showing the proper valuation of the assets acquired by Pressler Company.

Problem C Timothy Company acquired and placed into use a heavy factory machine on 2009 October 1. The machine had an invoice price of USD 360,000, but the company received a 3 per cent cash discount by paying the bill on the date of acquisition. An employee of Timothy Company hauled the machine down a city street without a permit. As a result, the company had to pay a USD 1,500 fine. Installation and testing costs totaled USD 35,800. The machine is estimated to have a USD 35,000 salvage value and a seven-year useful life. (A fraction should be used for the DDB calculation rather than a percentage.)

- a. Prepare the journal entry to record the acquisition of the machine.
- b. Prepare the journal entry to record depreciation for 2009 under the double-declining balance method.
- c. Assume Timothy Company used the straight-line depreciation method. At the beginning of 2009, it estimated the machine will last another six years. Prepare the journal entry to record depreciation for 2009. The estimated salvage value would not change.

Problem D Peach Company has the following entries in its Building account:

		Debits	
2009			
May	5	Cost of land and building purchased	\$200,000
	5	Broker fees incident to purchase of land and building	12,000
2010			
Jan.	3	Contract price of new wing added to south end	84,000
	15	Cost of new machinery, estimated life 10 years	160,000
June	10	Real estate taxes for six months ended 2010/6/30	3,600
Aug.	10	Cost of building parking lot for employees in back of building	4,960
Sept.	6	Replacement of windows broken in August	160
Oct.	10	Repairs due to regular usage	2,240
		Credits	
2009			
May	24	Transfer to Land account, per allocation of purchase cost authorized in minutes of board of directors	32,000
2010			
Jan.	5	Proceeds from leases of second floor for six months ended 2009/12/31	8,000

Peach acquired the original property on 2009 May 5. Orange immediately engaged a contractor to construct a new wing on the south end of the building. While the new wing was being constructed, the company leased the second floor as temporary warehouse space to Kellett Company. During this period (July 1 to 2009 December 31), the company installed new machinery costing USD 160,000 on the first floor of the building. Regular operations began on 2010 January 2.

a. Compute the correct balance for the Buildings account as of 2010 December 31. The company employs a calendar-year accounting period.

b. Prepare the necessary journal entries to correct the records of Peach Company at 2010 December 31. No depreciation entries are required.

Problem E Cardine Company acquired and placed into use equipment on 2009 January 2, at a cash cost of USD 935,000. Transportation charges amounted to USD 7,500, and installation and testing costs totaled USD 55,000.

The equipment was estimated to have a useful life of nine years and a salvage value of USD 37,500 at the end of its life. It was further estimated that the equipment would be used in the production of 1,920,000 units of product during its life. During 2009, 426,000 units of product were produced.

Compute the depreciation to the nearest dollar for the year ended December 31, using:

- a. Straight-line method.
- b. Units-of-production method.
- c. Double-declining-balance method (use a fraction rather than a percentage).

Problem F Goodrich Company purchased a machine on 2009 October 1 for USD 100,000. The machine has an estimated salvage value of USD 30,000 and an estimated useful life of eight years.

Compute to the nearest dollar the amount of depreciation Goodrich should record on the machine for the years ending 2009 December 31, and 2010, under each of the following methods:

- a. Straight-line.
- b. Double-declining-balance.

Alternate problems

Alternate problem A Brite Company purchased a machine that had an invoice price of USD 400,000 excluding sales tax. Terms were net 30. A 4 per cent sales tax was levied on the sale. The company incurred and paid freight costs of USD 10,000. Special electrical connections were run to the machine at a cost of USD 14,000 and a special reinforced base for the machine was built at a cost of USD 18,000. The machine was dropped and damaged while being mounted on this base. Repairs cost USD 4,000. Raw materials with a cost of USD 1,000 were consumed in testing the machine. Safety guards were installed on the machine at a cost of USD 1,400, and the machine was placed in operation. In addition, USD 500 of costs were incurred in removing an old machine.

Prepare a schedule showing the amount at which the machine should be recorded in Brite Company's account.

Alternate problem B Maxwell Company purchased 2 square miles of farmland under the following terms: USD 968,000 cash; and liability assumed on mortgage note of USD 320,000 and interest accrued on mortgage note assumed, USD 12,800. The company paid USD 67,200 of legal and brokerage fees and also paid USD 3,200 for a title search on the property.

The company planned to use the land as a site for a new office building and a new factory. Maxwell paid clearing and leveling costs of USD 28,800. It sold crops on the land for USD 7,360 and sold one of the houses on the property for USD 19,200. The other buildings were torn down at a cost of USD 14,400; sale of salvaged materials yielded cash proceeds of USD 13,600. Approximately 1 per cent of the land acquired was deeded to the county for roads. The cost of excavating a basement for the office building amounted to USD 9,120.

Prepare a schedule showing the amount at which the land should be carried on Maxwell Company's books.

Alternate problem C Dawson Towing Company purchased a used panel truck for USD 28,800 cash. The next day the company's name and business were painted on the truck at a total cost of USD 1,488. The truck was then given a minor overhaul at a cost of USD 192, and new "super" tires were mounted on the truck at a cost of USD 1,920, less a trade-in allowance of USD 240 for the old tires. The truck was placed in service on 2009 April 1, at which time it had an estimated useful life of five years and a salvage value of USD 3,360.

- a. Prepare a schedule showing the cost to be recorded for the truck.
- b. Prepare the journal entry to record depreciation at the end of the calendar-year accounting period, 2009 December 31. Use the double-declining-balance method.
- c. Assume that the straight-line depreciation method has been used. At the beginning of 2009 it is estimated the truck will last another four years. The estimated salvage value changed to USD 1,920. Prepare the entry to record depreciation for 2012.

Alternate problem D You are the new controller for Jayson Company, which began operations on 2009 October 1, after a start-up period that ran from the middle of 2008. While reviewing the accounts, you find an account entitled "Fixed Assets", which contains the following items:

Cash paid to previous owner of land and old buildings	\$ 192,000
Cash given to construction company as partial payment for the new building	72,000
Legal and title search fees	2,400
Real estate commission	14,400
Cost of demolishing old building	16,800
Cost of leveling and grading	9,600
Architect's fee (90% of building and 10% improvements)	6,000
Cost of excavating (digging) basement for new building	21,600

Cash paid to construction company for new building	288,000
Repair damage done by vandals	7,200
Sprinkler system for lawn	31,200
Lighting system for parking lot	40,800
Paving of parking lot	60,000
Net invoice price of machinery	1,152,000
Freight cost incurred on machinery	50,400
Installation and testing of machinery	19,200
Medical bill paid for employee injured in installing machinery	3,600
Landscaping (permanent)	38,400
Repair damage to building in installation of machinery	4,800
Special assessment paid to city for water mains and sewer line	45,600
Account balance	\$2,106,000

In addition, you discover that cash receipts of USD 1,200 from selling materials salvaged from the old building were credited to Miscellaneous Revenues in 2009. Digging deeper, you find that the plant manager spent all of his time for the first nine months of 2009 supervising installation of land improvements (10 per cent), building construction (40 per cent), and installation of machinery (50 per cent). The plant manager's nine-month salary of USD 108,000 was debited to Officers' Salaries Expense.

a. List all items on a form containing columns for Land, Land Improvements, Building, and Machinery. Sort the items into the appropriate columns, omitting those items not properly included as an element of asset cost. Show negative amounts in parentheses. Total your columns.

b. Prepare one compound journal entry to reclassify and adjust the accounts and to eliminate the Fixed Assets account. Do not attempt to record depreciation for the partial year.

Alternate problem E Land Company acquired and put into use a machine on 2009 January 1, at a cash cost of USD 120,000 and immediately spent USD 5,000 to install it. The machine had an estimated useful life of eight years and an estimated salvage value of USD 15,000 at the end of this time. It was further estimated that the machine would produce 500,000 units of product during its life. In the first year, the machine produced 100,000 units.

Prepare journal entries to record depreciation to the nearest dollar for 2009, using:

- Straight-line method.
- Units-of-production method.
- Double-declining-balance method.

Alternate problem F Crawford Company paid USD 60,000 for a machine on 2009 April 1, and placed it in use on that same date. The machine has an estimated life of 10 years and an estimated salvage value of USD 10,000.

Compute the amount of depreciation to the nearest dollar the company should record on this asset for the years ending 2009 December 31, and 2010, under each of the following methods:

- Straight-line.
- Double-declining-balance.

Beyond the numbers—Critical thinking

Business decision case A You are a new staff auditor assigned to audit Cray Company's Buildings account. You determine that Cray Company made the following entries in its Buildings account in 2009:

		Debits	
2009			
Jan.	2	Cost of land and old buildings purchased	\$ 720,000
	2	Legal fees incident to purchase	9,600
	2	Fee for title search	1,200
	12	Cost of demolishing old buildings on land	19,200
June	16	Cost of insurance during construction of new building	4,800

July 30	Payment to contractor on completion of new building	1,080,000
Aug. 5	Architect's fees for design of new building	48,000
Sept. 15	City assessment for sewers and sidewalks (considered permanent)	16,800
Oct. 6	Cost of landscaping (considered permanent)	9,600
Nov. 1	Cost of driveways and parking lots	60,000
	Credits	
Jan. 15	Proceeds received upon sale of salvaged materials from old buildings	4,800

In addition to the entries in the account, you obtained the following information in your interview with the accountant in charge of the Buildings account:

The company began using the new building on 2009 September 1. The building is estimated to have a 40-year useful life and no salvage value.

The company began using the driveways and parking lots on 2009 November 1. The driveways and parking lots have an estimated 10-year useful life and no salvage value.

The company uses the straight-line depreciation method to depreciate all of its plant assets.

Using all of this information, do the following:

- Prepare a schedule that shows the separate cost of land, buildings, and land improvements.
- Compute the amount of depreciation expense for 2009.
- Complete the journal entries required to correct the accounts at 2009 December 31. Assume that closing entries have not been made.
- Write a brief statement describing to management why depreciation must be recorded and how recording depreciation affects net income.

Business decision case B On 2010 October 1, Besler Company acquired and placed into use new equipment costing USD 504,000. The equipment has an estimated useful life of five years and an estimated salvage value of USD 24,000. Besler estimates that the equipment will produce 2 million units of product during its life. In the last quarter of 2010, the equipment produced 120,000 units of product. As the company's accountant, management has asked you to do the following:

- Compute the depreciation for the last quarter of 2010, using each of the following methods:

Straight-line.

Units-of-production.

Double-declining-balance.

- Prepare a written report describing the conditions in which each of these four methods would be most appropriate.

Business decision case C The notes to the financial statements of Wolverine World Wide, Inc., in "A Broader Perspective", stated that substantially all fixed assets are depreciated using the straight-line method. Explain why the straight-line method of depreciation may be appropriate for this company.

Business decision case D Discuss the meaning of rate of return on operating assets, its elements, and what it means to investors and management.

Calculate the rate of return on operating assets for The Limited in the Annual report appendix for the two most recent years. Assume all assets are operating assets. Comment on the results.

Annual report analysis E The following footnote excerpted from a recent annual report of Kerr-McGee Corporation describes the company's accounting policies for property, plant, and equipment:

Property, plant, and equipment is depreciated over its estimated life by the unit-of-production or the straight-line-method.

- a. How many different depreciation methods are used by Kerr-McGee Corporation? Does this practice conform with generally accepted accounting principles?
- b. Discuss why management might select each of these methods to depreciate plant assets.

Group project F In a group of two or three students, visit a large company in your community and inquire about the subsidiary records it maintains to establish accounting control over its plant assets. Also inquire about physical controls used to protect its equipment that is movable, such as computers, copy machines, and so on. Write a report to your instructor summarizing your findings and be prepared to give a short report to your class.

Group project G With a team of two or three students, visit two companies in your community to inquire about why they use certain depreciation methods. Try to locate companies that use several depreciation methods in accounting for various depreciable fixed assets. Interview those who made the decision as to methods to use to find out the reasons for their choices. Write a report to your instructor summarizing your findings.

Group project H In a small group of students, visit a large company in your community to determine how it decides to account for expenditures on fixed assets made after the assets have been in use for some time. In other words, how does it decide whether to debit the asset account, the accumulated depreciation account, or an expense account? What role does materiality play in the decision? Evaluate the reasonableness of the decision model used. Write a report to your instructor summarizing your findings and be prepared to make a short presentation to your class.

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Investigate this site. Identify the major types of employers. Make note of any interesting information at this site. Write a report to your instructor summarizing your findings. Be prepared to make a short presentation to the class.

Visit the Best Software website at:

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What types of software does the company sell? Why might a company buy a software package from Best Software? Study any other aspect of the information that looks interesting. Write a report to your instructor summarizing your findings.

Answers to self-test

True-false

True. The cost of land includes all normal, reasonable, and necessary expenditures to obtain the land and get it ready for use.

False. Depreciation is a process of allocation, not valuation, and the book value of an asset has little to do with its market value.

False. Depreciation accounting does not provide funds required to replace plant assets. Instead, accumulated depreciation simply shows how much of an asset's cost has been charged to expense since the asset was acquired.

False. Expenditures that improve the quality of services are charged to the asset account.

True. Plant asset subsidiary ledgers provide detailed information that the general ledger account cannot provide and thus give better control over plant assets.

Multiple-choice

b. The depreciation expense for 2010 using the straight-line method is computed as follows:

$$\frac{(\text{USD } 440,000 - \text{USD } 40,000)}{10} = \text{USD } 40,000$$

d. Double-declining balance rate = $2 \times \left(\frac{100 \text{ per cent}}{10}\right) = 20 \text{ per cent}$

$$\text{Depreciation expense for 2010} = (2 \text{ per cent} \times \text{USD } 440,000) \times \frac{6}{12} = \text{USD } 44,000$$

e. At the beginning of 2010, the balance of accumulated depreciation is USD 2,800 (annual depreciation of USD 1,400 X 2) and book value is USD 7,200, or (USD 10,000 - USD 2,800). The revised annual depreciation expense is USD 3,100, or $\left[\frac{(\text{USD } 7,200 - \text{USD } 1,000)}{2}\right]$.

a. The error in recording a capital expenditure as a revenue expenditure results in an overstatement of current year's expense, as well as an understatement of current year's net income.

Chapter 8: Part 2

Plant asset disposals, natural resources, and intangible assets

Learning objectives

After studying this section, you should be able to:

- Calculate and prepare entries for the sale, retirement, and destruction of plant assets.
- Describe and record exchanges of nonmonetary assets.
- Determine the periodic depletion cost of a natural resource and calculate depreciation of plant assets located on extractive industry property.
- Prepare entries for the acquisition and amortization of intangible assets.
- Analyze and use the financial results-total assets turnover.

A company accountant's role in measuring intangibles

Many assets have no physical substance. These assets are referred to as intangible. Even though these assets have no substance, the accountant still must spend time measuring the value of these assets to corporation and how these assets contribute to the cash flow of the entity.

The accountant must first place a value on something that cannot be seen by the naked eye. Then the accountant must determine if the asset is making a contribution toward cash flow of the entity (if so and how long) and finally, the accountant must determine if and when this benefit has indeed expired.

As we move ever more toward an information based economy, the per cent of intangible assets to total assets also increases. In many cases, intangible assets compose a significant majority of total assets. Thus, the earning power of such companies is primarily based on the valuation of assets that cannot be seen or touched. Some intangible assets, such as human assets and internally generated intangibles, are not even recorded on the company's books. This makes it even more difficult to value the assets and determine their contribution to earnings.

Investors and analysts often compare book value per share with the market price per share for a corporation. This ratio is referred to as the price to book ratio (PB). It measures the market's beliefs about the value of net assets as compared to the recorded amount of net assets. In 1998 Tootsie Roll had a PB ratio of approximately 5.2. The recorded net assets were approximately USD 400 million, yet the market perceived Tootsie Roll to have net assets worth over USD 2,000 million. What is the nature of those unrecorded (intangible) assets? In 1998, Microsoft had a PB ratio of approximately 12.4. The real value of Microsoft's net assets exceeded those reported in the accounting records by a factor of 12.4. It is reasonable to assume that a large portion of the unrecorded assets of Microsoft must be intangible. How does the accountant value something that has no physical substance and in many cases has not been recorded? It is similar to walking around in a dark closet wearing a blindfold.

This function is closely related to the work of the plant asset accountant. Many of the same questions must be addressed when accounting for intangible assets. The question still remains, how can you measure something you cannot see?

Your study of long-term assets—plant assets, natural resources, and intangible assets—began in Chapter 10, which focused on determining plant asset cost, computing depreciation, and distinguishing between capital and

revenue expenditures. This chapter begins by discussing the disposal of plant assets. The next topic is accounting for natural resources such as ores, minerals, oil and gas, and timber. The final topic is accounting for intangible assets such as patents, copyrights, franchises, trademarks and trade names, leases, and goodwill.

Note that accounting for all the long-term assets discussed in these chapters is basically the same. A company that purchases a long-term asset records it at cost. As the company receives benefits from the asset and its future service potential decreases, the accountant transfers the cost from an asset account to an expense account. Finally, the asset is sold, retired, or traded in on a new asset. Because the lives of long-term assets can extend for many years, the methods accountants use in reporting such assets can have a dramatic effect on the financial statements of many accounting periods.

Disposal of plant assets

All plant assets except land eventually wear out or become inadequate or obsolete and must be sold, retired, or traded for new assets. When disposing of a plant asset, a company must remove both the asset's cost and accumulated depreciation from the accounts. Overall, then, all plant asset disposals have the following steps in common:

- Bring the asset's depreciation up to date.
- Record the disposal by:
 - (a) Writing off the asset's cost.
 - (b) Writing off the accumulated depreciation.
 - (c) Recording any consideration (usually cash) received or paid or to be received or paid.
 - (d) Recording the gain or loss, if any.

As you study this section, remember these common procedures accountants use to record the disposal of plant assets. In the paragraphs that follow, we discuss accounting for the (1) sale of plant assets, (2) retirement of plant assets without sale, (3) destruction of plant assets, (4) exchange of plant assets, and (5) cost of dismantling and removing plant assets.

Sale of plant assets

Companies frequently dispose of plant assets by selling them. By comparing an asset's book value (cost less accumulated depreciation) with its selling price (or net amount realized if there are selling expenses), the company may show either a gain or loss. If the sales price is greater than the asset's book value, the company shows a gain. If the sales price is less than the asset's book value, the company shows a loss. Of course, when the sales price equals the asset's book value, no gain or loss occurs.

To illustrate accounting for the sale of a plant asset, assume that a company sells equipment costing USD 45,000 with accumulated depreciation of USD 14,000 for USD 35,000. The firm realizes a gain of USD 4,000:

Equipment cost	\$ 45,000
Accumulated depreciation	14,000
Book value	\$ 31,000
Sales price	35,000
Gain realized	\$ 4,000

The journal entry to record the sale is:

Cash (+A)		35,000
Accumulated Depreciation—Equipment (+A)	14,000	
Equipment (-A)		45,000

Gain on Disposal of Plant Assets (+SE)	4,000
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To record sale of equipment at a price greater than book value.

If on the other hand, the company sells the equipment for USD 28,000, it realizes a loss of USD 3,000 (USD 31,000 book value—USD 28,000 sales price). The journal entry to record the sale is:

Cash (+A)	28,000
Accumulated Depreciation—Equipment (+A)	14,000
Loss from Disposal of Plant Asset (-SE)	3,000
Equipment (-A)	45,000

To record the sale of equipment at a price less than book value.

If a firm sells the equipment for USD 31,000, no gain or loss occurs. The journal entry to record the sale is:

Cash (+A)	31,000
Accumulated Depreciation—Equipment (+A)	14,000
Equipment (-A)	45,000

To record sale of equipment at a price equal to book value.

Accounting for depreciation to date of disposal When selling or otherwise disposing of a plant asset, a firm must record the depreciation up to the date of sale or disposal. For example, if it sold an asset on April 1 and last recorded depreciation on December 31, the company should record depreciation for three months (January 1-April 1). When depreciation is not recorded for the three months, operating expenses for that period are understated, and the gain on the sale of the asset is understated or the loss overstated.

To illustrate, assume that on 2011 August 1, Ray Company sold a machine for USD 1,500. When purchased on 2003 January 2, the machine cost USD 12,000; Ray was depreciating it at the straight-line rate of 10 per cent per year. As of 2010 December 31, after closing entries were made, the machine's accumulated depreciation account had a balance of USD 9,600. Before determining a gain or loss and before making an entry to record the sale, the firm must make the following entry to record depreciation for the seven months ended 2011 July 31:

July 31	Depreciation Expense—Machinery (-SE)	700	
	Accumulated Depreciation—Machinery (-A)		700

To record depreciation for seven months
 [(\$12,000 X 0.10 X (7/12))]

An accountant would compute the USD 200 loss on the sale as follows:

Machine cost	\$ 12,00
	0
Accumulated depreciation (\$9,600 + \$700)	10,30
	0
Book value	\$ 1,700
Sales price	1,500
Loss realized	\$ 200

The journal entry to record the sale is:

Cash (+A)	1,500
Accumulated Depreciation—Machinery (+A)	10,300
Loss from Disposal of Plant Assets (-SE)	200
Machinery(-A)	12,000

To record the sale of machinery at a price less than book value.

When retiring a plant asset from service, a company removes the asset's cost and accumulated depreciation from its plant asset accounts. For example, Hayes Company would make the following journal entry when it retired a fully depreciated machine that cost USD 15,000 and had no salvage value:

Accumulated Depreciation—Machinery (+A)	15,000	
Machinery (-A)		15,000

To record the retirement of a fully depreciated machine.

Occasionally, a company continues to use a plant asset after it has been fully depreciated. In such a case, the firm should not remove the asset's cost and accumulated depreciation from the accounts until the asset is sold, traded, or retired from service. Of course, the company cannot record more depreciation on a fully depreciated asset because total depreciation expense taken on an asset may not exceed its cost.

Sometimes a business retires or discards a plant asset before fully depreciating it. When selling the asset as scrap (even if not immediately), the firm removes its cost and accumulated depreciation from the asset and accumulated depreciation accounts. In addition, the accountant records its estimated salvage value in a Salvaged Materials account and recognizes a gain or loss on disposal. To illustrate, assume that a firm retires a machine with a USD 10,000 original cost and USD 7,500 of accumulated depreciation. If the machine's estimated salvage value is USD 500, the following entry is required:

Salvaged materials (+A)	500	
Accumulated Depreciation—Machinery (+A)	7,500	
Loss from Disposal of Plant Assets (-SE)	2,000	
Machinery (-A)		10,000

To record the retirement of machinery, which will be sold for scrap at a later time.

An accounting perspective:

Uses of technology

The main advantages that companies give for having a home page on the Internet are (1) increased efficiency in the work environment, (2) increased revenue, and (3) faster customer access. A home page can be developed for a small company for a few hundred dollars and can be maintained for a fairly low monthly fee. The Small Business Administration has a website at <http://www.sba.gov> that provides helpful information to small businesses. One concern that companies have regarding Internet use by their employees is that they might visit interesting nonbusiness related sites on company time.

Sometimes accidents, fires, floods, and storms wreck or destroy plant assets, causing companies to incur losses. For example, assume that fire completely destroyed an uninsured building costing USD 40,000 with up-to-date accumulated depreciation of USD 12,000. The journal entry is:

Fire Loss (-SE)	28,000	
Accumulated Depreciation—Buildings (+A)	12,000	

Buildings (-A)	40,000
To record fire loss.	

If the building was insured, the company would debit only the amount of the fire loss exceeding the amount to be recovered from the insurance company to the Fire Loss account. To illustrate, assume the company partially insured the building and will recover USD 22,000 from the insurance company. The journal entry is:

Receivable from Insurance Company (+A)	22,000	
Fire Loss (-SE)	6,000	
Accumulated Depreciation—Buildings (+A)	12,000	
Buildings (-A)		40,000
To record fire loss and amount recoverable from insurance company.		

Exchanges of nonmonetary assets Until late 2004, the rules according to *APB Opinion No. 29* for recording exchanges of nonmonetary assets depended on whether they were exchanges of dissimilar assets such as a truck for a machine or were similar assets such as a truck for a truck². If the exchange classified as an exchange of dissimilar assets, the acquired asset would be recorded at its fair value and any gain or loss would be recognized. In late 2004, the FASB issued a new standard, *Statement of Financial Accounting Standards No. 153*, "Exchanges of Nonoperating Assets: an amendment of APB Opinion No. 29"³. This new standard was issued to bring about greater agreement between US Generally Accepted Accounting Principles and International Financial Reporting Standards and is effective for exchanges occurring during fiscal periods beginning after 2005 June 15.

This change allows the financial statements of US companies to be more comparable to the financial statements of companies utilizing International Financial Reporting Standards.

The new FASB standard no longer distinguishes between dissimilar and similar asset exchanges. Instead it differentiates between exchanges that have commercial substance and those that do not have commercial substance. An exchange has **commercial substance** if, as a result of the exchange, future cash flows are expected to change significantly. For instance, if a company exchanges a building for land (a dissimilar exchange), the timing and the future cash flows are likely to be different than if the exchange had not occurred. Most exchanges qualify as having commercial substance. However, if the exchange is not expected to create a significant change in future cash flows, the exchange does not result in commercial substance. For example, if a company exchanges one truck for another truck (a similar exchange) that will perform the same function as the old truck and for the same time period so that the future cash flows are not significantly different, then the exchange does not result in commercial substance. However, if the future cash flows are likely to be significantly different, then the exchange of similar assets has commercial substance.

Exchanges of nonmonetary assets having commercial substance For exchanges of nonmonetary assets that have commercial substance, accountants record the new asset at the fair market value of the asset received or the asset(s) given up, whichever is more clearly evident. When the cash price of the new asset is stated, they use the cash price to record the new asset. If the cash price is not stated, they assume that the fair market value of the old asset plus any cash paid would equate to the cash price of the new asset and use that value to record the new asset.

² APB, *APB Opinion No. 29*, "Accounting for Nonmonetary Transactions" (New York: AICPA, May 1973).

³ FASB, *FASB Statement No. 153*, "Exchanges of Nonmonetary Assets: an amendment of APB Opinion No. 29" (Norwalk, CT: FASB Board, December 2004).

Thus, accountants would normally record the asset received at either (1) the stated cash price of the new asset or (2) a known fair market value of the asset given up plus any cash paid.

Debiting accumulated depreciation and crediting the old asset removes the book value of the old asset from the accounts. The firm credits the Cash account for any amount paid. If the amount at which the new asset is recorded exceeds the book value of the old asset plus any cash paid, a company records a gain to balance the journal entry. If the situation is reversed, it records a loss to balance the journal entry. To illustrate such an exchange having commercial substance, assume a company exchanges an old machine for a new delivery truck. The future cash flows from the exchange are expected to be significantly different and, therefore, the exchange has commercial substance. The machine cost USD 45,000 and had an up-to-date accumulated depreciation balance of USD 38,000. The truck had a USD 55,000 cash price and was acquired by trading in the machine with a fair value of USD 3,000 and paying USD 52,000 cash. The journal entry to record the exchange is:

Trucks (+A)	55,000
Accumulated Depreciation—Machinery (+A)	38,000
Loss from Disposal of Plant Assets (-SE)	4,000
Machinery (-A)	45,000
Cash (-A)	52,000

To record loss on exchange of dissimilar plant assets.

Another way to compute the USD 4,000 loss on the exchange is to use the book value of the old asset less the fair market value of the old asset. The calculation is as follows:

Machine cost	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset	
(trade-in allowance)	3,000
Loss realized	\$ 4,000

To illustrate the recognition of a gain from such an exchange having commercial substance, assume that the fair market value of the machine was USD 9,000 instead of USD 3,000, and that only USD 46,000 was paid in cash. The journal entry to record the exchange would be:

Trucks (+A)	55,000
Accumulated Depreciation—Machinery (+A)	38,000
Machinery (-A)	45,000
Cash (-A)	46,000
Gain on Disposal of Plant Assets(+SE)	2,000

To record gain on exchange of dissimilar assets.

Another way to compute the gain of USD 2,000 on the exchange is to use the fair market value of the old asset less the book value of the old asset. The calculation is as follows:

Machine cost	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset	
(trade-in allowance)	9,000
Gain realized	\$ 2,000

Remember, when the book value and the market value of the old asset are different, companies always recognize a gain or a loss on an exchange of nonmonetary assets having commercial substance. As discussed earlier, they do not recognize a gain or loss on an exchange of nonmonetary assets not having commercial substance.

Exchanges of nonmonetary assets not having commercial substance Often firms exchange plant assets such as automobiles, trucks, and office equipment by trading the old asset for a similar new one. Once in a while, such an exchange does not result in an expected change in future cash flows and therefore lacks commercial substance. When such an exchange occurs, the company receives a trade-in allowance for the old asset, and pays the balance in cash.⁴ Usually, the cash price of the new asset is stated. If not, accountants assume the cash price of the new asset is the fair market value of the old asset plus the cash paid.

When such assets are exchanged, we must modify the general rule that new assets are recorded at the fair market value of what is given up or received, whichever is clearer. Thus, companies record the new asset at the book value of the old asset plus the cash paid. When applying this rule to exchanges of assets where no commercial substance results, firms recognize no losses or gains.

To illustrate the accounting for exchanges of nonmonetary assets that do not have commercial substance, assume that a delivery service exchanged USD 50,000 cash and truck No. 1—which cost USD 45,000, had USD 38,000 of up-to-date accumulated depreciation, and had a USD 5,000 fair market value—for truck No. 2. The new truck has a cash price (fair market value) of USD 55,000. The delivery service realized a loss of USD 2,000 on the exchange which cannot be recorded. The loss is calculated as follows:

The journal entry to record the exchange is:

Cost of trunk No. 1	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset	
(trade-in allowance)	5,000
Loss indicated (but not recorded)	\$ 2,000

However, if a loss is indicated and is added to the recorded value of the new asset, the asset may later be written down because of rules of impairment (as required by *FASB Standard No. 144*), a topic left to Intermediate Accounting texts.

4 Trade-in allowance is sometimes expressed as the difference between list price and cash paid, but we choose to define it as the difference between cash price and cash paid because this latter definition seems to agree with current practice for exchange transactions.

Truck (cost of No. 2) (+A)	57,000	
Accumulated Depreciation—Trucks (+A)	38,000	
Trucks (cost of No. 1) (-A)		45,000
Cash (-A)		50,000

To record the exchange of non-monetary assets with no commercial substance (no loss recorded).

Accounting for any gain resulting from exchanges of nonmonetary assets having no commercial substance is similar to the case where a loss is present but unrecorded. To illustrate, assume that in the preceding example, the delivery service gave truck No. 1 (now with a fair market value of USD 9,000) and USD 46,000 cash in exchange for truck No. 2. The gain on the exchange is USD 2,000, but would be unrecorded.

Book value of old truck (No. 1)	\$ 7,000	1
Cash paid	46,000	
Cost of new truck (No. 2)	\$ 53,000	
Fair market value of new truck (No. 2)	\$ 55,000	1
Less: Gain indicated	2,000	(equal)
Cost of new truck (No. 2)	\$ 53,000	1

The company would record the new asset at the book value of the old asset (USD 7,000) plus cash paid (USD 46,000). The company deducts the gain from the cost of the new asset (USD 55,000). Thus, the cost basis of the new delivery truck is equal to USD 55,000 less than the USD 2,000 gain, or USD 53,000. The delivery service uses this USD 53,000 cost basis in recording depreciation on the truck and determining any gain or loss on its disposal.

The journal entry to record the exchange is:

Cost of truck No. 1	\$ 45,000
Accumulated depreciation	38,000
Book value	\$ 7,000
Fair market value of old asset (trade-in allowance)	5,000
Loss indicated (but not recorded)	\$ 2,000

Firms would realize the gain on an exchange of nonmonetary assets not having commercial substance in future accounting periods as increased net income resulting from smaller depreciation charges on the newly acquired asset. In the preceding example, annual depreciation expense is less if it is based on the truck's USD 53,000 cost basis than if it is based on the truck's USD 55,000 cash price. Thus, future net income per year will be larger.

Trucks (cost of No. 2) (+A)	53,000	
Accumulated Depreciation—Trucks (+A)	38,000	
Trucks (cost of No. 1) (-A)		45,000
Cash (-A)		46,000

To record exchange of nonmonetary assets with no commercial substance (no gain recorded).

In Exhibit 14, we summarize the rules for recording nonmonetary asset exchanges.

An accounting perspective:

Uses of technology

Although sophisticated computer systems automatically compute the gain or loss on the disposal of assets, such programs depend on human input. If an error was made in inputting the type of

disposal or exchange, or if the life of the asset was estimated inaccurately, the calculated gain or loss would be incorrect.

	Exchanges Having Commercial Substance	Exchanges NOT Having Commercial Substance
Recognize Gains?	Yes	No
Recognize Losses?	Yes	No
Record New Asset At:	Fair market value of asset received (new asset) or fair market value of asset given up (old asset), whichever is more clearly evident	Book value of old asset plus cash paid

Exhibit 14: Summary of rules for recording exchanges of plant assets

Companies incur removal costs when dismantling and removing old plant assets. They deduct these costs from salvage proceeds to determine the asset's net salvage value. (The removal costs could be greater than the salvage proceeds.) Accountants associate removal costs with the old asset, not the new asset acquired as a replacement.

The next section discusses natural resources. Note the underlying accounting principle of matching the expenses with the revenues earned in that same accounting period.

Natural resources

Resources supplied by nature, such as ore deposits, mineral deposits, oil reserves, gas deposits, and timber stands, are **natural resources** or **wasting assets**. Natural resources represent inventories of raw materials that can be consumed (exhausted) through extraction or removal from their natural setting (e.g. removing oil from the ground).

On the balance sheet, we classify natural resources as a separate group among noncurrent assets under headings such as "Timber stands" and "Oil reserves". Typically, we record natural resources at their cost of acquisition plus exploration and development costs; on the balance sheet, we report them at total cost less accumulated depletion. (Accumulated depletion is similar to the accumulated depreciation used for plant assets.) When analyzing the financial condition of companies owning natural resources, exercise caution because the historical costs reported for the natural resources may be only a small fraction of their current value.

An accounting perspective:

Business insight

Kerr-McGee Corporation is a global energy and chemical company engaged in oil and gas exploration and production, and the production and marketing of titanium dioxide pigment. In notes to its financial statements, Kerr-McGee states that the company's geologists and engineers in accordance with the Securities and Exchange Commission definitions have prepared estimates of proved reserves. These estimates include reserves that may be obtained in the future by improved recovery methods now in operation or for which successful testing has been exhibited.

Depletion is the exhaustion that results from the physical removal of a part of a natural resource. In each accounting period, the depletion recognized is an estimate of the cost of the natural resource that was removed from its natural setting during the period. To record depletion, debit a Depletion account and credit an Accumulated Depletion account, which is a contra account to the natural resource asset account.

By crediting the Accumulated Depletion account instead of the asset account, we continue to report the original cost of the entire natural resource on the financial statements. Thus, statement users can see the percentage of the resource that has been removed. To determine the total cost of the resource available, we combine this depletion cost with other extraction, mining, or removal costs. We can assign this total cost to either the cost of natural resources sold or the inventory of the natural resource still on hand. Thus, we could expense all, some, or none of the depletion and removal costs recognized in an accounting period, depending on the portion sold. If all of the resource is sold, we expense all of the depletion and removal costs. The cost of any portion not yet sold is part of the cost of inventory.

Computing periodic depletion cost To compute depletion charges, companies usually use the units-of-production method. They divide total cost by the estimated number of units—tons, barrels, or board feet—that can be economically extracted from the property. This calculation provides a per-unit depletion cost. For example, assume that in 2010 a company paid USD 650,000 for a tract of land containing ore deposits. The company spent USD 100,000 in exploration costs. The results indicated that approximately 900,000 tons of ore can be removed economically from the land, after which the land will be worth USD 50,000. The company incurred costs of USD 200,000 to develop the site, including the cost of running power lines and building roads. Total cost subject to depletion is the net cost assignable to the natural resource plus the exploration and development costs. When the property is purchased, a journal entry assigns the purchase price to the two assets purchased—the natural resource and the land. The entry would be:

Land (+A)	50,000	
Ore Deposits (+A)	600,000	
Cash (-A)		650,000
To record purchase of land and mine.		

After the purchase, an entry debits all costs to develop the site (including exploration) to the natural resource account. The entry would be:

Ore Deposits (\$100,000 + \$200,000) (+A)	300,000	
Cash (-A)		300,000
To record costs of exploration and development.		

The formula for finding depletion cost per unit is:

$$\text{Depletion cost per unit} = \frac{\text{Cost of site} - \text{Residual value of land (if owned)} + \text{Costs develop site}}{\text{Estimated number of units that can be economically extracted}}$$

In some instances, companies buy only the right to extract the natural resource from someone else's land. When the land is not purchased, its residual value is irrelevant and should be ignored. If there is an obligation to restore the land to a usable condition, the firm adds these estimated restoration costs to the costs to develop the site.

In the example where the land was purchased, the total costs of the mineral deposits equal the cost of the site (USD 650,000) minus the residual value of land (USD 50,000) plus costs to develop the site (USD 300,000), or a total of USD 900,000. The unit (per ton) depletion charge is USD 1 (or USD 900,000/900,000 tons). The formula to compute the depletion cost of a period is:

$$\text{Depletion cost of a period} = \text{Depletion cost per unit} \times \text{Number of units extracted during period}$$

In this example, if 100,000 tons are mined in 2010, this entry records the depletion cost of USD 100,000 (USD 1 X 100,000) for the period:

Depletion (-SE)	100,000
-----------------	---------

Accumulated Depletion—Ore Deposits⁴ (-A) 100,000
 To record depletion for 2010.

5

The Depletion account contains the "in the ground" cost of the ore or natural resource mined. Combined with other extractive costs, this cost determines the total cost of the ore mined. To illustrate, assume that in addition to the USD 100,000 depletion cost, mining labor costs totaled USD 320,000, and other mining costs, such as depreciation, property taxes, power, and supplies, totaled USD 60,000. If 80,000 tons were sold and 20,000 remained on hand at the end of the period, the firm would allocate the total cost of USD 480,000 as follows:

Depletion cost	USD 100,000
Mining labor costs	320,000
Other mining costs	60,000
Total cost of 100,000 tons mined (USD 4.80 per ton)	USD 480,000
Less: One inventory (20,000 tons at USD 4.80)	96,000
Cost of ore sold (80,000 tons at USD 4.80)	USD 384,000

Note that the average cost per ton to mine 100,000 tons was USD 4.80 (or USD 480,000/100,000). The income statement would show cost of ore sold of USD 384,000. The mining company does not report depletion separately as an expense because depletion is included in cost of ore sold. The balance sheet would show inventory of ore on hand (a current asset) at USD 96,000 (or USD 4.80 X 20,000). Also, it would report the cost less accumulated depletion of the natural resource as follows:

One deposits	\$900,000	
Less: Accumulated depletion	100,000	\$ 800,000

Another method of calculating depletion cost is the percentage of revenue method. Because firms use this method only for income tax purposes and not for financial statements, we do not discuss it in this text.

Companies depreciate plant assets erected on extractive industry property the same as other depreciable assets. If such assets will be abandoned when the natural resource is exhausted, they depreciate these assets over the shorter of the (a) physical life of the asset or (b) life of the natural resource. In many cases, firms compute periodic depreciation charges using the units-of-production method. Using this method matches the life of the plant asset with the life of the natural resource. This method is recommended where the physical life of the plant asset equals or exceeds the resource's life but its useful life is limited to the life of the natural resource.

Assume a mining company acquires mining property with a building it plans to use only in the mining operations. Also assume that the firm uses the units-of-production method for computing building depreciation.

Relevant facts are:

Building cost	\$310,000	
Estimated physical life of building	20	year
		s
Estimated salvage value of building (after mine is exhausted)	\$ 10,000	
Capacity of mine	1,000,000	tons
Expected life of mine	10	year
		s

⁵ Instead of crediting the accumulated depletion account, the Ore Deposits account could have been credited directly. But for reasons indicated earlier, the credit is usually to an accumulated depletion account.

Because the life of the mine (10 years or 1,000,000 tons) is shorter than the life of the building (20 years), the building should be depreciated over the life of the mine. The basis of the depreciation charge is tons of ore rather than years because the mine's life could be longer or shorter than 10 years, depending on how rapidly the ore is removed.

Suppose that during the first year of operations, workers extracted 150,000 tons of ore. Building depreciation for the first year is USD 45,000, computed as follows:

$$\begin{aligned} \text{Depreciation per unit} &= \frac{\text{Asset cost} - \text{Estimated salvage value}}{\text{Total tons of ore in mine that can be economically extracted}} \\ &= \frac{\$310,000 - \$10,000}{1,000,000} \text{ tons} = \$0.30 \text{ per ton} \end{aligned}$$

Depreciation for year = Depreciation per unit X Units extracted

USD 0.30 per ton X 150,000 tons = USD 45,000

On the income statement, depreciation on the building appears as part of the cost of ore sold and is carried as part of inventory cost for ore not sold during the period. On the balance sheet, accumulated depreciation on the building appears with the related asset account.

Plant assets and natural resources are tangible assets used by a company to produce revenues. A company also may acquire intangible assets to assist in producing revenues.

Intangible assets

Although they have no physical characteristics, **intangible assets** have value because of the advantages or exclusive privileges and rights they provide to a business. Intangible assets generally arise from two sources: (1) exclusive privileges granted by governmental authority or by legal contract, such as patents, copyrights, franchises, trademarks and trade names, and leases; and (2) superior entrepreneurial capacity or management know-how and customer loyalty, which is called goodwill.

All intangible assets are nonphysical, but not all nonphysical assets are intangibles. For example, accounts receivable and prepaid expenses are nonphysical, yet classified as current assets rather than intangible assets. Intangible assets are generally both nonphysical and noncurrent; they appear in a separate long-term section of the balance sheet entitled "Intangible assets".

Initially, firms record intangible assets at cost like most other assets. However, computing an intangible asset's acquisition cost differs from computing a plant asset's acquisition cost. Firms may include only outright purchase costs in the acquisition cost of an intangible asset; the acquisition cost does not include cost of internal development or self-creation of the asset. If an intangible asset is internally generated in its entirety, none of its costs are capitalized. Therefore, some companies have extremely valuable assets that may not even be recorded in their asset accounts. To explain the reasons for this practice, we discuss the history of accounting for research and development costs next.

Research and development (R&D) costs are costs incurred in a planned search for new knowledge and in translating such knowledge into new products or processes. Prior to 1975, businesses often capitalized research and development costs as intangible assets when future benefits were expected from their incurrence. Due to the difficulty of determining the costs applicable to future benefits, many companies expensed all such costs as incurred. Other companies capitalized those costs that related to proven products and expensed the rest as incurred.

As a result of these varied accounting practices, in 1974 the Financial Accounting Standards Board in *Statement No. 2* ruled that firms must expense all research and development costs when incurred, unless they were directly reimbursable by government agencies and others. Immediate expensing is justified on the grounds that (1) the amount of costs applicable to the future cannot be measured with any high degree of precision; (2) doubt exists as to whether any future benefits will be received; and (3) even if benefits are expected, they cannot be measured. Thus, research and development costs no longer appear as intangible assets on the balance sheet. The Board applies the same line of reasoning to other costs associated with internally generated intangible assets, such as the internal costs of developing a patent.

Amortization is the systematic write-off of the cost of an intangible asset to expense. A portion of an intangible asset's cost is allocated to each accounting period in the economic (useful) life of the asset. All intangible assets are not subject to amortization. Only recognized intangible assets with finite useful lives are amortized. The **finite useful life** of such an asset is considered to be the length of time it is expected to contribute to the cash flows of the reporting entity. (Pertinent factors that should be considered in estimating useful life include legal, regulatory, or contractual provisions that may limit the useful life). The method of amortization should be based upon the pattern in which the economic benefits are used up or consumed. If no pattern is apparent, the straight-line method of amortization should be used by the reporting entity.

Recognized intangible assets deemed to have indefinite useful lives are not to be amortized. Amortization will however begin when it is determined that the useful life is no longer indefinite. The method of amortization would follow the same rules as intangible assets with finite useful lives.⁶

Straight-line amortization is calculated the same as straight-line depreciation for plant assets. Generally, we record amortization by debiting Amortization Expense and crediting the intangible asset account. An accumulated amortization account could be used to record amortization. However, the information gained from such accounting would not be significant because normally intangibles do not account for as many total asset dollars as do plant assets.

A **patent** is a right granted by the federal government. This exclusive right enables the owner to manufacture, sell, lease, or otherwise benefit from an invention for a limited period. The value of a patent lies in its ability to produce revenue. Patents have a legal life of 17 years. Protection for the patent owner begins at the time of patent application and lasts for 17 years from the date the patent is granted.

When purchasing a patent, a company records it in the Patents account at cost. The firm also debits the Patents account for the cost of the first successful defense of the patent in lawsuits (assuming an outside law firm was hired rather than using internal legal staff). Such a lawsuit establishes the validity of the patent and thereby increases its service potential. In addition, the firm debits the cost of any competing patents purchased to ensure the revenue-generating capability of its own patent to the Patents account.

The firm would amortize the cost of a purchased patent over its finite life which reasonably would not exceed its legal life. If a patent cost USD 40,000 and has a useful life of 10 years, the journal entries to record the patent and periodic amortization are:

Patents (+A)	40,000	
Cash (-A)		40,000
To record purchases of patent.		

6 FASB, *SFAS No. 142*. "Goodwill and Other Intangible Assets" (CT: FASB, June 2001), par. 11.

Patient Amortization Expense (-SE)	4,000	
Patents (-A)		4,000
To record annual patent amortization.		

For a patent that becomes worthless before it is fully amortized, the company expenses the unamortized balance in the Patents account.

As noted earlier, all R&D costs incurred in the internal development of a product, process, or idea that is later patented must be expensed, rather than capitalized. In the previous example, the company amortized the cost of the purchased patent over its useful life of 10 years. If the patent had been the result of an internally generated product or process, the firm would have expensed its cost of USD 40,000 as incurred, in accordance with *Statement No. 2* of the Financial Accounting Standards Board.

A **copyright** is an exclusive right granted by the federal government giving protection against the illegal reproduction by others of the creator's written works, designs, and literary productions. The finite useful life for a copyright extends to the life of the creator plus 50 years.⁷ Most publications have a limited (finite) life; a creator may amortize the cost of the copyright to expense on a straight-line basis or based upon the pattern in which the economic benefits are used up or consumed.

A **franchise** is a contract between two parties granting the franchisee (the purchaser of the franchise) certain rights and privileges ranging from name identification to complete monopoly of service. In many instances, both parties are private businesses. For example, an individual who wishes to open a hamburger restaurant may purchase a McDonald's franchise; the two parties involved are the individual business owner and McDonald's Corporation. This franchise would allow the business owner to use the McDonald's name and golden arch, and would provide the owner with advertising and many other benefits. The legal life of a franchise may be limited by contract.

The parties involved in a franchise arrangement are not always private businesses. A government agency may grant a franchise to a private company. A city may give a franchise to a utility company, giving the utility company the exclusive right to provide service to a particular area.

In addition to providing benefits, a franchise usually places certain restrictions on the franchisee. These restrictions generally are related to rates or prices charged; also they may be in regard to product quality or to the particular supplier from whom supplies and inventory items must be purchased.

If periodic payments to the grantor of the franchise are required, the franchisee debits them to a Franchise Expense account. If a lump-sum payment is made to obtain the franchise, the franchisee records the cost in an asset account entitled Franchise and amortizes it over the finite useful life of the asset. The legal life (if limited by contract) and the economic life of the franchise may limit the finite useful life.

A **trademark** is a symbol, design, or logo used in conjunction with a particular product or company. A **trade name** is a brand name under which a product is sold or a company does business. Often trademarks and trade names are extremely valuable to a company, but if they have been internally developed, they have no recorded asset cost. However, when a business purchases such items from an external source, it records them at cost and amortizes them over their finite useful life.

⁷ In 1998 Congress changed the period from 50 to 70 years. At this writing, the Supreme Court was reviewing the constitutionality of this change.

A **lease** is a contract to rent property. The property owner is the grantor of the lease and is the lessor. The person or company obtaining rights to possess and use the property is the lessee. The rights granted under the lease are a **leasehold**. The accounting for a lease depends on whether it is a capital lease or an operating lease.

Capital leases A **capital lease** transfers to the lessee virtually all rewards and risks that accompany ownership of property. A lease is a capital lease if, among other provisions, it (1) transfers ownership of the leased property to the lessee at the end of the lease term or (2) contains a bargain purchase option that permits the lessee to buy the property at a price significantly below fair market value at the end of the lease term.

A capital lease is a means of financing property acquisitions; it has the same economic impact as a purchase made on an installment plan. Thus, the lessee in a capital lease must record the leased property as an asset and the lease obligation as a liability. Because a capital lease is an asset, the lessee depreciates the leased property over its useful life. The lessee records part of each lease payment as interest expense and the balance as a payment on the lease liability.

The proper accounting for capital leases for both lessees and lessors has been an extremely difficult problem. We leave further discussion of capital leases for an intermediate accounting text.

Operating leases A lease that does not qualify as a capital lease is an **operating lease**. A one-year lease on an apartment and a week's rental of an automobile are examples of operating leases. Such leases make no attempt to transfer any of the rewards and risks of ownership to the lessee. As a result, there may be no recordable transaction when a lease is signed.

In some situations, the lease may call for an immediate cash payment that must be recorded. Assume that a business signed a lease requiring the immediate payment of the annual rent of USD 15,000 for each of the first and fifth years of a five-year lease. The lessee would record the payment as follows:

Prepaid Rent (+A)	15,000	
Leasehold (+A)	15,000	
Cash (-A)		30,000
To record first and fifth years' rent on a five-year lease.		

Since the Leasehold account is actually a long-term prepaid rent account for the fifth year's annual rent, it is an intangible asset until the beginning of the fifth year. Then the Leasehold account becomes a current asset and may be transferred into a Prepaid Rent account. Accounting for the balance in the Leasehold account depends on the terms of the lease. In the previous example, the firm would charge the USD 15,000 in the Leasehold account to expense over the fifth year only. It would charge the balance in Prepaid Rent to expense in the first year. Thus, assuming the lease year and fiscal year coincide, the entry for the first year is:

Rent Expense (-SE)	15,000	
Prepaid Rent (-A)		15,000
To record rent expense.		

The entry in the fifth year is:

Rent Expense (-SE)	15,000	
Leasehold (-A)		15,000
To record rent expense.		

The accounting for the second, third, and fourth years would be the same as for the first year. The lessee records the rent in Prepaid Rent when paid in advance for the year and then expenses it. As stated above, the lessee may

transfer the amount in the Leasehold account to Prepaid Rent at the beginning of the fifth year by debiting Prepaid Rent and crediting Leasehold. If this entry was made, the previous entry would have credited Prepaid Rent.

In some cases, when a lease is signed, the lump-sum payment does not cover a specific year's rent. The lessee debits this payment to the Leasehold account and amortizes it over the life of the lease. The straight-line method is required unless another method can be shown to be superior. Assume the USD 15,000 rent for the fifth year in the example was, instead, a lump-sum payment on the lease in addition to the annual rent payments. An annual adjusting entry to amortize the USD 15,000 over five years would read:

Rent Expense (-SE)	3,000	
Leasehold (-A)		3,000
To amortize leasehold.		

In this example, the annual rental expense is USD 18,000: USD 15,000 annual cash rent plus USD 3,000 amortization of leasehold (USD 15,000/5).

The lessee may base periodic rent on current-year sales or usage rather than being a constant amount. For example, if a lease called for rent equal to 5 per cent of current-year sales and sales were USD 400,000 in 2010, the rent for 2010 would be USD 20,000. The rent would either be paid or an adjusting entry would be made at the end of the year.

A **leasehold improvement** is any physical alteration made by the lessee to the leased property in which benefits are expected beyond the current accounting period. Leasehold improvements made by a lessee usually become the property of the lessor after the lease has expired. However, since leasehold improvements are an asset of the lessee during the lease period, the lessee debits them to a Leasehold Improvements account. The lessee then amortizes the leasehold improvements to expense over the period benefited by the improvements. The amortization period for leasehold improvements should be the shorter of the life of the improvements or the life of the lease. If the lease can (and probably will) be renewed at the option of the lessee, the life of the lease should include the option period.

As an illustration, assume that on 2010 January 2, Wolf Company leases a building for 20 years under a nonrenewable lease at an annual rental of USD 20,000, payable on each December 31. Wolf immediately incurs a cost of USD 80,000 for improvements to the building, such as interior walls for office separation, ceiling fans, and recessed lighting. The improvements have an estimated life of 30 years. The company should amortize the USD 80,000 over the 20-year lease period, since that period is shorter than the life of the improvements, and Wolf cannot use the improvements beyond the life of the lease. If only annual financial statements are prepared, the following journal entry properly records the rental expense for the year ended 2010 December 31:

Rent Expense (or Leasehold Improvement Expense) (-SE)	4,000	
Leasehold Improvements (-A)		4,000
To record amortization of leasehold improvement.		
Rent Expense (-SE)	20,000	
Cash (-A)		20,000
To record annual rent.		

Thus, the total cost to rent the building each year equals the USD 20,000 cash rent plus the amortization of the leasehold improvements.

Although leaseholds are intangible assets, leaseholds and leasehold improvements sometimes appear in the property, plant, and equipment section of the balance sheet.

In accounting, **goodwill** is an intangible value attached to a company resulting mainly from the company's management skill or know-how and a favorable reputation with customers. A company's value may be greater than the total of the fair market value of its tangible and identifiable intangible assets. This greater value means that the company generates an above-average income on each dollar invested in the business. Thus, proof of a company's goodwill is its ability to generate superior earnings or income.

A goodwill account appears in the accounting records only if goodwill has been purchased. A company cannot purchase goodwill by itself; it must buy an entire business or a part of a business to obtain the accompanying intangible asset, goodwill.

To illustrate, assume that Lenox Company purchased all of Martin Company's assets for USD 700,000. Lenox also agreed to assume responsibility for a USD 350,000 mortgage note payable owed by Martin. Goodwill is the difference between the amount paid for the business including the debt assumed (USD 700,000 + USD 350,000 = USD 1,050,000) and the fair market value of the assets purchased. Notice that Lenox would use the fair market value of the assets rather than book value to determine the amount of goodwill. The following computation is for the goodwill purchased by Lenox:

Cash paid		\$ 700,000
Mortgage note payable		350,000
Total price paid		\$1,050,000
Less fair market values of individually identifiable assets:		
Accounts receivable	\$ 95,000	
Merchandise inventory	100,000	
Land	240,000	
Buildings	275,000	
Equipment	200,000	
Patents	65,000	975,000
Goodwill		\$ 75,000

The USD 75,000 is the goodwill Lenox records as an intangible asset; it records all of the other assets at their fair market values, and the liability at the amount due.

ANY COMPANY
Partial Balance Sheet
2010 June 30

Property, plant, and equipment			
Land		\$ 30,000	
Buildings	\$ 75,000		
Less: Accumulated depreciation	45,000	30,000	
Equipment	\$ 9,000		
Less: Accumulated depreciation	1,500	7,500	
Total property, plant, and equipment			\$ 67,500
Natural resources:			
Mineral deposits		\$300,000	
Less: Accumulated depreciation		100,000	
Total natural resources			\$200,000
Intangible assets:			
Patents		\$ 10,000	
Goodwill		20,000	\$ 30,000
Total intangible assets			

Exhibit 15: Partial balance sheet

Specific reasons for a company's goodwill include a good reputation, customer loyalty, superior product design, unrecorded intangible assets (because they were developed internally), and superior human resources. Since these positive factors are not individually quantifiable, when grouped together they constitute goodwill. The journal entry to record the purchase is:

Accounts Receivable (+A)	95,000	
Merchandise Inventory (+A)	100,000	
Land (+A)	240,000	
Buildings (+A)	275,000	
Equipment(+A)	200,000	
Patents (+A)	65,000	
Goodwill(+A)	75,000	
Cash (-A)		700,000
Mortgage Note Payable (+L)		350,000

To record the purchase of Martin Company's assets and assumption of mortgage note payable.

The intangible asset goodwill is not amortized. Goodwill is to be tested periodically for impairment. The amount of any goodwill impairment loss is to be recognized in the income statement as a separate line before the subtotal income from continuing operations (or similar caption).⁸ The goodwill account would be reduced by the same amount.⁹

Look at Exhibit 15, a partial balance sheet for ANY company. Unlike plant assets or natural resources, intangible assets usually are a net amount in the balance sheet.

⁸ Discussion of testing for impairment is beyond the scope of this text. For more information on such testing see *SFAS No. 142*.

⁹ *SFAS No. 142*, par. 18.

Analyzing and using the financial results—Total assets turnover

In determining the productivity of assets, management may compare one year's assets turnover ratio to a previous year's. **Total assets turnover** shows the relationship between the dollar volume of sales and the average total assets used in the business. To calculate this ratio:

$$\text{Total assets turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$

This ratio indicates the efficiency with which a company uses its assets to generate sales. When the ratio is low relative to industry standards or the company's ratio in previous years, it could indicate an over-investment in assets, a slow year in sales, or both. Thus, if the ratio is relatively low and there was no significant decrease in sales during the current year, management should identify and dispose of any inefficient equipment.

The total assets turnover in a recent year for several actual companies was as follows:

Company	Net Sales (\$ thousands)	Total Assets (\$ thousands)			Turnover
		Beginning of Year	End of Year	Average	
Procter & Gamble	\$ 39,244,000	\$ 34,366,000	\$ 37,374,300	\$ 35,870,150	109.41%
Tyco International	28,931,900	32,344,300	40,404,300	36,374,300	79.54%
Kimball International	1,261,171	723,651	678,984	701,318	179.83%

These three companies compete in very different industries. However, they are all manufacturers. To see if each of these companies is performing above standard, management should compare its company's percentage to the industry's standard. In addition, calculating this ratio over approximately five years would help management see any trends indicating problems or confirm successful asset management.

This chapter concludes your study of accounting for long-term assets. In Chapter 12, you learn about classes of capital stock.

Understanding the learning objectives

- By comparing an asset's book value (cost less up-to-date accumulated depreciation) with its sales price, the company may show either a gain or a loss. If sales price is greater than book value, the company shows a gain. If sales price is less than book value, the company shows a loss. If sales price equals book value, no gain or loss results.
- When a plant asset is retired from service, the asset's cost and accumulated depreciation must be removed from the plant asset accounts.
- Plant assets are sometimes wrecked in accidents or destroyed by fire, flood, storm, and other causes. If the asset was not insured, the loss is equal to the book value. If the asset was insured, only the amount of the loss exceeding the amount to be recovered from the insurance company would be debited to a loss account.
- In exchanges of nonmonetary assets having commercial substance, the firm records the asset received at either (1) the stated cash price of the new asset or (if the cash price is not stated) (2) the known fair market value of the asset given up plus any cash paid.
- In exchanges of nonmonetary assets not having commercial substance, the firm records the new asset at the book value of the old asset plus the cash paid.

**An ethical perspective:
ABC corporation**

In 2010, prior to the tax law change permitting the amortization of goodwill for tax purposes, ABC Corporation acquired XYZ Company for USD 10,000,000 cash. ABC acquired the following assets:

Accounts receivable		\$80,000
	Old Book	Fair Market
	Value	Value
Merchandise inventory	\$ 200,000	\$ 300,000
Buildings	3,000,000	4,000,000
Land	1,000,000	3,000,000
Equipment	500,000	700,000

An experienced appraiser with an excellent reputation established the fair market value of the assets. ABC also assumed the liability for paying XYZ's USD 50,000 of accounts payable.

John Gilbert, ABC's accountant, prepared the following journal entry to record the purchase: In explaining the entry to ABC's president, Gilbert said that the assets had to be recorded at their fair market values. He also stated that the goodwill could not be amortized for accounting purposes or tax purposes.

Accounts Receivable	80,000	
(+A)		
Merchandise Inventory	300,000	
(+A)		
Buildings (+A)	4,000,000	
Land (+A)	3,000,000	
Equipment (+A)	700,000	
Goodwill (+A)	1,970,000	
Accounts Payable (+L)		50,000
Cash (-A)		10,000,000
To record the purchase of XYZ Company.		

The president reacted with, "It is not fair that we are prohibited from amortizing goodwill when it is a part of the cost of the purchase. Besides, appraisals are very inexact, and maybe some of our other assets are worth more than the one appraiser indicated. I want you to reduce goodwill down to USD 470,000 and assign the other USD 1,500,000 to the buildings and equipment. Then, we can benefit from the depreciation on these assets. If I need to find an appraiser who will support the new allocations, I will."

When Gilbert protested, the president stated, "If you are going to have a future with us, you need to be a team player. We just cannot afford to lose those tax deductions." Gilbert feared that if he did not go along, he would soon be unemployed.

- Depletion charges usually are computed by the units-of-production method. Total cost is divided by the estimated number of units that are economically extractable from the property. This calculation provides a per unit depletion cost that is multiplied by the units extracted each year to obtain the depletion cost for that year.

- Depreciable assets located on extractive industry property should be depreciated over the shorter of the (1) physical life of the asset or (2) life of the natural resource. The periodic depreciation charges usually are computed using the units-of-production method. Using this method matches the life of the plant asset with the life of the natural resource.

- Only outright purchase costs are included in the acquisition cost of an intangible asset. If an intangible asset is internally generated, its cost is immediately expensed.

- Intangibles should be amortized over their finite useful lives. The method of amortization should be based upon the pattern in which the economic benefits are used up. If no pattern is apparent, straight-line amortization should be used.

- $$\text{Total assets turnover} = \frac{\text{Net sales}}{\text{Average total assets}}$$

- This ratio indicates the efficiency with which a company uses its assets to generate sales.

Demonstration problem

Demonstration problem A On 2007 January 2, Darton Company purchased a machine for USD 36,000 cash. The machine has an estimated useful life of six years and an estimated salvage value of USD 1,800. Darton uses the straight-line method of depreciation.

a. Compute the book value of the machine as of 2010 July 1.

b. Assume the machine was disposed of on 2010 July 1. Prepare the journal entries to record the disposal of the machine under each of the following unrelated assumptions:

- The machine was sold for USD 12,000 cash.

- The machine was sold for USD 18,000 cash.

- The machine and USD 24,000 cash were exchanged for a new machine that had a cash price of USD 39,000. The exchange has commercial substance.

- The machine was completely destroyed by fire. Darton expects to recover cash of USD 10,800 from the insurance company.

Demonstration problem B Howard Company acquired on 2010 January 1, a tract of property containing timber at a cost of USD 8,000,000. After the timber is removed, the land will be worth about USD 3,200,000 and will be sold to another party. Costs of developing the site were USD 800,000. A building was erected at a cost of USD 160,000. The building had an estimated physical life of 20 years and will have an estimated salvage value of USD 80,000 when the timber is gone. It was expected that 50,000,000 board feet of timber can be economically cut. During the first year, 16,000,000 board feet were cut. Howard uses the units-of-production basis to depreciate the building.

Prepare the entries to record:

a. The acquisition of the property.

b. The development costs.

c. Depletion cost for the first year.

d. Depreciation on the building for the first year.

Demonstration problem C O n 2010 January 2, Bedford Company purchased a 10-year sublease on a warehouse for USD 30,000. Bedford will also pay annual rent of USD 6,000. Bedford immediately incurred costs of USD 20,000 for improvements to the warehouse, such as lighting fixtures, replacement of a ceiling, heating system, and loading dock. The improvements have an estimated life of 12 years and no residual value.

Prepare the entries to record:

- a. The payment for the sublease on a warehouse.
- b. The rent payment for the first year.
- c. The payment for the improvements.
- d. Amortization of the leasehold for the first year.
- e. Amortization of the leasehold improvements for the first year.

Solution to demonstration problem

Solution to demonstration problem A

DARTON COMPANY			
Schedule to Compute Book Value			
2010 July 1			
a.	Cost	\$ 36,000	
	Less accumulated depreciation:		
	(\$35,000 - \$1,800)/6 years= \$5,700 per year	19,950	
	\$5,700 X 3 1/2 years = \$19,950	\$ 16,050	
	Book value		
b. (1)	Cash (+A)	12,000	
	Accumulated Depreciation—Machinery (+A)	19,950	
	Loss from Disposal of Plant Assets (-SE)	4,050	36,000
	Machinery (-A)		
	To record the sale of machinery at loss.		
(2)	Cash (+A)	18,000	
	Accumulated Depreciation—Machinery (+A)	19,950	36,000
	Machinery (-A)		1,950
	Gain on Disposal of Plant Assets (+SE)		
	To record sale of machinery at a gain.		

Machinery (new) (+A)	39,000	
Accumulated Depreciation—Machinery (+A)	19,950	
Loss from Disposal of Plant Asset (-SE)	1,050	
Machinery (old) (-A)		36,000
Cash (-A)		24,000
To record exchange of machines.		

The exchange has commercial substance.

Receivable from Insurance Company (+A)	10,800	
Accumulated Depreciation—Machinery (+A)	19,950	
Fire Loss (-SE)	5,250	
Machinery (-A)		36,000
To record loss of machinery.		

Solution to demonstration problem B

a. Land (+A)	3,200,00	
Timber Stands (+A)	0	
Cash (-A)	4,800,00	8,000,00
To record purchase of land and timber.	0	0
b. Timber Stands (+A)	800,000	
Cash (-A)		800,000
To record costs of development of the site.		
c. Depletion (-SE)	1,792,00	
Accumulated Depletion—Timber Stands (-A)	0	1,792,00
To record depletion for 2007.		0
(\$4,800,000 + \$800,000/50,000,000 = \$0.112 per board foot. \$0.112 X 16,000,000 = \$1,792,000.)		
d. Depreciation Expense—Buildings (-SE)	25,600	
Accumulated Depreciation—Buildings (-A)		25,600
To record depreciation expense: (\$160,000 - \$80,000)/50,000,000 board feet = \$0.0016 per board foot. \$0.0016 X 16,000,000 = \$25,600.		

Solution to demonstration problem C

a. Leasehold (+A)	30,000	
Cash (-A)		30,000
To record purchase of sublease on warehouse.		
b. Rent Expense (-SE)	6,000	
Cash (-A)		6,000
To record annual rent payment.		
c. Leasehold Improvements (+A)	20,000	
Cash (-A)		20,000
To record payment for leasehold improvements.		
d. Rent Expense(-SE)	3,000	
Leasehold (-A)		3,000
To record leasehold amortization for 2007: Annual amortization = \$30,000/10 years = \$3,000		
e. Rent Expense (-SE)	2,000	
Leasehold Improvements (+A)		2,000
To amortize leasehold improvements: Annual amortization = \$20,000/10years = \$2,000		

Key terms

Amortization The term used to describe the systematic write-off of the cost of an intangible asset to expense.

Capital lease A lease that transfers to the lessee virtually all of the rewards and risks that accompany ownership of property.

Commercial substance The result if an exchange of nonmonetary assets causes future cash flows to differ significantly.

Copyright An exclusive right granted by the federal government giving protection against the illegal reproduction by others of the creator's written works, designs, and literary productions.

Depletion The exhaustion of a natural resource; an estimate of the cost of the resource that was removed from its natural setting during the period.

Finite Useful Life Length of time an intangible asset is expected to contribute to the cash flows of the entity.

Franchise A contract between two parties granting the franchisee (the purchaser of the franchise) certain rights and privileges ranging from name identification to complete monopoly of service.

Goodwill An intangible value attached to a company resulting mainly from the company's management skill or know-how and a favorable reputation with customers. Evidenced by the ability to generate an above-average rate of income on each dollar invested in the business.

Intangible assets Items that have no physical characteristics but are of value because of the advantages or exclusive privileges and rights they provide to a business.

Lease A contract to rent property. Grantor of the lease is the lessor; the party obtaining the rights to possess and use property is the lessee.

Leasehold The rights granted under a lease.

Leasehold improvement Any physical alteration made by the lessee to the leased property in which benefits are expected beyond the current accounting period.

Natural resources Resources supplied by nature, such as ore deposits, mineral deposits, oil reserves, gas deposits, and timber stands supplied by nature.

Operating lease A lease that does not qualify as a capital lease.

Patent A right granted by the federal government giving the owner the exclusive right to manufacture, sell, lease, or otherwise benefit from an invention for a limited period.

Research and development (R&D) costs Costs incurred in a planned search for new knowledge and in translating such knowledge into a new product or process.

Total assets turnover Equal to Net sales/Average total assets. This ratio indicates the efficiency with which a company uses its assets to generate sales.

Trademark A symbol, design, or logo used in conjunction with a particular product or company.

Trade name A brand name under which a product is sold or a company does business.

Wasting assets See Natural resources.

Self-test

True-false

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

When a plant asset is still being used after it has been fully depreciated, depreciation can be taken in excess of its cost.

In an exchange of nonmonetary assets having commercial substance, the new asset is recorded at the fair market value of the asset received or the fair market value of the asset given up plus cash paid, whichever is more clearly evident.

In calculating depletion, the residual value of acquired land containing an ore deposit is included in total costs subject to depletion.

All recorded intangible assets are subject to amortization.

Multiple-choice

Select the best answer for each of the following questions.

When a fully depreciated asset is still in use:

- a. Prior years' depreciation should be adjusted.
- b. The cost should be adjusted to market value.
- c. Part of the depreciation should be reversed.
- d. The cost and accumulated depreciation should remain in the ledger and no more depreciation should be taken.
- e. It should be written off the books.

A truck costing USD 45,000 and having an estimated salvage value of USD 4,500 and an original life of five years is exchanged for a new truck. The cash price of the new truck is USD 57,000, and a trade-in allowance of USD 22,500 is received. The old truck has been depreciated for three years using the straight-line method. The new truck would be recorded at:

- a. USD 55,200.
- b. USD 57,000.
- c. USD 34,500.
- d. USD 43,200.
- e. None of the above.

Land containing a mine having an estimated 1,000,000 tons of economically extractable ore is purchased for USD 375,000. After the ore deposit is removed, the land will be worth USD 75,000. If 100,000 tons of ore are mined and sold during the first year, the depletion cost charged to expense for the year is:

- a. USD 300,000.
- b. USD 37,500.
- c. USD 30,000.
- d. USD 375,000.
- e. None of the above.

Bren Company purchased a patent for USD 36,000. The patent is expected to have a finite life of 10 years even though its legal life is 17 years. The amortization for the first year is:

- a. USD 36,000.
- b. USD 3,600.
- c. USD 2,118.
- d. USD 3,240.
- e. None of the above.

Now turn to “Answers to self-test” at the end of the chapter to check your answers.

Questions

- When depreciable plant assets are sold for cash, how is the gain or loss measured?
- A plant asset that cost USD 27,000 and has a related accumulated depreciation account balance of USD 27,000 is still being used in business operations. Would it be appropriate to continue recording

depreciation on this asset? Explain. When should the asset's cost and accumulated depreciation be removed from the accounting records?

- A machine and USD 22,500 cash were exchanged for a delivery truck. The exchange has commercial substance. How should the cost basis of the delivery truck be measured?
- A plant asset was exchanged for a new asset of a similar type. How is the cost of the new asset determined?
- When nonmonetary assets not having commercial substance are exchanged, a resulting gain is not recognized. Discuss why this is so.
- What is the proper accounting treatment for the costs of removing or dismantling a company's old plant assets?
 - Distinguish between depreciation, depletion, and amortization. Name two assets that are subject to depreciation, to depletion, and to amortization.
 - Distinguish between tangible and intangible assets, and classify the assets named in part (a) accordingly.
- A building with an estimated physical life of 40 years was constructed at the site of a coal mine. The coal mine is expected to be completely exhausted within 20 years. Over what length of time should the building be depreciated, assuming the building will be abandoned after all the coal has been extracted?
- What are the characteristics of intangible assets? Give an example of an asset that has no physical existence but is not classified as an intangible asset.
- What reasons justify the immediate expensing of most research and development costs?
- Over what length of time should intangible assets be amortized?
- Should costs incurred on internally generated intangible assets be capitalized in asset accounts?
- Describe the typical accounting for a patent.
- During 2010, Hardy Company incurred USD 123,000 of research and development costs in its laboratory to develop a patent that was granted on 2010 December 29. Legal fees (outside counsel) and other costs associated with registration of the patent totaled USD 22,800. What amount should be recorded as a patent on 2010 December 29?
- What is a capital lease? What features may characterize a capital lease?
- What is the difference between a leasehold (under an operating lease contract) and a leasehold improvement? Is there any difference in the accounting procedures applicable to each?
- Walt Company leased a tract of land for 40 years at an agreed annual rental fee of USD 18,000. The effective date of the lease was 2009 July 1. During the last six months of 2009, Walt constructed a building on the land at a cost of USD 450,000. The building was placed in operation on 2010 January 2, at which time it was estimated to have a physical life of 50 years. Over what period should the building be depreciated? Why?
- You note that a certain store seems to have a steady stream of regular customers, a favorable location, courteous employees, high-quality merchandise, and a reputation for fairness in dealing

with customers, employees, and suppliers. Does it follow automatically that this business should have goodwill recorded as an asset? Explain.

Exercises

Exercise A Plant equipment originally costing USD 32,400, on which USD 21,600 of up-to-date depreciation has been accumulated, was sold for USD 8,100.

- a. Prepare the journal entry to record the sale.
- b. Prepare the entry to record the sale of the equipment if USD 90 of removal costs were incurred to allow the equipment to be moved.

Exercise B On 2009 August 31, Hutch Company sold a truck for USD 6,900 cash. The truck was acquired on 2006 January 1, at a cost of USD 17,400. Depreciation of USD 10,800 on the truck has been recorded through 2008 December 31, using the straight-line method, four-year expected useful life, and an expected salvage value of USD 3,000.

Prepare the journal entries to update the depreciation on the truck on 2009 August 31, and to record the sale of the truck.

Exercise C A machine costing USD 120,000, on which USD 90,000 of up-to-date depreciation has been accumulated, was completely destroyed by fire. What journal entry should record the machine's destruction and the resulting fire loss under each of the following unrelated assumptions?

- a. The machine was not insured.
- b. The machine was insured, and it is estimated that USD 22,500 will be recovered from the insurance company.

Exercise D Kale Company owned an automobile acquired on 2007 January 1, at a cash cost of USD 35,100; at that time, the automobile was estimated to have a useful life of four years and a USD 2,700 salvage value. Depreciation has been recorded through 2009 December 31, on a straight-line basis. On 2010 January 1, the automobile was traded for a new automobile. The old automobile had a fair market value (trade-in allowance) of USD 6,750. Cash of USD 31,050 was paid. The exchange has commercial substance.

Prepare the journal entry to record the trade-in under generally accepted accounting principles.

Exercise E Equipment costing USD 330,000, on which USD 225,000 of up-to-date accumulated depreciation has been recorded, was disposed of on 2009 January 2. What journal entries are required to record the equipment's disposal under each of the following unrelated assumptions?

- a. The equipment was sold for USD 120,000 cash.
- b. The equipment was sold for USD 87,000 cash.
- c. The equipment was retired from service and hauled to the junkyard. No material was salvaged.
- d. The equipment was exchanged for similar equipment having a cash price of USD 450,000. A trade-in allowance of USD 150,000 from the cash price was received, and the balance was paid in cash. The exchange has no commercial substance.
- e. The equipment was exchanged for similar equipment having a cash price of USD 450,000. A trade-in allowance of USD 75,000 was received, and the balance was paid in cash. The exchange has commercial substance.

Exercise F Nola Mining Company purchased a tract of land containing ore for USD 630,000. After spending USD 90,000 in exploration costs, the company determined that 600,000 tons of ore existed on the tract but only 500,000 tons could be economically removed. No other costs were incurred. When the company finishes with the tract, it estimates the land will be worth USD 180,000. Determine the depletion cost per ton.

Exercise G Boyd Company paid USD 7,200,000 for the right to extract all of the mineral-bearing ore, estimated at 10 million tons, that can be economically extracted from a certain tract of land. During the first year, Boyd Company extracted 1,000,000 tons of the ore and sold 800,000 tons. What part of the USD 7,200,000 should be charged to expense during the first year?

Exercise H The Slate Mining Company acquired a tract of land for mining purposes and erected a building on-site at a cost of USD 675,000 and having no salvage value. Though the building has a useful life of 10 years, the mining operations are expected to last only 6 years. The company has determined that 800,000 tons of ore exist on the tract but only 600,000 tons can be economically removed. If 100,000 tons of ore are extracted in the first year of operations, what is the appropriate depreciation charge using the units-of-production method?

Exercise I Talse Company purchased a patent on 1995 January 1, at a total cost of USD 61,200. In 2006 January, the company hired an outside law firm and successfully defended the patent in a lawsuit. The legal fees amounted to USD 13,500. What will be the amount of patent cost amortized in 2009? (The finite useful life of the patent is the same as its legal life—17 years.)

Exercise J Don Jackson paid Hungry Hannah's Hamburgers USD 54,000 for the right to operate a fast-food restaurant in Thomasville under the Hungry Hannah's name. Jackson also agreed to pay an operating fee of 0.5 per cent of sales for advertising and other services rendered by Hungry Hannah's. Jackson began operations on 2009 January 2. Sales for 2009 amounted to USD 540,000. The finite useful life of the franchise is 40 years.

Give the entries to record the payment of the USD 54,000 and to record expenses incurred relating to the right to use the Hungry Hannah's name.

Exercise K Lem Company leased the first three floors in a building under an operating lease contract for a 10-year period beginning 2009 January 1. The company paid USD 240,000 in cash (not representing a specific period's rent) and agreed to make annual payments equal to 1 per cent of the first USD 1,500,000 of sales and 0.5 per cent of all sales over USD 1,500,000. Sales for 2009 amounted to USD 4,500,000. Payment of the annual amount will be made in January 2010.

Prepare journal entries to record the cash payment of 2009 January 1, and the proper expense to be recognized for the use of the space in the leased building for 2009.

Exercise L Rye Company purchased all of the assets of Shef Company for USD 900,000. Rye Company also agreed to assume responsibility for Shef Company's liabilities of USD 90,000. The fair market value of the assets acquired was USD 810,000. How much goodwill should be recorded in this transaction? Give the journal entry to record this transaction.

Problems

Problem A Orr Company traded in an automobile that cost USD 18,000 and on which USD 15,000 of up-to-date depreciation has been recorded for a new automobile with a cash price of USD 34,500. The company received a trade-in allowance (its fair value) for the old automobile of USD 2,100 and paid the balance in cash. The exchange has commercial substance.

Record the exchange of automobiles.

Problem B On 2007 January 2, Blake Company purchased a delivery truck for USD 78,750 cash. The truck has an estimated useful life of six years and an estimated salvage value of USD 6,750. The straight-line method of depreciation is being used.

a. Prepare a schedule showing the computation of the book value of the truck on 2009 December 31.

b. Assume the truck is to be disposed of on 2010 July 1. Prepare the journal entry to record depreciation for the six months ended 2010 June 30.

c. Prepare the journal entries to record the disposal of the truck on 2010 July 1, under each of the following unrelated assumptions:

- i. The truck was sold for USD 26,250 cash.
- ii. The truck was sold for USD 48,000 cash.
- iii. The truck was retired from service, and it is expected that USD 20,625 will be received from the sale of salvaged materials.
- iv. The truck and USD 60,000 cash were exchanged for office equipment that had a cash price of USD 105,000. The exchange has commercial substance.
- v. The truck and USD 67,500 cash were exchanged for a new delivery truck that had a cash price of USD 112,500. The exchange has no commercial substance.
- vi. The truck was completely destroyed in an accident. Cash of USD 25,500 is expected to be recovered from the insurance company.

Problem C Eagle Moving Company purchased a new moving van on 2009 October 1. The cash price of the new van was USD 33,750, and the company received a trade-in allowance of USD 5,600 for a 2007 model. The balance was paid in cash. The 2007 model had been acquired on 2007 January 1, at a cost of USD 22,500. Depreciation has been recorded through 2008 December 31, on a straight-line basis, with three years of expected useful life and no expected salvage value. The exchange has no commercial substance.

Prepare journal entries to update the depreciation and to record the exchange of the moving vans.

Problem D On 2009 January 1, Moyer Company had the following balances in some of its accounts:

Asset	Accumulated Depreciation
Land	
Leasehold	
Buildings	\$ 286,650
Equipment	1,389,960
Trucks	158,790

- The leasehold covers a plot of ground leased on 2005 January 1, for a period of 20 years.
- Building No. 1 is on the owned land and was completed on 2008 July 1, at a cost of USD 1,965,600; its life is set at 40 years with no salvage value. Building No. 2 is on the leased land and was completed on 2005 July 1, at a cost of USD 1,460,160; its life is also set at 40 years with no expected salvage value.
- The equipment had an expected useful life of eight years with no estimated salvage value.
- Truck A, purchased on 2007 January 1, at a cost of USD 149,760, had an expected useful life of 2 1/2 years and a salvage value of USD 9,360. Truck B, purchased on 2007 July 1, at a cost of USD 131,040, had an expected life of two years and an estimated salvage value of USD 21,840. Truck C, purchased on 2008 July 1, at a cost of USD 168,480, had an expected life of three years and an estimated salvage value of USD 21,060.

The following transactions occurred in 2009:

Jan. 2 Rent for 2009 on leased land was paid, USD 87,360.

April 1 Truck B was traded in for truck D. The cash price of the new truck was USD 149,760. A trade-in allowance of USD 28,080 was granted from the cash price. The balance was paid in cash. Truck D has an expected life of 20 years and an estimated salvage value of USD 9,360. The exchange has commercial substance.

1 Truck A was sold for USD 28,080 cash.

Prepare journal entries to record the 2009 transactions and the necessary 2009 December 31, adjusting entries, assuming a calendar-year accounting period. Use the straight-line depreciation method.

Problem D On 2009 January 2, York Mining Company acquired land with ore deposits at a cash cost of USD 1,800,000. Exploration and development costs amounted to USD 192,000. The residual value of the land is expected to be USD 360,000. The ore deposits contain an estimated 6 million tons. Present technology will allow the economical extraction of only 85 per cent of the total deposit. Machinery, equipment, and temporary sheds were installed at a cost of USD 255,000. The assets will have no further value to the company when the ore body is exhausted; they have a physical life of 12 years. In 2007, 200,000 tons of ore were extracted. The company expects the mine to be exhausted in 10 years, with sharp variations in annual production.

- a. Compute the depletion charge for 2009. Round to the nearest cent.
- b. Compute the depreciation charge for 2009 under the units-of-production method.
- c. If all other mining costs, except depletion, amounted to USD 1,260,000, what was the average cost per ton mined in 2009? (The depreciation calculated in b is included in the USD 1,260,000.)

Problem E East Company spent USD 249,900 to purchase a patent on 2009 January 2. Management assumes that the patent's finite useful life is 17 years. In January 2010, the company hired an outside law firm and successfully defended the patent in a lawsuit at a cost of USD 48,000. Also, in January 2010, the company paid USD 72,000 to obtain patents that could, if used by competitors, make the earlier East patent useless. The purchased patents will never be used.

Give the entries for 2009 and 2010 to record the information relating to the patents.

Problem F Following are selected transactions and other data relating to Long Company for the year ended 2009 December 31.

a. The company rented the second floor of a building for five years on 2009 January 2, and paid the annual rent of USD 18,000 for the first and fifth years in advance.

b. In 2008, the company incurred legal fees of USD 54,000 paid to an outside law firm in applying for a patent and paid a fee of USD 18,000 to a former employee who conceived a device that substantially reduced the cost of manufacturing one of the company's products. The patent on the device has a market value of USD 540,000 and is expected to be useful for 10 years.

c. In 2008, the company entered into a 10-year operating lease on several floors of a building, paying USD 36,000 in cash immediately and agreeing to pay USD 18,000 at the end of each of the 10 years of life in the lease. The company then incurred costs of USD 72,000 to install partitions, shelving, and fixtures. These items would normally last 25 years.

d. The company spent USD 21,600 promoting a trademark in a manner that it believed enhanced the value of the trademark considerably. The trademark has an indefinite life.

e. The company incurred costs amounting to USD 180,000 in 2008 and USD 234,000 in 2009 for research and development of new products that are expected to enhance the company's revenues for at least five years.

f. The company paid USD 180,000 to the author of a book that the company published on 2009 July 2. Sales of the book are expected to be made over a two-year period from that date.

For each of the situations just described, prepare only the journal entries to record the expense applicable to 2009.

Alternate problems

Alternate problem A Ray, Inc., purchased a new 2010 model automobile on 2010 December 31. The cash price of the new automobile was USD 28,080, from which Ray received a trade-in allowance of USD 4,320 for a 2008 model traded in. The 2008 model had been acquired on 2008 January 1, at a cost of USD 20,700. Depreciation has been recorded on the 2008 model through 2009 December 31, using the straight-line method, an expected four-year useful life, and an expected salvage value of USD 2,700. The exchange has commercial substance.

- a. Record depreciation expense for 2010.
- b. Prepare the journal entries needed to record the exchange of automobiles.

Alternate problem B On 2007 January 1, Wood Company purchased a truck for USD 43,200 cash. The truck has an estimated useful life of six years and an expected salvage value of USD 5,400. Depreciation on the truck was computed using the straight-line method.

- a. Prepare a schedule showing the computation of the book value of the truck on 2009 December 31.
- b. Prepare the journal entry to record depreciation for the six months ended 2010 June 30.
- c. Prepare journal entries to record the disposal of the truck on 2010 June 30, under each of the following unrelated assumptions:
 - (a) The truck was sold for USD 3,600 cash.
 - (b) The truck was sold for USD 25,200 cash.
 - (c) The truck was scrapped. Used parts valued at USD 6,660 were salvaged.
 - (d) The truck (which has a fair market value of USD 10,800) and USD 32,400 of cash were exchanged for a used back hoe that did not have a known market value. The transaction has commercial substance.
 - (e) The truck and USD 29,700 cash were exchanged for another truck that had a cash price of USD 51,300. The exchange has no commercial substance.
 - (f) The truck was stolen July 1, and insurance proceeds of USD 7,560 were expected.

Alternate problem C Kine Company purchased a new Model II computer 2009 October 1. Cash price of the new computer was USD 24,960; Jackson received a trade-in allowance of USD 9,300 from the cash price for a Model I computer. The old computer was acquired on 2007 January 1, at a cost of USD 23,040. Depreciation has been recorded through 2008 December 31, on a straight-line basis, with an estimated useful life of four years and USD 3,840 expected salvage value. The exchange has commercial substance.

Prepare the journal entries to record the exchange.

Alternate problem D On 2009 July 1, Morgan Company had the following balances in some of its accounts:

	Asset	Accumulated Depreciation
Land	\$ 672,000	
Leasehold	252,000	

Buildings	3,151,680	\$369,768
Equipment	1,370,880	436,800
Trucks	238,560	71,652

The leasehold covers a plot of ground leased on 2004 July 1, for a period of 25 years under an operating lease.

The office building is on the leased land and was completed on 2005 July 1, at a cost of USD 967,680; its physical life is set at 40 years. The factory building is on the owned land and was completed on 2004 July 1, at a cost of USD 2,184,000; its life is also set at 40 years with no expected salvage value.

The equipment has a 15-year useful life with no expected salvage value.

The company owns three trucks—A, B, and C. Truck A, purchased on 2007 July 1, at a cost of USD 53,760, had an expected useful life of three years and a salvage value of USD 3,360. Truck B, purchased on 2008 January 2, at a cost of USD 84,000, had an expected life of four years and an estimated salvage value of USD 6,720. Truck C, purchased on 2009 January 2, at a cost of USD 100,800, had an expected life of five years and an estimated salvage value of USD 10,080.

The following transactions occurred in the fiscal year ended 2010 June 30:

2009

July 1 Rent for 2009 July 1, through 2010 June 30, on leased land was paid, USD 31,920.

Oct. 1 Truck A was traded in on truck D. Cash price of the new truck was USD 107,520. Cash of USD 90,720 was paid. Truck D has an expected life of four years and a salvage value of USD 5,880. The exchange has no commercial substance.

2010

Feb. 2 Truck B was sold for USD 47,040 cash.

June 1 Truck C was completely demolished in an accident. The truck was not insured.

Prepare journal entries to record these transactions and the necessary 2010 June 30, adjusting entries. Use the straight-line depreciation method.

Alternate problem E In December 2008, Brown Company acquired a mine for USD 2,700,000. The mine contained an estimated 10 million tons of ore. It was also estimated that the land would have a value of USD 240,000 when the mine was exhausted and that only 4 million tons of ore could be economically extracted. A building was erected on the property at a cost of USD 360,000. The building had an estimated useful life of 35 years and no salvage value. Specialized mining equipment was installed at a cost of USD 495,000. This equipment had an estimated useful life of seven years and an estimated USD 33,000 salvage value. The company began operating on 2009 January 1, and put all of its assets into use on that date. During the year ended 2009 December 31, 400,000 tons of ore were extracted. The company decided to use the units-of-production method to record depreciation on the building and the straight-line method to record depreciation on the equipment.

Prepare journal entries to record the depletion and depreciation charges for the year ended 2009 December 31. Show calculations.

Alternate problem F Trask Company purchased a patent for USD 108,000 on 2009 January 2. The patent was estimated to have a finite life of 10 years. The USD 108,000 cost was properly charged to an asset account and amortized in 2009. On 2010 January 1, the company incurred legal and court costs of USD 32,400 in a successful defense of the patent in a lawsuit. The legal work was performed by an outside law firm.

a. Compute the patent amortization expense for 2009 and give the entry to record it.

b. Compute the patent amortization expense for 2010 and give the entry to record it.

Alternate problem G Selected transactions and other data for Grant Company:

a. The company purchased a patent in early January 2006 for USD 144,000 and began amortizing it over its finite life of 10 years. In early January 2008, the company hired an outside law firm and successfully defended the patent in an infringement suit at a cost of USD 38,400.

b. Research and development costs incurred in 2008 of USD 43,200 were expected to provide benefits over the three succeeding years.

c. On 2009 January 2, the company rented space in a warehouse for five years at an annual fee of USD 9,600. Rent for the first and last years was paid in advance.

d. A total of USD 96,000 was spent uniformly throughout 2009 by the company in promoting its lesser known trademark, which is expected to have a finite useful life of 20 years.

e. In January 2007, the company purchased all of the assets and assumed all of the liabilities of another company, paying USD 192,000 more than the fair market value of all identifiable assets acquired, less the liabilities assumed. The company expects the cash flow benefits for which it paid the USD 192,000 to last 10 years (finite useful life).

For each of these unrelated transactions, prepare journal entries to record only those entries (required for 2009). Note any items that do not require an entry in 2009.

Beyond the numbers-Critical thinking

Business decision case A During your audit examination of the Shirley Company's Plant, Property, and Equipment accounts, the following transaction came to your attention. On 2009 January 2, machine A was exchanged for machine B. Shirley Company acquired machine A for USD 90,000 on 2007 January 2. Machine A had an estimated useful life of four years and no salvage value, and the machine was depreciated on the straight-line basis. Machine B had a cash price of USD 108,000. In addition to machine A, cash of USD 30,000 was given up in the exchange. Machine B has an estimated useful life of five years and no salvage value, and the machine is being depreciated using the straight-line method. The exchange has no commercial substance. Upon further analysis, you discover that the company recorded the transaction as an exchange of nonmonetary assets having commercial substance instead of one not having commercial substance. You must now determine the following:

a. What journal entry did the Shirley Company make when it recorded the exchange of machines? (Show computations.)

b. What journal entry should the Shirley Company have made to record the exchange of machines?

c. Assume the error was discovered on 2010 December 31, before adjusting journal entries have been made. What journal entries should be made to correct the accounting records? (Adjustments of prior years' net income because of errors should be debited or credited to Retained Earnings.) What adjusting journal entry should be made to record depreciation for 2010? (Ignore income taxes.)

d. What effect did the error have on reported net income for 2009? (Ignore income taxes.)

e. How should machine B be reported on the 2010 December 31, balance sheet?

Business decision case B Currently, many corporations are looking for acquisition opportunities. Tyre, Inc., is trying to decide whether to buy Amite Company or Beauman Company. Tyre, Inc., has hired you as a consultant to analyze the two companies' financial information and to determine the more advantageous acquisition. Your

review of the companies' books has revealed that both Amite and Beauman have assets with the following book values and fair market values:

	Book Value	Fair Market Value
Accounts receivable	\$150,000	\$ 150,000
Inventories	450,000	750,000
Land	375,000	675,000
Buildings	450,000	1,050,000
Equipment	180,000	300,000
Patents	120,000	150,000

Liabilities assumed on the purchase of either company include accounts payable, USD 300,000, and notes payable, USD 75,000.

The only difference between the companies is that Amite has net income that is about average for the industry, while Beauman's net income is greatly above average for the industry.

Top-level management at Tyre, Inc., has asked you to respond in writing to the following possible situations:

a. Assume Tyre, Inc., can buy Amite Company for USD 2,700,000 or Beauman Company for USD 3,450,000. Prepare the journal entries to record the acquisition of Amite Company and Beauman Company. What accounts for the difference between the purchase price of the two companies?

b. Assume Tyre, Inc, can buy either company for USD 2,700,000. Write a report for Tyre, Inc., advising which company to buy.

Annual report analysis C The mission of Rational Software Corporation is to ensure the success of customers constructing the software systems that they depend on.

Using the following excerpts from Rational Software's annual reports, calculate the firm's total assets turnover for 2004 and 2003. (Amounts are in USD thousands.)

	2004	2003	2002
Net sales	\$ 814,935	\$ 572,190	\$ 411,816
Total assets	1,709,323	1,225,776	453,956

In a written report, discuss the meaning of the total assets turnover ratio and what the ratio means to management and investors. Use the total assets turnover ratios you computed for Rational Software as an example in your report.

Ethics case D Based on the situation described in the ethics case regarding ABC Corporation, respond in writing to the following questions.

- Depending on his actions, what are the possible consequences for John Gilbert in this situation?
- Assuming that the president cannot find another appraiser to support the new allocations, what would you do if you were Gilbert?
- If the president can find a reputable appraiser to support these new allocations, what would you do if you were Gilbert?

Group project E In teams of two or three students, find a recent annual report that includes intangible assets on the balance sheet. Select one member of each team to give an informal presentation discussing intangible asset disclosures on the face of the statements and in the notes to the financial statements. All members should be prepared to discuss intangible asset disclosures from their annual report in detail.

Group project F In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 2*, "Accounting for Research and Development Costs", published by the Financial Accounting Standards Board. Write a report to your instructor giving the highlights of the standard. For instance,

what alternatives were considered and why did the board conclude that all research and development costs should be expensed when incurred?

Group project G In a group of one or two other students, go to the library and locate *Statement of Financial Accounting Standards No. 121*, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of", published by the Financial Accounting Standards Board. Write a report to your instructor giving the highlights of the standard. For instance, what does "impairment" mean and what are its causes? How can one determine that impairment of an asset has possibly occurred? Also review some of the background information as to why this was important enough for the FASB to act.

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Click on each icon to investigate the information available at this site. Browse any of the areas that look interesting. How would accounting practitioners make good use of this site? In a report to your instructor, summarize the features available at this site.

Visit the Small Business Administration site at:

<http://www.sba.gov>

Suppose you wanted to start a small business. What helpful information would you find at this site? Would this site provide information on how to finance the business? Browse around this site to see what it offers. Then write a report to your instructor summarizing the types of helpful information this site provides.

Answers to self-test

True-false

False. No more depreciation can be taken on a fully depreciated plant asset.

True. The new asset is recorded at the fair market value of the asset received or given up, whichever is more clearly evident.

False. The residual value of land should be deducted from total costs subject to depletion.

False. Only intangible assets with finite useful lives should be amortized.

Multiple-choice

d. The cost and accumulated depreciation should not be removed from the accounts until the disposal of the asset.

a. On the date of exchange, the book value of the old truck is USD 20,700 (USD 45,000 minus accumulated depreciation of USD 24,300). The trade-in allowance of USD 22,500 indicates a gain on exchange of USD 1,800. In an exchange of nonmonetary assets not having commercial substance, a gain is not recognized, but reduces the cost of a new asset. Therefore, the cost of the new truck is USD 55,200 (USD 57,000 minus USD 1,800), and no gain is recognized.

c. The depletion charge for the first year is:

$$\text{Depletion charge per ton} = \frac{(\text{USD } 375,000 - \text{USD } 75,000)}{1,000,000}$$

= USD 0.30

$$\text{Depletion charge for the year} = \text{USD } 0.30 \times 100,000$$

= USD 30,000

Since all of the ore that was extracted was sold, all of the USD 30,000 is expensed as cost of ore sold.

b. The patent is amortized over 10 years:

$$\text{Annual amortization expense} = \frac{\text{USD } 36,000}{10}$$

= USD 3,600

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