Chapter 10 Learning Objectives

1. Measure the cost of property, plant, and equipment
2. Account for depreciation using the straight-line, units-of-production, and double-declining-balance methods
3. Journalize entries for the disposal of plant assets
4. Account for natural resources
5. Account for intangible assets
6. Use the asset turnover ratio to evaluate business performance
7. Journalize entries for the exchange of plant assets (Appendix 10A)

HOW DOES A BUSINESS MEASURE THE COST OF PROPERTY, PLANT, AND EQUIPMENT?

Learning Objective 1
Measure the cost of property, plant, and equipment

Property, Plant, and Equipment (PP&E)
Long-lived, tangible assets, such as land, buildings, and equipment, used in the operation of a business.

Depreciation
The process by which businesses spread the allocation of a plant asset's cost over its useful life.

Property, plant, and equipment (PP&E) are long-lived, tangible assets used in the operations of a business. Examples include land, buildings, equipment, furniture, and automobiles. Often, property, plant, and equipment are referred to as *plant assets, operational assets,* or *fixed assets* in financial statements. Many businesses use the heading Property, Plant, and Equipment on their classified balance sheets when reporting on these assets. However, the term *plant assets* is commonly used in conversation. We will use the terms interchangeably.

Plant assets are unique from other assets, such as office supplies, because plant assets are long term (lasting several years). This requires a business to allocate the cost of the asset over the years that the asset is expected to be used. This allocation of a plant asset's cost over its useful life is called depreciation and follows the matching principle. The matching principle ensures that all expenses are matched against the revenues of the period. Because plant assets are used over several years, a business will record a portion of the cost of the asset as an expense in each of those years. All plant assets except land are depreciated. We record no depreciation for land because it does not have a definitive or clearly estimable life, so it is difficult to allocate the cost of land.

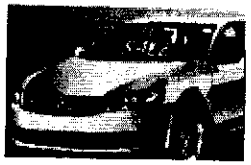
Plant assets are used in the operations of the business. This means that they are not specifically acquired for resale, but instead they are used to help create the business's revenue. For example, a business that has a vacant building that is not currently being used would classify this asset as a long-term investment instead of as a plant asset. This is because the vacant building is sitting idle and not currently being used in the operations of the business.

Exhibit 10-1 summarizes the life cycle of a plant asset in a business. The business begins by acquiring the asset and recording the asset on its books. This involves determining

Exhibit 10-1 | Life Cycle of a Plant Asset


1. Acquisition of asset


2. Usage of asset


3. Disposal of asset

record depreciation expense. In addition, the business also incurs additional expenses (such as repairs and maintenance) related to the asset. And lastly, when the asset has reached the end of its useful life, the business disposes of the asset. Each of these stages in the life of a plant asset must be recorded on the business's books.

Cost Principle
A principle that states that acquired assets and services should be recorded at their actual cost.

Plant assets are recorded at historical cost—the amount paid for the asset. This follows the cost principle, which states that acquired assets (and services) should be recorded at their actual cost. The *actual cost of a plant asset* is its purchase price plus taxes, purchase commissions, and all other amounts paid to ready the asset for its intended use. Let's begin by reviewing the different categories of plant assets.

Land and Land Improvements

The cost of land includes the following amounts paid by the purchaser:

- Purchase price
- Brokerage commission
- Survey and legal fees
- Delinquent property taxes
- Taxes assessed to transfer the ownership (title) on the land
- Cost of clearing the land and removing unwanted buildings

The cost of land does *not* include the following costs:

- Fencing
- Paving
- Sprinkler systems
- Lighting
- Signs

Land Improvement
A depreciable improvement to land, such as fencing, sprinklers, paving, signs, and lighting.

These separate plant assets (fencing, paving, and so on) are called land improvements. Unlike land, land improvements are subject to depreciation.

Suppose Smart Touch Learning needs property and purchases land on August 1, 2019, for $50,000 with a note payable for the same amount. The company also pays cash as follows: $4,000 in delinquent property taxes, $2,000 in transfer taxes, $5,000 to remove an old building, and a $1,000 survey fee. What is the company's cost of this land? Exhibit 10-2 shows all the costs incurred to bring the land to its intended use.

Exhibit 10-2 | Measuring the Cost of Land

Purchase price of land		$ 50,000
Add related costs:		
Property taxes	$ 4,000	
Transfer taxes	2,000	
Removal of building	5,000	
Survey fee	1,000	12,000
Total cost of land		$ 62,000

Date	Accounts and Explanation	Debit	Credit
Aug. 1	Land	62,000	
	Notes Payable		50,000
	Cash		12,000
	To record purchase of land with cash and note payable.		

A↑ = L↑ + E

Land↑, Cash↓ = Notes Payable↑

We would say that Smart Touch Learning *capitalized* the cost of the land at $62,000. Capitalized means that an asset account was debited (increased) because the company acquired an asset. So, for our land example, Smart Touch Learning debited the Land account for $62,000, the capitalized cost of the asset.

Capitalize
Recording the acquisition of land, building, or other assets by debiting (increasing) an asset account.

Suppose Smart Touch Learning then pays $20,000 for fences, paving, lighting, and signs on August 15, 2019. The following entry records the cost of these land improvements:

Date	Accounts and Explanation	Debit	Credit
Aug. 15	Land Improvements	20,000	
	Cash		20,000
	To record purchase of land improvements for cash.		

A↑↓ = L + E

Land Improvements↑, Cash↓ =

Land and land improvements are two entirely separate assets. Recall that land is not depreciated. However, the cost of land improvements *is* depreciated over that asset's useful life.

Buildings

The cost of a building depends on whether the company is constructing the building itself or is buying an existing one. These costs include the following:

Constructing a Building	Purchasing an Existing Building
• Architectural fees	• Purchase price
• Building permits	• Costs to renovate the building to ready the building for use, which may include any of the charges listed under the "Constructing a Building" column
• Contractor charges	
• Payments for materials, labor, and miscellaneous costs	

Machinery and Equipment

The cost of machinery and equipment includes the following:

- Purchase price (less any discounts)
- Transportation charges
- Insurance while in transit
- Sales tax and other taxes
- Purchase commission
- Installation costs
- Testing costs (prior to use of the asset)

ance, taxes, ordinary repairs, and maintenance to the Equipment account. From that point on, insurance, taxes, repairs, and maintenance costs are recorded as expenses.

Furniture and Fixtures

Furniture and fixtures include desks, chairs, file cabinets, display racks, shelving, and so forth. The cost of furniture and fixtures includes the basic cost of each asset (less any discounts), plus all other costs to ready the asset for its intended use. For example, for a desk, this may include the cost to ship the desk to the business and the cost paid to a laborer to assemble the desk.

Lump-Sum Purchase

A company may pay a single price for several assets as a group—a lump-sum purchase (sometimes called a *basket purchase*). For example, Smart Touch Learning may pay a single price for land and a building. For accounting purposes, the company must identify the cost of each asset purchased. The total cost paid (100%) is divided among the assets according to their relative market values. This is called the relative-market-value method.

Relative-Market-Value Method A method of allocating the total cost (100%) of multiple assets purchased at one time. Total cost is divided among the assets according to their relative market values.

Suppose Smart Touch Learning paid a combined purchase price of $100,000 on August 1, 2019, for the land and building. An appraisal indicates that the land's market value is $30,000, and the building's market value is $90,000. It is clear that the company got a good deal, paying less than fair market value, which is $120,000 for the combined assets. But how will the accountant allocate the $100,000 paid for both assets?

First, calculate the ratio of each asset's market value to the total market value for both assets. The total appraised value is $120,000.

Total market value = Land market value + Building market value
= $30,000 + $90,000
= $120,000

The land makes up 25% of the total market value and the building 75%, as follows:

Percentage of total value = Land market value / Total market value
= $30,000 / $120,000
= 25%

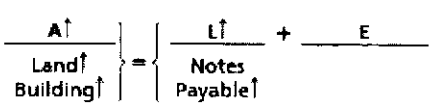
Percentage of total value = Building market value / Total market value
= $90,000 / $120,000
= 75%

For Smart Touch Learning, the land is assigned the cost of $25,000 and the building is assigned the cost of $75,000. The calculations follow:

Asset	Market Value	Percentage of Total Value	× Total Purchase Price	= Assigned Cost of Each Asset
Land	$ 30,000	$30,000 / $120,000 = 25%	× $100,000	= $ 25,000
Building	90,000	$90,000 / $120,000 = 75%	× $100,000	= 75,000
Total	$ 120,000	100%		$ 100,000

record the purchase of the land and building is as follows:

Date	Accounts and Explanation	Debit	Credit
Aug. 1	Land	25,000	
	Building	75,000	
	Notes Payable		100,000
	To record purchase of land and building in exchange for note payable.		



Capital and Revenue Expenditures

Accountants divide spending on plant assets after the acquisition into two categories:

- Capital expenditures
- Revenue expenditures

A capital expenditure is debited to an asset account because it increases the asset's capacity or efficiency or extends the asset's useful life. A capital expenditure is also called a *balance sheet expenditure* because the cost of the expenditure is reported on the balance sheet as an asset.

Capital Expenditure
An expenditure that increases the capacity or efficiency of a plant asset or extends its useful life. Capital expenditures are debited to an asset account.

Examples of capital expenditures include the purchase price plus all the other costs to bring an asset to its intended use, as discussed in the preceding sections. Also, an extraordinary repair is a capital expenditure because it extends the asset's capacity or useful life. An example of an extraordinary repair would be spending $3,000 to rebuild the engine on a five-year-old truck. This extraordinary repair would extend the asset's life past the normal expected life. As a result, its cost would be debited to the asset account for the truck as follows:

Extraordinary Repair
Repair work that generates a capital expenditure because it extends the asset's life past the normal expected life.

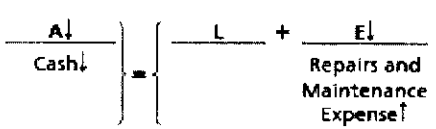
Date	Accounts and Explanation	Debit	Credit
	Truck	3,000	
	Cash		3,000
	To record cost of rebuilding engine on truck.		

Expenses incurred to maintain the asset in working order, such as repair or maintenance expense, are *not* debited to an asset account. Examples include the costs of maintaining equipment, such as repairing the air conditioner on a truck, changing the oil filter, and replacing its tires. These ordinary repairs are called revenue expenditures and are debited to an expense account, such as Repairs and Maintenance Expense. Revenue expenditures, often called *income statement expenditures*, do not increase the capacity or efficiency of an asset or extend its useful life and are reported on the income statement as an expense in the period incurred.

Revenue Expenditure
An expenditure that does not increase the capacity or efficiency of an asset or extend its useful life. Revenue expenditures are debited to an expense account.

Suppose that Smart Touch Learning paid $500 cash to replace tires on the truck. This expenditure does not extend the useful life of the truck or increase its efficiency. The company's accounting clerk records this transaction as a revenue expenditure as shown:

Date	Accounts and Explanation	Debit	Credit
	Repairs and Maintenance Expense	500	
	Cash		500
	To record repairs and maintenance costs incurred.		



truck.

Exhibit 10-3 | Delivery Truck Expenditures—Capital Expenditure and Revenue Expenditure

CAPITAL EXPENDITURE: Debit an Asset Account	REVENUE EXPENDITURE: Debit an Expense Account
Capital Expenditures:	*Revenue Expenditures:*
Major engine or transmission overhaul	Repair of transmission or engine
Modification for new use	Oil change, lubrication, and so on
Addition to storage capacity	Replacement of tires or windshield
Anything that increases the life of the asset	Paint job

Treating a capital expenditure as an expense, or vice versa, creates an accounting error. Suppose a business replaces the engine in the truck. This would be an extraordinary repair because it increases the truck's life. If the company expenses the cost by debiting Repairs and Maintenance Expense rather than capitalizing it (debiting the asset), the company would be making an accounting error. This error has the following effects:

- Overstates Repairs and Maintenance Expense on the income statement
- Understates net income on the income statement
- Understates owner's equity on the statement of owner's equity and balance sheet
- Understates the Truck account (asset) on the balance sheet

Incorrectly capitalizing an expense creates the opposite error. Assume a minor repair, such as replacing the water pump on the truck, was incorrectly debited to the asset account. The error would result in expenses being understated and net income being overstated on the income statement. Additionally, the cost of the truck would be overstated on the balance sheet by the amount of the repair bill.

Try It!

1. Budget Banners pays $200,000 cash for a group purchase of land, building, and equipment. At the time of acquisition, the land has a market value of $22,000, the building $187,000, and the equipment $11,000. Journalize the lump-sum purchase.

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercises S10-1 and S10-2. MyAccountingLab

WHAT IS DEPRECIATION, AND HOW IS IT COMPUTED?

Learning Objective 2
Account for depreciation using the straight-line, units-of-production, and double-declining-balance methods

As we learned earlier, depreciation is the allocation of a plant asset's cost to expense over its useful life. Depreciation matches the expense against the revenue generated from using the asset to measure net income.

All assets, except land, wear out as they are used. For example, a business's delivery truck can only go so many miles before it is worn out. As the truck is driven, this use is part of what causes depreciation. Additionally, physical factors, like age and weather, can cause depreciation of assets.

out. An asset is obsolete when a newer asset can perform the job more efficiently. As a result, an asset's useful life may be shorter than its physical life. In all cases, the asset's cost is depreciated over its useful life.

Obsolete
An asset is considered obsolete when a newer asset can perform the job more efficiently.

Now that we have discussed causes of depreciation, let's discuss what depreciation is *not*.

1. *Depreciation is not a process of valuation.* Businesses do not record depreciation based on changes in the asset's market value.
2. *Depreciation does not mean that the business sets aside cash to replace an asset when it is used up.* Depreciation has nothing to do with cash.

Factors in Computing Depreciation

Depreciation of a plant asset is based on three main factors:

1. Capitalized cost
2. Estimated useful life
3. Estimated residual value

Capitalized cost is a known cost and, as mentioned earlier in this chapter, includes all items paid for the asset to perform its intended function. The other two factors are estimates.

Estimated useful life is how long the company expects it will use the asset. Useful life may be expressed in time, such as months or years, or usage, such as units produced, hours used (for machinery), or miles driven (for a vehicle). A company's useful life estimate might be shorter than the actual life of the asset. For example, a business might estimate a useful life of five years for a delivery truck because it has a policy that after five years the truck will be traded in for a new vehicle. The business knows that the truck will last longer than five years, but the business uses a useful life of only five years because this is how long the company expects to use the asset.

Useful Life
Length of the service period expected from an asset. May be expressed in time or usage.

Useful life is an estimate based on a company's experience and judgment. The goal is to define estimated useful life with the measure (years, units, and so on) that best matches the asset's decline or use. When determining useful life, a company considers how long it will use the asset and when the asset will become obsolete.

Estimated residual value, also called *salvage value*, is the asset's expected value at the end of its useful life. When a company decides to dispose of an asset, the company will sell or scrap it. The residual value is the amount the company expects to receive when the company disposes of the asset. Residual value can sometimes be zero if a company does not expect to receive anything when disposing of the asset. If a company plans on trading the asset in for a new asset, the residual value will be the expected trade-in value. Estimated residual value is *not* depreciated because the company expects to receive this amount at the end. Cost minus estimated residual value is called depreciable cost.

Residual Value
The expected value of a depreciable asset at the end of its useful life.

Depreciable Cost
The cost of a plant asset minus its estimated residual value.

Depreciable cost = Cost − Estimated residual value

Depreciation Methods

There are many depreciation methods for plant assets, but three are used most commonly:

1. Straight-line method
2. Units-of-production method
3. Double-declining-balance method

but they all result in the same total depreciation over the total life of the asset. Exhibit 10-4 gives the data we will use for a truck that Smart Touch Learning purchases and places in service on January 1, 2019.

Exhibit 10-4 | Data for Truck

Data Item	Amount
Cost of truck	$ 41,000
Less: Estimated residual value	1,000
Depreciable cost	$ 40,000
Estimated useful life—Years	5 years
Estimated useful life—Units	100,000 miles

Straight-Line Method

Straight-Line Method
A depreciation method that allocates an equal amount of depreciation each year. (Cost − Residual value) / Useful life.

The straight-line method allocates an equal amount of depreciation each year and is calculated as follows:

Straight-line depreciation = (Cost − Residual value) / Useful life
= ($41,000 − $1,000) / 5 years
= $8,000 per year

Because the asset was placed in service on the first day of the year, the adjusting entry to record each year's depreciation is as follows:

A↓ Accumulated Depreciation—Truck↑ = L + E↓ Depreciation Expense—Truck↑

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Depreciation Expense—Truck	8,000	
	Accumulated Depreciation—Truck		8,000
	To record depreciation on truck.		

Book Value
A depreciable asset's cost minus accumulated depreciation.

Depreciation Expense is reported on the income statement. Accumulated Depreciation is a contra asset that is reported on the balance sheet following the Truck account. The book value of the plant asset, cost minus accumulated depreciation, is reported on the balance sheet at December 31, 2019, as follows:

Property, Plant, and Equipment	
Truck	$ 41,000
Less: Accumulated Depreciation—Truck	(8,000)
Truck, Net	$ 33,000

A straight-line depreciation schedule for this truck is shown in Exhibit 10-5. The final column on the right shows the asset's book value, which is cost less accumulated depreciation. Notice that the depreciation expense amount is the same every year and that the accumulated depreciation is the sum of all depreciation expense recorded to date for the depreciable asset.

Date	Asset Cost	Depreciation for the Year: Depreciable Cost	Useful Life		Depreciation Expense	Accumulated Depreciation	Book Value	
1-1-2019	$ 41,000						$ 41,000	
12-31-2019		($41,000 – $1,000)	/ 5 years	=	$ 8,000	$ 8,000	33,000	
12-31-2020		($41,000 – $1,000)	/ 5 years	=	8,000	16,000	25,000	
12-31-2021		($41,000 – $1,000)	/ 5 years	=	8,000	24,000	17,000	
12-31-2022		($41,000 – $1,000)	/ 5 years	=	8,000	32,000	9,000	
12-31-2023		($41,000 – $1,000)	/ 5 years	=	8,000	40,000	1,000	← Residual value

As an asset is used, accumulated depreciation increases and book value decreases. (See the Accumulated Depreciation and Book Value columns in Exhibit 10-5.) At the end of its estimated useful life, the asset is said to be fully depreciated. An asset's final book value is its residual value ($1,000 in this example).

Units-of-Production Method

The units-of-production method allocates a varying amount of depreciation each year based on an asset's usage. Units-of-production depreciates by units rather than by years. As we noted earlier, a unit of output can be miles, units, hours of output, depending on which unit type best defines the asset's use. When a plant asset's usage varies every year, the units-of-production method does a better of job of matching expenses with revenues.

Units-of-Production Method A depreciation method that allocates a varying amount of depreciation each year based on an asset's usage.

The truck in our example is estimated to be driven 20,000 miles the first year, 30,000 the second, 25,000 the third, 15,000 the fourth, and 10,000 during the fifth (for a total useful life of 100,000 miles). The units-of-production depreciation for each period varies with the number of units (miles, in the case of the truck) the asset produces. Units-of-production depreciation is calculated as follows:

Step 1:

Depreciation per unit = (Cost − Residual value) / Useful life in units
= ($41,000 − $1,000) / 100,000 miles
= $0.40 per mile

Step 2:

Units-of-production depreciation = Depreciation per unit × Current year usage
= $0.40 per mile × 20,000 miles
= $8,000 (Year 1)

Exhibit 10-6 | Units-of-Production Depreciation Schedule

Date	Asset Cost	Depreciation for the Year: Depreciation Per Unit		Number of Units		Depreciation Expense	Accumulated Depreciation	Book Value	
1-1-2019	$41,000							$41,000	
12-31-2019		$0.40	×	20,000	=	$ 8,000	$ 8,000	33,000	
12-31-2020		0.40	×	30,000	=	12,000	20,000	21,000	
12-31-2021		0.40	×	25,000	=	10,000	30,000	11,000	
12-31-2022		0.40	×	15,000	=	6,000	36,000	5,000	
12-31-2023		0.40	×	10,000	=	4,000	40,000	1,000	← Residual value

Double-Declining-Balance Method

Accelerated Depreciation Method
A depreciation method that expenses more of the asset's cost near the start of its useful life and less at the end of its useful life.

Double-Declining-Balance Method
An accelerated depreciation method that computes annual depreciation by multiplying the depreciable asset's decreasing book value by a constant percent that is two times the straight-line depreciation rate.

An accelerated depreciation method expenses more of the asset's cost near the start of an asset's life and less at the end of its useful life. The main accelerated method of depreciation is the double-declining-balance method. The double-declining-balance method multiplies an asset's decreasing book value (the asset's cost less its accumulated depreciation) by a constant percentage that is twice the straight-line depreciation rate. The straight-line depreciation rate is calculated as 1 / Useful life. Therefore, the double-declining-balance method rate will be 2 × (1 / Useful life). Double-declining-balance amounts can be computed using the following formula:

Double-declining-balance depreciation = (Cost − Accumulated depreciation) × 2 × (1 / Useful life)

For the first year of the truck, the calculation would be as shown:

Double-declining-balance depreciation = (Cost − Accumulated depreciation) × 2 × (1 / Useful life)
= ($41,000 − $0) × 2 × (1 / 5 years)
= $16,400 (Year 1)

In Year 2, the amount of depreciation would decline because the asset has accumulated some depreciation (the $16,400 for the first year). For the second year of the truck, therefore, the calculation would be as shown:

Double-declining-balance depreciation = (Cost − Accumulated depreciation) × 2 × (1 / Useful life)
= ($41,000 − $16,400) × 2 × (1 / 5 years)
= $9,840 (Year 2)

Note that residual value is not included in the formula. Residual value is ignored until the depreciation expense takes the book value below the residual value. When this occurs, the final year depreciation is calculated as the amount needed to bring the asset to its residual value. In the case of the truck, residual value was given at $1,000. In the double-declining-balance schedule in Exhibit 10-7, notice that, after Year 4 (December, 31, 2022), the truck's

31, 2023. At the end of the asset's life, its book value should equal the residual value. Therefore, in the final year, depreciation is book value, $5,314, less the $1,000 residual value, or $4,314 in depreciation expense.

Exhibit 10-7 | Double-Declining-Balance Depreciation Schedule

Date	Asset Cost	Depreciation for the Year: Book Value	DDB Rate	Depreciation Expense	Accumulated Depreciation	Book Value
1-1-2019	$ 41,000					$ 41,000
12-31-2019		$41,000	× 2 × (1/5 years)	= $ 16,400	$ 16,400	24,600
12-31-2020		24,600	× 2 × (1/5 years)	= 9,840	26,240	14,760
12-31-2021		14,760	× 2 × (1/5 years)	= 5,904	32,144	8,856
12-31-2022		8,856	× 2 × (1/5 years)	= 3,542	35,686	5,314
12-31-2023				4,314*	40,000	1,000 ← Residual value

*Last year depreciation is the "plug figure" needed to reduce book value to the residual amount ($5,314 – $1,000 = $4,314).

Comparing Depreciation Methods

Let's compare the depreciation methods. Annual depreciation expense amounts vary, but total accumulated depreciation is $40,000 for all three methods.

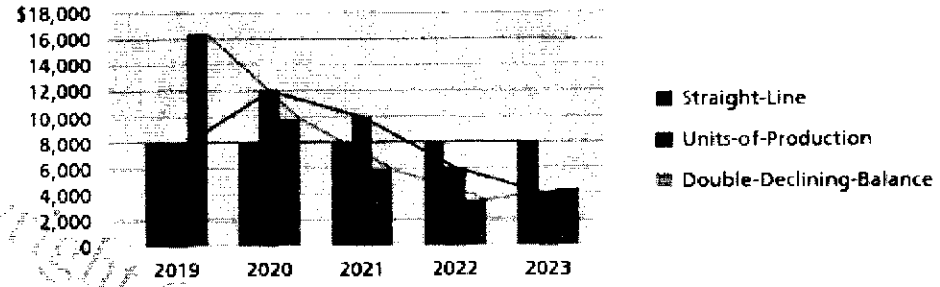
	Amount of Depreciation per Year		
			Accelerated Method
Year	Straight-Line	Units-of-Production	Double-Declining-Balance
1	$ 8,000	$ 8,000	$ 16,400
2	8,000	12,000	9,840
3	8,000	10,000	5,904
4	8,000	6,000	3,542
5	8,000	4,000	4,314
Total Accumulated Depreciation	$ 40,000	$ 40,000	$ 40,000

Deciding which method is best depends on the asset. A business should match an asset's expense against the revenue that the asset produces. The following are some guidelines for which method to use:

Method	Asset Characteristics	Effect on Depreciation	Example Assets
Straight-line	Generates revenue evenly over time	Equal amount each period	Building
Units-of-production	Depreciates due to wear and tear rather than obsolescence	More usage causes larger depreciation	Vehicles (miles) Machinery (machine hours)
Double-declining-balance	Produces more revenue in early years	Higher depreciation in early years, less later	Computers

that the straight-line method produces a straight line on the graph because there is an equal amount of depreciation expense each year. The double-declining-balance method produces a line that is decreasing, and the units-of-production method's line varies based on usage.

Exhibit 10-8 | Annual Depreciation by Method



DECISIONS

Which depreciation method should be selected?

Three Junes Weaving has just purchased an automated weaving machine and is trying to figure out which depreciation method to use: straight-line, units-of-production, or double-declining-balance. Ira Glasier, the controller, is interested in using a depreciation method that approximates the usage of the weaving machine. He also expects that the weaving machine will have increasing repairs and maintenance as the asset ages. Which method should Ira choose?

Solution

If Ira is interested in using a depreciation method that approximates the usage of the weaving machine, he should use the units-of-production method to depreciate the asset. He could use number of machine hours as the unit of output. This method would best match the usage of the machine to the amount of expense recorded. Ira should be aware, though, that this method could produce varying amounts of depreciation expense each year. For example, if Three Junes Weaving does not use the weaving machine in one year, no depreciation expense would be recorded. This could cause net income to vary significantly from year to year. Because Ira expects the weaving machine to need more repairs as the asset ages, Ira might consider using the double-declining-balance method instead. The double-declining-balance method records a higher amount of depreciation in the early years and less later. This method works well for assets that are expected to have increasing repairs and maintenance in their later years because the total expense (depreciation and repairs and maintenance) can be spread out equally over the life of the asset.

Depreciation for Tax Purposes

Modified Accelerated Cost Recovery System (MACRS)
A depreciation method that is used for tax purposes.

The Internal Revenue Service (IRS) requires that companies use a specific depreciation method for tax purposes. This method is the Modified Accelerated Cost Recovery System (MACRS).

Under MACRS, assets are divided into specific classes, such as 3-year, 5-year, 7-year, and 39-year property. Businesses do not get to choose the useful life of the asset. Instead, the IRS specifies the useful life based on the specific classes. For example, office furniture has a 7-year life for tax purposes but might only be depreciated for five years for book purposes.

fully depreciated to a book value of zero. MACRS is not acceptable for financial reporting under GAAP. This requires that businesses record depreciation for plant assets under two methods—book method (straight-line, units-of-production, or double-declining-balance) and tax method (MACRS).

Can the MACRS method be used for financial reporting in accordance with GAAP?

Partial-Year Depreciation

In the previous examples, we calculated depreciation for the entire year. What would happen if the business placed the truck in service on July 1, 2019, instead of January 1, 2019? Would the depreciation for any of the methods change? Yes, but only the methods that are calculated based on a time period, which means only straight-line and double-declining-balance would change. Units-of-production does not consider years in its formula; thus, that calculation remains the same.

When a business purchases an asset during the year (other than January 1), the business should record depreciation for only the portion of the year that the asset was used in the operations of the business. This partial-year depreciation could be calculated to the nearest day, but this is unnecessary. In this book, we will assume a method called *modified half-month convention*, which means if an asset is purchased on or before the 15th of the month, the asset will be depreciated for the whole month. If the asset is purchased after the 15th of the month, the asset will not be depreciated until the following month.

Returning to our example, assume that the truck was placed into service on July 1, 2019. Therefore, the truck was in service for six months in 2019, from July 1 through December 31. The revised straight-line calculation for 2019 under the altered in-service date is as follows:

Straight-line depreciation = [(Cost − Residual value) / Useful life] × (Number of months / 12 months)
= [($41,000 − $1,000) / 5 years] × (6 / 12)
= $4,000

Because the business used the asset for six months of the year, we only record 6/12 (6 out of 12 months) of straight-line depreciation expense, or $4,000, in 2019.

Partial-year depreciation also applies to disposals of assets (which we will cover later in this chapter). If an asset is disposed of during the year, the business must calculate depreciation for only the time period the asset was in service before the asset was disposed, not the entire year.

Changing Estimates of a Depreciable Asset

Estimating the useful life and residual value of a plant asset poses a challenge. As the asset is used, the business may change its estimated useful life or estimated residual value. If this happens, the business must recalculate depreciation expense. For example, the business may find that its truck lasts eight years instead of five. This is a change in estimated useful life. Accounting changes like this are common because useful life and residual value are estimates and, as a result, are not based on perfect foresight. When a company makes an accounting change, Generally Accepted Accounting Principles require the business to recalculate the depreciation for the asset in the year of change and in future periods. They do not require that businesses restate prior years' financial statements for this change in estimate.

For a change in either estimated asset life or residual value, the asset's remaining depreciable book value is spread over the asset's remaining life. Suppose Smart Touch Learning used the truck purchased on January 1, 2019, for two full years. Under the straight-line method, accumulated depreciation would be $16,000. (Refer to Exhibit 10-5.)

= $8,000 per year × 2 years
= $16,000

Remaining depreciable book value (cost *less* accumulated depreciation) is $25,000 ($41,000 – $16,000). Suppose Smart Touch Learning believes the truck will remain useful for six more years (for a total of eight years). Residual value is unchanged. At the start of 2021, the company would recompute depreciation as follows:

Revised depreciation = (Book value − Revised residual value) / Revised useful life remaining
= ($25,000 − $1,000) / 6 years
= $4,000 per year

Make sure to use the useful life remaining as the denominator in the formula.

In years 2021 to 2026, the yearly depreciation entry based on the new useful life would be as follows:

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Depreciation Expense—Truck	4,000	
	Accumulated Depreciation—Truck		4,000
	To record depreciation on truck.		

A↓ Accumulated Depreciation—Truck↑ } = { L + E↓ Depreciation Expense—Truck↑

IFRS permits the presentation of plant assets at their fair market value because market value may be more relevant and thus more useful to readers of financial statements.

Reporting Property, Plant, and Equipment

Property, plant, and equipment are reported at book value on the balance sheet. Companies may choose to report plant assets as a single amount, with a note to the financial statements that provides detailed information, or companies may provide detailed information on the face of the statement. The cost of the asset and the related accumulated depreciation should be disclosed. Exhibit 10-9 shows the two alternative reporting treatments for plant assets.

Treatment 1: Property, Plant, and Equipment on the Balance Sheet of Smart Touch Learning (December 31)

Property, Plant, and Equipment:		
Land		$ 20,000
Building	$ 60,000	
Less: Accumulated Depreciation—Building	(250)	59,750
Furniture	18,000	
Less: Accumulated Depreciation—Furniture	(300)	17,700
Property, Plant, and Equipment, Net		$ 97,450

Treatment 2: Property, Plant, and Equipment on the Balance Sheet of Smart Touch Learning (December 31)

Property, Plant, and Equipment, Net (See Note 8)	$ 97,450

Try It!

2. On January 1, Alamo Cranes purchased a crane for $140,000. Alamo expects the crane to remain useful for six years (1,000,000 lifts) and to have a residual value of $2,000. The company expects the crane to be used for 80,000 lifts the first year.

Compute the first-year depreciation expense on the crane using the following methods:

a. Straight-line
b. Units-of-production (Round *depreciation per unit* to two decimals. Round depreciation expense to the nearest whole dollar.)

Compute the first-year and second-year depreciation expense on the crane using the following method:

c. Double-declining-balance (Round depreciation expense to the nearest whole dollar.)

Check your answers online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercises S10-3 through S10-6 MyAccountingLab

HOW ARE DISPOSALS OF PLANT ASSETS RECORDED?

Learning Objective 3
Journalize entries for the disposal of plant assets

Eventually, an asset wears out or becomes obsolete. The business then has several options regarding property, plant and equipment:

- Discard the plant asset.
- Sell the plant asset.
- Exchange the plant asset for another plant asset.

In this section, we discuss the first two options. Exchanging a plant asset for another asset is covered in the appendix to this chapter (Appendix 10A).

Plant assets remain on the business's books until they are disposed of. For example, a fully depreciated asset, one that has reached the end of its estimated useful life and is still in service, will still be reported as an asset on the balance sheet. If the asset is still useful, the company may continue using it even though no additional depreciation is recorded. If the asset is no longer useful, it is disposed of. This requires the business to remove the asset and associated accumulated depreciation from the books. In addition, a gain or loss might be recognized by the company.

1. Bring the depreciation up to date.
2. Remove the old, disposed-of asset and associated accumulated depreciation from the books.
3. Record the value of any cash received (or paid) in the disposal of the asset.
4. Finally, determine the amount of any gain or loss. Gain or loss is determined by comparing the cash received and the market value of any other assets received with the book value of the asset disposed of.

Discarding Plant Assets

Discarding of plant assets involves disposing of the asset for no cash. If an asset is disposed of when it is fully depreciated and has no residual value, then the business simply removes the asset and contra asset, Accumulated Depreciation, from the books (Step 2). There is no need to bring the depreciation up to date (Step 1) because the asset is already fully depreciated. In addition, no cash was received or paid and no gain or loss is recognized (Steps 3 and 4).

For example, assume that on July 1, Smart Touch Learning discards equipment with a cost of $10,000 and accumulated depreciation of $10,000. The asset and contra asset accounts are shown below before disposal.

Equipment	
10,000	

Accumulated Depreciation—Equipment	
	10,000

To dispose of the equipment, Smart Touch Learning will need to credit the asset account, Equipment, and debit Accumulated Depreciation—Equipment. The accounting clerk will record the transaction as follows:

A↑↓ = L + E

Equipment↓
Accumulated Depreciation—Equipment↓

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Accumulated Depreciation—Equipment	10,000	
	Equipment		10,000
	Discarded fully depreciated equipment.		

Equipment			Accumulated Depreciation—Equipment		
10,000	10,000	July 1	July 1	10,000	10,000
Bal. 0					0 Bal.

After disposal, notice that the Equipment and Accumulated Depreciation—Equipment accounts now have a zero balance. These accounts will no longer be reported on the financial statements because Smart Touch Learning no longer owns the equipment.

Suppose, instead, that on July 1, Smart Touch Learning discarded the equipment, which has a cost of $10,000 but it is not fully depreciated. As of December 31 of the previous year, accumulated depreciation was $8,000. Annual depreciation expense is $1,000 per year.

from January 1 through July 1 since the last recording of depreciation, one-half of a year's depreciation will be recorded ($1,000 × 1/2 = $500) as follows:

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Depreciation Expense—Equipment	500	
	Accumulated Depreciation—Equipment		500
	To record depreciation on equipment.		

A↓	=	L	+	E↓
Accumulated Depreciation—Equipment↑				Depreciation Expense—Equipment↑

Steps 2 through 4 involve recording the disposal of the equipment and accumulated depreciation and calculating any gain or loss. In this situation, there is a $1,500 loss calculated as follows:

Market value of assets received		$ 0
Less: Book value of asset disposed of:		
Cost	$ 10,000	
Less: Accumulated Depreciation ($8,000 + $500)	(8,500)	1,500
Gain or (Loss)		$ (1,500)

When calculating gain or loss, don't forget to update the Accumulated Depreciation account. In this example, before recording depreciation, the Accumulated Depreciation account was $8,000; $500 of additional depreciation was recorded at disposal, bringing the total accumulated depreciation to $8,500.

The account, Loss on Disposal, will be used. This account has a normal debit balance and is reported in the Other Income and (Expenses) section of the income statement which includes gains and losses on the sale of plant assets.

Smart Touch Learning records the following entry to dispose of the equipment:

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Accumulated Depreciation—Equipment	8,500	
	Loss on Disposal	1,500	
	Equipment		10,000
	Discarded equipment with a book value of $1,500.		

A↓	=	L	+	E↓
Equipment↓ Accumulated Depreciation—Equipment↓				Loss on Disposal↑

Equipment

	10,000	10,000	July 1
Bal.	0		

Accumulated Depreciation—Equipment

		8,000	
July 1	8,500	500	July 1
		0	Bal.

Loss on Disposal

July 1	1,500		

Companies will often sell a plant asset for cash. We will again use Smart Touch Learning as an example. On July 1, the company sells equipment with a historical cost of $10,000 and accumulated depreciation, as of December 31 of the previous year, of $8,000. Annual depreciation is $1,000. The first step is to bring the depreciation up to date for the six months from the last recording of depreciation through the date of disposal.

A↓	=	L	+	E↓
Accumulated Depreciation—Equipment↑	=			Depreciation Expense—Equipment↑

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Depreciation Expense—Equipment	500	
	Accumulated Depreciation—Equipment		500
	To record depreciation on equipment.		

This entry brings the accumulated depreciation to $8,500 ($8,000 + $500). The equipment now has a book value of $1,500 ($10,000 − $8,500). Now that we have recorded Step 1, let's look at Steps 2 through 4 for several different scenarios.

Selling a Plant Asset at Book Value

Suppose that Smart Touch Learning sells the equipment for $1,500. Notice that the cash received is equal to the book value of the asset. When a business sells an asset for book value, no gain or loss is recorded. This is because the cash received is equal to the book value of the asset sold.

Market value of assets received		$ 1,500
Less: Book value of asset disposed of:		
Cost	$ 10,000	
Less: Accumulated Depreciation	(8,500)	1,500
Gain or (Loss)		$ 0

In recording the journal entry, Smart Touch Learning will debit cash for $1,500 and then take the equipment and accumulated depreciation off the books as follows:

A↑↓	=	L	+	E
Cash↑ Equipment↓ Accumulated Depreciation—Equipment↓	=			

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Cash	1,500	
	Accumulated Depreciation—Equipment	8,500	
	Equipment		10,000
	Sold equipment for cash.		

Cash

July 1	1,500

Equipment

	10,000	10,000	July 1
Bal.	0		

Accumulated Depreciation—Equipment

		8,000	
July 1	8,500	500	July 1
		0	Bal.

on sale of the equipment. Notice that the cash received is more than the book value of the asset. When a business sells an asset for more than its book value, a gain is recorded.

Market value of assets received		$ 4,000
Less: Book value of asset disposed of:		
Cost	$ 10,000	
Less: Accumulated Depreciation	(8,500)	1,500
Gain or (Loss)		$ 2,500

The account, Gain on Disposal, will be used. This account has a normal credit balance and is reported in the Other Income and (Expenses) section of the income statement.

In recording the journal entry, Smart Touch Learning will remove the old equipment and accumulated depreciation from the books (Step 2), record a debit to Cash for $4,000 (Step 3), and then record a credit to Gain on Disposal (Step 4) as follows:

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Cash	4,000	
	Accumulated Depreciation—Equipment	8,500	
	Equipment		10,000
	Gain on Disposal		2,500
	Sold equipment for cash.		

A↑ Cash↑ Equipment↓ Accumulated Depreciation—Equipment↓ = L + E↑ Gain on Disposal↑

After you have recorded the transaction for disposal of plant assets, it's always a good idea to check that debits equal credits in the journal entry.

Cash

July 1	4,000		

Equipment

	10,000	10,000	July 1
Bal.	0		

Accumulated Depreciation—Equipment

		8,000	
July 1	8,500	500	July 1
		0	Bal.

Gain on Disposal

	2,500	July 1

If Smart Touch Learning sells the equipment for $500, the company will record a loss on the sale of the equipment. Notice that the cash received is less than the book value of the asset. When a business sells an asset for less than its book value, a loss is recorded.

Market value of assets received		$ 500
Less: Book value of asset disposed of:		
Cost	$ 10,000	
Less: Accumulated Depreciation	(8,500)	1,500
Gain or (Loss)		$ (1,000)

In recording the journal entry, Smart Touch Learning will remove the old equipment and accumulated depreciation from the books (Step 2), record a debit to Cash for $500 (Step 3), and then record a debit to Loss on Disposal (Step 4) as follows:

A↓ Cash↑, Equipment↓, Accumulated Depreciation—Equipment↓ = L + E↓ Loss on Disposal↑

Date	Accounts and Explanation	Debit	Credit
Jul. 1	Cash	500	
	Accumulated Depreciation—Equipment	8,500	
	Loss on Disposal	1,000	
	Equipment		10,000
	Sold equipment for cash.		

Cash

July 1	500		

Equipment

	10,000	10,000	July 1
Bal.	0		

Accumulated Depreciation—Equipment

		8,000	
July 1	8,500	500	July 1
		0	Bal.

Loss on Disposal

July 1	1,000		

In each disposal illustrated, the company has decreased net income over the life of the asset by recording depreciation expense each year prior to the disposal. When the company records the disposal, the company will record a gain, a loss, or neither. Gains recorded at disposal increase net income and losses recorded at disposal decrease net income. Over the life of the asset, the company records a net decrease in net income equal to the net cost of the asset. The net cost of the asset is the amount paid for the asset when it was purchased less the cash received at disposal. For each scenario, let's compare the effect on net income to the net cost, as shown in the table below:

	Asset Discarded		Asset Sold		
	Fully Depreciated	Not Fully Depreciated	At Book Value	Above Book Value	Below Book Value
Accumulated depreciation	$ 10,000	$ 8,500	$ 8,500	$ 8,500	$ 8,500
Plus: Loss on disposal	0	1,500	0	0	1,000
Less: Gain on disposal	0	0	0	2,500	0
Net decrease in net income	$ 10,000	$ 10,000	$ 8,500	$ 6,000	$ 9,500
Cost	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Less: Cash received at disposal	0	0	1,500	4,000	500
Net cost	$ 10,000	$ 10,000	$ 8,500	$ 6,000	$ 9,500

Notice in each case that the net decrease in net income is equal to the net cost of the asset. We have, in effect, expensed the net cost of the asset over its life.

In this section, we have also reviewed the journal entries for discarding and selling of plant assets. Exhibit 10-10 (on the next page) summarizes what you have learned. Before moving on, take a moment to review the exhibit.

Discarding of a fully depreciated plant asset:

Date	Accounts and Explanation	Debit	Credit
	Accumulated Depreciation	10,000	
	Plant Asset		10,000

Discarding of a plant asset that is not fully depreciated:

Date	Accounts and Explanation	Debit	Credit
	Accumulated Depreciation	8,500	
	Loss on Disposal	1,500	
	Plant Asset		10,000

Selling a plant asset at book value:

Date	Accounts and Explanation	Debit	Credit
	Cash	1,500	
	Accumulated Depreciation	8,500	
	Plant Asset		10,000

Selling a plant asset above book value:

Date	Accounts and Explanation	Debit	Credit
	Cash	4,000	
	Accumulated Depreciation	8,500	
	Plant Asset		10,000
	Gain on Disposal		2,500

Selling a plant asset below book value:

Date	Accounts and Explanation	Debit	Credit
	Cash	500	
	Accumulated Depreciation	8,500	
	Loss on Disposal	1,000	
	Plant Asset		10,000

Try It!

3. Counselors of Atlanta purchased equipment on January 1, 2017, for $20,000. Counselors of Atlanta expected the equipment to last for four years and have a residual value of $2,000. Suppose Counselors of Atlanta sold the equipment for $8,000 on December 31, 2019, after using the equipment for three full years. Assume depreciation for 2019 has been recorded. Journalize the sale of the equipment, assuming straight-line depreciation was used.

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercises S10-7 through S10-10. MyAccountingLab

Learning Objective 4
Account for natural resources

Natural Resource
An asset that comes from the earth and is consumed

Depletion
The process by which businesses spread the allocation of a natural resource's cost over its usage

Natural resources are assets that come from the earth that are consumed. Examples include iron ore, oil, natural gas, diamonds, gold, coal, and timber. Natural resources are expensed through depletion. Depletion is the process by which businesses spread the allocation of a natural resource's cost to expense over its usage. It's called depletion because the company is depleting (using up) a natural resource such that at some point in time, there is nothing left to extract. Depletion expense is computed by the units-of-production method.

For example, an oil well cost $700,000 and is estimated to hold 70,000 barrels of oil. There is no residual value. If 3,000 barrels are extracted and sold during the year, then depletion expense is calculated as follows:

Step 1:

Depletion per unit = (Cost − Residual value) / Estimated total units
= ($700,000 − $0) / 70,000 barrels
= $10 per barrel

Step 2:

Depletion expense = Depletion per unit × Number of units extracted
= $10 per barrel × 3,000 barrels
= $30,000 (Year 1)

The depletion entry for the year is as follows:

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Depletion Expense—Oil Reserves	30,000	
	Accumulated Depletion—Oil Reserves		30,000
	To record depletion.		

A	=	L	+	E
Accumulated Depletion—Oil Reserves ↓				Depletion Expense—Oil Reserves ↑

Accumulated Depletion is a contra asset account similar to Accumulated Depreciation. Natural resources can be reported on the balance sheet as shown for oil reserves in the following example:

Oil Reserves	$ 700,000	
Less: Accumulated Depletion—Oil Reserves	(30,000)	$ 670,000

4. Amplify Petroleum holds huge reserves of oil. Assume that at the end of 2017, Amplify Petroleum's cost of oil reserves totaled $80,000,000, representing 100,000,000 barrels of oil. Suppose Amplify Petroleum removed and sold 20,000,000 barrels of oil during 2018. Journalize depletion expense for 2018.

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercise S10-11. MyAccountingLab

HOW ARE INTANGIBLE ASSETS ACCOUNTED FOR?

Learning Objective 5
Account for intangible assets

Intangible Asset
An asset with no physical form that is valuable because of the special rights it carries.

Intangible assets are assets that have no physical form. Instead, these assets convey special rights from patents, copyrights, trademarks, and other creative works.

In our technology-driven economy, intangibles are very important. The intellectual property of a business is difficult to measure. However, when one company buys another, we get a glimpse of the value of the intellectual property of the acquired company. For example, in 2006, Google acquired YouTube. Google said it would pay $1.65 billion for YouTube even though YouTube had never had a profitable year. Why so much for so little? Because YouTube's intangible assets were extremely valuable. Intangibles can account for most of a company's market value, so companies must value their intangibles just as they value other assets, such as merchandise inventory and equipment.

Accounting for Intangibles

Intangible assets that are purchased are recorded at cost. If an intangible is not purchased, only some limited costs can be capitalized. Most purchased intangibles are expensed through amortization, the allocation of the cost of an intangible asset to expense over its useful life. Amortization applies to intangibles exactly as depreciation applies to equipment and depletion to oil and timber.

Amortization
The process by which businesses spread the allocation of an intangible asset's cost over its useful life.

Intangibles either have a definite life or an indefinite life. Intangibles with an indefinite life have no factors (such as legal and contractual obligations) that limit the usage of the intangible asset. Only intangibles that have a definite life are amortized. Intangible assets with an indefinite life are tested for impairment annually. Impairment occurs when the fair value of an asset is less than the book value. In other words, there has been a permanent decline in the value of the asset. If an impairment occurs, the company records a loss in the period that the decline is identified.

Impairment
A permanent decline in asset value.

Specific Intangibles

As noted earlier, patents, copyrights, and trademarks are intangible assets. The accounting for the purchase and amortization of each asset is similar.

Patents

Patent
An intangible asset that is a federal government grant conveying an exclusive 20-year right to produce and sell a process, product, or formula.

A patent is an intangible asset that is a federal government grant conveying an exclusive 20-year right to produce and sell an invention. The invention may be a process, product, or formula—for example, the Dolby noise-reduction process or a prescription drug formula. The acquisition cost of a patent is debited to the Patent account.

at acquisition:

Date	Accounts and Explanation	Debit	Credit
Jan. 1	Patent	200,000	
	Cash		200,000
	To record purchase of patent.		

A↑↓ | Patent↑ Cash↓ | = | L + E

Smart Touch Learning believes this patent's useful life is only five years because it is likely that a new, more efficient process will be developed within that time. Amortization expense is calculated using the straight-line method as follows:

Amortization expense = (Cost − Residual value) / Useful life
= ($200,000 − $0) / 5 years
= $40,000 per year

For most intangibles, the residual value will be zero.

The company's accounting clerk would record the following adjusting entry for amortization:

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Amortization Expense—Patent	40,000	
	Patent		40,000
	To record amortization of patent.		

A↓ | Patent↓ | = | L | + | E↓ Amortization Expense—Patent↑

Notice that Smart Touch Learning credited the amortization directly to the intangible asset, Patent, instead of using an Accumulated Amortization account. A company may credit an intangible asset directly when recording amortization expense, or it may use the account Accumulated Amortization. **Companies frequently choose to credit the asset account directly because the residual value is generally zero and there is no physical asset to dispose of at the end of its useful life, so the asset essentially removes itself from the books through the process of amortization.**

At the end of the first year, Smart Touch Learning will report this patent at $160,000 ($200,000 cost minus first-year amortization of $40,000), the next year at $120,000, and so forth. Each year for five years the value of the patent will be reduced until the end of its five-year life, at which point its book value will be $0.

Why was the account Patent credited instead of Accumulated Amortization—Patent?

Copyrights and Trademarks

A copyright is the exclusive right to reproduce and sell a book, musical composition, film, other work of art, or intellectual property. Copyrights also protect computer software programs, such as Microsoft® Windows® and the Microsoft® Excel® spreadsheet software. Issued by the federal government, a copyright is granted for the life of the creator plus 70 years.

Copyright
Exclusive right to reproduce and sell a book, musical composition, film, other work of art, or intellectual property.

because it thinks it will be able to profit from selling the novel. Even though copyrights have a long legal life (life of creator plus 70 years), most copyrights have short useful lives. Copyrights are amortized over their legal life or useful life, whichever is shorter.

Trademark
An asset that represents distinctive identifications of a product or service.

A trademark (also called *trade name*) is an asset that represents distinctive identifications of products or services, such as the Nike "swoosh" or the McDonald's "golden arches." Legally protected slogans include Chevrolet's "Like a Rock" and De Beers's "A Diamond Is Forever." The cost of a trademark or trade name is amortized over its useful life.

Franchises and Licenses

Franchise
Privilege granted by a business to sell a product or service under specified conditions.

License
Privilege granted by a government to use public property in performing services.

Franchises are privileges granted by a business to sell goods or services under specified conditions. The Dallas Cowboys football organization is a franchise granted by the National Football League. McDonald's and Subway are well-known business franchises. Licenses are privileges granted by a government to use public property in performing services. A radio station might be granted permission by the federal government to use the airwaves to broadcast its music. The acquisition cost of a franchise or license is amortized over its useful life.

Goodwill

Goodwill
Excess of the cost of an acquired company over the sum of the market values of its net assets (assets minus liabilities).

In accounting, goodwill is the excess of the cost to purchase another company over the market value of its net assets (assets minus liabilities). Goodwill is the value paid above the net worth of the company's assets and liabilities.

Suppose White Company acquired Mocha Company on January 1, 2018. The sum of the market values of Mocha's assets was $9 million and its liabilities totaled $1 million, so Mocha's net assets totaled $8 million. Suppose White paid $10 million to purchase Mocha. In this case, White paid $2 million above the market value of Mocha's net assets. Therefore, that $2 million is considered goodwill and is computed as follows:

Purchase price to acquire Mocha		$ 10,000,000
Market value of Mocha's assets	$ 9,000,000	
Less: Market value of Mocha's liabilities	(1,000,000)	
Less: Market value of Mocha's net assets		8,000,000
Goodwill		$ 2,000,000

White's entry to record the purchase of Mocha, including the goodwill that White purchased, would be as follows:

A↑ = L↑ + E

Assets↑
Goodwill↑
Cash↓

Liabilities↑

Date	Accounts and Explanation	Debit	Credit
Jan. 1	Assets	9,000,000	
	Goodwill	2,000,000	
	Liabilities		1,000,000
	Cash		10,000,000
	To record purchase of Mocha Company.		

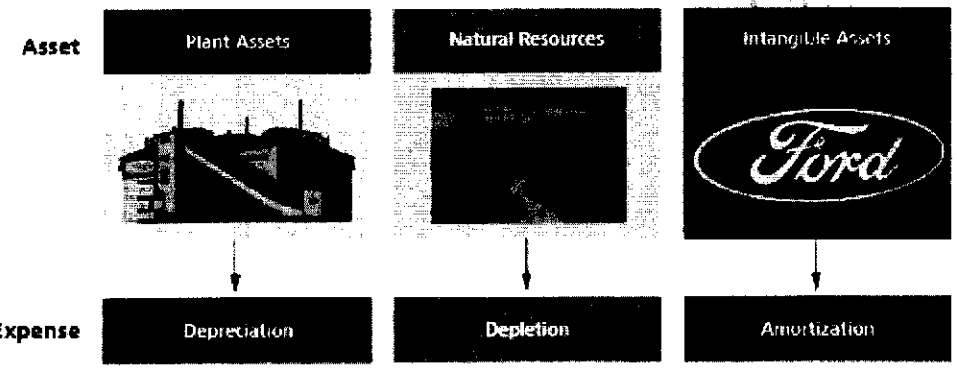
- Goodwill is recorded only by an acquiring company when it purchases another company and pays more for that company than the market value of the net assets acquired (as in our entry above where White purchased Mocha for $2 million more than the market value of Mocha's net assets). An outstanding reputation may create goodwill, but that company never records goodwill for its own business.
- According to Generally Accepted Accounting Principles (GAAP), goodwill is *not* amortized. Instead, the acquiring company measures the fair value of its acquired goodwill each year. If the goodwill has increased in fair value, there is nothing to record. But if goodwill's fair value has decreased, then the company records an impairment loss and writes the goodwill down by debiting (increasing) the Impairment Loss on Goodwill account and crediting (decreasing) the Goodwill account.

Reporting of Intangible Assets

Intangible assets are reported on the balance sheet similarly to plant assets. If a company uses the contra account, Accumulated Amortization, this account is not typically shown on the balance sheet. Instead, intangible assets are shown only at their net book value. Amortization expense is reported on the income statement as part of operations.

Exhibit 10-11 summarizes our coverage of plant assets, natural resources, and intangibles. Remember that plant assets are those assets that have physical characteristics and are used in operations. Natural resources are assets that come from the physical earth and can be ultimately used up, and intangible assets are assets whose value is not derived from their physical substance.

Exhibit 10-11 | **Assets and Their Related Expenses**



Most of us, at one time or another, have visited a McDonald's. Widely known for its "golden arches," **McDonald's Corporation** is the world's leading global food service retailer with more than 36,000 locations worldwide in more than 100 countries. The corporation operates and franchises McDonald's restaurants, which serve menu items such as the Big Mac, Chicken McNuggets, and McFlurry desserts. In addition, McDonald's also serves McCafe beverages and pastries.

Would McDonald's Corporation report plant assets on its financial statements?

Yes, McDonald's Corporation reports plant assets including buildings, leasehold improvements, and equipment on its balance sheet. The corporation owns real estate in connection with its restaurants and in many cases owns the building. In addition, McDonald's owns the equipment inside restaurants such as the fryers, ovens, and tables.

How do franchises affect McDonald's Corporation?

In addition to owning McDonald's restaurants, the company also franchises restaurants. Approximately 80% of McDonald's restaurants are owned and operated by independent franchisees. When an individual franchises a McDonald's restaurant, the franchisee maintains control over personnel, purchasing, marketing, and pricing decisions while still benefiting from McDonald's global brand. Under a conventional franchise arrangement, McDonald's Corporation owns the land and building. The franchisee purchases the equipment, signs, seating, and décor.

Try It!

5. On January 1, Orange Manufacturing paid $40,000 for a patent. Although it gives legal protection for 20 years, the patent is expected to provide a competitive advantage for only eight years. Assuming the straight-line method of amortization, record the journal entry for amortization for Year 1.

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercises S10-12 and S10-13. MyAccountingLab

HOW DO WE USE THE ASSET TURNOVER RATIO TO EVALUATE BUSINESS PERFORMANCE?

Learning Objective 6
Use the asset turnover ratio to evaluate business performance

The asset turnover ratio measures the amount of net sales revenue generated for each average dollar of total assets invested. This ratio measures how well a company is using its assets to generate net sales revenue. To compute this ratio, we divide net sales revenue by average total assets. Using net sales revenue and total assets (in millions) from **Kohl's Corporation's** 2015 Annual Report (see http://www.pearsonhighered.com/Horngren for a link to the 2015 Annual Report), we can calculate the asset turnover ratio.

Asset Turnover Ratio
Measures how efficiently a business uses its average total assets to generate sales. Net sales revenue / Average total assets.

	January 30, 2016	January 31, 2015
Net sales revenue	$ 19,204	$ 19,023
Total assets	13,606	14,333

Asset turnover ratio = Net sales revenue / Average total assets
= $19,204 / [($13,606 + $14,333) / 2]
= 1.37 times (rounded)

is only producing $1.37 of net sales revenue for each dollar ($1.00) of assets invested while the average company in this industry is producing $1.90 in net sales revenue for every dollar invested in assets. Kohl's should evaluate ways to improve its efficiency and increase its asset turnover ratio, such as increasing net sales revenue or decreasing average total assets. A high asset turnover ratio is desirable.

Try It!

6. Maxim Company reported beginning and ending total assets of $140,000 and $160,000, respectively. Its net sales revenue for the year was $240,000. What was Maxim's asset turnover ratio?

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercise S10-14. MyAccountingLab

APPENDIX 10A: Exchanging Plant Assets

HOW ARE EXCHANGES OF PLANT ASSETS ACCOUNTED FOR?

Learning Objective 7
Journalize entries for the exchange of plant assets

Earlier in the chapter, we discussed ways that businesses could dispose of plant assets. One way is for a business to exchange a plant asset for another plant asset. In this section, we evaluate how to account for exchanges that have *commercial substance*. An exchange has commercial substance if the future cash flows change as a result of the transaction. In other words, an exchange has commercial substance if, in the future, cash flows (receipts of revenue or payment of expenses) of the business will change because of the exchange. For example, exchanging an older asset for a new asset will increase productivity, thereby creating more revenue for the business. Therefore, this exchange has commercial substance.

Commercial Substance
A characteristic of a transaction that causes a change in future cash flows.

Exchanges that have commercial substance require any gain or loss on the transaction to be recognized. The old asset will be removed from the books, and the new asset will be recorded at its market value. Exchanges that lack commercial substance ignore any gain or loss on the transaction, except in limited situations. The new asset is recorded at the old asset's book value plus cash paid and minus cash received instead of at market value.

Exchange of Plant Assets—Gain Situation

Suppose that on December 31, Smart Touch Learning exchanges used equipment for new equipment. The old equipment has a historical cost of $10,000 and accumulated depreciation of $9,000. Its current book value is $1,000 ($10,000 − $9,000). The company acquires the new equipment with a market value of $8,000 and pays cash of $2,000. Assuming this exchange has commercial substance, the gain will be calculated as shown on the next page:

Less:		
Book value of asset exchanged	$ 1,000	
Cash paid	2,000	3,000
Gain or (Loss)		$ 5,000

The accounting clerk records the following entry:

A↑ = L + E↑

Equipment (new)↑
Accumulated Depreciation—Equipment↓
Equipment (old)↓
Cash↓
Gain on Disposal↑

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Equipment (new)	8,000	
	Accumulated Depreciation—Equipment	9,000	
	Equipment (old)		10,000
	Cash		2,000
	Gain on Disposal		5,000
	Exchanged old equipment and cash for new equipment.		

Cash

	2,000 Dec. 31

Equipment (new)

Dec. 31 8,000	

Equipment (old)

10,000	10,000 Dec. 31
Bal. 0	

Accumulated Depreciation—Equipment

	9,000
Dec. 31 9,000	
	0 Bal.

Gain on Disposal

	5,000 Dec. 31

Exchange of Plant Assets—Loss Situation

Suppose instead that on December 31, Smart Touch Learning exchanges used equipment for new equipment. The old equipment has a historical cost of $10,000 and accumulated depreciation of $9,000. Its current book value is $1,000 ($10,000 − $9,000). The company acquires the new equipment with a market value of $3,000 and pays cash of $2,500. Assuming this exchange has commercial substance, the loss will be calculated as follows:

Market value of assets received		$ 3,000
Less:		
Book value of asset exchanged	$ 1,000	
Cash paid	2,500	3,500
Gain or (Loss)		$ (500)

Date	Accounts and Explanation	Debit	Credit
Dec. 31	Equipment (new)	3,000	
	Accumulated Depreciation—Equipment	9,000	
	Loss on Disposal	500	
	Equipment (old)		10,000
	Cash		2,500
	Exchanged old equipment and cash for new equipment.		

A↓: Equipment (new)↑; Accumulated Depreciation—Equipment↓; Equipment (old)↓; Cash↓ = L + E↓: Loss on Disposal↑

Cash

		2,500	Dec. 31

Equipment (new)

Dec. 31	3,000		

Equipment (old)

	10,000	10,000	Dec. 31
Bal.	0		

Accumulated Depreciation—Equipment

		9,000	
Dec. 31	9,000		
		0	Bal.

Loss on Disposal

Dec. 31	500		

Try It!

7A. Arca Salvage, Company, purchased equipment for $10,000. Arca recorded $8,000 depreciation on the equipment. Assume that Arca exchanged the old equipment for new equipment, paying $4,000 cash. The fair market value of the new equipment is $5,000. Journalize Arca's exchange of equipment. Assume this exchange has commercial substance.

Check your answer online in MyAccountingLab or at http://www.pearsonhighered.com/Horngren.

For more practice, see Short Exercises S10A-15 and S10A-16. MyAccountingLab

REVIEW

> Things You Should Know

1. How does a business measure the cost of property, plant, and equipment?

- Property, plant, and equipment are long-lived, tangible assets used in the operations of a business. They are commonly referred to as plant assets.
- Plant assets are recorded at historical cost—the amount paid for the asset. This includes the purchase price plus taxes, purchase commissions, and all other amounts paid to ready the asset for its intended use.