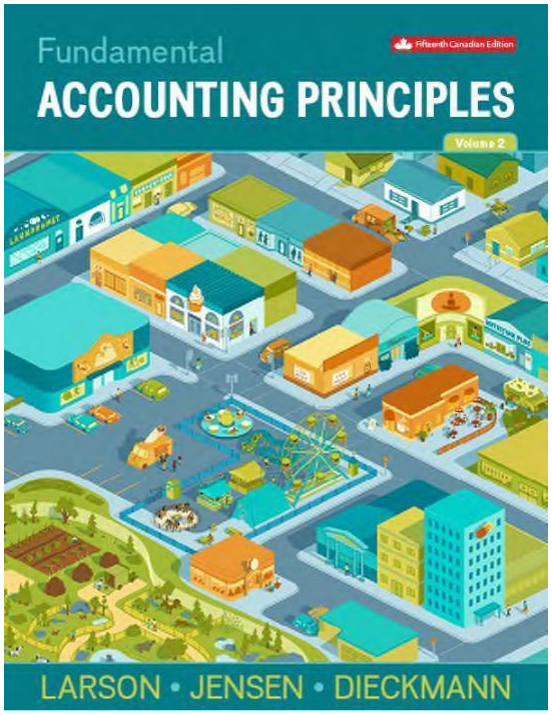
SOLUTIONS MANUAL

to accompany

Fundamental Accounting Principles, Volume 2

15th Canadian Edition

by Larson/Jensen/Dieckmann



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Chapter 9 Property, Plant and Equipment and Intangibles

Chapter Opening Critical Thinking Challenge Questions*

You are asked by the CFO of YVR to evaluate the newest capital asset, the Airside Operations Building at YVR, and to break it into major components for depreciation purposes. Identify at least five major components and determine an expected life for each of those components.

Components of the Airside Operations Building could include:

1.	Building exterior walls	40 years
2.	Roofing	25 years
3.	Pavement	15 years
4.	Landscaping	10 years
5.	Electrical Components	15 years
6.	Flooring	15 years
7.	Plumbing	15 years
8.	Furniture and Fixtures	15 years
9.	Fire Equipment	20 years
10.	Snow Removal Equipment	20 years

***The Chapter 9 Critical Thinking Challenge questions are asked at the beginning of this chapter. Students are reminded at the conclusion of the chapter to refer to the Critical Thinking Challenge questions at the beginning of the chapter. The solutions to the Critical Thinking Challenge questions are available here in the Solutions Manual and accessible to students at Connect.**

Concept Review Questions

1. **A property, plant and equipment asset is long-lived in that it has a service life of longer than one accounting period; it is used in the production or sale of products or services. It is different from other assets such as receivables or inventory in that the property, plant and equipment is used within the operations of business to generate profit, whereas inventory is purchased or manufactured for resale. Receivables represent the amounts due from customers based on past transactions.**

2. **Land held for future expansion is classified as a long-term investment. It is not a property, plant and equipment asset because it is not being used in the production or sale of other assets or services.**

3. **The cost of a property, plant and equipment asset includes all normal, reasonable, and necessary costs of getting the asset in place and ready to use. For example, cost includes such items as the invoice price paid, freight costs, non refundable sales taxes (PST, HST) and all costs incurred related to installing and testing an asset before it is put into use.**

4. **Land is an asset with an unlimited life and, therefore, is not subject to depreciation. Land improvements refer to items such as fencing, parking lots surfaces, landscape lighting and have limited lives and are depreciated over their useful lives.**

5. **No. The Accumulated Depreciation, Machinery account is a contra asset account with a credit balance that does not represent cash or any other funds. Funds available for buying machinery would be shown on the balance sheet as liquid assets with debit balances, such as the account Cash and Cash Equivalents. The balance of the Accumulated Depreciation, Machinery account shows the portion of the machinery's original cost that has been charged to depreciation expense, and gives some indication of how soon the asset will need to be replaced.**

6. **Revenue expenditures, such as repairs, are made to keep a plant and equipment asset in normal, good operating condition, and should be charged to expense of the current period. Capital expenditures are made to extend the service potential or the life of a plant and equipment asset beyond the original estimated life and are charged to the plant and equipment asset account. After incurring a capital expenditure, a depreciation policy also needs to be established. 7. Because the $75 cost of the plant and equipment asset is not likely to be material to the users of the financial statements, the materiality principle justifies charging it to expense.**

8. **Danier Leather did not report any gains or losses on disposal of assets for its year ended June 28, 2014. However, the corporation did have an Impairment loss on property and equipment of $663,000.**

9. **A company might sell or exchange an asset when it reaches the end of its useful life, or if it becomes inadequate or obsolete, or because the company has changed its business plans. An asset may also be damaged or destroyed by fire or some other accident.**

10. **An intangible asset has no physical existence. Its value comes from the unique legal and contractual rights held by its owner.**

11. Types of intangible assets are patents, copyrights, leaseholds, drilling rights, and trademarks.

12. WestJet reported $60,623,000 as Intangible assets at December 31, 2014.

13. A business can only record goodwill when the price paid for a company being purchased exceeds the fair market value of this company's net assets (assets minus liabilities) if purchased separately.

14. Westjet did not report any Goodwill at December 31, 2014.

15. When an asset is constructed, such as the development of a new runway, all costs for construction-related materials and labour costs can be capitalized. Also any electricity and utilities consumed relating to the project, plus a reasonable amount for depreciation on any equipment used during construction. Other permitted costs include design fees, building materials and any interest charges on debt outstanding during the period of construction incurred to finance the project.

QUICK STUDY

Quick Study 9-1 (5 minutes)

$18,000 + $180,000 + $3,000 + $600 = $201,600

Quick Study 9-2 (10 minutes)

1. (a) R
(b) C
(c) R
(d) C

2.

(a)			
Mar. 15	**Repairs Expense**	**120**	
	Accounts Payable		**120**
	To record repairs.		
(b)			
Mar. 15	**Refrigeration Equipment**	**40,000**	
	Accounts Payable		**40,000**
	To record capital expenditure.		
(c)			
Mar. 15	**Repairs Expense**	**200**	
	Accounts Payable		**200**
	To record repairs.		
(d)			
Mar. 15	**Office Building**	**175,000**	
	Accounts Payable		**175,000**
	To record capital expenditure.		

Quick Study 9-3 (10 minutes)

PPE Item	(a) Appraised Values	(b) Ratio of Individual Appraised Value to Total Appraised Value *(a) ÷ Total Appraised Value*	(c) Cost Allocation *(b) x Total Actual Cost*
Land	$ 320,000	320,000 ÷ 500,000 = .64 or 64%	$ 345,600[1]
Building	180,000	180,000 ÷ 500,000 = .36 or 36%	194,400[2]
Totals	$ 500,000		$ 540,000

1. *64% x 540,000 = 345,600*
2. *36% x 540,000 = 194,400*

2017				
Apr. 14	Land	345,600		
	Building	194,400		
	Cash			85,000
	Notes Payable.....			455,000
	To record purchase of land and building.			

Quick Study 9-4 (10 minutes)

TechCom Partial Balance Sheet October 31, 2017

Assets			
Current assets:			
Cash		$ 9,000	
Accounts receivable	$16,400		
Less: Allowance for doubtful accounts	800	15,600	
.....Totalcurrentassets			$ 24,600
Property, plant and equipment:			
Land		$48,000	
Vehicles	$62,000		
Less: Accumulated depreciation	13,800	48,200	
.....Equipment	$25,000		
Less: Accumulated depreciation	3,800	21,200	
.....Totalproperty,plantandequipment			117,400
Intangible assets:			
Patent	$20,100		
Less: Accumulated amortization, patent	3,100		17,000
.....Totalassets			$159,000

Quick Study 9-5 (10 minutes)

($55,900 – $1,900)/4 = $13,500/year

Quick Study 9-6 (10 minutes)

Rate per copy = ($45,000 – $5,000)/4,000,000 copies = $0.01/copy

Year	Calculation		Annual Depreciation
2017	$.01 × 650,000	=	$6,500
2018	$.01 × 798,000	=	7,980
2019	$.01 × 424,000	=	4,240
2020	$.01 × 935,000	=	9,350
2021	$.01 × 1,193,000	=	11,930
			$40,000

Quick Study 9-7 (10 minutes)

Annual rate of depreciation = 2/5 = .40 or 40% per year

Year	Calculation	Annual Depreciation
2017	40% × $86,000 =	$34,400
2018	40% × ($86,000 – $34,400) =	20,640
2019	40% × ($86,000 – $34,400 – $20,640) =	12,384
2020	40% × ($86,000 – $34,400 – $20,640 – $12,384) =	2,576*
2021		0
		$70,000

***The calculation shows $7,430 of depreciation but that amount would cause accumulated depreciation to exceed the maximum allowed of cost less residual ($86,000 – $16,000 = $70,000). Therefore, the depreciation for 2020 must be adjusted to $2,576.**

Quick Study 9-8 (10 minutes)

Computer panel:
$4,000/8 years = $500 depreciation

Dry-cleaning drum:
$70,000 - $5,000 = $65,000/400,000 garments = $0.1625/garment;
$0.1625/garment × 62,000 garments = $10,075 depreciation

Stainless steel housing:
$85,000 - $10,000 = $75,000/20 years = $3,750 depreciation

Miscellaneous parts:
$26,000/2 years = $13,000 depreciation
Total depreciation on the dry cleaning equipment for 2017= $500 + $10,075 + $3,750 + $13,000 = $27,325

Quick Study 9-9 (10 minutes)

	2017	2018
a.	$5,000	$6,000
b.	$3,000	$6,000

Calculations:

a. $\frac{60,000 - 0}{10 \text{ years}}$ = 6,000/year x 10/12 = 5,000
b. 6,000/year x 6/12 = 3,000

Quick Study 9-10 (10 minutes)

	2017	2018
a.	$10,000	$10,000
b.	$6,000	$10,800

Calculations:

a. 2/10 = .2 or 20%; 20% x 60,000 = 12,000 x 10/12 = 10,000 for 2017
20% x (60,000 – 10,000) = 10,000 for 2018
b. 20% x 60,000 = 12,000 x 6/12 = 6,000 for 2017
20% x (60,000 – 6,000) = 10,800 for 2018

Quick Study 9-11 (10 minutes)

	2017	2018
a.	10,000	14,000
b.	**10,000**	**14,000**

Calculations:
75,000 – 15,000 = 60,000/120,000 = $0.50 depreciation expense per unit produced
$0.50 x 20,000 = $10,000 for 2017; $0.50 x 28,000 = $14,000 for 2018

NOTE: The units-of-production method is a usage-based method as opposed to a time-based method (such as straight-line and double-declining-balance) and therefore partial periods do not affect the calculations.

Quick Study 9-12 (10 minutes)

[($35,720 – $11,820[1]) – $1,570]/ 7[2] years remaining = $3,190

1.($35,720 – $4,200)/8 = $3,940/year × 3 years = $11,820
2.10–3=7

Quick Study 9-13 (10 minutes)

2017			
Jan. 3	**Barbecue – Rotisserie……**	**1,000**	
	Cash……..		**1,000**
	To record the purchase of electronic rotisserie.		
Dec. 31	**Depreciation Expense, Barbecue……**	**1,560**	
	Accumulated Depreciation, Barbecue……		**1,560**
	To record revised depreciation on the barbecue caused by the addition of a rotisserie; $7,000 - $200 = $6,800 ÷ 5 years = $1,360 PLUS $1,000 ÷5 years = $200; Total depreciation = $1,360 + $200 = $1,560.		

Quick Study 9-14 (10 minutes)

Impairment losses occurred on the computer and the furniture in the amounts of $1,500 and $21,000, respectively.

Calculations:

Asset	Cost	Accumulated Depreciation	Book Value	Recoverable Amount	Impairment Loss
Building	$1,200,000	$465,000	$735,000	$735,000	N/A
Computer	3,500	1,800	1,700	200	$ 1,500
Furniture	79,000	53,000	26,000	5,000	21,000
Land	630,000	0	630,000	790,000	N/A
Machine	284,000	117,000	167,000	172,000	N/A

Quick Study 9-15 (10 minutes)

a.

2017			
Oct. 1	**Accumulated Depreciation, Equipment**	**39,000**	
	Cash	**17,000**	
	Equipment		**56,000**
	To record sale of equipment.		

b.

Oct. 1	**Accumulated Depreciation, Machinery**	**96,000**	
	Cash	**27,000**	
	Machinery		**109,000**
	Gain on Disposal		**14,000**
	To record sale of equipment.		

c.

Oct. 1	**Accumulated Depreciation, Truck**	**33,000**	
	Cash	**11,000**	
	Loss on disposal	**4,000**	
	Delivery truck		**48,000**
	To record sale of equipment.		

d.

Oct. 1	**Accumulated Depreciation, Furniture**	**21,000**	
	Loss on disposal	**5,000**	
	Furniture		**26,000**
	To record disposal of equipment.		

Quick Study 9-16 (10 minutes)

2017			
Dec 31	**Accumulated Depreciation, Automobile .....**	**13,500**	
	Computer*	**5,800**	
	Automobile		**15,000**
	Cash		**2,750**
	Gain on Disposal		**1,550**
	To record exchange.		

***Computer = FV of assets received= $5,800 as given**

Quick Study 9-17 (15 minutes)

2017			
Mar. 1	**Accumulated Depreciation, Machine (old) .....**	**36,000**	
	Machine (new)[2]	**117,000**	
	Cash[1]		**63,000**
	Machine (old)		**90,000**
	To record exchange of machines.		

1. Cash paid = $123,000 - $60,000 = $63,000

2. Machine (new) = $63,000 cash paid + $54,000 book value of old = $117,000

Quick Study 9-18 (10 minutes)

2017			
Jan. 4	**Franchise .....**	**95,000**	
	Cash		**95,000**
	To record purchase of franchise.		
Dec. 31	**Amortization Expense, Franchise .....**	**9,500**	
	Accumulated Amortization, Franchise		**9,500**
	To record amortization of franchise;		
	$95,000/10 years = $9,500 per year		

Quick Study 9-19 (10 minutes)

2017			
Oct. 1	**Mineral Rights**	**35,000,000**	
	Water Rights	**4,000,000**	
	Cash		**9,000,000**
	Long-Term Note Payable		**30,000,000**
	To record the purchase of intangibles.		
Dec. 31	**Amortization Expense, Mineral Rights**	**875,000**	
	Accumulated Amortization, Mineral Rights		**875,000**
	To record amortization of mineral rights;		
	$35,000,000 ÷ 10 years = $3,500,000/year;		
	$3,500,000/year × 3/12 = $875,000.		
31	**Amortization Expense, Water Rights**	**100,000**	
	Accumulated Amortization, Water Rights		**100,000**
	To record amortization of water rights;		
	$4,000,000 ÷ 10 years = $400,000/year;		
	$400,000/year × 3/12 = $100,000.		

***Quick Study 9-20 (20 minutes)**

Motor (old)	**$45,000 - $5,000 = $40,000 ÷ 10 yrs× 8/12 =**	**$ 2,667**
Motor (new)	**$60,000 - $10,000 = $50,000 ÷ 8 yrs × 4/12 =**	**2,083**
Metal housing	**$68,000 - $15,000 = $53,000 ÷ 25 yrs =**	**2,120**
Misc. parts	**$15,000 ÷ 5 yrs =**	**3,000**
Total depreciation expense to be recorded on the machine for 2017 =		**$ 9,870**

EXERCISES

Exercise 9-1 (10 minutes)

Invoice cost	**$15,000**
Freight costs	**260**
Steel mounting	**795**
Assembly	**375**
Raw materials for testing	**120**
Less: discount ($15,000 × 2%)	**300**
Total acquisition costs	**$16,250**

Note: The $190 repairs are an expense and therefore not capitalized.

Exercise 9-2 (15 minutes)

Cost of land:

Purchase price for land	**$1,200,000**
Purchase price for old building	**480,000**
Demolition costs for old building	**75,000**
Levelling the lot	**105,000**
Total cost of land	**$1,860,000**

Cost of new building:

Construction costs	**$2,880,000**
Less: Cost of land improvements*	**215,000**
Cost of new building	**$2,665,000**

****The land improvements are a distinct PPE asset that depreciates at a different rate than the building. Therefore it should be debited to an account separate from the building.***

Journal entry:

2017				
Mar. 10	**Land**		**1,860,000**	
	Land Improvements		**215,000**	
	Building		**2,665,000**	
	Cash			**4,740,000**
	To record costs of plant assets.			

Exercise 9-3 (15 minutes)

Allocation of total cost:

PPE Asset	*(a)* Appraised Values	*(b)* Ratio of Individual Appraised Value to Total Appraised Value *(a) ÷ Total Appraised Value*	*(c)* Cost Allocation *(b) x Total Actual Cost*
Land	$249,480	249,480 ÷594,000 = .42 or 42%	$ 244,346[2]
Land Imprv.	83,160	83,160 ÷594,000 = .14 or 14%	81,448[3]
Building	261,360	261,360 ÷594,000 = .44 or 44%	255,981[4]
Totals	$594,000		$ 581,775[1]

1. 552,375 + 29,400 = 581,775
2. 42% x 581,775 = 244,346
3. 14% x 581,775 = 81,448
4. 44% x 581,775 = 255,981

Journal entry:

2017			
Apr. 12	Land	244,346	
	Land Improvements	81,448	
	Building	255,981	
	Cash		581,775
	To record costs of lump-sum purchase.		

Exercise 9-4 (20 minutes)

2017			
Jan. 1	Land	1,296,000	
	Building	1,512,000	
	Equipment	1,123,200	
	Tools	388,800	
	Cash		1,104,000
	Notes Payable		3,216,000
	To record lump-sum purchase.		

Calculations:

	(a)	*(b)*	*(c)*
PPE Asset	Appraised Values	Ratio of Individual Appraised Value to Total Appraised Value *(a) ÷ Total Appraised Value*	Cost Allocation *(b) x Total Actual Cost*
Land	$ 1,152,000	1,152,000 ÷3,840,000 = .30 or 30%	$ 1,296,000[1]
Building	1,344,000	1,344,000 ÷3,840,000 = .35 or 35%	1,512,000[2]
Equipment	998,400	998,400 ÷3,840,000 = .26 or 26%	1,123,200[3]
Tools	345,600	345,600 ÷3,840,000 = .09 or 9%	388,800[4]
Totals	$		$ 4,320,000

1. 30% x 4,320,000 = 1,296,000
2. 35% x 4,320,000 = 1,512,000
3. 26% x 4,320,000 = 1,123,200
4. 9% x 4,320,000 = 388,800

Exercise 9-5 (10 minutes)

2017				
Jan 1	**Truck**	**63,000**		
	Cash		**63,000**	

Calculation:
37,500 + 13,500 + 6,750 + 5,250 = 63,000

Jan 4	**Prepaid insurance**	**3,600**		
	Gas expense	**180**		
	Cash		**3,780**	

2017				
Dec. 31	**Depreciation Expense, Truck**	**11,100**		
	Accumulated Depreciation, Truck		**11,100**	
	To record depreciation.			

Calculation:
[(37,500 + 13,500 + 6,750 + 5,250) – 7,500] / 5 years = 11,100

Note: Insurance expense entries could also be made, to move from prepaid insurance, although not required in question.

Exercise 9-6 (15 minutes)

	(a)	(b)	(c)
Year	Straight-line	Double-declining-balance (Rate = 2/4 = .50 or 50%)	Units-of-production (Rate = [(169,200 – 24,000)/181,500] = .80/unit)
2017	36,300[1]	50% × 169,200 = 84,600	30,640 (.80 × 38,300)
2018	36,300	50% × (169,200 – 84,600) = 42,300	32,920 (.80 × 41,150)
2019	36,300	$18,300[2]	42,080 (.80 × 52,600)
2020	36,300	0	39,560[3]

1. (169,200 – 24,000)/4 = 36,300/year
2. Maximum depreciation is limited to $145,200 which is cost less residual ($169,200 – $24,000) therefore depreciation for 2019is $18,300 calculated as $145,200 – $126,900 accumulated depreciation recorded to date.
3. Maximum depreciation is limited to $145,200 which is cost less residual ($169,200 – $24,000) therefore depreciation for 2020is $39,560 calculated as $145,200 – $105,640 accumulated depreciation recorded to date.

Exercise 9-7 (15 minutes)

a. (238,400 – 46,400)/5 = $38,400

b. Rate = 2/5 = .40 or 40%
40% × 238,400 = $95,360

c. Rate = (238,400 – 46,400)/240,000 km =
$0.80/km $0.80/km × 38,000 km = $30,400

Analysis component:
The units-of-production method will produce the highest profit in 2017because it is the lowest depreciation expense for 2017.

Exercise 9-8 (30 minutes)

	Straight-Line[1]		Double-Declining-Balance[2]		Units-of-Production[3]	
	Depreciation	Book Value at	Depreciation	Book Value at	Depreciation	Book Value at
Year	Expense	December 31	Expense	December 31	Expense	December 31
2017	21,250	104,000	50,100	75,150	16,875	108,375
2018	21,250	82,750	30,060	45,090	22,250	86,125
2019	21,250	61,500	18,036	27,054	30,000	56,125
2020	21,250	40,250	8,054	19,000	37,125	19,000
2021	21,250	19,000	0	19,000	0	19,000

Calculations:

1. **125,250 – 19,000 = 106,250/5 = 21,250**
2. **2/5 = .4 or 40%; .4 x 125,250 = 50,100; .4 x (125,250 – 50,100) = 30,060;**
   .4 x (125,250 – 50,100 – 30,060) = 18,036;
   .4 x (125,250 – 50,100 – 30,060 – 18,036) = 10,822; maximum = 8,054 calculated as cost less residual = 125,250 – 19,000 = 106,250 less total deprec. taken of 98,196 = 8,054.
3. **125,250 – 19,000 = 106,250/8,500 = $12.50/hour;**
   2017– 12.50 x 1,350 = 16,875;
   2018– 12.50 x 1,780 = 22,250;
   2019– 12.50 x 2,400 = 30,000;
   2020– 12.50 x 2,980 = 37,250; maximum = 37,125; calculated as cost less residual = 125,250 – 19,000 = 106,250 less total deprec. taken of 69,125 = 37,125.

Analysis component:

a. 2017– Units-of-production; 2020– Straight-line
b. 2017– Double-declining-balance; 2020– Units-of-production

Exercise 9-9 (30 minutes)

PPE Asset	*(a)* Appraised Values	*(b)* Ratio of Individual Appraised Value to Total Appraised Value *(a) ÷ Total Appraised Value*	*(c)* Cost Allocation *(b) x Total Actual Cost*
Land	$ 700,000	700,000 ÷2,100,000 = .33 or 33.33%	$ 840,000[1]
Building	1,120,000	1,120,000 ÷2,100,000 = .533 or 53.33%	1,344,000[2]
Equipment	210,000	210,000 ÷2,100,000 = .10 or 10%	252,000[3]
Tools	70,000	70,000 ÷2,100,000 = .033 or 3.33%	84,000[4]
Totals	$ 2,100,000		$ 2,520,000

1. *33.33% x 2,520,000 = 840,000*
2. *53.33% x 2,520,000 = 1,344,000*
3. *10.00% x 2,520,000 = 252,000*
4. *3.33% x 2,520,000 = 84,000*

PPE Asset	Cost	2017Depreciation	2018Depreciation
Land	$ 840,000	N/A[5]	N/A[5]
Building	1,344,000	1,344,000 × 2/10 = 268,800	(1,344,000 – 268,800) × 2/10 = 215,040
Equipment	252,000	252,000 × 2/5 = 100,800	(252,000 – 100,800) × 2/5 = 60,480
Tools	84,000	84,000 × 2/3 = 56,000	(84,000 – 56,000) × 2/3 = 18,667

5. Land is not depreciated as it has an unlimited life and is not consumed when used.

Analysis component:

We do not depreciate the cost of land as it has an unlimited life and is not consumed when used.

Exercise 9-10 (20 minutes)

Cost Information						Depreciation		
Description	Date of Purchase	Depreciation Method	Cost	Residual	Life	Balance of Accum. Deprec. Dec. 31, 2016	Depreciation Expense for 2017	Balance of Accum. Deprec. Dec. 31, 2017
Building	2 May 2011	S/L	$650,000	$250,000	10 yr.	$226,667	$40,000[1]	$266,667[2]
Modular Furniture	2 May 2011	S/L	72,000	0	6 yr.	68,000	4,000[3]	72,000[4]
Truck	25 Jan 2014	DDB	80,000	10,000	8 yr.	45,313	8,672[5]	53,985[6]

1. (650,000 – 250,000)/10 = 40,000/year
2. 226,667 + 40,000 = 266,667
3. (72,000 – 0)/6 = 12,000 per year; however the maximum accumulated depreciation = 72,000; 72,000 less total depreciation taken of 68,000(8,000 in 2011 [(72,000 – 0)/6 = $12,000 per year X 8/12] plus 12,000 in years 2012– 2016) = 4,000
4. 68,000 + 4,000 = 72,000
5. Rate = 2/8 = .25 or 25%
   25% × (80,000 – 45,313) = 8,672
6. 45,313 + 8,672 = 53,985

Analysis component:

Depreciation is the process of allocating an asset's cost to expense over its useful life. It should be done using a rational and systematic manner. Dynamic uses the straight-line method and the double-declining balance method for its assets, which are both acceptable under GAAP. Dynamic has likely chosen different methods for depreciating its assets to better reflect the usage pattern of each asset, which is acceptable under GAAP.

Exercise 9-11 (15 minutes)

DYNAMICEXPLORATION
Partial Balance Sheet
December 31, 2016

Assets			
Current assets			**$338,000**
Property, plant and equipment:			
Furniture	**$72,000**		
Less: Accumulated depreciation	**68,000**	**$4,000**	
Building	**$650,000**		
Less: Accumulated depreciation	**226,667**	**423,333**	
Truck	**$ 80,000**		
Less: Accumulated depreciation	**45,313**	**34,687**	
Total property, plant and equipment			**462,020**
Total assets			**$800,020**

Exercise 9-12 (15 minutes)

a. Straight-line depreciation:

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Totals
Profit before depreciation	**$171,000**	**$171,000**	**$171,000**	**$171,000**	**$171,000**	**$855,000**
Depreciation expense[1]	**73,080**	**73,080**	**73,080**	**73,080**	**73,080**	**365,400**
Profit	**$97,920**	**$97,920**	**$97,920**	**$97,920**	**$97,920**	**$489,600**

b. Double-declining-balance depreciation:

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Totals
Profit before depreciation	**$171,000**	**$171,000**	**$171,000**	**$171,000**	**$171,000**	**$855,000**
Depreciation expense[2]	**188,160**	**112,896**	**64,344**	**0**	**0**	**365,400**
Profit (loss)	**$(17,160)**	**$58,104**	**$106,656**	**$171,000**	**$171,000**	**$489,600**

1. **(470,400 – 105,000)/5 = 73,080**
2. **Rate = 2/5 = .40 or 40%**
   Year 1: 470,400 × 40% = 188,160
   Year 2: (470,400 – 188,160) × 40% = 112,896
   Year 3: 64,344 max. depreciation expense (calculated as 470,400 – 105,000 – 188,160 – 112,896 = 64,344)

Analysis component:

Kenartha Oil will choose straight-line depreciation to depreciate the equipment if its goal is to show the highest value possible for the equipment on the Year 1 balance sheet. Straight-line will result in lower depreciation than double declining balance in Year 1. The lower the depreciation, the greater the net book value of the asset (cost less accumulated depreciation appearing in the balance sheet).

Exercise 9-13 (15 minutes)

	Depreciation	
Year	Straight-Line[1]	Units-of-Production[3]
2017	7,200	20,088
2018	21,600	43,416
2019	21,600	33,696

1. **156,000 – 26,400 = 129,600/6 = 21,600 x 4/12 = 7,200**
2. **156,000 – 26,400 = 129,600/200,000 = $0.648/unit;**
   .648 x 31,000 = 20,088; .648 x 67,000 = 43,416; .648 x 52,000 = 33,696

Analysis component:

If depreciation is not recorded, expenses are understated and net income is overstated on the income statement and on the balance sheet, assets and equity would be overstated.

Exercise 9-14 (25 minutes)

	Depreciation	
Year	Straight-Line[1]	Double-Declining-Balance[2]
2017	11,000	22,000
2018	22,000	35,200
2019	22,000	21,120

Calculations:

1. 110,000/5 = 22,000 x 6/12 =11,000
2. 2/5 = .4 or 40%; .4 x 110,000 x 6/12 = 22,000;
   .4 x (110,000 – 22,000) = 35,200; .4 x (110,000 – 22,000 – 35,200) = 21,120

Analysis component:

If the furniture had been debited to an expense account in 2017when purchased instead of being recorded as a PPE asset, expenses would have been overstated and net income would have been understated on the income statement in 2017while assets and equity would have been understated on the balance sheet for the same year.

Exercise 9-15 (10 minutes)

	(a)	(b)
Year	Straight-Line	Double-Declining-Balance
2017	(125,000– 12,500)/5 = 22,500 x 9/12 = 16,875	Rate = 2/5 = .40 or 40% 125,000 × 40% × 9/12 = 37,500
2018	(125,000– 12,500)/5 = 22,500	(125,000 – 37,500) × 40% =35,000

Exercise 9-16 (10 minutes)

1. (43,500 – 5,000)/4 = 9,625/year × 2 years = 19,250 accumulated depreciation
   Book value = 43,500 – 19,250 = <u>24,250</u>

2. [(43,500 – 19,250) – 3,850]/3 = <u>6,800</u>

Exercise 9-17 (15 minutes)

2020			
Dec. 31	**Depreciation Expense, Machine .....**	**7,624**	
	Accumulated Depreciation, Machine		**.....7,624**
	To record depreciation.		

Calculations:

Revised depreciation = (71,200 – 30,800*) – 8,000 = 7,624/year

7 – 2 9/12 = 4.25 yrs

***2017depreciation = 8,400 (71,200 – 15,200)/5 = 11,200 × 9/12**

2018depreciation = 11,200

2019depreciation = 11,200

Accumulated depreciation 30,800

Exercise 9-18 (20 minutes)

Part 1

2017			
Jan. 5	**Warehouse – Door……**	**25,500**	
	Accounts Payable……		**25,500**
	To record addition of door on East wall of warehouse.		

Part 2

2017			
Dec. 31	**Depreciation Expense, Warehouse ……**	**14,700**	
	Accumulated Depreciation, Warehouse….		**14,700**

To record revised depreciation on warehouse;
$292,500 – $90,000 = $202,500; $202,500 ÷ 15 yrs = $13,500
PLUS $25,500 - $7,500 = $18,000; $18,000 ÷ 15 yrs = $1,200;
Total depreciation on the warehouse = $13,500 + $1,200 = $14,700.

Exercise 9-19 (30 minutes)

Part 1

2017			
Dec. 31	Impairment Loss	13,500	
	Equipment		12,000
	Office Building		1,500
	To record impairment loss on equipment and office building.		

Part 2

2018			
Dec. 31	Depreciation Expense, Equipment	1,800	
	Accumulated Depreciation, Equipment		1,800
	To record revised depreciation on equipment.		
31			
	To record depreciation on furniture.		491
31	Depreciation Expense, Office Building	3,838	
	Accumulated Depreciation, Office Building		3,838
	To record depreciation on office building		
31	Depreciation Expense, Warehouse	2,250	
	Accumulated Depreciation, Warehouse		2,250
	To record depreciation on warehouse.		

Calculations:

Asset	Cost	Accum. Deprec.	Book Value	Recoverable Amount	Impairment Loss	2018Dep. Exp.
Equipment	$40,000	$20,000	$20,000	$ 8,000	$12,000	1,800[1]
Furniture	12,000	9,509	2,491	2,950	N/A	491[2]
Land	85,000	N/A	85,000	101,800	N/A	N/A
Office Bldng	77,000	23,000	54,000	52,500	1,500	3,838[3]
Warehouse	55,000	12,938	42,062	45,100	N/A	2,250[4]

1. [40,000 – 5,000)/7,000] = $5.00/unit; 20,000 accum. dep. ÷ $5.00/unit = 4,000 units; 7,000 units in original useful life less 4,000 units depreciated to date equals 3,000 remaining units; 40,000 – 12,000 = 28,000 revised cost; 28,000 – 20,000 accum. dep. = 8,000 revised book value; 8,000 – 5,000 residual value = 3,000; 3,000 ÷ 3,000 remaining units = $1.00/unit revised depreciation rate; 1.00/unit × 1,800 units = 1,800
2. 12,000 – 9,509 = 2,491; 2,491 × 2/8 = 623 which exceeds maximum allowable; maximum allowable = 2,491 remaining book value – 2,000 residual = 491
3. 77,000 – 1,500 = 75,500 revised cost of office building; 75,500 – 23,000 = 52,500 remaining book value; (52,500 – 17,000) ÷ 9.25 yrs remaining useful life = 3,838
4. 55,000 – 10,000 = 45,000; 45,000 ÷ 20 yrs = 2,250

Exercise 9-20 (20 minutes)

a.

2017				
Mar. 1	Accumulated Depreciation, Truck		21,850	
	Cash		20,150	
	Truck			42,000
	To record the sale of the truck for $20,150.			

b.

Mar. 1	Accumulated Depreciation, Truck		21,850	
	Cash		21,600	
	Truck			42,000
	Gain on Disposal			1,450
	To record the sale of the truck for $21,600.			

c.

Mar. 1	Accumulated Depreciation, Truck		21,850	
	Cash		19,200	
	Loss on Disposal		950	
	Truck			42,000
	To record the sale of the truck for $19,200.			

d.

Mar. 1	Accumulated Depreciation, Truck		21,850	
	Loss on Disposal		20,150	
	Truck			42,000
	To record the sale of the truck for $0; it was scrapped.			

Exercise 9-21 (15 minutes)

To record partial year's depreciation in 2021:

2021			
July 1	**Depreciation Expense**	**21,200**	
	Accumulated Depreciation, Machine		**21,200**
	To record partial year depreciation in year of disposal; (296,800/7) × 6/12 = 21,200.		

(a)

July 1	**Accumulated Depreciation, Machine**	**190,800***	
	Cash	**112,000**	
	Machine		**296,800**
	Gain on Disposal		**6,000**
	To record sale of machine for 112,000.		

(b)

1	**Accumulated Depreciation, Machine**	**190,800***	
	Cash	**96,000**	
	Loss on Disposal	**10,000**	
	Machine		**296,800**
	To record receipt of $96,000 from insurance settlement.		

***(296,800/7) × 4.5 years = 190,800**

Exercise 9-22 (10 minutes)

a. **190,000 – 105,000 = 85,000 book value**

b.

Book value of the assets given up = (85,000 + 164,000) ..	**=**	**249,000**
Less: Fair value of assets given up (56,000 + 164,000)	**=**	**220,000**
Loss on exchange		**29,000**

c. **220,000**

d.

2017			
Oct. 6	**Tractor (new)***	**220,000**	
	Accumulated Depreciation, Tractor (old)	**105,000**	
	Loss on Exchange	**29,000**	
	Cash		**164,000**
	Tractor (old)		**190,000**
	To record exchange of old tractor for a new one.		

***$56,000 + $164,000 = $220,000.**

Exercise 9-23 (20 minutes)

a.

2017				
Nov. 3	**Accumulated Depreciation, Computer (old)**	.....	**65,000**	
	Computer (new)[1]	.....	**175,000**	
	Computer (old)	.....		**150,000**
	Cash	.....		**90,000**
	To record exchange of computers.			

1. Computer (new) = Cash paid + Book Value of asset given up
= $90,000 + $85,000 = $175,000

b.

2017				
Nov. 3	**Accumulated Depreciation, Computer (old)**	.....	**65,000**	
	Computer (new)[1]	.....	**174,000**	
	Loss on Disposal[2]	.....	**1,000**	
	Computer (old)	.....		**150,000**
	Cash	.....		**90,000**
	To record exchange of computers.			

1. Computer (new) = Fair Value of Assets Received
= $174,000
2. Loss on Disposal = Proceeds – Book Value of assets given up
= $174,000 – [($150,000 – $65,000) + $90,000] = $1,000

Analysis component:
The dollar value that will be used to depreciate the new computer is $174,000 because the Cost Principle requires that all transactions are to be recorded at their original cost. $174,000 was determined to be the cost.

Exercise 9-24 (25 minutes)

(a)

Jan. 2	**Accumulated Depreciation, Machine**	**45,250**	
	Cash	**32,500**	
	Loss on Disposal	**6,250**	
	Machine		**84,000**
	To record sale of machine;		
	32,500 – (84,000 – 45,250) = 6,250 loss.		

(b)

Jan. 2	**Accumulated Depreciation, Machine**	**45,250**	
	Tools	**115,750**	
	Cash		**77,000**
	Machine		**84,000**
	To record exchange of machine;		
	Value of assets given up = $77,000 cash + $38,750		
	book value of the old machine = $115,750.		

(c)

Jan. 2	**Accumulated Depreciation, Machine**	**45,250**	
	Van	**104,000**	
	Loss on Disposal	**2,750**	
	Cash		**68,000**
	Machine		**84,000**
	To record exchange of machine;		
	104,000 – (68,000 + 38,750) = 2,750 loss.		

(d)

Jan. 2	**Accumulated Depreciation, Machine**	**45,250**	
	Land	**75,000**	
	Machine		**84,000**
	Cash		**25,000**
	Gain on Disposal		**11,250**
	To record exchange;		
	75,000 – (25,000 + 38,750) = 11,250 gain.		

Exercise 9-25 (10 minutes)

2017				
Jan.	**1**	**Copyrights**	**177,480**	
		Cash		**177,480**
		To record purchase of copyright.		
Dec.	**31**	**Amortization Expense, Copyrights**	**14,790**	
		Accumulated Amortization, Copyrights		**14,790**
		To record amortization of copyright;		
		177,480/12 = 14,790		

Exercise 9-26 (15 minutes)

Part 1

2017				
Sept.	**5**	**Timber Rights**	**432,000**	
		Cash		**96,000**
		Long-Term Notes Payable		**336,000**
		To record purchase of timber rights.		
	27	**Patent**	**148,000**	
		Accounts Payable		**148,000**
		To record purchase of patent.		

Part 2

2017				
Dec.	**31**	**Amortization Expense, Timber Rights**	**48,000**	
		Accumulated Amort., Timber Rights		**48,000**
		To record amortization of timber rights;		
		$432,000 ÷ 3 yrs = $144,000/year × 4/12 = $48,000.		
	31	**Amortization Expense, Patent**	**3,700**	
		Accumulated Amortization, Patent		**3,700**
		To record amortization of patent;		
		$148,000 ÷ 10 yrs = $14,800/year × 3/12 = $3,700.		
2018				
Dec.	**31**	**Amortization Expense, Timber Rights**	**144,000**	
		Accumulated Amortization, Timber Rights		**144,000**
		To record amortization of timber rights;		
		$432,000 ÷ 3 yrs = $144,000/year.		
	31	**Amortization Expense, Patent**	**14,800**	
		Accumulated Amortization, Patent		**14,800**
		To record amortization of patent;		
		$148,000 ÷ 10 yrs = $14,800/year.		

Exercise 9-27 (25 minutes)

Huang Resources
Balance Sheet
October 31, 2017

Assets			
Current assets:			
Cash		$ 9,600	
Accounts receivable	$ 27,200		
Less: Allowance for doubtful accounts	1,920	25,280	
Total current assets			$ 34,880
Property, plant and equipment:			
Land		$ 89,600	
Building	$ 147,200		
Less: Accumulated depreciation	81,600	65,600	
Equipment	$ 184,000		
Less: Accumulated depreciation	110,400	73,600	
Total property, plant and equipment			228,800
Intangible assets:			
Mineral rights	$ 57,600		
Less: Accumulated amortization	30,400	$ 27,200	
Trademark	$ 33,600		
Less: Accumulated amortization	22,400	11,200	
Total intangible assets			38,400
Total assets			$ 302,080
Liabilities			
Current liabilities:			
Accounts payable	$18,400		
Current portion of long-term note	34,000		
Total current liabilities		$ 52,400	
Non-current liabilities:			
Note payable, less current portion		38,000	
Total liabilities			$ 90,400
Equity			
Ave Huang, capital			211,680[1]
Total liabilities and equity			$302,080

Calculations:

1. **221,280 adjusted capital balance + 1,433,600 revenues – 1,443,200 expenses = 211,680 post-closing capital balance**

Exercise 9-28 (35 minutes)

Montalvo Bionics
Balance Sheet
April 30, 2017

Assets			
Current assets:			
Cash		$ 9,000	
Accounts receivable	$16,200		
Less: Allowance for doubtful accounts	900	15,300	
Prepaid rent		1,080[1]	
Total current assets			$ 25,380
Property, plant and equipment:			
Furniture	$21,600		
Less: Accumulated depreciation	14,400[2]	$ 7,200	
Machinery	$48,600		
Less: Accumulated depreciation	21,600[3]	27,000	
Total property, plant and equipment			34,200
Intangible assets:			
Patent		$21,600	
Less: Accumulated amortization		720[4]	20,880
Total assets			$80,460
Liabilities			
Current liabilities:			
Accounts payable	$4,860		
Unearned revenues	5,760		
Current portion of long-term note	5,400		
Total current liabilities		$ 16,020	
Non-current liabilities:			
Note payable, less current portion		8,100	
Total liabilities			$24,120
Equity			
Josh Montalvo, capital			56,340[5]
Total liabilities and equity			$80,460

Calculations:

1. **12,960 × 11/12 = 11,880 rent used; 12,960 – 11,880 = 1,080 remaining in Prepaid Rent**
2. **21,600 ÷ 5 = 4,320; 4,320 + 10,080 = 14,400 accum. dep.**
3. **48,600 – 20,088 = 28,512; 28,512 × 2/10 = 5,702; maximum depreciation is 48,600 – 27,000 = 21,600 therefore 2017 depreciation expense is 1,512 and accum. dep. is 20,088 + 1,512 = 21,600.**
4. **21,600 ÷ 15 = 1,440/year; 1,440 × 6/12 = 720.**
5. **22,572 unadjusted capital + 223,200 revenues – 82,800 withdrawals – 88,200 expenses – 4,320 dep. furniture – 1,512 dep. machinery – 720 amort. patent – 11,880 rent expense = 56,340 post-closing capital**

Exercise 9-29

2015			
April 1	**Food Truck**	**52,000**	
	Oven	**6,000**	
	Prepaid Insurance	**3,600**	
	Cash		**61,600**
	To record the purchase of food truck, oven and insurance.		
Oct 1	**Repairs Expense**	**1,800**	
	Cash		**1,800**
	To record repairs for truck		
Dec 31	**Insurance Expense**	**2,700**	
	Prepaid Insurance		**2,700**
	To record 9 months of insurance expense		
Dec 31	**Depreciation Expense, Truck**	**6,300**	
	Accumulated Depreciation, Truck		**6,300**
	To record depreciation of truck;		
	Calculation:		
	[(48,000 + 4,000) – 10,000] / 5 years = 8,400 ×		
	9/12 = $6,300.		
31	**Depreciation Expense, Oven**	**750**	
	Accumulated Depreciation, Oven		**750**
	To record depreciation of oven;		
	($6,000-1000) ÷ 5 yrs = $1,000/year × 9/12 = $750.		
2016			
April 1	**Repair Expense**	**2,100**	
	Prepaid Insurance	**3,600**	
	Cash		**5,700**
	To record purchase of tires and insurance for year		

Dec 31	**Insurance Expense**	**3,600**	
	Prepaid Insurance		**3,600**
	To record 1 year of insurance expense.		

Dec 31	**Depreciation Expense, Truck**	**8,400**	
	Accumulated Depreciation, Truck		**8,400**
	To record depreciation of truck;		
	Calculation:		
	[(48,000 + 4,000) – 10,000] / 5 years = 8,400		

31	**Depreciation Expense, Oven**	**1,000**	
	Accumulated Depreciation, Oven		**1,000**
	To record depreciation of oven;		
	($6,000-1000) ÷ 5 yrs = $1,000/year		

2017			
Mar 31	**Depreciation Expense .....**	**2,100**	
	Accumulated Depreciation, Truck		**2,100**
	To record partial year depreciation in year of disposal; 8,400 × 3/12 = 2,100.		
Mar 31	**Depreciation Expense .....**	**250**	
	Accumulated Depreciation, Oven		**250**
	To record partial year depreciation in year of disposal; 1000 × 3/12 = 250.		

Mar 31	**Accumulated Depreciation, Truck .....**	**16,800**	
	Accumulated Depreciation, Oven.....	**2,000**	
	Cash	**21,000**	
	Truck		**52,000**
	Oven.....		**6,000**
	Loss on Disposal.....	**18,200**	
	To record loss on sale of truck;		
	16,800+2,000+21,000-52,000-6,000=18,200		

***Exercise 9-30 (30 minutes)**

Part 1

2017

Jul. 3 Truck – Tool Carrier	9,600	
Cash		9,600

To record installation of new component to truck.

Part 2

Truck:

Component	Date of Purchase	Cost	Est. Resid.	Est. Life	Accum. Dep. at Dec 31/16	Dep. Exp. Dec 31/17	Dep. Exp. Dec 31/18
Truck body	Jul 7/15	$ 28,000	-0-	10 yr	$ 4,200	$ 2,800[1]	$ 2,800[1]
Motor	Jul 7/15	8,000	-0-	10 yr	1,200	800[2]	800[2]
Tool Carrier	Jul 3/17	9,600	-0-	8 yr	-0-	600[3]	1,200[3]
		$ 45,600			$ 5,400	$4,200	$4,800

Calculations:

1. 28,000 ÷ 10 yrs = 2,800/yr
2. 8,000 ÷ 10 yrs = 800/yr
3. 9,600 ÷ 8 yrs = 1,200/yr × 6/12 = 600 for partial period in 2017

Part 3

Book value of truck at December 31, 2017:
$45,600 total cost – ($5,400 + $4,200 = $9,600) = $36,000

Book value of truck at December 31, 2018:
$36,000 - $4,800 = $31,200

PROBLEMS

Problem 9-1A (25 minutes)

Part 1

	Land	*Building Two*	*Building Three*	*Land Impmnts. One*	*Land Impmnts. Two*
Purchase price*	$2,867,200	$985,600		$627,200	
Demolition	676,160				
Landscaping	267,520				
New building.....			$3,230,400		
New improvements					$252,800
.....Totals	$3,810,880	$985,600	$3,230,400	$627,200	$252,800

***Allocation of purchase price:**

	Appraised Value	*Percent of Total*	*Apportioned Cost*
Land	$ 2,984,960	64%	$ 2,867,200
Building Two	1,026,080	22	985,600
Land Improvements One	652,960	14	627,200
Totals	$ 4,664,000	100%	$ 4,480,000

Part 2

Mar. 31	Land	3,810,880	
	Building Two	985,600	
	Building Three	3,230,400	
	Land Improvements One	627,200	
	Land Improvements Two	252,800	
	Cash		8,906,880
	To record costs of plant assets.		

Problem 9-2A (25 minutes)

Derlak Enterprises
Balance Sheet
December 31

	2017		2016	
Assets				
Current assets:				
Cash	$ 12,000		$ 28,800	
Prepaid rent	40,000		48,000	
Office supplies	2,400		2,320	
Total current assets		$ 54,400		$ 79,120
Property, plant and equipment:				
Equipment	$184,000		$100,000	
Less: Accumulated depreciation	72,800	111,200	64,800	35,200
Tools	$143,920		$100,800	
Less: Accumulated depreciation	44,800	99,120	42,400	58,400
Vehicles	$ 252,800		$ 252,800	
Less: Accumulated depreciation	108,800	144,000	97,600	155,200
Total property, plant and equipment		354,320		248,800
Intangible assets:				
Franchise	$ 41,600		$ 41,600	
Less: Accumulated amortization	19,200	22,400	11,200	30,400
Patent	$16,000		$16,000	
Less: Accumulated amortization	4,000	12,000	2,400	13,600
Total intangible assets		34,400		44,000
Total assets		$ 443,120		$ 371,920
Liabilities				
Current liabilities:				
Accounts payable	$ 56,800		$ 9,600	
Salaries payable	32,800		26,400	
Total current liabilities		$ 89,600		$ 36,000
Non-current liabilities:				
Notes payable, due in 2023		240,000		129,600
Total liabilities		$329,600		$165,600
Equity				
Lee Derlak, capital		113,520 *		206,320
Total liabilities and equity		$443,120		$371,920

206,320 – 32,000 – 780,800 + 720,000 = 113,520

Analysis component:

Derlak's assets are financed mainly by equity in 2016. In 2017, the assets are financed largely by debt. The change from 2016to 2017in how assets were mainly financed (from equity to debt) is unfavourable because the greater the debt the greater the risk associated with debt (is/will Derlak be in a position to pay the interest and principal as it comes due).

Problem 9-3A (25 minutes)

1. Purchased January 1, 2017	2017	2018	2019
A. Double-declining-balance method			
Equipment	$375,000	$375,000	$375,000
Less: Accumulated depreciation	93,750	164,063	216,797
Year-end book value	$281,250	$210,937	$158,203
Depreciation expense for the year[1]	$93,750	$70,313	$52,734
B. Straight-line method			
Equipment	$375,000	$375,000	$375,000
Less: Accumulated depreciation	39,063	78,126	117,189
Year-end book value	$335,937	$296,874	$257,811
Depreciation expense for the year	$39,063[2]	$39,063	$39,063

1. Rate = 2/8 = 0.25 or 25%
   2017: 0.25 × 375,000 = 93,750
   2018: 0.25 × (375,000 – 93,750) = 70,313
   2019: 0.25 × (375,000 – 93,750 – 70,313) = 52,734

2. (375,000 – 62,500)/8 = 39,063 = 39,063

2. Purchased July 1, 2017	2017	2018	2019
A. Double-declining-balance method			
Equipment	$375,000	$375,000	$375,000
Less: Accumulated depreciation	46,875	128,906	190,430
Year-end book value	$328,125	$246,094	$184,570
Depreciation expense for the year[3]	$46,875	$82,031	$61,524
B. Straight-line method			
Equipment	$375,000	$375,000	$375,000
Less: Accumulated depreciation	19,532	58,594	97,657
Year-end book value	$355,468	$316,405	$277,342
Depreciation expense for the year	$19,532[4]	$39,063	$39,063

3. Rate = 2/8 = 0.25 or 25%
   2017: 0.25 × 375,000 × 6/12 = 46,875
   2018: 0.25 × (375,000 – 46,875) = 82,031
   2019: 0.25 × (375,000 – 46,875 – 82,031) = 61,524

4. (375,000 – 62,500)/8 = 39,063 × 6/12 = 19,532

Problem 9-4A (25 minutes)

Year	Depreciation Method[1]:		
	Straight-line	Double-declining balance	Units-of-production[2]
2017	(828,000 – 192,000)/10 = 63,600/year × 10/12 = 53,000	Rate = 2/10 = .20 or 20% 828,000 × 20% × 10/12 = 138,000	Rate = (828,000 – 192,000)/13,250 = 48/hour 48×720= 34,560
2018	63,600	(828,000 – 138,000) × 20% = 138,000	48 × 1,780 = 85,440
2019	63,600	(828,000 – 138,000 – 138,000) × 20% = 110,400	48 × 1,535 = 73,680

1. ***Depreciation is calculated to the nearest month.***
2. ***Assume actual hours of service were: 2017: 720; 2018: 1,780; 2019: 1,535.***

Analysis component:

If you could ignore the matching principle, you might record the purchase of the boats as a revenue expenditure which means the entire cost of $828,000 would have been expensed in 2017, the year of purchase. This would have resulted in the net income being understated in 2017and, because of depreciation expense not being recorded, net income would be overstated in the remaining years of the asset's useful life as well. On the balance sheet, recording the purchase of the boats as a revenue expenditure would have caused assets and equity to be understated in each year of the asset's life. It is interesting to note that the error would self-correct by the end of the asset's life if it would have gone undetected.

Problem 9-5A (25 minutes)

Year	Depreciation Method[1]:		
	Straight-line	Double-declining balance	Units-of-production[2]
2017	(828,000 – 192,000)/10 = 63,600/year × 6/12 = 31,800	Rate = 2/10 = .20 or 20% 828,000 × 20% × 6/12 = 82,800	Same as Problem 9-4A; Units-of-production is usage based and not affected by time 34,560
2018	63,600	(828,000 – 82,800) × 20% = 149,040	85,440
2019	63,600	(828,000 – 82,800 – 149,040) × 20% = 119,232	73,680

1. ***Depreciation is calculated using the half-year convention.***
2. ***Assume actual hours of service were: 2017: 720; 2018: 1,780; 2019: 1,535.***

Problem 9-6A (15 minutes)

1.

	2017			
Apr.	**30**	**Depreciation Expense, Building .....**	**65,000**	
		Accumulated Depreciation, Building		**65,000**
		To record annual depreciation;		
		975,000/15 = 65,000.		
	30	**Depreciation Expense, Equipment .....**	**86,400**	
		Accumulated Depreciation, Equipment		**86,400**
		To record annual depreciation;		
		Rate = 2/10 = .20 or 20%;		
		432,000 × 20% = 86,400.		

2.

BigSkyFarms Partial Balance Sheet April 30, 2018

Property, plant and equipment:		
Land		**$650,000**
Building	**$975,000**	
Less: Accumulated depreciation.....	**780,000**	**195,000**
Equipment	**750,000**	
Less: Accumulated depreciation.....	**404,400**	**345,600**
.....Totalproperty,plantandequipment		**$1,190,600**

Problem 9-7A (50 minutes)

Part 1

	Market Value	*Percentage of Total*	*Apportioned Cost*
Building	**$652,800**	**48%**	**$604,800**
Land	**462,400**	**34**	**428,400**
Land improvements	**68,000**	**5**	**63,000**
Vehicles	**176,800**	**13**	**163,800**
Total	**$1,360,000**	**100%**	**$1,260,000**

2017			
Mar. 1	**Building**	**604,800**	
	Land	**428,400**	
	Land Improvements	**63,000**	
	Vehicles	**163,800**	
	Cash		**1,260,000**
	To record asset purchases.		

Part 2 **2017straight-line depreciation on building:**
($604,800 – $41,040)/15 × 10/12 = $31,320

Part 3**2017double-declining-balance depreciation on land improvements:**
Rate = 2/5 = .40 or 40%
$63,000 × 40% × 10/12 = $21,000

Analysis component:
If the assets purchased on March 1, 2017were put into service on May 23, 2017the depreciation expense calculated in parts 2 and 3 above would be based on 7 months instead of 10 months because straight-line and double-declining-balance depreciation are both based on the time the assets are actually USED during the period.

Problem 9-8A (30 minutes)

Year	*Straight-Line*[a]	*Units-of-Production*[b]	*Double-Declining-Balance*[c]
2017	$ 38,000	$ 20,544	$ 84,000
2018	114,000	117,504	210,000
2019	114,000	114,816	105,000
2020	114,000	113,472	52,500
2021	76,000	89,664	4,500
Totals	$ 456,000	$ 456,000	$ 456,000

a

Straight-line:

Cost per year = (504,000 – 48,000)/4 years = $114,000 per year × 4/12 = 38,000

b

Units-of-production:

Cost per unit = (504,000 – 48,000)/475,000 units = $0.96 per unit

Year	*Units*	*Unit Cost*	*Depreciation*
2017	21,400	$0.96	$ 20,544
2018	122,400	0.96	117,504
2019	119,600	0.96	114,816
2020	118,200	0.96	113,472
2021	102,000	0.96	89,664*
Total			$ 456,000

Take only enough depreciation in Year 2021to reach the maximum accumulated depreciation of $456,000 (which is cost less residual).

c

Double-declining-balance:

Rate = 2/4 = .50 or 50%

2017: 50% × 504,000 × 4/12 = 84,000

2018: 50% × (504,000 – 84,000) = 210,000

2019: 50% × (504,000 – 84,000 – 210,000) = 105,000

2020: 50% × (504,000 – 84,000 – 210,000 – 105,000) = 52,500

2021: 456,000 – 451,500* = 4,500

Take only enough depreciation in Year 2021to reach the maximum accumulated depreciation of $456,000 (which is cost less residual).

Problem 9-9A (30 minutes)

Cost Information						Depreciation		
Description	Date of Purchase	Depreciation Method	Cost	Residual	Life	Balance of Accum. Deprec. Dec. 31, 2017	Deprec. Expense for 2018	Balance of Accum. Deprec. Dec. 31, 2018
Office equipment	March 27/14	Straight-line	$52,000	$14,000	10 yr.	14,250[1]	3,800[2]	8,050[3]
Machinery	June 4/14	Double-declining balance	$275,000	$46,000	6 yr.	209,362[4]	19,638[5]	229,000[6]
Truck	Nov. 13/17	Units-of-production	$113,000	$26,000	250,000 km.	4,872[7]	23,664[8]	8,536[9]

1. (52,000 – 14,000)/10 = 3,800/year × 3 9/12 = 14,250
2. (52,000 – 14,000)/10 = 3,800/year
3. 14,250 + 3,800 = 18,050
4. Rate = 2/6 = .3333 or 33.33%

2014: 33.33%× 275,000 × 7/12 =	53,472
2015: 33.33%× (275,000 – 53,472) =	73,843
2016: 33.33%× (275,000 – 53,472 – 73,843) =	49,228
2017: 33.33%× (275,000 – 53,472 – 73,843 – 49,228) =	32,819
Accumulated depreciation at Dec. 31, 2017=	$209,362

5. 2018: (275,000 – 46,000) 209,362 = $19,638
6. $209,362 + $19,638 = 229,000
7. Rate = (113,000 – 26,000)/250,000 = $0.348/km; 14,000 × 0.348 = 4,872
8. 68,000 × 0.348 = 23,664
9. 4,872 + 23,664 = 28,536

Problem 9-10A (20 minutes)

2017				
Mar.	26	Delivery Truck	102,900	
		Cash		102,900
		To record purchase of new truck; $97,075 plus $5,825freight costs.		
Dec.	31	Depreciation Expense, Delivery Truck[1]	13,185	
		Accumulated Depreciation, Delivery Truck		13,185
		To record depreciation from Mar. 26 to Dec. 31, 2017.		
2018				
Dec.	31	Depreciation Expense, Delivery Truck[2]	22,220	
		Accumulated Depreciation, Delivery Truck		22,220
		To record depreciation.		

1. (102,900 – 15,000)/5 × 9/12 = 13,185

2. $\dfrac{102{,}900 - 13{,}185 - 17{,}500}{4 - 9/12 = 3.25} = 22{,}220$

Problem 9-11A (30 minutes)

2018				
Dec.	31	Depreciation Expense, Machinery[1]	95,200	
		Accumulated Depreciation, Machinery		95,200
		To record annual depreciation.		
	31	Depreciation Expense, Office Furniture[2]	11,733	
		Accumulated Depreciation, Office Furniture		11,733
		To record annual depreciation.		

Calculations:

1. Cost – Accumulated Depreciation – Residual

$\dfrac{556{,}800 - 246{,}400 - 120{,}000}{2} = 95{,}200$

2. Cost – Accumulated Depreciation – Residual

$\dfrac{89{,}600 - 49{,}600 - (11{,}200 - 6{,}400)}{5-2=3} = 11{,}733$

Problem 9-12A (20 minutes)

Part 1

2017			
Jan. 7	**Machine #5027 – Blade (new) .....**	**10,400**	
	Accumulated Depreciation, Machine #5027 – Blade	**2,688**[1]	
	Loss on Disposal	**5,032**	
	Machine #5027 – Blade (old)		**7,720**
	Cash		**10,400**
	To record installation of replacement blade.		

Calculations:

1. **7,720 – 1,000 = 6,720; 6,720 ÷ 5 yrs = 1,344 deprec. for 2015;**
   1,344+ 1,344 deprec. for 2016= 2,688 accum. deprec. at Dec. 31, 2016.

Part 2

Metal Housing	**44,000 – 8,000 = 36,000; 36,000 ÷ 15 yrs = 2,400 for 2015*PLUS*2,400 for 2016= 4,800 accum. deprec. at Dec. 31/2016;** **Revised deprec. = 44,000 – 4,800 = 39,200 book value;** **39,200 – 8,600 residual = 30,600 depreciable cost;**	**$1,700**
	30,600 ÷ 18 years* = ***20 years – 2 yrs already depreciated = 18 yr remaining life***	
Motor	**2015: 26,000 × 2/10 = 5,200** **2016: 26,000 – 5,200 = 20,800 × 2/10 = 4,160** **2017: 20,800 – 4,160 = 16,640 × 2/10 =**	**3,328**
Blade	**10,400 – 1,000 = 9,400; 9,400 ÷ 5 yrs =**	**1,880**
Total depreciation expense to be recorded on Machine #5027 for 2017=		**$6,908**

Problem 9-13A (40 minutes)

Part 1

2017				
Oct. 31	Impairment Loss		**24,200**	
	Equipment			**24,200**
	To record impairment loss on equipment.			
31	Impairment Loss		**14,300**	
	Furniture			**14,300**
	To record impairment loss on furniture.			

Calculations:

	Book Value	Recoverable Value	Impairment Loss
Land	**$105,600**	**$136,400**	**NA**
Building	**57,200**	**105,600**	**NA**
Equipment	**52,800**	**28,600**	**$24,200**
Furniture	**29,700**	**15,400**	**14,300**

Problem 9-13A (*concluded*)
Part 2

Safety-First Company
Balance Sheet
October 31, 2017

Assets			
Current assets:			
Cash		$ 11,000	
Accounts receivable	$ 19,800		
Less: Allowance for doubtful accounts	880	18,920	
Merchandise inventory		35,200	
Total current assets			$ 65,120
Property, plant and equipment:			
Land		$105,600	
Building	$136,400		
Less: Accumulated depreciation	79,200	57,200	
Equipment	$66,000[1]		
Less: Accumulated depreciation	37,400	28,600	
Furniture	$36,300[2]		
Less: Accumulated depreciation	20,900	15,400	
Total property, plant and equipment			206,800
Total assets			$271,920
Liabilities			
Current liabilities:			
Accounts payable	$ 11,220		
Unearned revenues	7,920		
Current portion of long-term note	26,400		
Total current liabilities		$ 45,540	
Non-current liabilities:			
Note payable, less current portion		59,400	
Total liabilities			$104,940
Equity			
Tarifa Sharma, capital			166,980[3]
Total liabilities and equity			$271,920

Calculations:

1. **90,200 cost – 24,200 impairment loss = 66,000**
2. **50,600 cost – 14,300 impairment loss = 36,300**
3. **62,480 adjusted capital balance + 904,200 sales – 761,200 expenses – 24,200 impairment loss, equip. – 14,300 impairment loss, furn. = 166,980 post-closing capital balance**

Analysis component:

An impairment loss causes net income to decrease on the income statement. On the balance sheet, an impairment loss causes total assets to decrease because of the decrease in property, plant and equipment. Equity also decreases on the balance sheet as a result of the decreased net income.

Problem 9-14A (30 minutes)

1.

2018				
Sept. 27	**Depreciation Expense, Building**		**4,950**	
	Accumulated Depreciation, Building[1]			**4,950**
	To record building depreciation for 2018.			
27	**Cash**		**592,000**	
	Accumulated Depreciation, Building[2]		**398,550**	
	Gain on Disposal			**67,350**
	Land			**396,800**
	Building			**526,400**
	To record sale of land and building.			

2.

Nov. 2	**Depreciation Expense, Equipment**		**16,133**	
	Accumulated Depreciation, Equipment[3]			**16,133**
	To record equipment depreciation for 2018.			
2	**Cash**		**56,800**	
	Accumulated Depreciation, Equipment[4]		**90,533**	
	Loss on Disposal		**23,867**	
	Equipment			**171,200**
	To record sale of equipment.			

1. Depreciation from Jan. 1, 2018to Sept. 27, 2018
[(526,400 – 393,600) – 80,000]/8 = 6,600/year × 9/12 = 4,950

2. Accumulated Depreciation, Building
= 4,950 + 393,600 = 398,550

3. Depreciation from Jan. 1, 2018to Nov. 2,
2018 Rate = 2/10 = .20 or 20%
171,200 – 74,400 = 96,800 × 20% = 19,360 × 10/12 = 16,133

4. Accumulated Depreciation, Equipment =
16,133 + 74,400 = 90,533

Problem 9-15A (45 minutes)

1.

2017				
Jan. 2	**Machine**		**116,900**	
	Cash			**116,900**
	To record purchase of machine.			
3	**Machine**		**4,788**	
	Cash			**4,788**
	To record capital repairs on machine.			
3	**Machine**		**1,512**	
	Cash			**1,512**
	To record installation of machine.			

2.

2017				
Dec. 31	**Depreciation Expense, Machine**		**17,080**	
	Accumulated Depreciation, Machine			**17,080**
	To record depreciation;			
	(123,200 – 20,720)/6 = 17,080.			
2022				
Sept. 30	**Depreciation Expense, Machine**		**12,810**	
	Accumulated Depreciation, Machine			**12,810**
	To record partial year's depreciation;			
	17,080 × 9/12 = 12,810.			

3(a).

30	**Accumulated Depreciation, Machine**[1]		**98,210**	
	Cash		**21,000**	
	Loss on Disposal[2]		**3,990**	
	Machine			**123,200**
	Sold machine for $21,000.			

3(b).

30	**Accumulated Depreciation, Machine**		**98,210**	
	Cash		**27,300**	
	Machine			**123,200**
	Gain on Disposal[3]			**2,310**
	Sold machine for $27,300.			

3(c).

30	**Accumulated Depreciation, Machine**		**98,210**	
	Cash		**25,760**	
	Machine			**123,200**
	Gain on Disposal[4]			**770**
	Received insurance settlement.			

Problem 9-15A *(continued)*

	Deprec. for 2017,2018, 2019, 2020, and 2021.	Accum. Deprec. for 2022.

1. Accumulated depreciation = (17,080 × 5 years) + 12,810 = 98,210

2. Gain (Loss) = Cash Proceeds – Book Value
= 21,000 – (123,200 – 98,210) = (3,990)

3. Gain (Loss) = Cash Proceeds – Book Value
= 27,300 – (123,200 – 98,210) = 2,310

4. Gain (Loss) = Cash Proceeds – Book Value
= 25,760 – (123,200 – 98,210) = 770

Problem 9-16A (15 minutes)

2017				
July 5	**Accumulated Depreciation, Truck**		**6,000**	
	Loss on Disposal*		**10,500**	
	Furniture		**45,100**	
		Truck		**36,000**
		Cash		**25,600**
	To record exchange.			
Dec. 31	**Depreciation Expense, Furniture**		**3,236**	
		Accumulated Depreciation, Furniture		**3,236**
	To record depreciation;			
	(45,100 – 6,268)/6 × 6/12 = 3,236.			

*** Gain (Loss) = Proceeds – Book Value of Assets Given Up**
= 45,100 – [25,600 + (36,000 – 6,000)
= 45,100 – 55,600
= (10,500)

Problem 9-17A (45 minutes)

a. Depreciation expense on first December 31 of each machine's life

2017				
Dec.	**31**	**Depreciation Expense, Machine 1550[1]**	**6,075**	
		Accumulated Depreciation, Machine 1550		**6,075**
		To record depreciation.		
2020				
Dec.	**31**	**Depreciation Expense, Machine 1795[3]**	**22,646**	
		Accumulated Depreciation, Machine 1795		**22,646**
		To record depreciation.		
2021				
Dec.	**31**	**Depreciation Expense, Machine BT-311[5]**	**77,810**	
		Accumulated Depreciation, Machine BT-311		**77,810**
		To record depreciation.		

b. Purchase/exchange/disposal of each machine. 2017

Apr.	**1**	**Machine 1550**	**52,900**	
		Cash		**52,900**
		To record purchase of Machine 15-50.		
2020				
Mar.	**29**	**Machine 1795 (= assets given up)**	**60,390**	
		Accumulated Depreciation, Machine 1550[2]	**24,300**	
		Machine 1550		**52,900**
		Cash		**31,790**
		To record exchange of Machine 1550.		
2021				
Oct.	**2**	**Machine BT-311**	**537,000**	
		Accumulated Depreciation, Machine 1795[4]	**36,800**	
		Loss on Disposal	**3,590**	
		Machine 1795		**60,390**
		Cash		**517,000**
		To record exchange of Machine 1795.		
2024				
Aug.	**21**	**Cash**	**81,200**	
		Accumulated Depreciation, Machine BT-311[6]	**348,890**	
		Loss on Disposal	**106,910**	
		Machine BT-311		**537,000**
		To record sale of Machine BT-311.		

Problem 9-17A *(continued)*

Calculations:

1. **52,900 – 4,300 = 8,100/year × 9/12 = 6,075**
   6

2. **Depreciation 2017: 6,075**
   2018: 8,100
   2019: 8,100
   2020: 2,025 (8,100× 3/12)
   Accum. Deprec. 24,300

Book Value 52,900 – 24,300= 28,600
Cash Paid 62,000 – 30,210 = 31,790
Book Value 28,600 plus cash paid 31,790 = 60,390

3. **Rate = 2/4 = .50 or 50%**
   50% × 60,390 × 9/12 = 22,646 (deprec. for 2017)

4. **50% × (60,390 – 22,646) × 9/12 = 14,154 (deprec. for 2021)**
   + 22,646 (deprec. for 2020)
   36,800 (accum. deprec.)

5. **(537,000 – 35,000)/200,000 = 2.51/unit**
   2021: 31,000 units × 2.51/unit = 77,810

6. **Depreciation for Jan. 1/2022to August 21/2024**
   = 108,000 units × 2.51/unit = 271,080
   +77,810 (2021)
   348,890 (accum. deprec.)

Problem 9-18A (10 minutes)

(a)

2017				
Oct.	**1**	**Copyright**	**288,000**	
		Cash		**288,000**
		To record purchase of copyright.		

(b)

Dec.	**31**	**Amortization Expense**	**24,000**	
		Accumulated Amortization, Copyright		**24,000**
		To record amortization of copyright;		
		288,000/3 × 3/12 = 24,000.		

Problem 9-19A (30 minutes)
Part 1

2017				
Dec. 31	**Amortization Expense, Mineral Rights**		**13,000**	
	Accumulated Amortization, Mineral Rights			**13,000**
	To record amortization on the mineral rights;			
	$62,400 ÷ 4 years = $15,600/year × 10/12 = $13,000.			
31	**Depreciation Expense, Equipment**		**51,000**	
	Accumulated Depreciation, Equipment			**51,000**
	To record depreciation on the equipment;			
	$244,800 ÷ 4 years = $61,200/year × 10/12 = $51,000.			
31	**Depreciation Expense, Truck**		**19,875**	
	Accumulated Depreciation, Truck			**19,875**
	To record depreciation on the truck;			
	$95,400 ÷ 4 years = $23,850/year × 10/12 = $19,875.			

Part 2

2020				
Oct. 31	**Accumulated Amortization, Mineral Rights**		**57,200**	
	Loss on Disposal		**5,200**	
	Mineral Rights			**62,400**
	To record disposal of the mineral rights;			
	$13,000 + $15,600 + $15,600 + 13,000 = $57,200			
	accum. amortization.			
31	**Accumulated Depreciation, Equipment**		**224,400**	
	Loss on Disposal		**20,400**	
	Equipment			**244,800**
	To record disposal of the equipment;			
	$51,000 + $61,200 + $61,200 + $51,000 = $224,400			
	accum. depreciation.			
31	**Accumulated Depreciation, Truck**		**87,450**	
	Loss on Disposal		**7,950**	
	Truck			**95,400**
	To record disposal of the truck;			
	$19,875+ $23,850 + $23,850 + $19,875 = $87,450			
	accum. depreciation.			

***Problem 9-20A (30 minutes)**

Part 1

a.

2017				
Jun. 27	**Depreciation Expense, Boat – Motor**		**2,660**	
	Accumulated Depreciation, Boat – Motor			**2,660**
	To update depreciation in 2017 regarding motor being replaced.			
27	**Boat – Motor (new)**		**63,000**	
	Accumulated Depreciation, Boat – Motor		**43,890**[1]	
	Loss on Disposal		**9,310**	
	Boat – Motor (old)			**53,200**
	Cash			**63,000**
	To record replacement of motor.			

b.

Dec. 31	**Depreciation Expense, Boat**		**3,113**[2]	
	Accumulated Depreciation, Boat			**3,113**
	To record revised depreciation for 2017 on the boat (boat body plus motor).			

Calculations:

1. 53,200 ÷ 10 years = 5,320/year; 5,320 × 9/12 = 3,990 depreciation for 2009; 5,320 × 7 years for 2010thru 2016= 37,240; 5,320/ year × 6/12 = 2,660 deprec. from Jan. 1/17to June 27/17; 37,240 + 3,990 + 2,660 = 43,890 accumulated depreciation at June 27, 2017;

2. Body: Accumulated depreciation at Dec. 31, 2016:
23,800 – 7,000 = 16,800; 16,800 ÷ 15 years = 1,120/year; 1,120 × 9/12 = 840 depreciation for 2009; 1,120 × 7 years (2010thru 2016) = 7,840; 7,840 + 840 = 8,680
Revised depreciation at Dec. 31, 2017(rounded):
23,800 – 8,680 – 7,000 = 8,120 remaining depreciable cost;
8,120 ÷ 12.25[1] years = $ 663*

[1] 20 – 7 9/12 = 12 3/12 or 12.25 years remaining useful life

Motor: 63,000 – 4,200 = 58,800; 58,800 ÷ 12 years = 4,900/yr × 6/12 = 2,450

$3,113

***rounded to the nearest whole dollar since depreciation is based on estimates.**

Part 2

Total 2017depreciation = $2,660 + $3,113 = $5,773

ALTERNATE PROBLEMS

Problem 9-1B (25 minutes)

Part 1

	Land	*Building B*	*Building C*	*Land Imprmnts. B*	*Land Imprmnts. C*
Purchase price*	$307,800	$183,600		$48,600	
Demolition	46,800				
Landscaping	69,000				
New building			$542,400		
New improvements					$40,500
Totals	$423,600	$183,600	$542,400	$48,600	$40,500

***Allocation of purchase price:**

Land	*Appraised Value*	*Percent of Total*	*Apportioned Cost*
.....	$317,034	57%	$307,800
Building B	189,108	34	183,600
Land Improvements B	50,058	9	48,600
.....Totals	$ 556,200	100 %	$ 540,000

Part 2

June 1	Land	423,600	
	Building B	183,600	
	Building C	542,400	
	Land Improvements B	48,600	
	Land Improvements C	40,500	
	Cash		1,238,700

To record costs of plant assets.

Problem 9-2B (25 minutes)

Xentel Interactive
Balance Sheet
September 30

	2017		2016	
Assets				
Current assets:				
Cash	$ 900		$ 2,700	
Accounts receivable	1,800		4,320	
Prepaid insurance	-0-		1,530	
Total current assets		$ 2,700		$ 8,550
Property, plant and equipment:				
Land		68,400		68,400
Machinery	$295,200		$115,200	
Less: Accumulated depreciation	90,000	205,200	82,800	32,400
Building	$225,000		$225,000	
Less: Accumulated depreciation	54,000	171,000	50,400	174,600
Total property, plant and equipment		444,600		275,400
Intangible assets:				
Copyright	$ 7,200		$ 7,200	
Less: Accumulated amortization	1,080	6,120	540	6,660
Total assets		$453,420		$290,610
Liabilities				
Current liabilities:				
Accounts payable	$ 4,320		$ 3,150	
Unearned fees	82,800		5,580	
Total current liabilities		$ 87,120		$ 8,730
Non-current liabilities:				
Notes payable, due in 2022		230,220		55,800
Total liabilities		$317,340		$ 64,530
Equity				
Mason Xentel, capital		136,080*		226,080
Total liabilities and equity		$453,420		$290,610

226,080 – 72,000 + 540,000 – 558,000 = 136,080

Analysis component:

Xentel's assets were mainly financed by equity in 2016. In 2017, Xentel's assets were mainly financed by debt. The increase in the debt financing has weakened the balance sheet as opposed to strengthening it.

Problem 9-3B (30 minutes)

Part 1. Purchase made on January 1, 2017	**2017**	**2018**	**2019**
A. Double-declining balance method			
Machinery	**$588,000**	**$588,000**	**$588,000**
Less: Accumulated depreciation	**58,800**	**164,640**	**249,312**
Year-end book value	**$529,200**	**$423,360**	**$338,688**
Depreciation expense for the year[1]	**$58,800**	**$105,840**	**$84,672**
B. Straight-line method			
Machinery	**$588,000**	**$588,000**	**$588,000**
Less: Accumulated depreciation	**26,600**	**79,800**	**133,000**
Year-end book value	**$561,400**	**$508,200**	**$455,000**
Depreciation expense for the year[2]	**$26,600**	**$53,200**	**$53,200**

1. Rate = 2/10 = .20 or 20%
2017: 20% × 588,000 × 6/12 = 58,800 note – using half year rule
2018: 20% × (588,000 – 58,800) = 105,840
2019: 20% × (588,000 – 58,800 – 105,840) = 84,672

2. (588,000 – 56,000)/10 = 53,200 × 6/12 = 26,600

Problem 9-3B (continued)

Part 2. Purchase made on April 1, 2017	2017	2018	2019
A. Double-declining balance method			
Machinery	$588,000	$588,000	$588,000
Less: Accumulated depreciation.....	58,800	164,640	249,312
Year-end book value	$529,200	$423,360	$338,688
Depreciation expense for the year[1]	$58,800	$105,840	$84,672
B. Straight-line method			
Machinery	$588,000	$588,000	$588,000
Less: Accumulated depreciation.....	26,600	79,800	133,000
Year-end book value	$561,400	$508,200	$455,000
Depreciation expense for the year[2]	$26,600	$53,200	$53,200

3. Rate = 2/10 = .20 or 20%
   2017: 20% × 588,000 × 6/12 = 58,800 (note – using half year rule)
   2018: 20% × (588,000 – 58,800) = 105,840
   2019: 20% × (588,000 – 58,800 – 105,840) = 84,672

4. (588,000 – 56,000)/10 = 53,200 × 6/12 = 26,600

Problem 9-4B (30 minutes)

Year	Depreciation Method:		
	Straight-line	Double-declining balance	Units-of-production
2017	(145,000 – 25,000)/5 = 24,000/year × 2/12 = 4,000	Rate = 2/5 = .40 or 40% 145,000 × 40% × 2/12 = 9,667	Rate = (145,000 – 25,000)/100,000 = 1.20/km 1.20 × 5,800 = 6,960
2018	24,000	(145,000 – 9,667) × 40% = 54,133	1.20 × 19,400 = 23,280
2019	24,000	(145,000 – 9,667 – 54,133) × 40% = 32,480	1.20 × 22,850 = 27,420
2020	24,000	(145,000 – 9,667 – 54,133 – 32,480) × 40% = 19,488	1.20 × 25,700 = 30,840
2021	24,000	4,232*	1.20 × 19,980 = 23,976
2022	20,000	0	120,000 – 112,476 = 7,524**
Totals	120,000	120,000	120,000

*Maximum allowed = $4,232 [$120,000 – ($9,667 + $54,133 + $32,480 + $19,488)]

**Maximum allowed = $7,524 [$120,000 – ($6,960 + $23,280 + $27,420 + $30,840 + $23,976)]

Problem 9-5B (30 minutes)

Year	Depreciation Method:		
	Straight-line	Double-declining balance	Units-of-production
2017	(145,000 – 25,000)/5 = 24,000/year × 6/12 = 12,000	Rate = 2/5 = .40 or 40% 145,000 × 40% × 6/12 = 29,000	Same as Problem 9-4B; Units-of-production is usage based and not affected by time 6,960
2018	24,000	(145,000 – 29,000) × 40% = 46,400	1.20 × 19,400 = 23,280
2019	24,000	(145,000 – 29,000 – 46,400) × 40% = 27,840	1.20 × 22,850 = 27,420
2020	24,000	(145,000 – 29,000 – 46,400 – 27,840) × 40% = 16,704	1.20 × 25,700 = 30,840
2021	24,000	56*	1.20 × 19,980 = 23,976
2022	12,000	0	120,000 – 112,476 = 7,524**
Totals	120,000	120,000	120,000

* Maximum allowed = $56 [$120,000 – ($29,000 + $46,400 + $27,840 + $16,704)]

** Maximum allowed = $7,524 [$120,000 – ($6,960 + $23,280 + $27,420 + $30,840 + $23,976)]

Problem 9-6B (15 minutes)

Part 1.

2018				
Dec. 31	**Depreciation Expense, Machinery**		**55,000**	
	Accumulated Depreciation, Machinery			**55,000**
	To record annual depreciation;			
	(500,000 – 60,000)/8 = 55,000			
31	**Depreciation Expense, Equipment**		**126,667**	
	Accumulated Depreciation, Equipment			**126,667**
	To record annual depreciation;			
	Rate = 2/4 = .50 or 50%;			
	50% × (1,280,000 – 1,026,667) = 126,667			

Part 2.

WESTFAIR FOODS
Partial Balance Sheet
December 31, 2018

Property, plant and equipment:		
Machinery	**$500,000**	
Less: Accumulated depreciation	**385,000**	**$115,000**
Equipment	**1,280,000**	
Less: Accumulated depreciation	**1,153,334**	**126,666**
Total property, plant and equipment		**$241,666**

Problem 9-7B (30 minutes)

Part 1

	Market Value	*Percentage of Total*	*Apportioned Cost*
Building	$ 663,300	55%	$574,200
Land	397,980	33	344,520
Land improvements	120,600	10	104,400
Truck	24,120	2	20,880
Total	$1,206,000	100%	$1,044,000

2017			
Sept. 30 Building		574,200	
Land		344,520	
Land Improvements		104,400	
Truck		20,880	
Cash			1,044,000
	To record asset purchases.		

Part 2 **2017straight-line depreciation on building:**

($574,200 – 45,000)/15 × 3/12 = $8,820

Part 3 **2017double-declining-balance depreciation on land improvements:**

Rate = 2/8 = .25 or 25%
$104,400 × 25% × 3/12 = $6,525

Problem 9-8B (45 minutes)

Year	*Straight-Line*[a]	*Units-of-Production*[b]	*Double-Declining-Balance*[c]
2017	$ 31,304	$32,928	$ 72,800
2018	46,956	51,744	80,080
2019	46,956	47,040	48,048
2020	46,956	44,688	28,829
2021	46,956	37,240	5,023*
2022	15,652	21,140	0
Totals	$ 234,780	$ 234,780	$ 234,780

a

Straight- line:

Cost per year = (273,000 – 38,220)/5 years = $46,956 per year × 8/12 = $31,304 for 2017

= $46,956/year × 4/12 = $15,652 for 2022

b

Units-of-production:

Cost per unit = (273,000 – 38,220)/168,000 units = $1.40 per unit (rounded)

Year	*Units*	*Unit Cost*	*Depreciation*
2017	23,520	$1.40	$32,928
2018	36,960	1.40	51,744
2019	33,600	1.40	47,040
2020	31,920	1.40	44,688
2021	26,600	1.40	37,240
2022	30,940	1.40	21,140*
Total			$ 234,780

***Take only enough depreciation in Year 2022to reach the maximum accumulated depreciation of $234,780.**

c

Double-declining-balance:

Rate = 2/5 = .40 or 40%

2017: 40% × 273,000 × 8/12 = 72,800
2018: 40% × (273,000 – 72,800) = 80,080
2019: 40% × (273,000 – 72,800 – 80,080) = 48,048
2020: 40% × (273,000 – 72,800 – 80,080 – 48,048) = 28,829
2021: 234,780 – 229,757* = 5,023

***Take only enough depreciation in Year 2021to reach the maximum accumulated depreciation of $234,780.**

Problem 9-9B (40 minutes)

Cost Information						Depreciation		
Description	Date of Purchase	Depreciation Method	Cost	Residual	Life	Balance of Accum. Deprec. Apr. 30, 2017	Depreciation Expense for 2018	Balance of Accum. Deprec. Apr. 30, 2018
Equipment	Oct. 3/14	Straight-line	$ 62,400	$ 16,800	20 yr.	$ 5,700[1]	$ 2,280[2]	$ 7,980[3]
Machinery	Oct. 28/14	Units-of-production	540,000	180,000	100,000 units	73,332[4]	38,124[5]	111,456[6]
Tools	Nov. 3/14	Double-declining balance	64,000	15,000	5 yr.	45,568[7]	3,432[8]	9,000[9]

1. (62,400 – 16,800)/20 = 2,280/year × 2 6/12 = 5,700
2. (62,400 – 16,800)/20 = 2,280/year
3. 5,700 + 2,280 = 7,980
4. Rate = (540,000 – 180,000)/100,000 = 3.60/unit;
   2015: 940 × 3.60 = 3,384
   2016: 10,150 × 3.60 = 36,540
   2017: 9,280 × 3.60 = 33,408
   73,332
5. 10,590 × 3.60 = 38,124
6. 73,332 + 38,124 = 111,456
7. Rate = 2/5 = .40 or 40%

2015: 40%× 64,000 × 6/12 =	12,800
2016: 40%× (64,000 – 12,800) =	20,480
2017: 40%× (64,000 – 12,800 – 20,480) =	12,288
Accumulated depreciation at Apr. 30, 2017=	$45,568

8. 2018: (64,000 – 15,000) – 45,568 = 3,432
9. 45,568 + 3,432 = 49,000

Problem 9-10B (20 minutes)

2017				
June	**26**	**Truck**	**71,820**	
		Cash		**71,820**
		To record purchase of new truck;		
		$68,400 + $3,420 freight costs.		
	27	**Truck**	**3,780**	
		Cash		**3,780**
		To record installation of special racks.		
Dec.	**31**	**Depreciation Expense, Truck[1]**	**7,200**	
		Accumulated Depreciation, Truck		**7,200**
		To record depreciation for half-year.		
2018				
Jan.	**5**	**No entry.**		
Mar.	**15**	**Repair and Maintenance Expense**	**660**	
		Cash		**660**
		To record repairs.		
Dec.	**31**	**Depreciation Expense, Truck[2]**	**10,600**	
		Accumulated Depreciation, Truck		**10,600**
		To record revised depreciation		

1. [(71,820 + 3,780) – 18,000]/4 × 6/12 = 7,200

2. [(71,820 + 3,780) – 7,200 – 10,100]/(6 – .5 = 5.5) = 10,600

Problem 9-11B (40 minutes)

2018				
Dec.	**31**	**Depreciation Expense, Building[1] .....**	**1,620**	
		Accumulated Depreciation, Building		**1,620**
		To record annual depreciation.		
	31	**Depreciation Expense, Equipment[2] .....**	**7,320**	
		Accumulated Depreciation, Equipment		**7,320**
		To record annual depreciation.		

1. $\dfrac{\text{Cost} - \text{Accumulated Depreciation} - \text{Residual}}{20} = \dfrac{274{,}800 - 134{,}400 - 108{,}000}{20} = \underline{\underline{1{,}620}}$

2. $\dfrac{\text{Cost} - \text{Accumulated Depreciation} - \text{Residual}}{10} = \dfrac{117{,}600 - 38{,}400 - 6{,}000}{10} = \underline{\underline{7{,}320}}$

Problem 9-12B (40 minutes)

2017			
Jan. 3	**Warehouse – Furnace (new) .....**	**39,000**	
	Accumulated Depreciation, Warehouse – Furnace	**18,153[1]**	
	Loss on Disposal	**8,847**	
	Warehouse – Furnace (old)		**27,000**
	Accounts Payable		**39,000**
	To record installation of new warehouse furnace.		

***Calculations*:**

1. 2012 Deprec.: 27,000 × 2/10 = 5,400;
2013Deprec.: (27,000 – 5,400) × 2/10 = 4,320;
2014Deprec.: (27,000 – 9,720) × 2/10 = 3,456;
2015Deprec.: (27,000 – 13,176) × 2/10 = 2,765;
2016Deprec.: (27,000 – 15,941) × 2/10 = 2,212;
Accum. Deprec. Dec. 31, 2016= 5,400 + 4,320 + 3,456 + 2,765 + 2,212 = 18,153.

Part 2

Windows	**51,750 ÷15=**	**$ 3,450**
Doors	**105,000 ÷ 20 = 5,250/yr;** **5,250/yr × 5 yrs = 26,250 Accum. Dep.;** **105,000 – 26,250 = 78,750 book value;** **78,750 – 23,100 = 55,650 revised depreciable value;** **55,650 ÷ (12 yrs – 5 yrs = 7 yrs) =**	**7,950**
Roofing	**43,500 ÷10=**	**4,350**
Siding	**54,000 ÷25=**	**2,160**
Framing/Walls	**222,000 – 60,000 = 162,000; 162,000 ÷ 30 =**	**5,400**
Furnace	**39,000 × 2/16 =**	**4,875**
Misc.	**Maximum allowable depreciation reached[1]**	**-0-**
Total depreciation	**expense to be recorded on the warehouse for 2017=**	**$28,185**

1. 2012: 61,500 × 2/5 = 24,600;
2013: (61,500 – 24,600) × 2/5 = 14,760;
2014: (61,500 – 39,360) × 2/5 = 8,856;
2015: (61,500 – 48,216) × 2/5 = 5,314;
2016: (61,500 – 53,530) × 2/5 = 3,188 which exceeds max. allowable accumulated depreciation of 54,000 therefore the maximum that can be recorded in 2016is 54,000 – 53,530 = 470 with no depreciation recorded in any subsequent years.

Problem 9-13B (40 minutes)

Part 1

2017				
Mar. 31	**Impairment Loss**		**26,000**	
	Computer Equipment			**26,000**
	To record impairment loss on computer equipment.			
31	**Impairment Loss**		**23,750**	
	Machinery			**23,750**
	To record impairment loss on machinery.			

Calculations:

	Book Value	Recoverable Value	Impairment Loss
Computer equipment	**$ 32,250**	**$6,250**	**$26,000**
Land	**145,000**	**172,500**	**NA**
Machinery	**88,750**	**65,000**	**23,750**
Warehouse	**173,500**	**243,750**	**NA**

Problem 9-13B (*concluded*)
Part 2

La Mancha Enterprises
Balance Sheet
March 31, 2017

Assets			
Current assets:			
Cash		$ 35,000	
Accounts receivable	$ 57,500		
Less: Allowance for doubtful accounts	6,000	51,500	
Office supplies		4,875	
Total current assets			$ 91,375
Property, plant and equipment:			
Land		$145,000	
Warehouse	$ 460,000		
Less: Accumulated depreciation	286,500	173,500	
Machinery	$217,500[1]		
Less: Accumulated depreciation	152,500	65,000	
Computerequipment	$46,500[2]		
Less: Accumulated depreciation	40,250	6,250	
Total property, plant and equipment			389,750
Totalassets			$481,125
Liabilities			
Current liabilities:			
Accounts payable	$ 14,750		
Salaries payable	33,750		
Current portion of long-term mortgage	59,550		
Totalcurrentliabilities		$108,050	
Non-current liabilities:			
Mortgage payable, less current portion		34,200	
Totalliabilities			$142,250
Equity			
Joy La Mancha, capital			338,875[3]
Total liabilities and equity			$481,125

Calculations:

1. 241,250 cost – 23,750 impairment loss = 217,500
2. 72,500 cost – 26,000 impairment loss = 46,500
3. 407,875 adjusted capital balance + 1,227,500 revenues – 1,246,750 expenses – 26,000 impairment loss, computer equip. – 23,750 impairment loss, machinery. = 338,875 post-closing capital balance

Analysis component:

The recording of an impairment loss causes expenses to increase which in turn causes net income to decrease. Decreases in income cause equity on the balance sheet to decrease.

Problem 9-14B (45 minutes)

Part 1

2017				
Mar.	**2**	**Depreciation Expense, Van**	**1,575**	
		Accumulated Depreciation, Van[1]		**1,575**
		To record depreciation on van for 2017.		
	2	**Cash**	**17,920**	
		Accumulated Depreciation, Van[1]	**42,175**	
		Loss on Disposal	**4,305**	
		Van		**64,400**
		To record sale of van.		

Part 2

Aug.	**27**	**Depreciation Expense, Machinery**	**12,642**	
		Accumulated Depreciation, Machinery[2]		**12,642**
		To record depreciation on machinery for 2017.		
	27	**Cash**	**95,718**	
		Accumulated Depreciation, Machinery[2]	**33,082**	
		Machinery		**128,800**
		To record sale of machinery.		

Part 3

June 29		**Depreciation Expense, Equipment**	**3,500**	
		Accumulated Depreciation, Equipment[3]		**3,500**
		To record depreciation on equipment for 2017.		
	29	**Cash**	**27,720**	
		Accumulated Depreciation, Equipment[3]	**48,300**	
		Gain on Disposal		**420**
		Equipment		**75,600**
		To record sale of equipment.		

Calculations:

1. Depreciation from Feb. 1/17to Mar. 2/17:

$$\frac{64{,}400 - 40{,}600 - 9{,}800}{40{,}000} = \$0.35/\text{km} \times 4{,}500\ \text{km} = 1{,}575$$

+ 40,600

42,175

(calculations continued on next page)

Problem 9-14B (*concluded*)

2. Depreciation from Feb. 1/17to Aug. 27/17:

128,800 – 20,440 = 108,360 Book Value

Rate = 2/10 = .20 or 20%

108,360 × 20% × 7/12 =	**12,642**
	+ 20,440
	33,082

3. Depreciation from Feb. 1/17to June 29/17:

75,600 – 44,800 – 5,600 × 5/12 =	**3,500**
3	**+ 44,800**
	48,300

Problem 9-15B (60 minutes)

Part 1

2017				
Jan.	**1**	**Machine**	**156,000**	
		Cash		**156,000**
		To record purchase of machine.		
	2	**Machine**	**4,068**	
		Cash		**4,068**
		To record capital repairs on machine.		
	2	**Machine**	**5,760**	
		Cash		**5,760**
		To record installation of machine.		

Part 2

Dec.	**31**	**Depreciation Expense, Machine**	**20,604**	
		Accumulated Depreciation, Machine		**20,604**
		To record depreciation;		
		(165,828 – 21,600)/7 = 20,604		
2022				
Apr.	**1**	**Depreciation Expense, Machine**	**5,151**	
		Accumulated Depreciation, Machine		**5,151**
		To record partial year's depreciation;		
		20,604 × 3/12 = 5,151.		

Problem 9-15B (*concluded*)

Part 3(a)

Apr. 30	Accumulated Depreciation, Machine[1]		108,171	
	Cash		36,000	
	Loss on Disposal[2]		21,657	
	Machine			165,828
	Sold machine for $36,000.			

Part 3(b)

30	Accumulated Depreciation, Machine		108,171	
	Cash		60,000	
	Machine			165,828
	Gain on Disposal[3]			2,343
	Sold machine for $60,000.			

Part 3(c)

30	Accumulated Depreciation, Machine		108,171	
	Cash		24,000	
	Loss on Disposal[4]		33,657	
	Machine			165,828
	Received insurance settlement.			

Calculations:

Depreciation

Deprec. for 2017, 2018, 2019, 2020, 2018 — Deprec. for 2022

1. **Accumulated depreciation = (20,604 × 5 years) + 5,151 = 108,171**

2. **Gain (Loss) = Cash Proceeds – Book Value**
   = 36,000 – (165,828 – 108,171) = (21,657)

3. **Gain (Loss) = Cash Proceeds – Book Value**
   = 60,000 – (165,828 – 108,171) = 2,343

4. **Gain (Loss) = Cash Proceeds – Book Value**
   = 24,000 – (165,828 – 108,171) = (33,657)

Problem 9-16B (20 minutes)

2017				
Aug.	**31**	**Accumulated Depreciation, Furniture**	**25,800**	
		Computer Equipment	**72,600**	
		Furniture		**42,000**
		Cash		**56,400**
		To record exchange.		
Sept.	**4**	**Computer Equipment**	**11,760**	
		Cash		**11,760**
		Addition of capital expenditures.		
Dec.	**31**	**Depreciation Expense, Computer Equipment**	**7,240**	
		Accumulated Depreciation, Computer Equipment		**7,240**
		To record depreciation;		
		[(72,600 + 11,760) – 19,200] /3 × 4/12.		

*** Assets Given up = Cash Paid+ Book Value of Assets Given Up**
= 56,400+[42,000–25,800]
= 56,400+16,200= 72,600

Problem 9-17B (45 minutes)

1. Depreciation expense on first December 31 of each machine's life

2017			
Dec. 31	Depreciation Expense, Machine 6690[1]	10,800	
	Accumulated Depreciation, Machine 6690		10,800
	To record depreciation.		
2019			
Dec. 31	Depreciation Expense, Machine 6691[3]	8,325	
	Accumulated Depreciation, Machine 6691		8,325
	To record depreciation.		
2022			
Dec. 31	Depreciation Expense, Machine 6711[5]	7,155	
	Accumulated Depreciation, Machine 6711		7,155
	To record depreciation.		

2. Purchase/exchange/disposal of each machine

2017			
May 1	Machine 6690	72,900	
	Cash		72,900
	To record purchase of Machine 6690.		
2019			
Aug. 5	Machine 6691 (= to assets given up)	49,950	
	Accumulated Depreciation, Machine 6690[2]	36,450	
	Machine 6690		72,900
	Cash		13,500
	To record exchange of Machine 6690.		
2022			
Feb. 1	Cash	13,500	
	Accumulated Depreciation, Machine 6691[4]	35,465	
	Loss on Disposal	985	
	Machine 6691		49,950
	To record sale of Machine 6691.		
1	Machine 6711	79,650	
	Cash		79,650
	To record purchase of Machine 6711.		
2023			
Oct. 3	Cash	54,000	
	Accumulated Depreciation, Machine 6711[6]	17,888	
	Loss on Disposal	7,762	
	Machine 6711		79,650
	To record sale of Machine 6711.		

Problem 9-17B *(continued)*

Calculations:

1. 72,900 – 8,100 = 16,200/year × 8/12 = 10,800
4

2. Depreciation 2017: 10,800
2018: 16,200
2019: 9,450 (16,200 × 7/12)
Accum. Deprec. 36,450

3. Rate = 2/5 = .40 or 40%
40% × 49,950 × 5/12 = 8,325

4.

2019:	**8,325**
2020: 40% × (49,950 – 8,325) =	**16,650**
2021: 40% × (49,950– 8,325 – 16,650) =	**9,990**
2022: 40% × (49,950– 8,325 – 16,650 – 9,990) × 1/12 =	**500**
	35,465

5. (79,650 – 8,100)/75,000 = $0.954/unit

2022: 7,500 units × 0.954/unit = 7,155

6. Depreciation for Jan. 1/2023to Oct. 3/2023:

= 11,250 units × 0.954/unit =	**10,733**
	7,155
Accum. Deprec.	**17,888**

Problem 9-18B (20 minutes)

Part 1

a.

2017			
Feb. 3	**Patent**	**220,800**	
	Cash		**220,800**
	To record purchase of patent.		

b.

Dec. 31	**Amortization Expense, Patent**	**40,480**	
	Accumulated Amortization, Patent		**40,480**
	To record amortization on patent;		
	220,800 ÷ 5 = 44,160/year;		
	44,160 x 11/12 = 40,480.		

Part 2

Secure Software Group
Partial Balance Sheet
December 31, 2017

Assets			
Current assets:			
Cash		**$103,200**	
Accounts receivable (net)		**277,200**	
Merchandise inventory		**135,600**	
Total current assets			**$ 516,000**
Property, plant and equipment:			
Land		**$110,400**	
Building	**$595,200**		
Less: Accumulated depreciation, building	**189,000**	**406,200**	
Equipment	**$477,600**		
Less: Accumulated depreciation, equip.	**259,200**	**218,400**	
Total property, plant and equipment			**735,000**
Intangible assets:			
Patent		**$220,800**	
Less: Accumulated amortization, patent		**40,480**	**180,320**
Total assets			**$ 1,431,320**

Problem 9-19B (30 minutes)

Part 1

2017				
Dec. 31	**Amortization Expense, Patent**		**9,625**	
	Accumulated Amortization, Patent			**9,625**
	To record amortization on the patent;			
	$210,000 ÷ 20 years = $10,500/yr × 11/12 = $9,625.			
31	**Depreciation Expense, Equipment**		**16,170**	
	Accumulated Depreciation, Equipment			**16,170**
	To record depreciation on the equipment;			
	$320,600 - $56,000 = $264,600;			
	$264,600 ÷ 15 years = $17,640/yr × 11/12 = $16,170.			
31	**Depreciation Expense, Computer**		**14,630**	
	Accumulated Depreciation, Computer			**14,630**
	To record depreciation on the computer;			
	$79,800 ÷ 5 years = $15,960/yr × 11/12 = $14,630.			

Part 2

2021				
Jan. 27	**Accumulated Amortization, Patent**		**42,000**	
	Loss on Disposal		**168,000**	
	Patent			**210,000**
	To record disposal of the patent;			
	4 yrs × $10,500/yr = $42,000 accum. amort.			
27	**Accumulated Depreciation, Equipment**		**70,560**	
	Cash		**252,000**	
	Gain on Disposal			**1,960**
	Equipment			**320,600**
	To record disposal of the equipment;			
	4 yrs × $17,640/yr = $70,560 accum. amort.			
27	**Accumulated Depreciation, Computer**		**63,840**	
	Loss on Disposal		**15,960**	
	Computer			**79,800**
	To record disposal of the computer;			
	4 yrs × $15,960/yr = $63,840 accum. amort.			

***Problem 9-20B (40 minutes)**

1.a. 2017

Oct. 3	**Depreciation Expense, Equipment – Fan .....**	**3,840**		
	Accum. Deprec., Equipment – Fan		**3,840**	
	To update depreciation on replaced fan from Jan 1/17to Oct 3/17.			
3	**Cash .....**	**8,400**		
	Accum. Deprec., Equipment – Fan	**28,800**[1]		
	Equipment – Fan (old)		**32,400**	
	Gain on Disposal		**4,800**	
	To record sale of replaced fan on the equipment.			
3	**Equipment – Fan (new) .....**	**36,000**		
	Cash		**36,000**	
	To record purchase of replacement fan on equipment.			
1.b. Dec. 31	**Depreciation Expense, Equipment .....**	**22,370**[2]		
	Accum. Deprec., Equipment		**22,370**	
	To record depreciation for 2017on the equipment (sum of all components).			

Calculations:

1. 32,400 – 3,600 = 28,800; 28,800 ÷ 5 yrs = 5,760/yr;
5,760 × 4/12 = 1,920 deprec. for 2012;
5,760/yr × 4 yrs (2013to 2016inclusive) = 23,040;
5,760/yr × 8/12 (max depreciation to depreciate 5 years) = 3,840 deprec. from Jan. 1/17to Oct. 3/17;
1,920 + 23,040 + 3,840 = 28,800 accum. deprec. at Oct. 3/17.

***Problem 9-20B (*continued*)**

2.	**Metal Frame**	**144,000 – 36,000 =108,000; 108,000 ÷ 20 yrs = 5,400/yr; 5,400/yr × 4/12 = 1,800 deprec. for 2012; 5,400/yr × 4 yrs (2013to 2016inclusive) = 21,600; 1,800 + 21,600 = 23,400 accum. deprec. at Dec. 31/16; Revised deprec. = 144,000 – 23,400 accum. deprec. = 120,600 remaining book value; 120,600 – (36,000 – 12,000 = 24,000 residual value) = 96,600 remaining depreciable cost; 96,600 ÷ 20 yrs =**	**$4,830**
	Engine	**2012: 96,000 × 2/10 × 4/12 = 6,400 2013: 96,000 – 6,400 = 89,600 × 2/10 = 17,920 2014: 89,600 – 17,920 = 71,680 × 2/10 = 14,336 2015: 71,680 – 14,336 = 57,344 × 2/10 = 11,469 2016: 57,344 – 11,469 = 45,875 × 2/10 = 9,175 2017: 45,875 – 9,175 = 36,700 × 2/10 =**	**7,340**
	New Fan	**36,000 – 4,800 = 31,200; 31,200 ÷ 5 yrs = 6,240 × 3/12 =**	**1,560**
	Conveyor System	**126,000 – 39,600 = 86,400; 86,400 ÷ 10 yrs =**	**8,640**
	Misc. Parts	**2012: 27,600 × 2/5 × 4/12 = 3,680 2013: 27,600 – 3,680 = 23,920 × 2/5 = 9,568 2014: 23,920 – 9,568 = 14,352 × 2/5 = 5,741 2015: 14,352 – 5,741 = 8,611 × 2/5 = 3,444 2016: 8,611 – 3,444 = 5,167 × 2/5 = 2,067 which exceeds max.; maximum that can be taken in 2016is 5,167 – 4,800 = 367; therefore, no depreciation is taken in 2017**	**-0-**
			$22,370

Part 2
Total 2017depreciation = $3,840 + $22,370 = $26,210

ANALYTICAL AND REVIEW PROBLEMS

A&R Problem 9-1

The following points should be set out in the report:

1. **Assets on which depreciation was charged were purchased for use in the business and not for resale. Therefore, the fact that they may be sold for more than cost is not relevant since, in keeping with the cost principle, PPE are maintained in the accounting records at cost.**
2. **Because these assets are subject to both physical and economic (obsolescence) deterioration, they have a limited useful life span, however long it may be, and their cost, less any residual value, must be allocated over their useful life.**
3. **Maintenance expenditures maintain these assets in a properly functioning order. They, however, do not eliminate the fact of physical and economic deterioration.**
4. **Not charging periodic depreciation is in violation of the matching principle and results in an understatement of expenses and overstatement of net income.**
5. **Depreciation is a process of allocation not of valuation.**

ETHICS CHALLENGE

1. **When managers acquire new assets a variety of decisions relative to depreciation must be made. The asset must be assigned a useful life and residual value, and a method of depreciation must be chosen.**

2. **It is true that managers can choose a useful life and residual value based on an estimate. However, the estimated life should be the manager's realistic expectation of how long the asset will actually be used in the operations of the business. The estimated residual value should not be arbitrary; it should reflect expectations of the recoverable value of the asset at the end of its useful life to the business, even if it is zero. The depreciation method should reflect a systematic allocation of the asset's cost based on how the asset is actually consumed by the business.**

3. **By selecting a useful life that is significantly greater than what is realistic in combination with an unreasonably high residual value, the profit margin will be overstated since depreciation expense will be greatly understated.**

FOCUS ON FINANCIAL STATEMENTS

FFS9-1

a.

	Cost Information					Depreciation/Amortization		
Description	Date of Purchase	Deprec. Method	Original Cost	Residual	Life	Accum. Balance Dec. 31, 2016	Expense for 2017	Accum. Balance
Land	July 3/14		$280,000			n/a	n/a	n/a
Building	July 3/14	S/L	454,000	$40,000	15 yr.	$ 69,000[1]	$46,000[2]	$115,000
Machinery	Mar 20/14	Units	150,000	30,000	250,000	72,960[3]	31,200[4]	104,160
Truck	Mar 01/14	S/L	298,800	30,000	7 yr.	108,800[5]	38,400[6]	147,200
Furniture	Feb 18/14	DDB	24,000	3,000	5 yr.	18,240[7]	576[8]	-0-[10]
Patent	Nov 7/15	S/L	103,800	-0-	5 yr.	24,220[9]	20,760[9]	44,980
Office Equip.	Apr 10/17	DDB	65,143[11]	10,000	4 yr.	-0-	24,429[12]	24,429
Furniture	Apr 10/17	DDB	48,857[11]	4,000	5 yr.	-0-	14,657[13]	14,657

Calculations:

1. (454,000 – 40,000)/15 = 27,600/year x 6/12 = 13,800 for 2014
   27,600 for 2015
   27,600 for 2016
   69,000 Accum. deprec. at Dec. 31/16

2. (454,000 – 40,000 – 69,000)/(10 – 2.5 = 7.5) = 46,000 for 2017

3. (150,000 – 30,000)/250,000 = $0.48/unit x 45,000 = 21,600 for 2014
   x 55,000 = 26,400 for 2015
   x 52,000 = 24,960 for 2016
   72,960 Accum. deprec. at Dec. 31/16

4. $0.48/unit x 65,000 = 31,200 for 2017

5. (298,800 – 30,000)/7 = 38,400/year x 10/12 = 32,000 for 2014
   38,400 for 2015
   38,400 for 2016
   108,800 Accum. deprec. Dec. 31/16

6. (298,800 – 30,000)/7 = 38,400/year depreciation for 2017

FFS 9-1 (*continued*)

7. 24,000 x 2/5 x 10/12 = 8,000 for 2014
(24,000 – 8,000) x 2/5 = 6,400 for 2015
24,000 – (8,000 + 6,400)] x 2/5 = 3,840 for 2016
18,240 Accum. deprec. Dec. 31/16

8. [24,000 – (8,000 + 6,400 + 3,840)] x 2/5 x 3/12 = 576 for 2017

9. (103,800 – 0)/5 = 20,760/year x 2/12 = 3,460 for 2015
20,760 for 2016
24,220 Total dep. taken to Dec. 31/16

10. This has a -0- balance at December 31, 2014 because the asset was disposed of (donated to charity).

11.

	Appraised Values	Ratio	Cost Allocation
Office Equipment	96,000	96/168 x 114,000	= 65,143
Furniture	72,000	72/168 x 114,000	= 48,857
Totals	168,000		114,000

12. 65,143 x 2/4 x 9/12 = 24,429 for 2017

13. 48,857 x 2/5 x 9/12 = 14,657 for 2017

FFS 9-1 (*continued*)
b.

Times TeleCom
Income Statement
For Year Ended December 31, 2017

Revenues:		
Fees earned		**$950,000**
Expenses:		
Salaries expense	**$294,000**	
Depreciation expense	**155,262**	
Amortization expense	**20,760**	
Insurance expense	**30,000**	
Loss on disposal of furniture	**5,184**	
Total expenses		**505,206**
Profit		**$444,794**

Times TeleCom
Statement of Changes in Equity
For Year Ended December 31, 2017

Susan Times, capital, January 1, 2017	**$421,180**
Add: Profit	**444,794**
Total	**865,974**
Less: Withdrawals by owner	**204,000**
Susan Times, capital, December 31, 2017	**$661,974**

FFS 9-1 (*continued*)

1.

Times TeleCom
Balance Sheet
December 31, 2017

Assets			
Current assets:			
Cash		$ 30,000	
Accounts receivable		72,000	
Prepaid insurance		15,600	
Total current assets			$ 117,600
Property, plant and equipment:			
Land		$280,000	
Building	$454,000		
Less: Accumulated depreciation	115,000	339,000	
Machinery	$150,000		
Less: Accumulated depreciation	104,160	45,840	
Truck	$298,800		
Less: Accumulated depreciation	147,200	151,600	
Officeequipment	$ 65,143		
Less: Accumulated depreciation	24,429	40,714	
Furniture	$ 48,857		
Less: Accumulated depreciation	14,657	34,200	
Total property, plant and equipment			891,354
Intangible assets:			
Patent	$103,800		
Less: Accumulated Amortization	44,980		58,820
Total assets			$1,067,774
Liabilities			
Current liabilities:			
Accounts payable	$ 68,000		
Unearned revenue	53,800		
Total current liabilities		$ 121,800	
Non-current liabilities:			
Notes payable, due 2020		284,000	
Total liabilities			$ 405,800
Equity			
Susan Times, capital			661,974
Total liabilities and equity			$1,067,774

FFS 9-2

Part 1

NOTE: Both Danier Leather and WestJet use the term 'amortization' instead of 'depreciation' in the statements referenced in this question. To be consistent with the textbook, the answers use the term 'depreciation'.

a.

The $16,826 (thousand) represents the book value of the PPE. The June 28, 2014, book value is the $46,166 (thousand) total cost of the PPE assets less the $28,161 (thousand) total accumulated depreciation of the PPE. (*Note to instructor: Point out to students that this additional information — cost and accumulated depreciation — is found in Danier's Note 6 of the financial statements.*)

b. The full disclosure principle requires financial statements to report all relevant information about the operations and financial position of the entity. In conformance with the full disclosure principle, information in addition to the $16,826 (thousand) book value is reported in Note 1(k) (depreciation methods) and Note 6 (cost, accumulated depreciation, and book value).

c. The depreciation expense for the year ended June 28, 2014, was $3,517 (thousand). Although depreciation expense typically appears on the income statement, Danier does not detail it there but these amounts do appear on the statement of cash flows and in Note 6.

Part 2

a. WestJet's property and equipment at December 31, 2014 is 60.11% of total assets calculated as ($2,793,194/$4,646,433) x 100.

b. Indigo's property, plant and equipment at March 29, 2014 represent 11.41% of total assets calculated as ($58,476,000/$512,588,000) x 100.

c. WestJet and Indigo operate in different industries: WestJet is an airline while Indigo operates bookstores. As such, WestJet has relatively little inventory in comparison to Indigo. Indigo's inventory at March 29, 2014 is $218,979 thousand or 42.72% of total assets (calculated as $218,979,000/$512,588,000 x 100). Indigo's inventory represents close to half of its total assets while WestJet's property and equipment represent over half of its assets. Indigo needs a large stock of inventory in order to operate. WestJet primarily needs property and equipment (planes) to operate its business. Therefore, it seems logical that the mix of assets would be different for each company.

2. CRITICAL THINKING MINI-CASE

CT 9-1

Note to instructor: Student responses will vary and therefore the answer here is only suggested and not inclusive of all possibilities; it is presented in point form for brevity.

Problem:

- **Taking the perspective of both the external and internal auditors, there is a problem with how a number of revenue expenditures were recorded as capital expenditures.**

Goal:*

- **To identify which transactions were recorded incorrectly, correct them, and restate net income on the income statement and restate assets and equity on the balance sheet.**
- **Another goal, from the perspective of the auditor, would be to bring these issues to the attention of the board of directors for their action because there may be ethical concerns regarding the behaviour of the business manager (bonus is tied to income so he/she may be manipulating the recording of transactions to maximize income).**

Principles:

- **The matching principle has been violated; it requires costs to be allocated or matched to the period in which it helped generate revenues.**
- **The prudence principle was also violated; it states that assets and income should never be overstated.**
- **Another GAAP requires consideration: materiality. If the misstatements are not material in nature (not significant in dollar amount so that the decisions of shareholders would not have been affected), the conclusions are affected. Therefore, we must look at the numbers to determine whether materiality has been violated or not.**

CT 9-1 (*continued*)

Facts:
as stated in the mini case

—The insurance was incorrectly debited to the Truck account; it should have been debited to a current asset account: Prepaid Insurance. The result of this error is an overstatement of net income in 2015 of $7,800 (36,000/24 months = 1,500/month insurance used x 10 months = 15,000 for 2015vs. 36,000/5 yrs useful life = 7,200; 15,000 – 7,200 = 7,800). 2015 net income is not known but if it is assumed that it approximates 2016net income as reported ($78,000), then the $7,800 overstatement of net income in 2015 is material in nature since it approximates 10%.

—The net income in 2016 would also have been materially overstated; by $10,800 (1,500 insurance expense per month x 12 months used = 18,000 – depreciation of 7,200 = 10,800). Net income in 2017would have been understated by $4,200 (7,200 depreciation– 3,000 insurance used = 4,200).

—It is unclear from the information provided how the insurance renewal was treated: as a capital or revenue expenditure; this would have affected the impact of the misstatement in 2017.

—It is unclear from the information provided whether revised depreciation was calculated when the subsequent expenditures (motors) were debited to the truck account (which is correct assuming that the motors enhanced the trucks which is likely). We will assume that this was treated correctly (capital expenditure with resulting calculation of revised depreciation) given no information to the contrary. The $32,000 and $2,500 costs regarding the tires and brakes were capitalized in error; they should have been expensed when incurred in 2017. Therefore, net income in 2017is overstated by a potential $34,500 (32,000 + 2,500) — I say potential because it is unclear whether revised depreciation was calculated on the truck; this additional depreciation would affect the amount of any misstatement in 2016and 2017.

—There is also the issue of when the bonus was recorded; these were recorded in the incorrect accounting periods (recorded when paid as opposed to the period which triggered the cost — violation of matching and realization principles). In addition, because the bonuses were based on overstated net income amounts, the bonuses would have been overstated for 2015 and 2016 and potentially in 2017.

—It appears that the 2016net income was overstated by almost 50%.

Conclusions/Consequences:

— To do 'nothing' would mean that shareholders/owners are making decisions based on inaccurate information.

— If the manager did, in fact, engage in unethical actions, a longer term implication from the perspective of the manager is that he/she may lose their job and future employability prospects in addition to damaging the credibility of the company and its share values assuming it is publicly held.

— The board of directors need to be made aware of the errors made in recording capital expenditures so that they can deal appropriately with the manager responsible and negative repercussions with shareholders/owners.

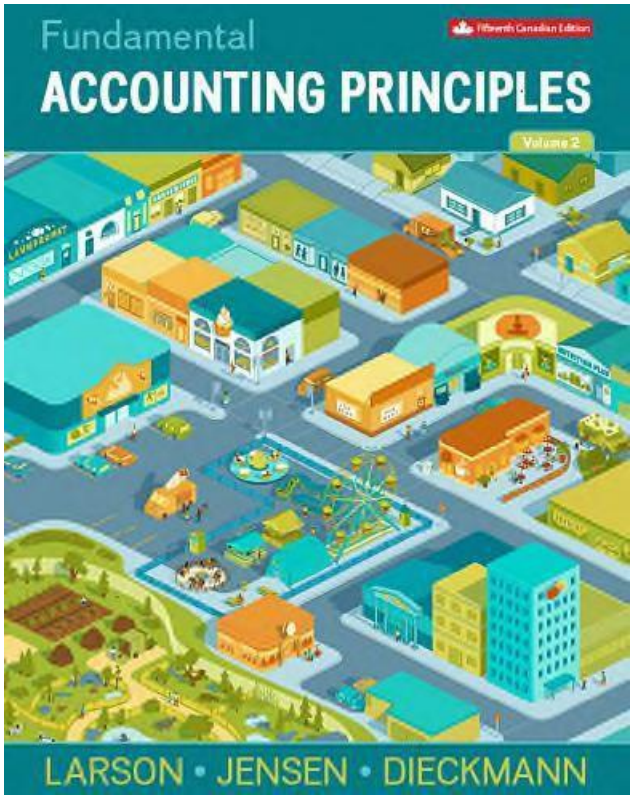
***The goal is highly dependent on perspective.**

Instructor's Manual

to accompany *Fundamental Accounting Principles*, Chapter 9,

15th edition,

By Larson/Jensen/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	9-1, 9-2, 9-3, 9-4, 9-5, 9-9	9-1A, 9-7A, 9-10A, 9-13A, 9-15A. 9-1B, 9-7B, 9-10B, 9-13B, 9-15B.
2. Explain, record and calculate depreciation using the methods of straight-line, units-of-production and double-declining-balance.	9-4, 9-5, 9-6, 9-7, 9-8, 9-9, 9-10, 9-11	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, 9-12A, 9-13A, 9-14A, 9-15A, 9-16A, 9-17A, 9-19A, 9-20A. 9-2B, 9-3B, 9-4B, 9-5B, 9-6B, 9-7B, 9-8B, 9-9B, 9-10B, 9-12B, 9-13B, 9-14B, 9-15B, 9-16B, 9-17B, 9-19B, 9-20B.
3. Explain and calculate depreciation for partial years.	9-9, 9-10, 9-11	9-13, 9-14, 9-15, 9-21, 9-26, 9-28, 9-29, 9-30	9-3A, 9-4A, 9-5A, 9-7A, 9-8A, 9-9A, 9-12A 9-13A, 9-14A, 9-15A, 9-16A, 9-17A, 9-19A, 9-20A. 9-3B, 9-4B, 9-5B, 9-7B, 9-8B, 9-9B, 9-12B, 9-13B, 9-14B, 9-15B, 9-16B, 9-17B, 9-19B, 9-20B.
4. Explain and calculate revised depreciation.	9-12, 9-13	9-16, 9-17, 9-18	9-10A, 9-11A, 9-12A, 9-20A. 9-10B, 9-11B, 9-12B, 9-16B, 9-20B.
5. Explain and record impairment losses.	9-14	9-19	9-13A. 9-13B, 9-15B.
6. Account for asset disposal through discarding, selling or exchanging an asset.	9-15, 9-16, 9-17	9-20, 9-21, 9-22, 9-23, 9-24, 9-29	9-14A, 9-15A, 9-16A, 9-17A, 9-19A. 9-14B, 9-16B, 9-17B, 9-19B.
7. Account for intangible assets and their amortization.	9-18, 9-19	9-25, 9-26, 9-27, 9-28	9-18A, 9-19A. 9-18B, 9-19B.
8. *Appendix 9A - Explain and calculate revised depreciation when there is a subsequent capital expenditure that creates a partial period depreciation.	9-20	9-29, 9-30	9-20A. 9-20B.

Chapter Outline

Property, plant and equipment (LO1)

Property, plant and equipment may be tangible or intangible. 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.

Cost of Property, plant and equipment

A. 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.

B. 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.

C. Subsidiary ledgers may be kept for maintaining control of large numbers of assets. Low cost asset purchases are usually expensed under the materiality principle.

D. Low cost assets may be expensed (treated as revenue expenditures) under the *materiality principle*.

E. 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

F. 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.

G. 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.

H. 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.

I. 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).

J. 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:
   a) *Inadequacy*—a condition in which the capacity of property, plant and equipment becomes too small for the productive demands of the business.
   b) *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.

B. Depreciation Methods

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*)
2. 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 value divided 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.

3. 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.

4. *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 postpone its tax payments by charging higher depreciation expense in the early years and lower amounts in the later years.
4. Federal income tax regulations require a company to depreciate assets according to the Capital Cost Allowance system (CCA)
5. 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)

When an 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. If estimated residual value and/or useful life is revised:

Depreciation expense calculations are revised by spreading the remaining cost to be depreciated over the revised useful life remaining.

Calculation:

$$\frac{\text{Remaining Book value-Revised residual value}}{\text{Revised remaining useful life}}$$

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.Subsequent Capital Expenditures:

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 property, plant and equipment (LO6)

Assets may be *discarded, sold, or exchanged* due to wear and tear, obsolescence, inadequacy, or damage by fire or other accident.

A. In general, accounting for disposals requires the following steps:

1. Record depreciation expense up to the date of disposal. This updates the accumulated depreciation account.
2. Remove the balances of the disposed asset and related accumulated depreciation accounts.
3. Record any cash (and other assets) received or paid in the disposal.
4. Record any gain or loss resulting from comparing the asset's book value with the value received in the disposal.

B. Discarding Property, plant and equipment—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. C.

Selling Property, plant and equipment—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!

D. Exchanging assets

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. This is a difficult topic for students to grasp. 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.

APPENDIX 9A (LO8)

Revised Depreciation When There Is a Subsequent Capital Expenditure That Creates Partial Period Depreciation

In this case depreciation is calculated and recorded using the following steps:

1. Depreciation on the asset is updated to the date of the subsequent capital expenditure.
2. The subsequent capital expenditure is recorded.
3. If the subsequent capital expenditure is a replacement, the component being replaced is removed from the books and any resulting gain or loss is recorded.
4. Revised depreciation is calculated.

VISUAL #9-1

FORMULAE FOR DEPRECIATION METHODS

1. STRAIGHT LINE

$$\frac{\text{Cost-Estimated Residual Value}}{\text{Estimated Useful Life (in years)}} = \text{Annual Depreciation}$$

---

2. UNITS OF PRODUCTION

a) $$\frac{\text{Cost- Estimated Residual Value}}{\text{Predicted units of production}} = \text{Depreciation per Unit}$$

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, 2017, 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, 2017, the machine is sold for $45,000.

Required:

1. Calculate the depreciation expense for each of the first three years using
    a. straight-line
    b. units-of-production
    c. 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:

2017	=	.50	x	80,000	=	40,000
2018	=	.50	x	50,000	=	25,000
2019	=	.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

2017	=	.40	x	100,000	=	40,000
2018	=	.40	x	60,000	=	24,000
2019	=	.40	x	36,000	=	14,400

2. 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

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.

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1. Calculate the depreciation expense for each of the first three years using
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    b. units-of-production
    c. double-declining-balance

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Solution to Alternate Demo Problem Chapter 9

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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

2017	=	.40	x	100,000	=	40,000
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Cash	45,000	
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Cash	45,000	
Accumulated depreciation	80,000	
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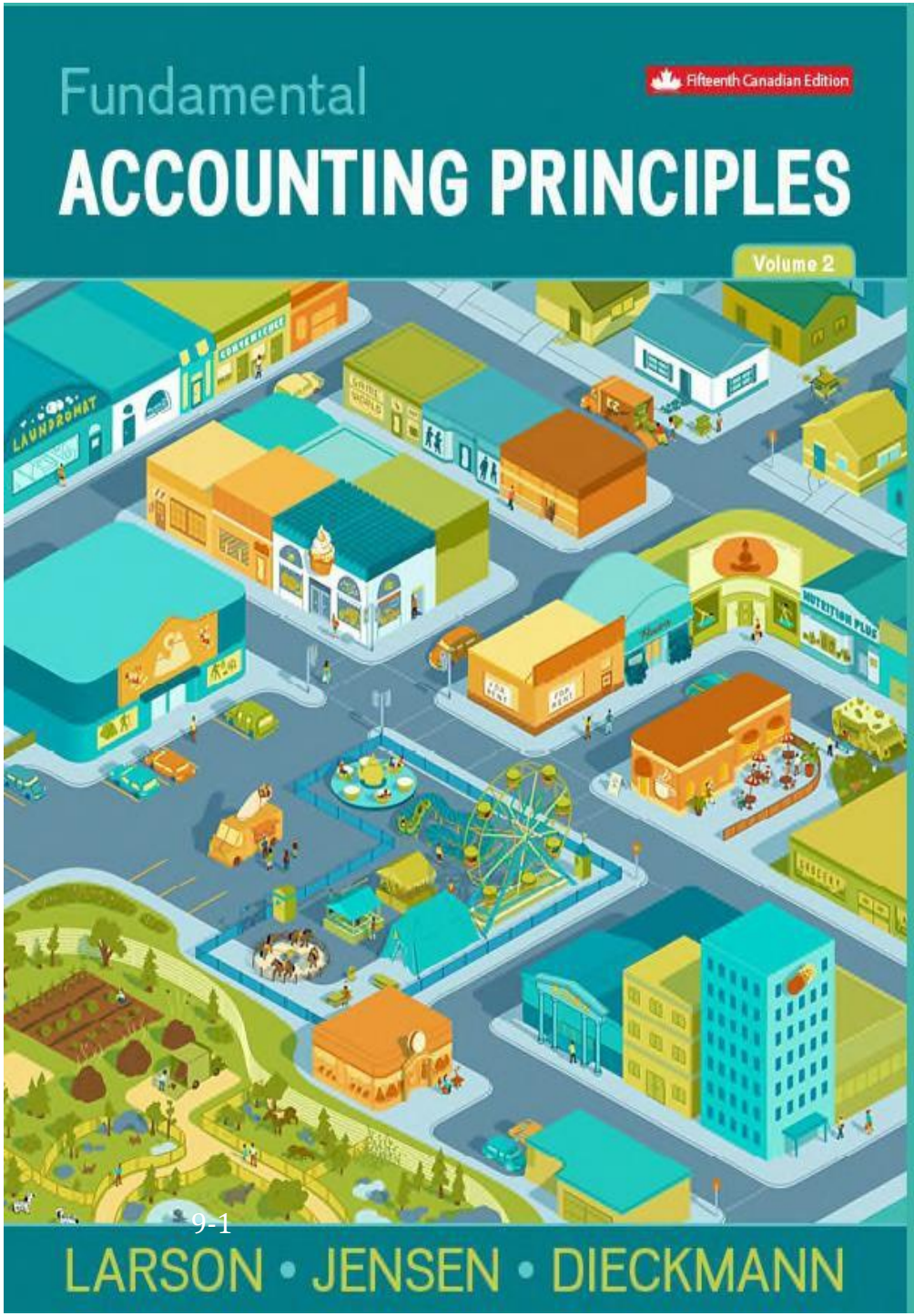
Gain on sale of machine.....		25,000

Double-declining-balance

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



Property, Plant and Equipment and Intangibles

CHAPTER

9

PowerPoint Slides to accompany
Fundamental Accounting Principles, 15ce
Prepared by
Betty Young, Red River College

Learning Objectives

1. Describe property, plant and equipment (PPE) and calculate their cost. (LO^1)
2. Explain, record, and calculate depreciation using the methods of straight-line, units of production, and double-declining balance. (LO^2)
3. Explain and calculate depreciation for partial years. (LO^3)

Learning Objectives

4. Explain and calculate revised depreciation. (LO^4)
5. Explain and record impairment losses. (LO^5)
6. Account for asset disposal through discarding, selling, or exchanging an asset. (LO^6)
7. Account for intangible assets and their amortization. (LO^7)

Learning Objectives

8. Explain and calculate revised depreciation when there is a subsequent capital expenditure that creates partial period depreciation. Appendix 9A (LO^8)

Vignette Video

YVR Builds State-of-the-Art Airside Operations Building: Vancouver Airport Authority is building a new state-of-the-art Airside Operations Building. The facility, scheduled to open in January 2015, will consolidate all airside operations into one airside building to support a heightened level of collaboration and cooperation.

https://www.youtube.com/watch?v=xS60bqgB8VM

Property, Plant and Equipment (PPE)

Characteristics:

- Non-current assets used in the operations of a business.
- Have a useful life greater than one accounting period.
- May be classified as Tangible or Intangible.

Property, Plant and Equipment (PPE)

- Also referred to as Fixed Assets.
- Examples: buildings, land, equipment, machinery, leasehold improvements, and vehicles.

Intangible Assets

- Lack physical substance.
- Examples: patents, trademarks, copyrights, leaseholds and drilling rights.

Issues in Accounting for PPE

EXHIBIT 9.1

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Decline in book value over service life

Acquisition
- Calculate initial cost

Use
- Account for subsequent costs
- Allocate cost to periods benefited

Disposal
- Record disposal

Cost of PPE

- PPE are recorded at cost, which includes all normal and reasonable expenditures necessary to get the asset in place and ready for its intended use.
- Examples: installation costs, design and engineering, legal and surveying fees.

Capital Expenditures

- Are costs of PPE that provide material benefits extending beyond the current period.
- Are reported on the balance sheet under PPE.

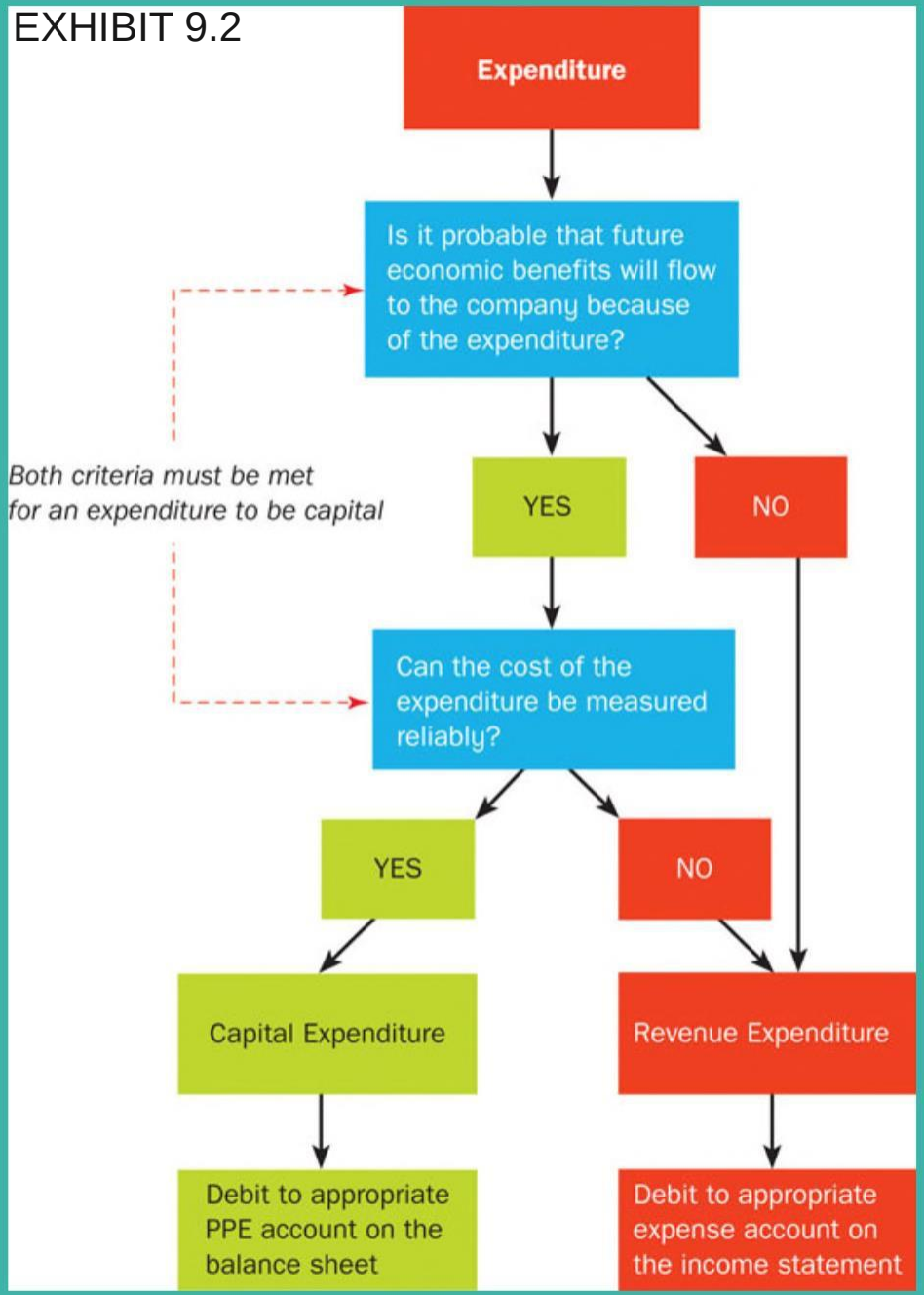
Revenue Expenditures

- Are costs that maintain an asset but do not materially increase the asset's life or productive capabilities.
- Are reported on the income statement as expenses.
- Examples: supplies, lubricants, repair and maintenance costs.

Subsequent Expenditures

- Expenditures that make PPE more efficient or productive and/or extend the useful life of the PPE beyond original expectations.
- Examples: roofing replacement, plant expansion and major overhauls of machinery and equipment.

EXHIBIT 9.2



Land

- Is not subject to depreciation.
- Cost of land includes:
  - Purchase price
  - Legal fees
  - Real estate commissions
  - Accrued property taxes
  - Payments for surveying, grading, draining, and clearing the land
  - Assessments by local governments

Land Improvements

- Assets that increase the usefulness of the land but have a limited life.
- Costs are charged to a separate PPE account.
- Costs are allocated over the period they benefit.
- Cost examples include parking lot surfaces, driveways, fences and lighting systems.

Buildings

- Costs include all expenditures to make the building ready for its intended use.
- Costs are depreciated over the period they benefit.
- Cost examples include purchase price, brokerage fees, taxes, title fees and legal costs.

Leasehold Improvements

- Costs of alterations or improvements to leased property.
- Costs are depreciated over the life of the improvements or the life of the lease, whichever is shorter.
- Examples include interior modifications, flooring, painting and storefronts.

Machinery and Equipment

- Costs include all expenditures normal and necessary to purchase it and prepare it for its intended use.
- Costs are depreciated over the periods they benefit.
- Cost examples include purchase price, less discounts, plus non-refundable sales taxes, transportation charges, insurance while in transit.

Lump-Sum Asset Purchase

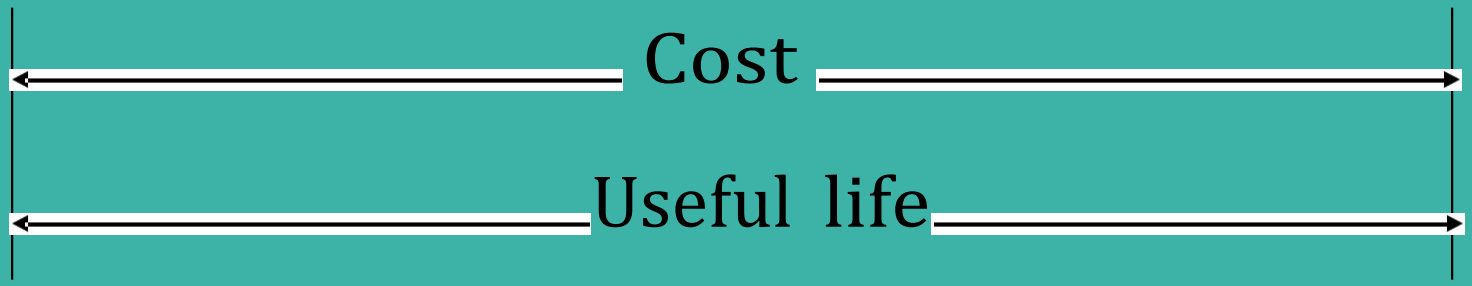
- PPE may be purchased in a group with a single transaction for a lump-sum price.
- The cost of the purchase is allocated to the various PPE based on their relative values.

Depreciation

- A process of matching (or allocating) the depreciable cost of an asset in a rational and systematic manner over the asset's estimated useful life.
- Depreciation does not measure the decline in market value of an asset.
- Depreciation begins to be recorded when the asset is put into use.

Depreciation

- PPE help the organization earn revenues over several accounting periods.
- The cost of these PPE are depreciated (spread out) over these same periods.



Depreciation

Factors relevant in determining depreciation:

1. Cost
2. Residual value
3. Useful (service) life

Depreciation Methods

The most commonly used methods are:

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

Straight-Line Method

The same amount is expensed each period of the asset's useful life.

$$\text{Straight-line depreciation expense} = \frac{\text{Cost} - \text{Estimated residual value}}{\text{Estimated useful life in years}}$$

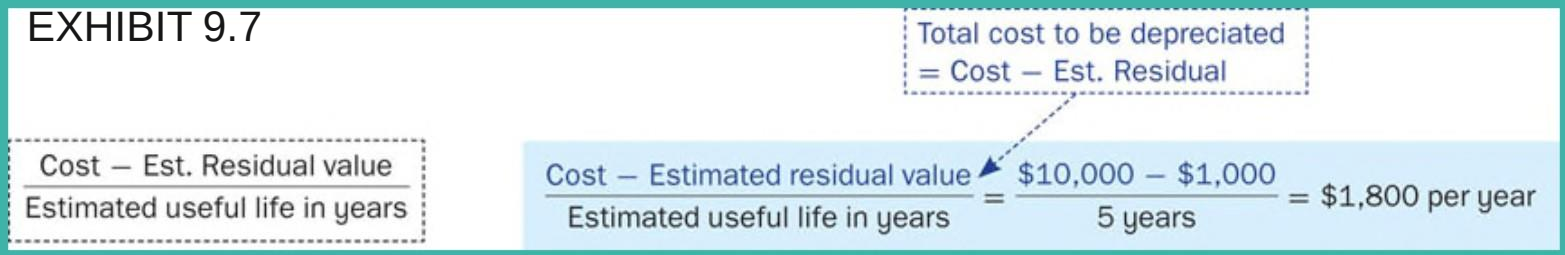
A piece of shoe-production equipment is purchased on January 1, 2017. The relevant data is as follows:

Cost	$10,000
Estimated residual value	-1,000
Cost to be depreciated	$9,000

Estimated useful life:

Accounting periods	5 years
Units produced	36,000 shoes

EXHIBIT 9.7



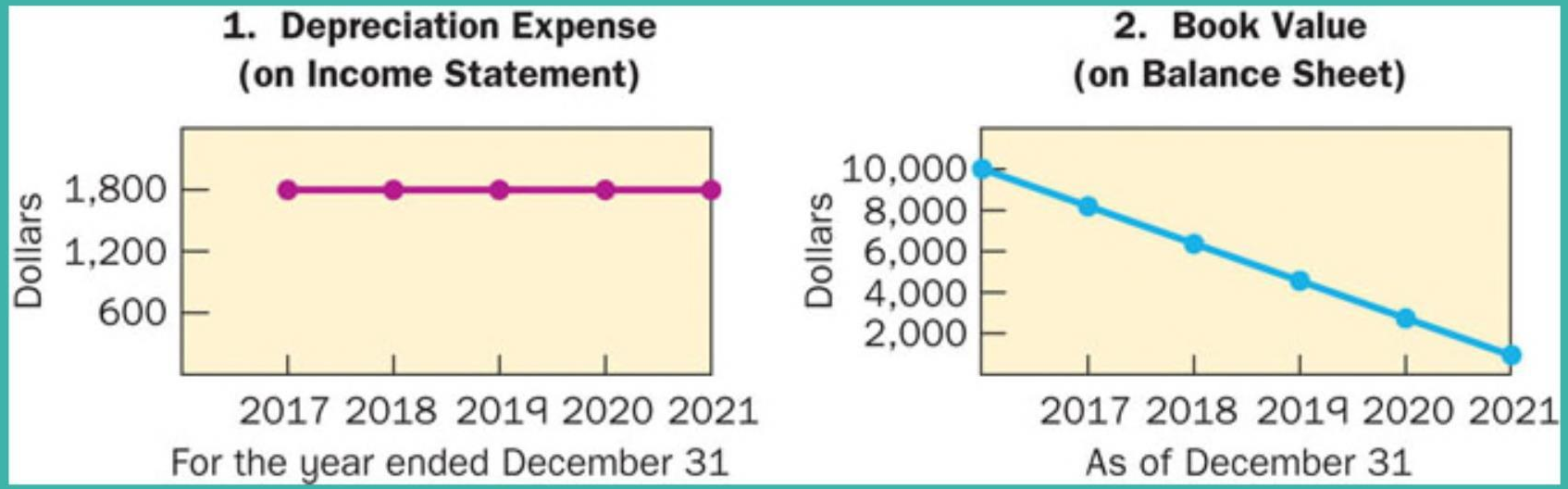
The annual adjusting entry to record depreciation on this equipment would be:

Depreciation Expense	1,800	
Accumulated Deprec. -Equipment		1,800

	2017	2018	2019	2020	2021
Equipment	$10,000	$10,000	$10,000	$10,000	$10,000
Less: Acc. Deprec.	1,800	3,600	5,400	7,200	9,000
Book Value	$8,200	$6,400	$4,600	$2,800	$1,000

Financial Statement Effects of Straight-Line Depreciation

EXHIBIT 9.10



Units-of-Production Method

- This method is employed when the use of an asset varies greatly from one period to the next.
- The amount charged to expense is based on the usage of the asset.

$$\text{Depreciation per unit} = \frac{\text{Cost} - \text{Estimated residual value}}{\text{Total estimated units of production}}$$

$$\text{Annual depreciation expense} = \text{Actual production} \times \text{depreciation per unit}$$

Units-of-Production Method

EXHIBIT 9.12

Step 1:

$$\text{Depreciation per unit} = \frac{\text{Cost} - \text{Est. residual value}}{\text{Total est. units}} = \text{Deprec. per unit}$$

$$\text{Depreciation per unit} = \frac{\text{Cost} - \text{Estimated residual value}}{\text{Total estimated units of production}} = \frac{\$10{,}000 - \$1{,}000}{36{,}000 \text{ units}}$$

$$= \$0.25 \text{ per shoe}$$

Step 2:

$$\text{Depreciation expense} = \text{Depreciation per unit} \times \text{Units produced in period}$$

$$\$0.25 \text{ per shoe} \times 7{,}000 \text{ shoes} = \mathbf{\$1{,}750}$$

EXHIBIT 9.13

	Depreciation for the Period			End of Period	
Period	Number of Units	Depreciation Per Unit	Depreciation Expense	Accumulated Depreciation	Book Value
	—	—	—	—	$10,000*
2017	7,000	$0.25	**$1,750**	$1,750	8,250
2018	8,000	0.25	**2,000**	3,750	6,250
2019	9,000	0.25	**2,250**	6,000	4,000
2020	7,000	0.25	**1,750**	7,750	2,250
2021	6,000**	0.25	**1,250*****	9,000	**1,000**

*Cost on January 1, 2017

**6,000 units were actually produced, but the maximum number of units on which depreciation can be calculated in 2021 is 5,000 [36,000 total estimated units less 31,000 units depreciated to date (7,000 + 8,000 + 9,000 + 7,000)]. Recall that an asset must not be depreciated below its residual value.

***5,000 × $0.25 = $1,250

Units-of-Production Method – Balance Sheet Presentation

	2017	2018	2019	2020	2021
Equipment	$10,000	$10,000	$10,000	$10,000	$10,000
Less: Acc. Deprec.	1,750	3,750	6,000	7,750	9,000
Book Value	$8,250	$6,250	$4,000	$2,250	$1,000

Declining-Balance Method

- This method provides higher depreciation expenses in the early years of an asset's life and lower charges in later years.
- A depreciation rate, of up to twice the straight-line rate, is applied to the asset's beginning-of-the period book value.

Double-Declining Balance Method

Steps:

1. Calculate the double-declining balance rate.*

   rate(= 2 / Estimated years of useful life)

2. Calculate depreciation expense by multiplying the rate by the asset's beginning-of-period book value.

   (depreciation expense = rate x book value)

*Note: Residual value is not used in these calculations.

Illustration: Double-Declining Balance Method

Rate = 2 / 5 years x 100% = 40% per year

EXHIBIT 9.15

	Depreciation for the Period		End of Period		
Period	Beginning-of-Period Book Value	Depreciation Rate	Depreciation Expense	Accumulated Depreciation	Book Value
	—	—	—	—	$10,000*
2017	$10,000	40%	$4,000	$4,000	6,000
2018	6,000	40	2,400	6,400	3,600
2019	3,600	40	1,440	7,840	2,160
2020	2,160	40	864	8,704	1,296
2021	1,296	40	296**	9,000**	1,000

*Cost on January 1, 2017

**Year 2021 depreciation is $1,296 – $1,000 = $296. This is because maximum accumulated depreciation equals cost minus residual as we depreciate the asset only up to the residual value.

Illustration: Double-Declining Balance Method – Balance Sheet Presentation

	2017	2018	2019	2020	2021
Equipment	$10,000	$10,000	$10,000	$10,000	$10,000
Less: Acc. Deprec.	4,000	6,400	7,840	8,704	9,000
Book Value	$6,000	$3,600	$2,160	$1,296	$1,000

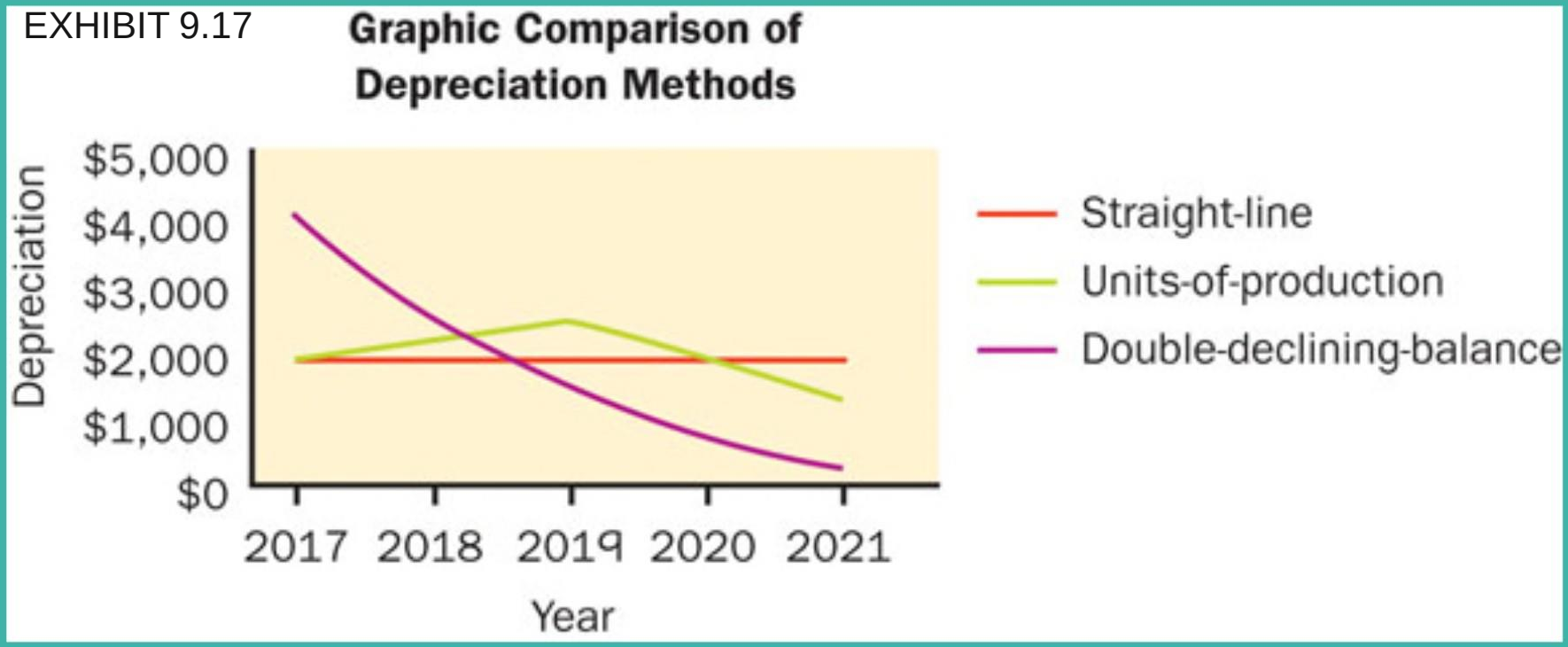
Comparison of Depreciation Methods

EXHIBIT 9.16

Period	Straight-Line: Cost − Est. residual / Est. useful life	Units-of-Production: Cost − Est. residual / Total est. units of production × Actual units produced in period	Double-Declining-Balance: Book value × 2/n, where n = Est. useful life
2017	$ 1,800	$ 1,750	$ 4,000
2018	1,800	2,000	2,400
2019	1,800	2,250	1,440
2020	1,800	1,750	864
2021	1,800	1,250	296
	$ 9,000	$ 9,000	$ 9,000

Graphic Comparison of Depreciation Methods

EXHIBIT 9.17



Partial-Year Depreciation

- Assets may be purchased or disposed of at any time during the year.
- Depreciation for a partial year is recorded when the purchase or disposal is made at a time other than the beginning or end of the accounting period.

Depreciation for Income Tax Reporting

- The Income Tax Act requires that companies use a declining–balance method called Capital Cost Allowance (CCA) for business tax reporting purposes.

- The Income Tax Act specifies the CCA rates for various groups of assets.

Partial-Year Depreciation

Methods:

1. Nearest whole month
   - If the asset was in use for more than half of the month, depreciation is calculated for the whole month.
   - If the asset was in use for less than half of the month, depreciation is not calculated for the month.
2. Half-year convention
   - Six months' depreciation is recorded regardless when an asset is acquired or disposed of.

Mini-Quiz

Gamma Company purchased a computer costing $4,000 on April 18. It is expected to last for three years and then sell for $400.

Calculate depreciation* for the first year using the:

1. Straight-line method.
2. Double declining balance method.

**Use the nearest whole month method.*

Mini-Quiz

Gamma Company purchased a computer costing $4,000 on April 18. It is expected to last for three years and then sell for $400.

$$\text{Straight-line depreciation expense} = \frac{\text{Cost} - \text{Estimated residual value}}{\text{Estimated useful life in years}} \times \text{Portion of year}$$

$$= \frac{\$4{,}000 - \$400}{3 \text{ years}} \times 8/12 \text{ year}$$

$$= \$800$$

Mini-Quiz

Gamma Company purchased a computer costing $4,000 on April 18. It is expected to last for three years and then sell for $400.

DDB depreciation expense = DDB rate x Cost x Portion of year

= (2 x 1/3) x $4,000 x 8/12

= $1,778 (rounded)

Revising Depreciation Rates

Depreciation rates for current and future periods may be revised if there is a change in an asset's:

1. Estimated residual value and/or useful life.

   or

2. Cost due to subsequent capital expenditures.

Changes in Estimated Residual Value and/or Estimated Useful Life

- The undepreciated cost of the asset is depreciated (allocated) over the remaining life of the asset.
- This is considered to be a change in an accounting estimate and not an error.

Changes in Estimated Residual Value and/or Estimated Useful Life

Example: Straight-line Method

$$\text{Revised depreciation for remaining years} = \frac{\text{Remaining book value} - \text{Revised residual value}}{\text{Revised remaining useful life}}$$

Revising Depreciation Rates When There is a Subsequent Capital Expenditure

- Subsequent capital expenditures cause the cost of an asset to change.
- These expenditures can be the addition of a component to an existing asset or the replacement or overhaul of a component.

Revising Depreciation Rates When There is a Subsequent Capital Expenditure

- Revised depreciation is calculated to reflect the new cost and/or changes in estimated life/residual value.
- When a subsequent expenditure results in a replacement of a component, the cost and accumulated depreciation of the component must be removed and a gain or loss is recorded.

Impairment of PPE Assets

- An impairment loss occurs when the book value of PPE is greater than the amount to be recovered through the asset's use or sale.
- Impairments may result from:
  - A significant decline in the market value of the asset.
  - Technological, economic, or legal factors.

Impairment of PPE Assets

If an impairment loss occurs:

- The loss is recorded.
- Depreciation is revised for future periods.

Disposal of Capital Assets

Capital assets may be disposed of for a variety of reasons such as:

1. Obsolescence
2. Wear and tear
3. Damage
4. Changing business plans

Disposal of PPE

Accounting for disposal involves:

1. Record depreciation up to date of disposal.
2. Compare the asset's book value with the net amount received/paid at disposal and record any resulting gain/loss.
3. Remove the balances of the disposed asset and related accumulated depreciation accounts.
4. Record any cash (and other assets) received or paid in the disposal.

Exchanging PPE

Accounting for exchange involves:

1. Record depreciation up to date of exchange.
2. Compare the asset's book value with the net amount received/paid on exchange and record any resulting gain/loss.
3. Remove the balances of the exchanged asset and related accumulated depreciation accounts.
4. Record the new asset and cash received or paid in the exchange.

Intangible Assets

- Have no physical substance.
- Are used in operations.
- Provide future economic benefits.
- Are recorded at cost when purchased.
- Examples include patents, copyrights, trademarks, drilling rights, trademarks and trade names, and leaseholds.

Intangible Assets

- Are recorded at cost when purchased.
- Cost is amortized* over estimated useful life.
- The straight-line method is usually used.
- Are shown on the balance sheet separately from PPE.
- * *Amortization is the systematic allocation of the cost of an intangible asset over its useful life*

Goodwill

The amount by which the price paid for a company exceeds the fair market value of the company's net assets if purchased separately.

Goodwill

- Is not an intangible asset.
- Is reported separately on the balance sheet.
- Is not amortized but may be decreased if it is impaired.

Review

Explain the difference between revenue and capital expenditures and how they are recorded in the accounting system.

- Revenue expenditures such as ordinary repairs expire in the current accounting period. They are debited to expense and are thus matched with current revenues.
- Capital expenditures provide material benefits extending beyond the current period. They are debited to PPE accounts and are matched with future periods through depreciation expense.
- Immaterial long-term expenditures are treated as current period expenses.

Revised Depreciation When There Is a Subsequent Capital Expenditure That Creates Partial Period Depreciation-Appendix 9A

Steps in Revising Depreciation:

1. Depreciation is updated to the date of the subsequent capital expenditure.
2. Record the subsequent capital expenditure and remove the component being replaced
3. Calculate and record the revised depreciation on the capital asset.

Summary – Chapter 9

1. Describe property, plant and equipment (PPE) and calculate their cost.
2. Explain, record, and calculate depreciation using the methods of straight-line, units of production, and double-declining balance.
3. Explain and calculate depreciation for partial years.

Summary – Chapter 9

4. Explain and calculate revised depreciation.
5. Explain and record impairment losses.
6. Account for asset disposal through discarding, selling, or exchanging an asset.
7. Account for intangible assets and their amortization.

Summary – Chapter 9

- Explain and calculate revised depreciation when there is a subsequent capital expenditure that creates partial period depreciation. Appendix 9A

End of Chapter