

Plant Assets, Natural Resources, and Intangible Assets

LO 1: Explain the accounting for Plant Asset Expenditures.

- **Plant Assets (Also known as Property, Plant, and Equipment/ Fixed Assets):** resources that have
 - **physical substance** (a definite size and shape).
 - are **used in the operations** of a business.
 - are **not intended for sale** to customers.
 - are expected to **provide service** to the company for a number of years.

- **Cost of Plant Assets:** Historical cost principle requires that companies record plant assets at **COST**.
 - **Consists of all expenditures necessary to acquire an asset and make it ready for its intended use.**
 - Cost is measured by the *cash paid in a cash transaction or the cash equivalent price paid*.
 - Cash equivalent price is the
 - *fair value of the asset given up or fair value of the asset received, whichever is more clearly determinable.*

- 1. **Revenue Expenditure:** costs incurred to acquire a plant asset that are EXPENSED IMMEDIATELY.
 - Include the cost of **ordinary repairs**, which are expenditures to maintain operating efficiency and expected productive life of the unit.
 - “Expenditures that produce benefits ONLY IN THE CURRENT PERIOD.” They are EXPENSED in the current period.
 - Ex: Engine tune-up for delivery truck. It allows the truck to continue its productive activity but DOES NOT INCREASE FUTURE BENEFITS. This is an example of a maintenance cost.

Ex: **Aug. 1:** \$500 was paid for a tune-up of a delivery truck. The journal entry would be recorded as

	Date	Debit	Credit
Maintenance and Repairs Expense	Aug. 1	500	
Cash			500

2. Capital Expenditure: costs INCLUDED IN A PLANT ASSET ACCOUNT.

- Include the cost of **additions and improvements**, which are costs incurred to increase the operating efficiency, productive capacity, or expected useful life of a plant asset.
- Costs that are **CAPITALIZED NOW** and expensed later.
- “Expenditures that produce future benefits.” They are recorded as an ASSET and EXPENSED IN FUTURE PERIODS.
- Ex: Major improvement on a truck that EXTENDS its useful life.
- The accounting varies depending on the nature of the expenditure.

Ex: **July 1:** The engine of a forklift near the end of its useful life is overhauled (taken apart to be repaired) at a cost of \$5,000 which extends its useful life by 6 years. The journal entry to record this expenditure is

	Date	Debit	Credit
(1) Forklift	July 1	5,000	
Cash			5,000

COST OF PLANT ASSETS

1. **Land:** All **necessary costs** incurred in making land **ready for its intended use** increase (debit) the Land account. Costs typically include:

- Cash purchase price.
- Closing costs such as title and attorney’s fees.
- Real estate brokers’ commissions.
- Accrued property taxes and other liens on the land assumed by the purchaser.

2. **Land Improvements:** Includes **all expenditures** necessary to make the improvements **ready for their intended use**. They have **limited useful lives** and they are expensed (depreciated) over their useful lives. Costs typically include:

- Driveways.
- Parking lots.
- Fences.
- Landscaping.
- Underground sprinklers.

3. **Buildings:** Includes all costs related directly to purchase or construction.

Purchase costs typically include:

- Purchase price, closing costs (attorney's fees, title insurance, etc.) and real estate broker's commission.
- Remodeling and replacing or repairing the roof, floors, electrical wiring, and plumbing.

Construction costs typically include:

- Contract price plus payments for architects' fees, building permits, and excavation costs.
- Interest costs to finance a construction project which are limited to interest costs incurred during the construction period.

4. **Equipment:** Include all costs incurred in acquiring the equipment and preparing it for use.

Costs typically include:

- Cash purchase price.
- Sales taxes.
- Freight charges.
- Insurance during transit paid by the purchaser.
- Expenditures required in assembling, installing, and testing the unit.

LO 2: Apply Depreciation Methods to Plant Assets

Depreciation: "Process of allocating to expense the cost of a plant asset over its useful life in a rational and systematic manner."

IMPORTANT FACTS ABOUT DEPRECIATION

- Process of **cost allocation, not asset valuation**.
- Applies to land improvements, buildings, and equipment, **NOT LAND**.
 - **LAND DOES NOT DEPRECIATE**.
- Depreciable, because the **revenue-producing ability of asset will decline** over the asset's useful life.

FACTORS IN COMPUTING DEPRECIATION

1. **Cost:** All expenditures necessary to acquire the asset and make it ready for intended use.
2. **Useful Life:** Estimate of the expected productive (service) life of the asset for its owner. It may be expressed in terms of time, units of activity (such as machine hours), or units of output.
3. **Salvage Value (Residual Value):** Estimate of the asset's value at the end of its useful life. An asset cannot be depreciated past its salvage value.

DEPRECIATION METHODS

1. **STRAIGHT-LINE METHOD:** equal amount of depreciation is taken out each year.

***Depreciable Cost (amount that gets depreciated) = Cost – Salvage Value**

$$\text{Depreciation Expense} = \frac{\text{Cost} - \text{Salvage Value}}{\text{Useful Life in Periods}}$$

Ex: Smith Inc. bought a machine for \$20,000 to use in his business. The machine’s useful life is 5 years. What is the depreciation expense per year and what journal entry would be made at the end of the year?

A) Depreciation Expense = $(\$20,000 - \$0) \div 5 \text{ years} = \mathbf{\$4,000 \text{ per year}}$

***Another way to compute depreciation expense would be to do **depreciable cost x straight-line rate.**

Straight-Line Rate= $100\% \div \text{Useful Life in Years} \dots\dots\dots 100\% \div 5 \text{ years} = \mathbf{20\%}$

Depreciable Cost = $\text{Cost} - \text{Salvage Value} \dots\dots\dots \$20,000 - \$0 = \mathbf{\$20,000}$

Depreciation Expense = $\$20,000 \times 20\% = \mathbf{\$4,000 \text{ per year}}$

B) End of the year journal entry on December 31 to record depreciation expense.

	Date	Debit	Credit
Depreciation Expense	Dec. 31	4,000	
Accumulated Depreciation- Machinery			4,000

STRAIGHT-LINE METHOD					
Depreciation Expense Per Year= $(\\$20,000 - \\$0) \div 5 = \mathbf{\\$4,000}$					
YEAR	BEGINNING BOOK VALUE (\$)	DEPRECIATION RATE (%)	DEPRECIATION EXPENSE (\$)	ACCUMULATED DEPRECIATION (END OF YEAR) (\$)	END BOOK VALUE (\$)
1	\$20,000	100%/5=20%	\$4,000	\$4,000	\$16,000
2	\$16,000	100%/5=20%	\$4,000	\$8,000	\$12,000
3	\$12,000	100%/5=20%	\$4,000	\$12,000	\$8,000
4	\$8,000	100%/5=20%	\$4,000	\$16,000	\$4,000
5	\$4,000	100%/5=20%	\$4,000	\$20,000	\$0

*** Don't NEED the rate to compute depreciation expense under straight-line method.**

If use rate, then 20% x \$20,000 depreciable cost will also get you \$4,000 depreciation expense per year.

End Book Value = Cost of Asset – Accumulated Depreciation

OR Beginning Book Value of the Current Year – Depreciation Expense

Beginning Book Value = Cost for the first year **AND** the End book value from the previous year for all other years

Accumulated Depreciation: Balance in Accumulated Depreciation from previous year + Current year’s depreciation expense

- **As you can see, after year 5, the machine has fully depreciated and reached its salvage value of \$0.**

2. **DECLINING BALANCE METHOD:** type of an accelerated depreciation method which yields larger depreciation expenses in the early years of an asset’s life and less depreciation in the later years. It uses a multiple of the straight-line rate and applies it to the asset’s beginning period book value.

STEP 1: Straight Line Rate = $100\% \div \text{Useful Life in Years}$

STEP 2: If **Double Declining**...Straight-Line Rate x 2

If **1.5 Declining**..... Straight-Line Rate x 1.5

Ex: Holiday Company purchased a machine for \$600,000. The company expects the service life of the machine to be five years. The anticipated residual value is \$40,000. Holiday Company uses the double declining method.

$100\% \div 5 \text{ years} = 20\% \times 2 = \mathbf{40\% \text{ Double Declining Rate}}$

STEP 3:

Use table to keep track of depreciation per year.

DECLINING BALANCE METHOD					
Double-Declining Rate= $100\%/5 = 20\% \times 2 = 40\%$					
YEAR	BEGINNING BOOK VALUE (\$)	DEPRECIATION RATE (%)	DEPRECIATION EXPENSE (\$)	ACCUMULATED DEPRECIATION (END OF YEAR) (\$)	END BOOK VALUE (\$)
1	\$600,000	40.0%	\$240,000	\$240,000	\$360,000
2	\$360,000	40.0%	\$144,000	\$384,000	\$216,000
3	\$216,000	40.0%	\$86,400	\$470,400	\$129,600
4	\$129,600	40.0%	\$51,840	\$522,240	\$77,760
5	\$77,760	40.0%	*\$37,760	\$575,920	\$40,000

*Need to reach residual value of \$40,000 by end of year 5 so depreciation expense for year 5 is end book value year 4 (\$77,760) - \$40,000 Salvage Value = \$37,760

Depreciation Expense = Beginning Book Value X Depreciation Rate

End Book Value = Cost of Asset – Accumulated Depreciation

OR Beginning Book Value of the Current Year – Depreciation Expense

B) What journal entry would Holiday Company have to record on December 31 of the 1st year the company had the machine to adjust for depreciation?

	Date	Debit	Credit
Depreciation Expense	Dec. 31	240,000	
Accumulated Depreciation- Machinery			240,000

3. **UNITS OF ACTIVITY METHOD:** charges a varying amount to expense for each period of an asset's useful life depending on its **USAGE**. May also be called the *units-of-production method* or *units-of-output method*. The usage can be in *hours, miles driven, or quantity produced*.

STEP 1:
$$\text{Depreciation Cost per Unit} = \frac{\text{Cost} - \text{Salvage Value}}{\text{Total Units of Activity}}$$

STEP 2: Depreciation Expense = Depreciation per unit X Units of Activity for Period

Ex: Clark Company bought an airplane for \$500,000 that had a total useful life of 3,000,000 miles. The salvage value of the plane at the end of its useful life is \$50,000. Year 1, the airplane flew 500,000 miles.

A) What is the depreciation expense and journal entry for the end of the 1st year?

Step 1: Depreciation Cost per Unit = $(\$500,000 - \$50,000) \div 3,000,000 \text{ miles} = \mathbf{\$0.15 \text{ per mile}}$

Step 2: Depreciation Expense = $\$0.15 \text{ per mile} \times 500,000 \text{ miles} = \mathbf{\$75,000}$

	Date	Debit	Credit
Depreciation Expense	Dec. 31	75,000	
Accumulated Depreciation- Airplane			75,000

B) If the airplane flew 800,000 in year 2, 900,000 in year 3, and 400,000 miles in years 4 and 5, what would the depreciation expense be in each of those years?

UNITS OF ACTIVITY						
Depreciation Rate Per Unit = $(\$500,000 - \$50,000) \div 3,000,000 \text{ miles} = \mathbf{\$0.15 \text{ per mile}}$						
YEAR	BEGINNING BOOK VALUE (\$)	MILES USED (MILES)	DEPRECIATION RATE PER UNIT (\$ per hour)	DEPRECIATION EXPENSE (\$)	ACCUMULATED DEPRECIATION (END OF YEAR) (\$)	END BOOK VALUE (\$)
1	\$500,000	500,000	\$0.15	\$75,000	\$75,000	\$425,000
2	\$425,000	800,000	\$0.15	\$120,000	\$195,000	\$305,000
3	\$305,000	900,000	\$0.15	\$135,000	\$330,000	\$170,000
4	\$170,000	400,000	\$0.15	\$60,000	\$390,000	\$110,000
5	\$110,000	400,000	\$0.15	\$60,000	\$450,000	\$50,000

*****Depreciation Expense = Depreciation Cost per unit X Units of Activity for Period**

Method	Useful Life	Depreciable Cost	Depreciation Rate	Depreciation Expense
Straight-line	Years	Cost less residual value	Straight-line rate*	Constant
Units-of-activity	Units of activity	Cost less residual value	$\frac{\text{Cost} - \text{Residual value}}{\text{Total units of activity}}$	Variable
Double-declining-balance	Years	Declining book value, but not below residual value	Straight-line rate* $\times 2$	Declining

*Straight-line rate = (100% \div Useful life)

PARTIAL YEAR DEPRECIATION

Annual Depreciation X Fraction of the Year that Company Has Fixed Asset

- Assets placed in service during the **first half of a month** are normally treated as having been purchased on the **FIRST DAY OF THAT MONTH**.
- Asset purchases during the **second half of a month** are treated as having been purchased on the **FIRST DAY OF THE NEXT MONTH**.

Ex) Smith Inc. bought a machine for \$20,000 on October 1 to use in his business. The machine's useful life is 10 years. What is the depreciation expense for the current year and what journal entry would be made at the end of the year?

STRAIGHT LINE

A) Depreciation Expense = $(\$20,000 - \$0) \div 10 \text{ years} = \$2,000 \text{ per year} \times 3/12 \text{ months} = \mathbf{\$500}$

B) End of the year journal entry on December 31 to record depreciation expense.

	Date	Debit	Credit
Depreciation Expense	Dec. 31	500	
Accumulated Depreciation- Machinery			500

DECLINING BALANCE METHOD

A) Depreciation Expense for Year 1....

Step 1: Double Declining Rate = $1/10 = 10\% \times 2 = \mathbf{20\%}$

Step 2: First-Year Annual Depreciation - $\$20,000 \times 20\% = \$4,000$

Step 3: First-Year Partial Depreciation (For 3 months) = $\$4,000 \times (3/12) = \mathbf{\$1,000}$

Depreciation Expense for Year 2....

Step 1: Book Value After Year 1 = \$20,000 - \$1,000 Depreciation= **\$19,000**

Step 2: Second-Year Annual Depreciation - \$19,000 x 20% = **\$3,800**

DECLINING BALANCE METHOD					
Double-Declining Rate= 100%/10 = 10% x 2 = 20%					
YEAR	BEGINNING BOOK VALUE (\$)	DEPRECIATION RATE (%)	DEPRECIATION EXPENSE (\$)	ACCUMULATED DEPRECIATION (END OF YEAR) (\$)	END BOOK VALUE (\$)
1	\$20,000	20.0%	\$1,000	\$1,000	\$19,000
2	\$19,000	20.0%	\$3,800	\$4,800	\$15,200

B) End of the year journal entry on December 31 of Year 1 and 2 to record depreciation expense.

	Date	Debit	Credit
Depreciation Expense	Dec. 31	1,000	
Accumulated Depreciation- Machinery	Year 1		1,000
Depreciation Expense	Dec. 31	3,800	
Accumulated Depreciation- Machinery	Year 2		3,800

REVISING PERIODIC DEPRECIATION

- Accounted for in the period of change and future periods (Change in Estimate).
- Not handled retrospectively.
- Not considered error.

New Depreciation per Year (assuming Straight-Line) =
$$\frac{\text{Book Value} - \text{Revised Salvage Value}}{\text{Revised Remaining Useful Life}}$$

Ex) Nanki Corporation purchased equipment on January 1, Year 1 for \$650,000. Years 1, 2, and 3 Nanki depreciated the asset on a straight-line basis with an estimated useful life of eight years and a \$10,000 salvage value. In Year 4, due to changes in technology, Nanki revised the useful life to a total of six years with no salvage value. What depreciation would Nanki record for the Year 4 on this equipment?

1. Find original depreciation expense per year. $(\$650,000 - \$10,000) \div 8 \text{ years} = \mathbf{\$80,000 \text{ per year}}$

2. Find book value at start of Year 4 (when the change in estimate occurred)

Book Value = Cost – Accumulated Depreciation = \$650,000 - \$240,000 [\$80,000 X 3 years] = **\$410,000**

3. Revised Salvage Value = **\$0**

4. Revised Remaining Useful Life= Total Life in Number of Years – Number of Years Used

*If useful life is extended then ADD Number of Years **Extended** to above formula.

*If useful life is decreased then DEDUCT Number of Years **Decreased** to above formula.

Revised Useful Life = 6 years – 3 years Used = **3 years remaining**

New Depreciation per Year = (\$410,000 - \$0) ÷ 3 years ≈ **\$136,667 a year starting in Year 4**

	Date	Debit	Credit
Depreciation Expense	Dec. 31	136,667	
Accumulated Depreciation- Equipment	Year 4		136,667

LO 3: Explain how to account for the Disposal of Plant Assets.

DISCARDING (RETIRING) A FIXED ASSET

- No cash is received.
- Decrease (debit) Accumulated Depreciation for the full amount of depreciation taken over the life of the asset.
- Decrease (credit) the asset account for the original cost of the asset.

Discarding a fixed asset (After fully depreciated)

	Debit	Credit
Accumulated Depreciation- Asset	XXX	
Equipment, Machinery, Building, etc.		XXX

Ex: Machinery acquired at a cost of \$50,000 is now fully depreciated. On October 31, the machinery is discarded. The entry to record the discard (retirement) is

	Date	Debit	Credit
Accumulated Depreciation-Machinery	Oct. 31	50,000	
Machinery			50,000

Discarding a fixed asset (Not fully depreciated)

	Debit	Credit
Accumulated Depreciation- Asset	XXX	
Loss on Disposal of Plant Assets	XXX	
Equipment, Machinery, Building, etc.		XXX

Ex: Machinery acquired at a cost of \$50,000 is discarded on October 31. However, the Machinery only had an accumulated depreciation balance of \$48,000 on October 31. The entry to record the discard is

	Date	Debit	Credit
Accumulated Depreciation-Machinery	Oct. 31	48,000	
Loss on Disposal of Machinery		2,000	
Machinery			50,000

SELLING AN ASSET

Step 1: Find Book Value = Cost – Accumulated Depreciation

Step 2: Proceeds Received from Sale – Book Value of Asset

If **POSITIVE**----Proceeds Received from Sale > Book Value of Asset then there is a **GAIN ON SALE**.
If **NEGATIVE**----Proceeds Received from Sale < Book Value of Asset then there is a **LOSS ON SALE**.

Journal Entry if GAIN

	Debit	Credit
Cash	XXX	
Accumulated Depreciation- Asset	XXX	
Equipment, Machinery, Building, etc.		XXX
Gain on Disposal of Plant Assets		XXX

Journal Entry if LOSS

	Debit	Credit
Cash	XXX	
Accumulated Depreciation- Asset	XXX	
Loss on Disposal of Plant Assets	XXX	
Equipment, Machinery, Building, etc.		XXX

Ex: Paradise Corporation sold equipment that cost \$100,000 and had accumulated depreciation of \$60,000 for \$45,000. Compute the gain or loss on sale and record the journal entry for the sale of equipment.

Step 1: Find Book Value = \$100,000 – \$60,000 = **\$40,000**

Step 2: Cash Received from Sale – Book Value of Asset = \$45,000 - \$40,000 = **\$5,000 GAIN**

	Debit	Credit
Cash	45,000	
Accumulated Depreciation- Equipment	60,000	
Equipment		100,000
Gain on Disposal of Plant Assets		5,000

LO 4: Describe how to account for Natural Resources and Intangible Assets.

Natural resources: consist of standing timber and underground deposits of oil, gas, and minerals (see Helpful Hint). These long-lived productive assets have two distinguishing characteristics: (1) they are physically extracted in operations (such as mining, cutting, or pumping), and (2) they are replaceable only by an act of nature.

The **acquisition cost** of a natural resource is the price needed to acquire the resource and prepare it for its intended use.

Depletion of Natural Resources

The allocation of the cost of natural resources in a rational and systematic manner over the resource's useful life is called depletion. Companies generally use the units-of-activity method to compute depletion. The reason is that depletion generally is a function of the units extracted during the year.

Under the units-of-activity method, companies divide the total cost of the natural resource minus salvage value by the number of units estimated to be in the resource. The result is a depletion cost per unit. To compute depletion, the cost per unit is then multiplied by the number of units extracted.

Example: Lane Coal Company invests \$5 million in a mine estimated to have 1 million tons of coal and no salvage value>

Step 1. Computation of Depletion Cost per unit

$\text{Total Cost-Salvage Value/ Total Estimated Units Available=Depletion Cost per Unit}$ $(\$5,000,000-\$0)/1,000,000 \text{ tons}=\5.00 per ton
--

Step 2: Compute Depletion Extracted

If Lane extracts 250,000 tons in the first year, then the depletion for the year is \$1,250,000 (250,000 tons × \$5). It records the depletion as follows.

Inventory (coal)	1,250,000	
Accumulated Depletion		1,250,000
(To record depletion of coal mine)		

Accumulated Depletion is a contra asset similar to Accumulated Depreciation. Lane credits Inventory when it sells the inventory and debits Cost of Goods Sold. The amount not sold remains in inventory and is reported in the current assets section of the balance sheet.

Intangible Assets: are rights, privileges, and competitive advantages that result from ownership of long-lived assets that do not possess physical substance.

- **Limited life** or an **indefinite life**.
- Common types include: patents, copyrights, franchises or licenses, trademarks, trade names, and goodwill.

ACCOUNTING FOR INTANGIBLES

Limited-Life Intangibles

- Amortize to expense.
- Credit asset account (**used more often**) or accumulated amortization.
- **Amortization:** USING up intangible assets. It results from the passage of time or a decline in usefulness of the intangible asset. (**Like depreciation for plant assets.**)

Indefinite-Life Intangibles

- No foreseeable limit on time the asset is expected to provide cash flows.
- No amortization.

TYPES OF INTANGIBLE ASSETS

1. **Patents:** “Exclusive right to manufacture, sell, or otherwise control an invention for a period of **20 years from the date of the grant.**”

- Capitalize costs of purchasing a patent and amortize over its 20-year life or its useful life, whichever is shorter.
- Expense any research and development costs in developing a patent.
- Legal fees incurred successfully defending a patent are capitalized to Patent account.
- Journal entry to record amortization of patents would be.....

	Debit	Credit
Amortization Expense	XXX	
Patents		XXX

2. **Research and Development Costs:** “Expenditures that may lead to patents, copyrights, new processes, and new products.”

- **NOT** intangible costs.
- All research and development costs are expensed when incurred.

3. **Copyrights:** “Give the owner the exclusive right to reproduce and sell an artistic or published work.”

- Granted for the **life of the creator plus 70 years**.
- Capitalize costs of acquiring and defending it.
- Amortized to expense over useful life.

4. **Trademarks and Trade Names:** “Word, phrase, jingle, or symbol that distinguishes or identifies a particular enterprise or product.” Examples include Wheaties, Monopoly, Sunkist, Kleenex, Coca-Cola, Big Mac, and Jeep.

- Legal protection for indefinite number of **20 year renewal periods**.
- Capitalize acquisition costs.
- No amortization.

5. **Franchises:** “Contractual arrangement between a franchisor and a franchisee.” Examples include Toyota, Shell, Subway, and Marriott.

- When a company incurs costs in connection with the acquisition of the franchise or license, it should recognize an intangible asset.
- Franchise (or license) with a limited life should be amortized to expense over the life of the franchise.
- Franchise with an indefinite life should be carried at cost and not amortized.

6. **Goodwill:** EXCESS of the purchase price that a company pays **OVER** the fair market value of another company’s identifiable net assets (assets – liabilities) that it acquires.

- Includes exceptional management, desirable location, good customer relations, skilled employees, high-quality products, etc.
- Only recorded when an entire business is purchased.
- Internally created goodwill should not be capitalized.

LO 5: Discuss how Plant Assets, Natural Resources, and Intangible Assets are Reported and Analyzed.

THE COCA-COLA COMPANY	
Balance Sheet (partial)	
(in millions)	
Property, plant, and equipment	
Land	\$ 972
Buildings and improvements	5,539
Machinery and equipment	18,225
Other	522
	25,258
Less: Accumulated depreciation	10,625
	14,633
Intangible assets	
Trademarks with indefinite lives	6,533
Goodwill	12,100
Bottlers' franchise rights with indefinite lives	6,689
Other intangible assets	1,050
	\$26,372

- Either within the balance sheet or the notes, companies should disclose the balances of the major classes of assets, such as land, buildings, and equipment, and of accumulated depreciation by major classes or in total.
- The depreciation and amortization methods used and the amount of depreciation and amortization expense for the period should also be disclosed.

ANALYSIS

Asset Turnover: indicates how efficiently a company uses its assets to generate sales.

$$\text{Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Total Assets}}$$

Ex: A asset turnover ratio of 1.4 indicates that a company generated \$1.40 of sales from every \$1 invested in average total assets.