**Instructor’s Manual**

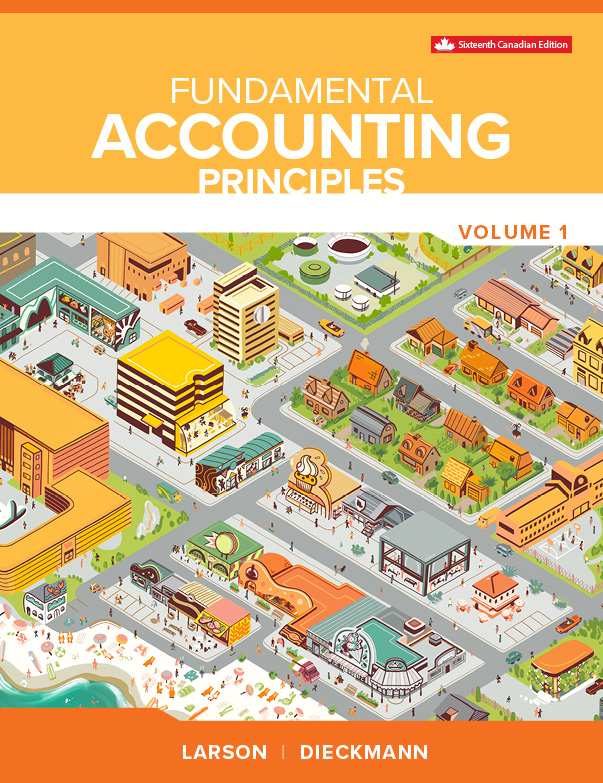
**to accompany**

***Fundamental Accounting Principles*,**

**Chapter 9,**

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**By Larson/Dieckmann**



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CHAPTER 9

Property, Plant and Equipment and intangibles

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Related Assignment Materials** | | | | |
| Student Learning Objectives | Quick Studies | Exercises | Problems | |
| 1. Describe property, plant and equipment (PPE) and calculate their cost. | 9-1, 9-2, 9-3,9-4. | 9-1, 9-2, 9-3, 9-4, 9-5, 9-9. | 9-1A, 9-7A, 9-8A, 9-11A, 9-14A, 9-15A, 9-16A  9-1B, 9-7B, 9-8B, 9-11B, 9-14B, 9-15B, 9-16B. | |
| 1. Explain, record and calculate depreciation using the methods of straight-line, units-of-production and double-declining-balance. | 9-5, 9-6, 9-7, 9-8, 9-9, 9-10, 9-11, 9-12. | 9-5, 9-6, 9-7, 9-8, 9-9, 9-10, 9-11, 9-12, 9-18, 9-19, 9-21, 9-26, 9-27, 9-28, 9-29, 9-30. | 9-2A, 9-3A, 9-4A, 9-5A, 9-6A, 9-7A, 9-8A, 9-9A, 9-10A, 9-11A, 9-12A, 9-13A, 9-14A, 9-15A, 9-16A, 9-17A, 9-18A, 9-19A, 9-20A, 9-21A.  9-2B, 9-3B, 9-4B, 9-5B, 9-6B, 9-7B, 9-8B, 9-9B, 9-10B, 9-11B, 9-12B, 9-13B, 9-14B, 9-15B, 9-16B, 9-17B, 9-18B, 9-19B, 9-20B, 9-21B. | |
| 1. Explain and calculate depreciation for partial years. | 9-9, 9-10, 9-11, 9-12. | 9-13, 9-14, 9-15, 9-21, 9-26, 9-28, 9-29, 9-30. | 9-4A, 9-5A, 9-6A, 9-7A, 9-8A, 9-9A, 9-10A, 9-12A 9-13A, 9-14A, 9-15A, 9-16A, 9-17A, 9-18A, 9-19A, 9-20A, 9-21A.  9-4B, 9-5B, 9-7B, 9-8B, 9-9B, 9-10B, 9-12B, 9-13B, 9-14B, 9-15B, 9-16B, 9-17B, 9-18B, 9-19B, 9-20B, 9-21B. | |
| 1. Explain and calculate revised depreciation. | 9-13, 9-14. | 9-16, 9-17, 9-18. | 9-11A, 9-12A, 9-13A, 9-20A, 9-21A  9-11B, 9-12B, 9-13B, 9-16B, 9-17B, 9-20B, 9-21B. | |
| 1. Explain and record impairment losses. | 9-15 | 9-19 | 9-13A, 9-14A  9-13B, 9-14B, 9-16B. | |
| 1. Account for asset disposal through discarding, selling or exchanging an asset. | 9-16, 9-17, 9-18. | 9-20, 9-21, 9-22, 9-23, 9-24, 9-29. | 9-14A, 9-15A, 9-16A, 9-17A, 9-18A, 9-19A, 9-20A.  9-14B, 9-15B, 9-17B, 9-18B, 9-19B, 9-20B. | |
| 1. Account for intangible assets and their amortization. | 9-19 | 9-25, 9-26, 9-27, 9-28 | 9-19A, 9-20A  9-19B, 9-20B | |
| 1. \*Appendix 9A - Explain and calculate revised depreciation when there is a betterment that creates partial-period depreciation. | 9-20 | 9-29, 9-30 | 9-20A, 9-21A  9-20B, 9-21B. | |
| Learning Objective | | | | |
| Property, Plant, and Equipment (PPE) (LO1) Non-current assets that are used in the operations of a business and have a useful life of more than one accounting period are divided into three groups:   1. Tangible assets known as property, plant, and equipment 2. Intangible assets 3. Goodwill     Assets used in the operations to help generate revenue and have a useful life of more than one accounting period are property, plant and equipment.     * 1. **Cost of PPE is** consistent with cost principle, property, plant and equipment are recorded at cost. Cost includes all normal and reasonable expenditures necessary to get the asset in place and ready for its intended use.   2. Subsequent expenditures may be incurred after an asset is placed in service. *Capital expenditures* are costs of PPE that provide material benefits extending beyond the current period. They are debited to PPE accounts and appear on the balance sheet. *Revenue expenditures* are normal costs incurred to keep an asset in its normal running condition. They are expenses and would appear on the income statement.  * 1. Subsidiary ledgers may be kept for maintaining control of large numbers of assets. Low cost asset purchases are usually expensed under the materiality principle.   2. Low cost assets may be expensed (treated as revenue expenditures) under the *materiality principle*. | | | | |
| * 1. Land purchased as a building site—cost includes purchase price, commissions, title insurance, legal fees, accrued property taxes, surveying, clearing, landscaping, and local government assessments (current or future) for streets, sewers, etc. Also includes cost of removal of any existing structures (less proceeds from sale of residual material   2. Land Improvements—Costs that increase the usefulness of the land. | | | | |
| * + 1. Examples: parking lot surfaces, driveways, fences, and lighting systems have limited useful lives.     2. Costs are charged to a separate Land Improvement account.     3. Costs are allocated to the periods they benefit through depreciation. | | | | |
| * 1. Buildings | | | | |
| * + 1. If purchased—Cost usually include its purchase price, brokerage fees, taxes, title fees, attorney costs, and all expenditures to make it ready for its intended use. (any necessary repairs or renovations such as wiring, lighting, flooring and wall coverings).     2. If constructed for own use—Costs includes materials and labour plus a reasonable amount of indirect overhead cost (heat, lighting, power, and depreciation on machinery used to construct the asset). Cost also includes design fees, building permits, and insurance during construction. | | | | |
| * 1. Leasehold improvements are alterations or improvements made to leased property. Leasehold improvements become part of the property and revert to the lessor at the end of the lease. These amounts are depreciated over the life of the lease or life of the improvements, whichever is less.   2. Machinery and Equipment—costs include all normal and necessary expenditures to purchase them and prepare them for their intended use (purchase price, taxes, transportation charges, insurance while in transit, and the installing, assembling and testing of machinery and equipment).   3. Lump-Sum Purchase—a group of property, plant and equipment purchased with a single transaction for a lump-sum price. Individual asset cost determined by allocating the cost of the purchase among the different types of assets acquired based on their relative values*.* | | | | |
| Depreciation (LO2) The process of allocating to expense the cost of a capital asset to the accounting periods benefiting from its use. Recorded as a debit to Depreciation Expense and a credit to Accumulated Depreciation. | | | | |
| A. Factors in Computing Depreciation | | | | |
| * + 1. Cost—described above.     2. Residual value— (*residual value*) an estimate of the asset’s value at the end of its benefit period.     3. Useful life— (*service life*) length of time the asset is expected to be productively used in a company’s operations. Factors affecting useful life include: | | | | |
| * + - 1. *Inadequacy—*acondition in which the capacity of property, plant and equipment becomes too small for the productive demands of the business.       2. *Obsolescence*—a condition in which, because of new inventions and improvements, a capital asset can no longer be used to produce goods or services with a competitive advantage. | | | | |
| * 1. Depreciation Methods (See Visual #9-1) | | | | |
| 1. Straight-line Method—charges the same amount to expense for each period of the asset’s useful life. *Calculation:*  * Cost minus residual value *(equals the cost to be depreciated)* divided by the asset's useful life*. (usually in years*)  1. Units-of-Production Method—charges a varying amount to expense for each period of an asset’s useful life depending on its usage. Charges are based on the consumed capacity of the asset. Examples of capacity measurements: miles driven, product outputs, hours used. *Calculation:*  * Cost minus residual valuedivided by the number of units to be produced equals the *depreciation per unit.* * Depreciation per unit X number of units consumed in period equals the period’s depreciation. | | | | |
| 1. Declining-Balance Method—an accelerated depreciation method. Charges larger depreciation during the early years of an asset's life and smaller expenses in the later years. Double-declining balance method (DDB) is also referred to as being twice the straight-line rate.   *Calculation:*  Calculate the rate. 2/useful life= % (or 100%/useful life X 2)  Calculate annual depreciation as:  Net Book Value X Rate  *Note:* Depreciation is a method of allocation, not of valuation. The cost of a capital asset, less estimated residual, is allocated over the estimated useful life in a systematic and rational manner. The amount of depreciation charged per year may vary with the different methods. However, the total depreciation over an asset’s life will be the same regardless of which method is used. | | | | |
| Depreciation for Tax Reporting—differences between financial and tax accounting systems are normal and expected. | | | | |
| * + 1. Many companies use accelerated depreciation in computing taxable income because it postpones its tax payments by charging higher depreciation expense in the early years and lower amounts in the later years.     2. Federal income tax regulations require a company to depreciate assets according to the Capital Cost Allowance system (CCA)     3. The income tax regulations specify maximum CCA rates that businesses may claim but a business may decide to claim less than the maximum or claim none at all. | | | | |
| Partial-Year Depreciation (LO3) Whenan asset is purchased (or disposed of) at a time other than the beginning or end of an accounting period, depreciation is recorded for the part of the year the asset was in use. The two methods we will examine are:   1. Nearest whole month, depreciation is calculated if the asset was in use for more than half of the month of acquisition. 2. Half-Year Convention, six months depreciation is recorded for the partial year, regardless of when the asset was acquired.  Revising Depreciation Rates (LO4) A. Revising Depreciation Rates When There Is a Change in the Estimated Residual Value and/or Estimated Useful Life | | | | |
|  | | | | |
| Depreciation expense calculations are revised by spreading the remaining cost to be depreciated over the revised useful life remaining.  Calculation:  Remaining Book value - Revised residual value  Revised remaining useful life  The revision is referred to as a*change in an accounting estimate*and is reflected in future financial statements. Past statements are not changed.  B. Revising Depreciation Rates When There Is a Betterment  Subsequent capital expenditures will change the book value of the asset. A revision to depreciation is required to reflect the change. The first step is to bring depreciation up to date at the time of the subsequent capital expenditure. (using the original rate) The capital expenditure may involve replacing a portion of an asset or adding to the asset without removing any portion. A journal entry is done to record the addition or the addition and removal of an old part. If an old part is removed there may be a loss recorded. Depreciation is then calculated at the revised rate. | | | | |
| Impairment of PPE Assets (LO5) An impairment loss happens when a PPE item’s book value is greater than the amount to be recovered through the asset’s use or sale. Assets should be assessed for impairment annually. Technological, economic or legal factors can all cause impairments to occur. The journal entry to record impairment:  Date Impairment loss XX  Asset account XX  The asset’s book value will be reduced. Depreciation would be revised to reflect this change. | | | | |
| Disposals of PPE (LO6) Assets may be *discarded, sold, or exchanged* due to wear and tear, obsolescence, inadequacy, or damage by fire or other accident. | | | | |
| * 1. In general, accounting for disposals requires the following steps: | | | | |
|  | | | | |
| 1. Discarding PPE—follow general accounting procedure above. | | | | |
| 1. If fully depreciated—no loss (can never have a gain if discarding) 2. If not fully depreciated—Record a loss (debit) equal to the book value. | | | | |
| * 1. Selling PPE—follow general accounting procedure above. Compare value received to book value to determine gain (receive value greater than book value) or loss (receive value less than book value). | | | | |
| 1. Sale is at a gain if value received exceeds book value. 2. Sale is at a loss if value received is less than book value.   Students frequently have difficulty in deriving the journal entry involving a gain or loss. It is very helpful to have them journalize the parts of the entry that they already know such as cash received, debit to accumulated depreciation and credit to the asset account. I usually leave a space between the debits and credits and show the calculation as being the difference between the two sides. A debit or credit can then be recorded with the entry still in the correct order. They just have to fill in the space!   1. Exchanging PPE   Assets are often exchanged (traded-in) for new assets. The exchange is treated as a sale of the old asset and the purchase of a new asset. The cost and accumulated depreciation of the old asset is removed from the books. The cost of the new asset will be recorded at the fair value of the asset(s) received. If the fair value cannot be reliably determined, the new asset will be recorded at the carrying value of the assets given up. Any gains or losses realized on the exchange are recorded at the time of disposal. Intangible Assets (LO7) Intangible assets have no physical substance but provide future economic benefits. Examples include patents, copyrights, leaseholds, drilling rights and trademarks. Accounting for intangibles is similar to accounting for PPE. Intangibles are recorded at cost when purchased. Cost is allocated to the asset over its useful life through amortization. The asset account itself is reduced. There is no accumulated account used. In this way intangibles will always be shown at net book value. Intangible assets are shown on the balance sheet separately from goodwill and property, plant and equipment.   1. Depreciation is the systematic allocation of the cost of plant and equipment over its useful life. 2. Amortization is the systematic allocation of the cost of an intangible asset over its useful life.   Goodwill  Goodwill arises as a result of a business acquisition and reflects the amount paid for a business that exceeds the fair market value of the company’s net assets (assets minus liabilities) if purchased separately. It is accounted for separately from other identifiable intangible assets on the financial statements.  At this point of student learning it is good to mention the concept of Goodwill and that it will be further discussed and learned in future accounting courses.  **Appendix 9A Revised Depreciation When There Is a Betterment That Creates Partial-Period Depreciation (LO8)**  In this case depreciation is calculated and recorded using the following steps:   1. Update depreciation on the equipment to the date of the betterment. 2. Record the betterment and remove the component being replaced. 3. Calculate and record revised depreciation on the equipment from date of betterment to end of Year. | | | | |

# VISUAL #9-1

**FORMULAE FOR DEPRECIATION METHODS**

**1. STRAIGHT LINE**

Cost-Estimated Residual Value Annual

=

Estimated Useful Life (in years) Depreciation

**2. UNITS OF PRODUCTION**

Depreciation

a) Cost- Estimated Residual Value per

=

Predicted units of production Unit

b) Depreciation per unit x units produced = Depreciation

for PERIOD

Depreciation should stop when book value is equal to residual value.

**3. DOUBLE DECLINING BALANCE**

Step 1: Calculate rate to be used----2/Estimated useful life

Step 2. Multiply Net Book Value by Rate

Net Book Value =Cost – Accumulated Depreciation to Date

Depreciation should stop when book value is equal to residual value.

Alternate Demo Problem Chapter 9

A new machine cost $100,000, has an estimated useful life of five years and an estimated residual value of $15,000 at the end of that time. It is expected that the machine can produce 170,000 widgets during its useful life.

The New Times Company purchases this machine on January 1, 2019 and uses it for exactly three years. During these years the annual production of widgets has been 80,000, 50,000, and 30,000 units, respectively. On January 1, 2019, the machine is sold for $45,000.

*Required:*

1. Calculate the depreciation expense for each of the first three years using

* 1. straight-line
  2. units-of-production
  3. double-declining-balance

2. Prepare the proper journal entry for the sale of the machine under the three different depreciation methods.

Solution to Alternate Demo Problem Chapter 9

1a. Straight-line  
  
The depreciation expense each year is equal to (cost - residual) / useful life. In this example the cost is $100,000, the residual is $15,000, and the useful life is 5 years. Therefore,

|  |  |  |
| --- | --- | --- |
| Annual depreciation | = | (100,000-15,000)/ 5 |
|  | = | 17,000 each year |

1b. Units-of-production  
  
The depreciation expense each year is equal to a rate

[(cost-residual) / total production] multiplied by the actual number of units produced that year. In this example the rate would be $0.50 per widget, (100,000-15,000)/ 170,000, and the depreciation expense for each of the first three years would be:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2019 | = | .50 | x | 80,000 | = | 40,000 |
| 2020 | = | .50 | x | 50,000 | = | 25,000 |
| 2021 | = | .50 | x | 30,000 | = | 15,000 |

1c. Double-declining-balance  
  
The depreciation expense each year is equal to a rate (twice the straight-line rate, or 2 / useful life) multiplied by the asset’s net book value (cost less accumulated depreciation) at the beginning of the year. In this example the rate would be 2/5, or 40%, and the depreciation expense for each of the first three years would be

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2019 | = | .40 | x | 100,000 | = | 40,000 |
| 2020 | = | .40 | x | 60,000 | = | 24,000 |
| 2021 | = | .40 | x | 36,000 | = | 14,400 |

1. The journal entry for the sale of the asset will have the same general form regardless of the method of depreciation adopted, except that whether there is a gain or a loss on the sale may change according to the depreciation method used. The gain or loss on disposal of the asset is determined by comparing the sale price, in this case $45,000, with the net book value of the asset at the time of the sale.

Straight-line

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cash | 45,000 |  |
|  | Accumulated depreciation | 51,000 |  |
|  | Loss on sale of machine | 4,000 |  |
|  | Machine |  | 100,000 |

Units-of-production

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cash | 45,000 |  |
|  | Accumulated depreciation | 80,000 |  |
|  | Machine |  | 100,000 |
|  | Gain on sale of machine |  | 25,000 |

Double-declining-balance

|  |  |  |  |
| --- | --- | --- | --- |
|  | Cash | 45,000 |  |
|  | Accumulated depreciation | 78,400 |  |
|  | Machine |  | 100,000 |
|  | Gain on sale of machine |  | 23,400 |