Chapter 8

Reporting and Interpreting Property, Plant, and Equipment; Intangibles; and Natural Resources固定资产；无形资产和自然资源的报告与解释

Learning Objectives

After studying this chapter, you should be able to:

8.1 Define, classify, and explain the nature of long-lived productive assets and interpret the fixed asset turnover ratio.

8-2 Apply the cost principle to measure the acquisition and maintenance of property, plant, and equipment.

8-3 Apply various cost allocation methods as assets are held and used over time.

8-4 Explain the effect of asset impairment on the financial statements.

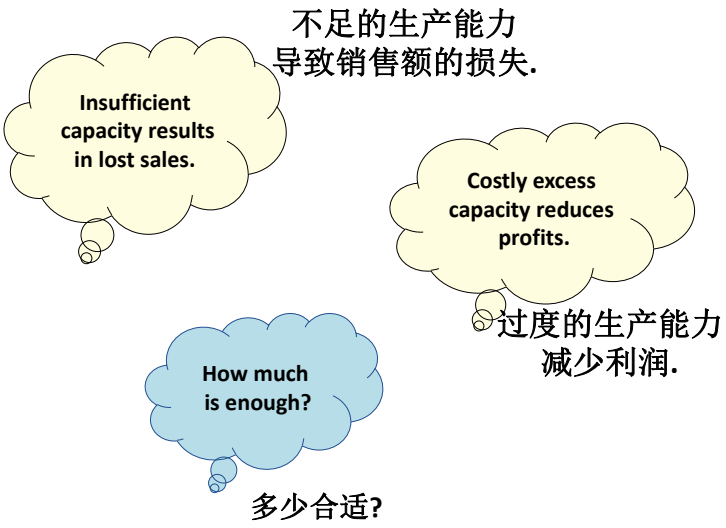
8-5 Analyze the disposal of property, plant, and equipment.

8-6 Apply measurement and reporting concepts for intangible assets and natural resources.

8-7 Explain how the acquisition, use, and disposal of long-lived assets impact cash flows.

8-2

Understanding the Business



8-3

Learning Objective 8-1

8-1 Define, classify, and explain the nature of long-lived productive assets and interpret the fixed asset turnover ratio.

8-4

Classifying Long-Lived Assets 长期资产的分类

Tangible有形资产
Physical Substance

- Land
- Buildings, fixtures, and equipment
- Natural resources

Intangible无形资产
No Physical Substance

- Patents
- Copyrights
- Franchises
- Licenses
- Trademarks

8-5

Exhibit 8.1
Southwest Airline's Asset Section of the Balance Sheet

SOUTHWEST AIRLINES CO.
Consolidated Balance Sheets (partial)
December 31, 2017 and 2016

Assets (*dollars in millions*)	**2017**	**2016**
Current assets: (*summarized*)	$ 4,815	$ 4,498
Property and equipment, at cost:		
Flight equipment	21,368	20,275
Ground property and equipment	4,399	3,779
Deposits on flight equipment purchase contracts	919	1,190
Assets constructed for others	1,543	1,220
	28,229	26,464
Less allowance for depreciation and amortization	9,690	9,420
Total property and equipment	18,539	17,044
Goodwill	970	970
Other assets	786	774
Total assets	$25,110	$23,286

8-6

Exercise 8-1

The following is a list of account titles and amounts (dollars in millions) from a recent annual report of Interactive Kids Corp., a manufacturer of games, toys, and interactive entertainment software for children and families:

Buildings and improvements	$ 392
Goodwill	948
Prepaid expenses and other current assets	342
Machinery, equipment, and software	826
Accumulated depreciation	806
Allowance for doubtful accounts	64
Inventories	600
Other noncurrent assets	400
Other intangibles	2,736
Accumulated amortization (other intangibles)	1,600
Land and improvements	14
Accounts receivable	1,288
Cash and cash equivalents	1,160
Tools, dies, and molds	100

Required:

Prepare the asset section of the balance sheet for Interactive Kids Corp., classifying the assets into Current Assets, Property, Plant, and Equipment (net), and Other Assets.

8-7

Interactive Kids Corporation
Consolidated Balance sheet (partial)

Assets (*dollars in millions*)	
Current assets	
Cash and cash equivalents	$1,160
Accounts receivable (net of allowance for doubtful accounts, $64)	1,224
Inventories	600
Prepaid expenses and other current assets	342
Tools, dies, and molds	100
Total current assets	3,426
Property, plant, and equipment	
Machinery, equipment, and software	826
Buildings and improvements	392
Land and improvements	14
Property, plant, and equipment (at cost)	1,232
Less: Accumulated depreciation	(806)
Total property, plant, and equipment (net)	426
Other assets	
Goodwill	948
Other intangibles (net of accumulated amortization, $1,600)	1,136
Other noncurrent assets	400
Total other assets	2,484
Total assets	**$6,336**

8-8

Fixed Asset Turnover固定资产周转率

KEY RATIO ANALYSIS

$$\text{Fixed Asset Turnover} = \frac{\text{Net Sales (or Operating Revenues)}}{\text{Average Net Fixed Assets}}$$

This ratio measures the sales dollars generated by each dollar of fixed assets used. A high rate suggests effective management.

The 2017 ratio for Southwest is (dollars in millions):

$$\frac{\text{Operating Revenues } \$21{,}171}{(\$17{,}044 + \$18{,}539) \div 2} = 1.19 \text{ times}$$

COMPARISONS OVER TIME Southwest Airlines		
2017	2016	2015
1.19	1.25	1.33

COMPARISONS WITH COMPETITORS	
Delta	United Continental Holdings
2017	2017
1.62	1.64

8-9

Learning Objective 8-2

8-2 Apply the cost principle to measure the acquisition and maintenance of property, plant, and equipment.

8-10

Measuring and Recording Acquisition Cost 取得成本的计量与报告(1 of 3)

Acquisition cost includes the purchase price and all expenditures needed to prepare the asset for its intended use. This does not include financing charges associated with the purchase.

资产的取得成本包括购买价格和为使资产达到可用状态的全部支出.资产的取得成本不包括购买的利息支出

Acquisition Costs

- Purchase price
- Sales taxes
- Legal fees
- Transportation costs
- Installation and preparation costs

Note - We say that the expenditures 支出 are **capitalized** 资本化when they are recorded as an asset.

8-11

Measuring and Recording Acquisition Cost (2 of 3)

Acquisition for Cash - Southwest Airlines paid cash for the aircraft and transportation and preparation costs.

	Debit	Credit
Flight equipment (+A)	120	
Cash (−A)		120

Acquisition for Debt - Southwest Airlines signed a note payable for the aircraft and paid cash for the transportation and preparation costs.

	Debit	Credit
Flight equipment (+A)	120	
Cash (−A)		2
Note Payable (+L)		118

8-12

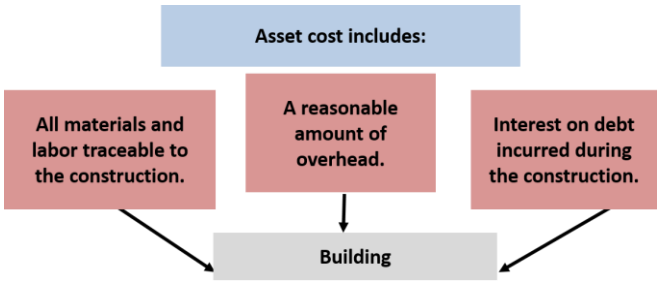
Measuring and Recording Acquisition Cost (3 of 3)

Acquisition for Equity - Southwest gave Boeing 1 million shares of $1 par value common stock with a market value of $55 per share and paid the balance of the plane plus transportation and preparation costs in cash.

	Debit	Credit
Flight equipment (+A)	120	
Common Stock (+SE)		1
Additional paid-in capital (+SE)		54
Cash (-A)		65

8-13

Measuring and Recording Acquisition Cost
Acquisition by Construction自建固定资产



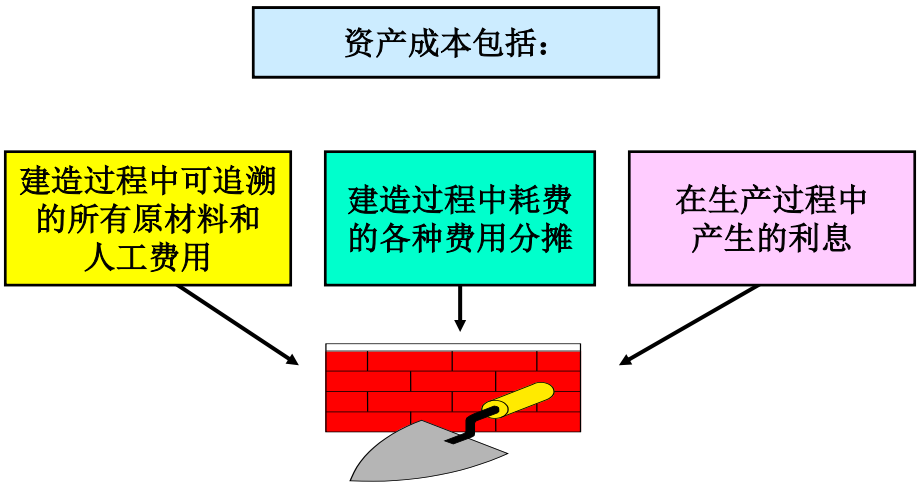
Assume Southwest constructed a new hangar that cost $8 million in total ($2 million in labor costs, $5 million in supplies and materials, and $1 million in interest expense during the year related to the construction project).

The following journal entry is made to record the asset:

	Debit	Credit
Building (+A)	8	
Cash (−A)		8

8-14

自建的固定资产



8-15

Exercise 8-2

Sebastian Incorporated purchased a new truck on January 1 for $22,500 plus $2,500 in sales tax.

The company paid $5,000 cash on the truck (including the sales tax), signing an 10 percent note for the $20,000 balance due in nine months (on September 30).

On January 2, the company paid cash of $500 to have the company name and logo painted on the truck.

On September 30, the company paid the balance due on the truck plus the interest.

On December 31 (the end of the accounting period), Sebastian recorded depreciation on the truck using the straight-line method with an estimated useful life of 5 years and an estimated residual value of $5,000.

8-16

Exercise 8-2

Required (round all amounts to the nearest dollar):

1. Indicate the effects (accounts, amounts, and + or −) of each transaction (on January 1, 2, and September 30) on the accounting equation.
2. Compute the acquisition cost of the truck.
3. Compute the depreciation expense to be reported for Year 1.
4. What impact does the interest paid on the 10 percent note have on the cost of the truck? Under what circumstances can interest expense be included in acquisition cost?
5. What would be the net book value of the truck at the end of Year 2?

8-17

Requirement 1

1. Indicate the effects (accounts, amounts, and + or −) of each transaction (on January 1, 2, and September 30) on the accounting equation.

Date	Assets		Liabilities		Stockholders' Equity	
January 1	Cash Equipment	−5,000 +25,000	Short-term notes payable	+20,000		
January 2	Cash Equipment	−500 +500				
September 30	Cash	−21,500	Short-term notes payable	−20,000	Interest expense	−1,500

$20,000 principal x 10% interest rate x 9/12 of a year = $1,500 interest

8-18

Requirement 2

2. Compute the acquisition cost of the truck.

Acquisition cost of the truck:	
Cash paid (including sales tax)	$ 5,000
Note payable to supplier	20,000
Painting cost	500
Acquisition cost	$25,500

8-19

Requirement 3

3. Compute the depreciation expense to be reported for Year 1.

Depreciation for Year 1 (using straight-line method)

Annual Depreciation = (Cost – Residual Value) ÷ Estimated useful life in years

= ($25,500 − $5,000) ÷ 5 = $4,100

8-20

Requirement 4

4. What impact does the interest paid on the 10 percent note have on the cost of the truck? Under what circumstances can interest expense be included in acquisition cost?

In this case, interest paid on note does not have any impact on cost of the truck.

In some cases, a company may construct an asset for its own use instead of buying it from a manufacturer.
A portion of the interest incurred during the construction period, called capitalized interest（在建工程利息资本化）
The amount of interest expense that is capitalized is recorded by debiting the asset and crediting cash when the interest is paid （资本化利息直接计入固定资产中）

8-21

Requirement 5

Net book value at the end of Year 2	
Equipment cost	$25,500
Less: Accumulated depreciation	8,200
Net book value at the end of Year 2	$17,300

8-22

Repairs, Maintenance, and Improvements (1 of 3)

Type of Expenditure	Identifying Characteristics	Accounting Treatment
Ordinary repairs and maintenance 常规维护保养	1. Maintains the productive capacity of the asset during the current accounting period only 2. Recurring in nature 3. Involve small amounts 4. Do not increase the productive life, operating efficiency, or capacity of the asset	Expense in the period incurred
Improvements 改良	1. Increase the productive life, operating efficiency, or capacity of the asset 2. Occur infrequently 3. Involve large amounts of money	Add to asset account (Capitalize)

8-23

Repairs, Maintenance, and Improvements (2 of 3)

Financial Statement Effect				
Treatment	Statement	Expense	Current Income	Current Taxes
Capitalize 资本化	Balance sheet account debited	Deferred	Higher	Higher
Expense费用化	Income statement account debited	Currently recognized	Lower	Lower

To avoid spending too much time classifying additions and improvements and repair expenses, some companies record all expenditures below a certain dollar amount as expenses.

Such policies are acceptable because immaterial amounts will not affect users' decisions when analyzing financial statements.

8-24

修理，维护与改良/扩建 (2 of 3)

区别	对财务报表的影响			
	报表	费用	当期收入	当期税负
资本性支出	借资产账户	递延	更高	更高
收益性支出	借费用账户	当期记录	更低	更低

基于会计重要性原则，许多公司将低于一定金额的花费都作为当期费用。

8-25

Repairs, Maintenance, and Improvements (3 of 3)

Southwest paid $1 billion for aircraft maintenance and repairs. This amount was reported as an expense on its income statement.

	Debit	Credit
Maintenance and repairs expense (+E, −SE)	1,000	
Cash (-A)		1,000

Southwest spent $300 million to modify the exterior of its aircraft to reduce fuel consumption, resulting in 9 percent greater fuel efficiency and lower operating costs. These expenditures would have been recorded by Southwest, as capital expenditures:

	Debit	Credit
Flight equipment (+A)	300	
Cash (−A)		300

8-26

维护、修理及改良/扩建补充

开支种类	资本或收入	区分特征
日常维护	收益性	1. 维护日常运营状态 2. 不增加生产力 3. 不增加设备的使用寿命
非正常修理	资本性	1. 大修或配件更换 2. 增加预期使用寿命
改良/扩建	资本性	1. 增加生产能力 2. 增加使用寿命 3. 改进或扩展

8-27

Exercise 8-3

Chicago Growers, Inc., owns equipment for sowing and harvesting its organic fruit, vegetables, and tree nuts that are sold to local restaurants and grocery stores. At the beginning of Year 3, an asset account for the company showed the following balances:

Equipment	$600,000
Accumulated depreciation through Year 2	230,000

During Year 3, the following expenditures were incurred for the equipment:

Routine maintenance and repairs on the equipment	$10,000
Major overhaul of the equipment that improved efficiency on January 1, Year 3	50,000

The equipment is being depreciated on a straight-line basis over an estimated life of 5 years with a $25,000 estimated residual value. The annual accounting period ends on December 31.

8-28

Exercise 8-3

Required:

1.Give the adjusting entry that was made at the end of Year 3 for depreciation on the equipment.

2.Starting at the beginning of Year 3, what is the remaining estimated life?

3.Give the journal entries to record the two expenditures during Year 3.

8-29

Requirement 1

The equipment is being depreciated on a straight-line basis over an estimated life of 5 years with a $25,000 estimated residual value.

Annual depreciation (using straight−line method)

Annual Depreciation = (Cost – Residual Value) ÷ Estimated useful life in years

($600,000 − $25,000) ÷ 5 = $115,000

Revised depreciation: ($600,000 + $50,000 – $230,000 – $25,000) / 3 = $131,667

	Debit	Credit
Depreciation Expense (+E, −SE)	131,667	
Accumulated Depreciation (+XA, −A)		131,667
(Adjustment of depreciation)		

8-30

Requirement 2

Remaining estimated useful life at the beginning of Year 3:

Estimated useful life	5 years
Less: Useful life through end of Year 2:	
$230,000 accumulated depreciation ÷ $115,000	2 years
Estimated remaining useful life	3 years

Requirement 3

During Year 3, the following expenditures were incurred for the equipment:

Routine maintenance and repairs on the equipment	$10,000
Major overhaul of the equipment that improved efficiency on January 1, Year 3	50,000

Journal entries to record the two expenditures during Year 3:

	Debit	Credit
Maintenance and Repairs Expense (+E, −SE)	10,000	
Cash (−A)		10,000
Equipment (+A)	50,000	
Cash (−A)		50,000

8-31

WorldCom: Hiding Billions in Expenses through Capitalization通过资本化隐藏费用

FINANCIAL ANALYSIS

When expenditures that should be recorded as current period expenses are improperly capitalized as part of the cost of the asset, the effects on the financial statements can be enormous.

In one of the largest accounting frauds in history, **WorldCom** (now part of Verizon) **inflated its income and cash flows from operations by billions of dollars.** This fraud turned WorldCom's actual losses into large profits.

Over five quarters in 2001 and 2002, the company initially announced that it had capitalized $3.8 billion that should have been recorded as operating expenses. By early 2004, auditors had discovered **$74.4 billion in necessary restatements** (reductions to previously reported pretax income) for 2000 and 2001.

8-32

虚增固定资产

虚假采购固定资产、在建工程等长期资产，如天丰节能采用虚假向国外采购机器设备的方式。

虚增资产的采购价格/建设成本，发行人利用部分资产不存在公开活跃市场、难以取得公允价值的弱点，随意虚增资产购买时的价格。

- 2014-2016年，HS乳业计划建设32家奶牛场，并预设每个养殖场的建设费用约为8900万元，总额约为30亿元。专家来评估牧场的建设成本，高估？

8-33

虚增在建工程，推迟转固

公司近十年在铝材加工、电解铝、水电、火电等大规模固定资产投资，年均投资支出约50亿元。

在建工程规模持续攀升，其中部分多个水电站、电解铝、铝板带等项目，建设周期近10年，工程投入进度早已超过100%以上，但项目大部分未转固。

此外，公司疑似以技改名义将部分固定资产转回在建工程，包括百河再生铝技改项目，在建工程净增加约18亿元。

8-34

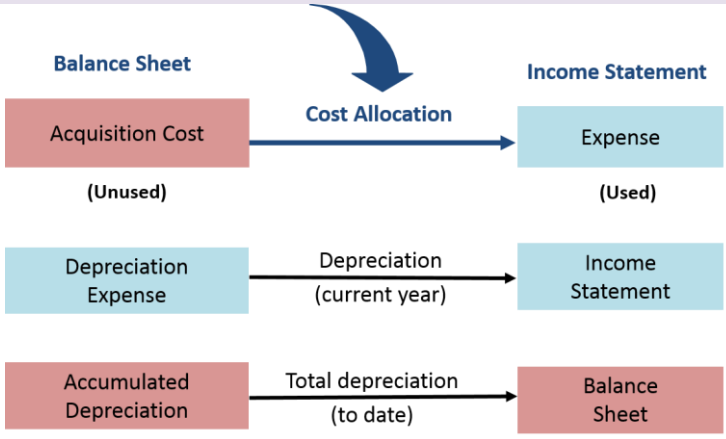
Learning Objective 8-3

8-3 Apply various cost allocation methods as assets are held and used over time.

8-35

Depreciation Concepts (1 of 2)

Depreciation is the process of allocating the cost of buildings and equipment over their productive lives using a systematic and rational method. 折旧是在固定资产的使用年限内采用系统、合理的方法分配其成本的过程



8-36

Key Depreciation Concepts

Depreciation is a process of cost allocation, not a process of determining market value.

The remaining balance sheet amount probably does not represent the asset's current market value.

The undepreciated cost is not measured on a market or fair value basis.

账面价值 ≠ 市场价值

8-37

Adjusting for Depreciation

An adjusting journal entry is needed at the end of each period to reflect the use of buildings and equipment for the period.

	Debit	Credit
Depreciation expense (+E, −SE)	x,xxx	
Accumulated depreciation (+XA, −A)		x,xxx

Cost	XX
− Accumulated Depreciation	−XX
Net Book Value	XX

资产净账面价值 = 购买成本 – 累计折旧

8-38

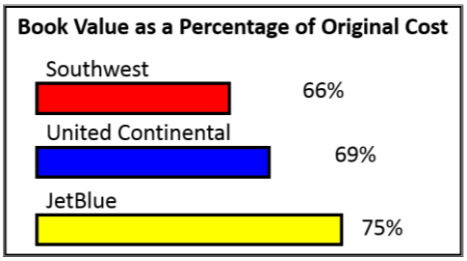
Book Value as an Approximation of Remaining Life

FINANCIAL ANALYSIS

Some analysts compare the book value of assets to their original cost as an approximation of their remaining life.

Example:

- If book value of an asset is 100 percent of its cost, it is a new asset.
- If book value of an asset is 25 percent of its cost, it only has around 25 percent of its life remaining.



8-39

Depreciation Concepts (2 of 2)

To calculate depreciation expense, three pieces of information are required for each asset:

- Acquisition cost
- Estimated useful life
- Estimated residual (or salvage) value at the end of the assets' useful life

计算资产的折旧，需要三个参数：

❶ 取得成本.

❷ 使用年限.

❸ 残值.

Alternative depreciation methods:

- Straight-line
- Units-of-production
- Declining-balance

8-40

Differences in Estimated Lives within a Single Industry

FINANCIAL ANALYSIS

Company	Estimated Life (in years)
Southwest	25
United Continental	25 to 30
Singapore Airlines	15 to 20

Differences in estimated lives of assets may be attributable to a number of factors such as the type of aircraft used by each company, equipment replacement plans, operational differences, and the degree of management's conservatism.

Differences in estimated lives and residual values of assets can have a significant impact on a comparison of the profitability of the competing companies.

8-41

Exhibit 8.2
Data for Illustrating the Computation of Depreciation

SOUTHWEST AIRLINES CO.
Acquisition of a New Service Vehicle

Cost, purchased on January 1, 2019	$62,500	
Estimated residual value	$ 2,500	
Estimated useful life		3 Years **OR** 100,000 miles
Actual miles driven in:	Year 2019	30,000 miles
	Year 2020	50,000 miles
	Year 2021	20,000 miles

8-42

Straight-Line Method直线法 (1 of 2)

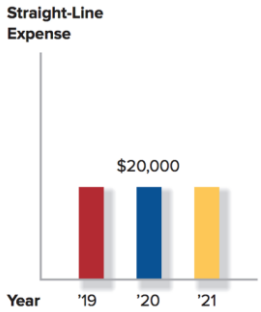
Straight-Line Formula:

$$\underbrace{(\text{Cost} - \text{Residual Value})}_{\text{Depreciable Cost}} \times \underbrace{\frac{1}{\text{Useful Life}}}_{\text{Straight-Line Rate}} = \text{Depreciation Expense}$$

$$(\$62{,}500 - \$2{,}500) \times \frac{1}{3 \text{ Years}} = \$20{,}000 \text{ per year}$$

Notice that:

- Depreciation expense is a constant amount each year.
- Accumulated depreciation increases by an equal amount each year.
- Net book value decreases by the same amount each year until it equals the estimated residual value.



8-43

Straight-Line Method (2 of 2)

Amount for the adjusting entry: **Reported on the income statement (closed at year-end)**

Balance in the contra-asset account after the adjusting entry

Cost less accumulated depreciation: **Reported on the balance sheet**

Straight-Line Method:

Year	Computation (Cost − Residual Value) × 1/Useful Life	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition				$62,500
2019	($62,500 − $2,500) × 1/3	$20,000	$20,000	42,500
2020	($62,500 − $2,500) × 1/3	20,000	40,000	22,500
2021	($62,500 − $2,500) × 1/3	20,000	60,000	2,500
	Total	$60,000		

Equal to estimated residual value at end of useful life

8-44

Units-of-Production Method工作量法 (1 of 2)

Southwest purchased ground equipment for $62,500 cash. The equipment has an estimated useful life of 100,000 miles and an estimated residual value of $2,500.
If the equipment is used 30,000 miles in the first year, what is the amount of depreciation expense?

Units - of - Production Formula :

$$\frac{\text{(Cost – Residual Value)}}{\text{Estimated Total Production}} \times \text{Actual Production} = \text{Depreciation Expense}$$

$$\downarrow$$

$$\frac{(\$62,500 - \$2,500)}{100,000 \text{ miles}} = \$0.60 \text{ per mile depreciation rate}$$

$$\$0.60 \text{ per mile} \times 30,000 \text{ actual miles in } 2019 = \underline{\underline{\$18,000}} \text{ for } 2019$$

8-45

Units-of-Production Method (2 of 2)

Units-of-Production Method:

Year	Computation [(Cost - Residual Value)/Total Estimated Production] × Actual Production	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition	RATE			$62,500
2019	$0.60 per mile × 30,000 miles	$18,000	$18,000	44,500
2020	$0.60 per mile × 50,000 miles	30,000	48,000	14,500
2021	$0.60 per mile × 20,000 miles	12,000	60,000	2,500
		$60,000		

Note – the ending Net Book Value is equal to the estimated residual value at the end of the useful life

8-46

Declining-Balance Method余额递减法 - an accelerated depreciation method

If an asset is more efficient or productive when it is newer, managers might choose the **declining-balance depreciation method** to match a higher depreciation expense with higher revenues in the early years of an asset's life and a lower depreciation expense with lower revenues in the later years.

This is an **accelerated depreciation** method.加速折旧法

	Depreciation Expense	Revenues
Early Years	High	High
Later Years	Low	Low

8-47

Double Declining-Balance Method双倍余额递减法 (1 of 2)

At the beginning of the year, Southwest purchased equipment for $62,500 cash. The equipment has an estimated useful life of three years and an estimated residual value of $2,500.

Double-Declining-Balance Formula:

$$(\text{Cost} - \text{Accumulated Depreciation}) \times \frac{2}{\text{Useful Life}} = \text{Depreciation Expense}$$

$$(\$62{,}500 - \$0 \text{ in } 2019) \times \frac{2}{3 \text{ years}} = \$41{,}667 \text{ in the first year}$$

Note – Accumulated Depreciation increases over time

Annual computation ignores residual value.

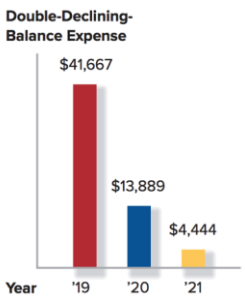
8-48

Double Declining-Balance Method (2 of 2)

Year	Computation (Cost − Accumulated Depreciation) × 2/Useful Life	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition				$62,500
2019	($62,500 − $0) × 2/3	$41,667	$41,667	$20,833
2020	($62,500 − $41,667) × 2/3	13,889	55,556	6,944
2021	($62,500 − $55,556) × 2/3	~~4,629~~ 4,444	~~60,185~~ 60,000	~~2,315~~ 2,500
	Total	$60,000		

Computed amount is too large

Equal to estimated residual value at end of useful life



Depreciation expense is limited to the amount that reduces book value to the estimated residual value.

8-49

Summary of the three depreciation methods

Method	Formula	Depreciation Expense
Straight-line	(Cost − Residual Value) × 1/Useful Life	Equal amounts each year
Units-of-production	[(Cost − Residual Value)/Estimated Total Production] × Annual Production	Varying amounts based on production level
Double-declining-balance	(Cost − Accumulated Depreciation) × 2/Useful Life	Declining amounts over time

8-50

Exercise 8-4

At the beginning of the year, Siegel Brothers, Inc., purchased a machine at a cost of $100,000. The estimated residual value was $10,000. Assume that the estimated useful life was four years, and the estimated productive life of the machine was 5,000 units. Actual annual production was as follows:

Year	Units
1	1,300
2	1,100
3	1,200
4	1,400

Required:

Complete a separate depreciation schedule for each of the alternative methods. Round your answers to the nearest dollar.

a.Straight-line.

b.Units-of-production.

c.Double-declining-balance.

8-51

Requirement 1

Straight-line method:

Annual depreciation = (Cost – Residual value) ÷ Estimated useful life

Year	Computation	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition				$100,000
1	($100,000 – $10,000) ÷ 4	$22,500	$22,500	$77,500
2	($100,000 – $10,000) ÷ 4	22,500	45,000	55,000
3	($100,000 – $10,000) ÷ 4	22,500	67,500	32,500
4	($100,000 – $10,000) ÷ 4	22,500	90,000	10,000

8-52

Requirement 2

Year	Units
1	1,300
2	1,100
3	1,200
4	1,400

Units-of-production method:

Annual depreciation = (Cost – Residual value) ÷ Estimated total production × Actual production

($100,000 – $10,000) ÷ 5,000 units = $18 per unit

Year	Computation	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition				$100,000
1	$18 per unit × 1,300 units	$23,400	$23,400	$76,600
2	$18 per unit × 1,100 units	19,800	43,200	56,800
3	$18 per unit × 1,200 units	21,600	64,800	35,200
4	$18 per unit × 1,400 units	25,200	90,000	10,000

8-53

Requirement 3

Year	Units
1	1,300
2	1,100
3	1,200
4	1,400

Double-declining balance method:

Annual depreciation = (Cost – Accumulated depreciation) × (2 ÷ Useful life)

Year	Computation	Depreciation Expense	Accumulated Depreciation	Net Book Value
At acquisition				$100,000
1	($100,000 – $0) × (2 ÷ 4)	$50,000	$50,000	$50,000
2	($100,000 – $50,000) × (2 ÷ 4)	25,000	75,000	25,000
3	($100,000 – $75,000) × (2 ÷ 4)	12,500	87,500	12,500
~~4~~	~~($100,000 – $87,500) × (2 ÷ 4)~~	~~6,250~~	~~93,750~~	~~6,250~~
4 (revised)	$12,500 – $10,000	2,500	90,000	10,000

8-54

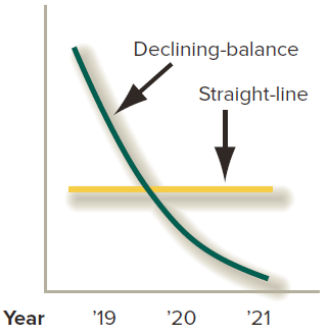
Impact of Alternative Depreciation Methods

Accelerated depreciation methods report higher depreciation and, therefore, lower net income during the early years of an asset's life. As the age of the asset increases, this effect reverses.

FINANCIAL ANALYSIS

$$$

Summary Depreciation Expense



The graph shown illustrates the relationship between the double-declining-balance method and the straight-line method of depreciation.

8-55

Increased Profitability Due to an Accounting Adjustment?会计调整提升盈利 Reading the Notes

Financial analysts are particularly interested in changes in accounting estimates because they can have a large impact on a company's before-tax operating income.

FINANCIAL ANALYSIS

$$$

In 2001, Singapore Airlines disclosed in its annual report that it had increased the estimated useful life of its aircraft from 10 to 15 years to reflect a change in its aircraft replacement policy.新加坡航空公司将飞机的折旧年限从10年延长至15年

The change reduced depreciation expense by $265 million each year.每年节约折旧费用$265million

8-56

鹏博士：固定资产折旧年限的变更

- 鹏博士（600804）：主要从事互联网接入服务、数据中心业务及相关的互联网增值服务业务
- 线路资产：2017年底高达46.44亿元
- 由原来的8年调整至8~15年
- 结果：
  - 减少固定资产折旧费用：3.54亿元
  - 2017年底净利润：7.19亿元，和上年持平

8-57

Component Allocation组件分摊

International Perspective

Under **IFRS**, the cost of an individual asset's components is allocated among each significant component and then depreciated separately over that component's useful life.

British Airways (now merged into International Airlines Group) depreciates its aircraft as follows:

- The body, engines, and spare engines over 7 to 29 years, depending on the aircraft type机身、引擎7-29年
- The cabin interior modifications over 5 years机舱内饰5年

8-58

Objective of GAAP versus Tax Reporting财务报告vs纳税申报

Financial Reporting (GAAP)	Tax Reporting (IRC)
The objective of financial reporting is to **provide economic information** about a business that is useful in projecting future cash flows of the business.	The objective of the Internal Revenue Code is to **raise sufficient revenues** to pay for the expenditures of the federal government.
Financial reporting rules follow generally accepted accounting principles.	Many of the Code's provisions are designed to encourage certain behaviors that are thought to benefit society.

8-59

How Managers Choose

Financial Reporting (GAAP)	Tax Reporting (IRC)
Managers determine which depreciation method provides the best matching of revenues and expenses. Choose the straight line method (the most common and easy to use) if the asset provides benefits evenly over time. During the early years of an asset's life, the straight-line method reports higher income than the accelerated methods do. Choose an accelerated method if assets produce more revenue in their early lives.	When given a choice managers will apply the least and latest rule. All taxpayers want to pay the lowest amount of tax that is legally permitted and at the latest possible date.

8-60

Two Sets of Books?两套账

Most public companies, maintains two sets of accounting records.

It is both legal and ethical to maintain separate records for tax and financial reporting purposes. However, these records must reflect the same transactions.合法，但是必须真实

Understating revenues or overstating expenses on a tax return can result in financial penalties and/or imprisonment. Accountants who aid tax evaders can be fined or imprisoned and lose their professional licenses.

QUESTION OF ETHICS

8-61

Deferred Tax Liabilities递延所得税负债

By maintaining two sets of books, corporations can defer (delay延迟纳税) paying millions and sometimes billions of dollars in taxes. The following companies reported significant gross deferred tax obligations

Company	Deferred Tax Liabilities	Percentage Due to Applying Different Depreciation Methods
Southwest Airlines	$3,279 million	97%
PepsiCo	$5,194 million	27
Hertz	$2,340 million	68
Amazon.com	$2,620 million	89

Company	Deferred Tax Liabilities	Percentage Due to Applying Different Depreciation Methods
FedEx Corporation	$9,120 million	96%
General Motors Company	$2,414 million	69
Amazon.com	$12,478 million	44
Costco Wholesale Corporation	$1,950 million	41

8-62

Learning Objective 8-4

8-4 Explain the effect of asset impairment on the financial statements.

Measuring Asset Impairment资产减值的计量

An asset's book value is **impaired** when the asset is not expected to generate **sufficient cash flows** (probable future benefits) at least equal to its book value.

Step 1: Test for Impairment减值测试 **Impairment** occurs when events or changed circumstances cause the estimated future cash flows (future benefits) of these assets to fall below their book value.

If net book value > Estimated future cash flows, then the asset is impaired

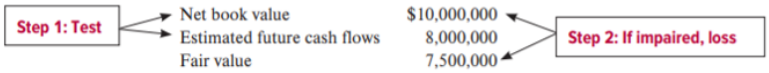
Step 2: Computation of Impairment Loss 减值损失计算 For any asset considered to be impaired, companies recognize a loss for the difference between the asset's book value and its **fair value公允价值** (a market concept). The asset is **written down** to fair value.

Impairment Loss = Net Book Value – Fair Value

减值损失 = 账面净值 – 公允价值

Asset Impairment Illustration

Assume that Southwest did a review for asset impairment and identified an aircraft with the following information:



Step 1: Because the net book value of $10 million exceeds the estimated future cash flows of $8 million, the asset is impaired.

Step 2: The loss is calculated as $2,500,000 ($10,000,000 net book value less $7,500,000 fair value). The following journal entry would be recorded:

	Debit	Credit
Loss due to impairment (+E, −SE)	2,500,000	
Flight equipment (−A)		2,500,000

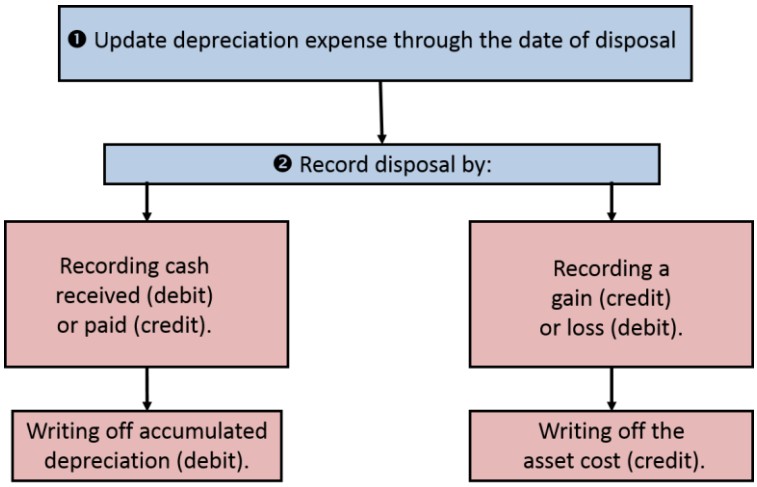
8-65

Learning Objective 8-5

8-5 Analyze the disposal of property, plant, and equipment.

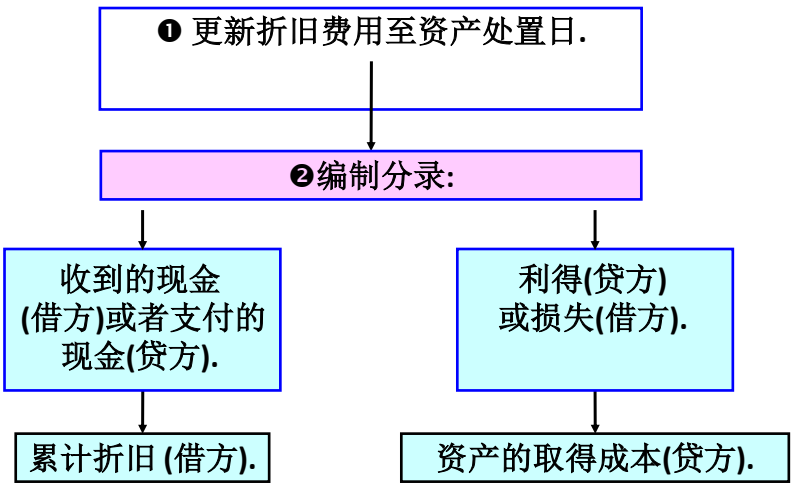
8-66

Disposal of Property, Plant, and Equipment (1 of 5)
处置固定资产



8-67

处置固定资产



8-68

处置固定资产

如果 现金 > 账面价值, 记利得 (贷方).
如果现金 < 账面价值, 记损失(借方).
如果 现金 = 账面价值, 不记利得或损失.

8-69

Disposal of Property, Plant, and Equipment (2 of 5)

Southwest Airlines sold flight equipment for $11 million cash at the end of its 17th year of use. The flight equipment originally cost $30 million and was depreciated using the straight-line method with zero residual value and a useful life of 25 years.

The amount of depreciation expense recorded at the end of the 17th year to bring depreciation up to date is:

a. $0
b. $1.2 million
c. $1.5 million
d. $2 million

Annual Depreciation:
($30,000,000 – $0) ÷ 25 years
= $1,200,000

8-70

Disposal of Property, Plant, and Equipment (3 of 5)

Southwest Airlines sold flight equipment for $11 million cash at the end of its 17th year of use. The flight equipment originally cost $30 million and was depreciated using the straight-line method with zero residual value and a useful life of 25 years.

After updating the depreciation, the equipment's book value at the end of the 17th year is:

a. $9.6 million
b. $20.4 million
c. $12.8 million
d. $6.6 million

Accumulated Depreciation = (17 yrs. × $1,200,000) = $20,400,000
BV = Cost – Accumulated Depreciation
BV = $30,000,000 – $20,400,000 = $9,600,000

8-71

Disposal of Property, Plant, and Equipment (4 of 5)

Southwest Airlines sold flight equipment for $11 million cash at the end of its 17th year of use. The flight equipment originally cost $30 million and was depreciated using the straight-line method with zero residual value and a useful life of 25 years.

The equipment's sale resulted in:

a. a gain of $1.4 million
b. a loss of $1.7 million
c. a gain of $3.8 million
d. a gain of $6.2 million

Gain = Cash Received – Book Value
Gain = $11,000,000 – $9,600,000 = $1,400,000

8-72

Disposal of Property, Plant, and Equipment (5 of 5)

Prepare the journal entry to record depreciation expense for Year 17:

	Debit	Credit
Depreciation expense (+E, −SE)	1.2	
Accumulated depreciation (+XA, −A)		1.2

Prepare the journal entry to record Southwest's sale of the equipment at the end of the 17th year.

	Debit	Credit
Cash (+A)	11.0	
Accumulated depreciation (−XA, +A)	20.4	
Flight equipment (−A)		30.0
Gain on sale of assets (+R, +SE)		1.4

8-73

Exercise 8-5

Dixieland Delivery Corporation is a rising company in the express-distribution industry. The company has approximately 131 aircraft and 10,200 vehicles and trailers that pick up and deliver packages. Assume that Dixieland sold a delivery truck that had been used in the business for three years. The records of the company reflected the following:

Delivery truck cost	$47,500
Accumulated depreciation	28,750

Required:

1. Give the journal entry for the disposal of the truck, assuming that the truck sold for
   a. $18,750 cash
   b. $19,500 cash
   c. $18,250 cash

2. Based on the three preceding situations, explain the effects of the disposal of an asset.

8-74

Delivery truck (cost)	$ 47,500
Less: Accumulated depreciation	28,750
Net book value	$ 18,750

Requirement 1 a

	Debit	Credit
Cash (+A)	18,750	
Accumulated Depreciation (–XA, +A)	28,750	
Delivery Truck (–A)		47,500
(Sale of an asset at book value; the result is no loss or gain.)		

Requirement 1 b

Cash (+A)	19,500	
Accumulated Depreciation (–XA, +A)	28,750	
Gain on Sale of Long- lived Asset (+Gain, +SE)		750
Delivery Truck (–A)		47,500
(Sale of an asset above book value; the result is a gain.)		

8-75

Requirement 1 c

	Debit	Credit
Cash (+A)	18,250	
Accumulated Depreciation (–XA, +A)	28,750	
Loss on Sale of Long lived Asset (+Loss, –SE)	500	
Delivery Truck (–A)		47,500
(Sale of an asset below book value; the result is a loss.)		

Requirement 2

Summarization of the effects of the disposal:

- The loss or gain on disposal of a long-lived asset is the difference between the disposal price and the book value at date of disposal.
- When the disposal price is the same as the book value, there is no loss or gain; when the price is above book value, there is a gain; and when the price is below book value, there is a loss on disposal.
- The book value does not purport to be market value, so a loss or gain on disposal of a long-lived asset normally would occur.

8-76

Learning Objective 8-6

8-6 Apply measurement and reporting concepts for intangible assets and natural resources.

8-77

Nature of Intangible Assets无形资产

Noncurrent assets without physical substance

Has value because of certain rights and privileges conferred by law

Usually evidenced by a legal document

Most common types of intangible assets:

- Goodwill (recognized in a business merger or acquisition)
- Trademarks
- Copyrights
- Technology (computer software and website)
- Patents
- Franchises
- Licenses and operating rights
- Other (customer lists/relationships, noncompete covenants, contracts and agreements)

Intangible assets are recorded at historical cost only if they have been purchased.外购无形资产才可以历史成本入账。 If these assets are developed internally by the company, they are expensed when incurred.

8-78

Amortization of Intangible Assets无形资产的摊销

Upon acquisition of intangible assets, managers determine whether they have definite or indefinite lives:

Definite Life有限使用年限

- Amortized over the shorter of the assets' economic life or legal life.
- Straight-line method used.
- Most companies doe not estimate a residual value

Indefinite Life无限使用年限

- Not amortized.
- Reviewed at least annually for possible impairment of value. If impaired, the carrying value is reduced to fair market value

Amortization is a cost allocation process similar to depreciation and depletion.

8-79

Common Intangibles (1 of 3)

Goodwill:商誉

- Only recorded as an asset when one company buys another business.
- Equals the purchase price of the company less the fair market value of the net assets (assets minus liabilities).
- Not amortized but reviewed annually for impairment.

Trademarks :商标

- A special name, image or slogan identified with a product or company.
- Rarely seen on balance sheets because they are only recorded if purchased.

Copyrights: 版权

- The exclusive right to publish, use, and sell a literary, musical, or artistic work.
- Legal life is the life of the creator plus 70 years.

8-80

暴风集团收购MPS案尘埃落定，光大资本认赔26.4亿元

- 欧洲版权商MP&Silva Holding S.A（简称MPS）
- 该公司成立于2004年，由三名意大利人创办，手中握有世界杯、英超、意甲、法甲、F1、法网、NFL、NBA等十多项世界顶级赛事版权。

- 2016年募集52亿元，购买65%的股权，没有禁业条款
- 不到一年，三位股东全部辞职。其中一人还重新开了一家版权公司，与老东家竞争
- MPS手中的版权也陆续到期了，成为一家空壳公司。2018年，MPS被伦敦法院裁定破产

8-81

Common Intangibles (2 of 3)

Technology:技术

- Website development: Capitalize the costs of acquiring a domain name and developing graphics.
- Software: Capitalize the direct costs of developing software (coding and testing) after the software is technologically feasible. Costs incurred during the preliminary concept phase should be expensed. Amortize as a general expense or as cost of goods sold if the software is to be sold to customers.

Patents:专利

- Exclusive right granted by the federal government for 20 years for inventions and new processes.
- Owner can use, manufacture, and sell both the subject of the patent and the patent itself.
- Only registration fees and legal costs are capitalized if developed internally. Research and development costs are expensed.

8-82

Common Intangibles (3 of 3)

Franchises:专营权

- Rights granted by the government or a company to provide a product or service.
- The investment made by the franchisee is accounted for as an intangible asset.
- The life of the franchise agreement depends on the contract and can be for a single year or indefinite period.

Licenses and operating rights: (许可/经营权)

- These intangible assets are the permissions to use a product or service according to specific terms and conditions.

8-83

Exercise 8-6

Billingsworth Company had three intangible assets at the end of Year 2 (end of the accounting year):

a. Computer software and Web development technology purchased on January 1, Year 1, for $63,000. The technology is expected to have a four-year useful life to the company with no residual value.
b. A patent purchased from Terry Taylor on January 1, Year 2, for a cash cost of $5,400. Taylor had registered the patent with the U.S. Patent Office five years ago. Billingsworth intends to use the patent for its remaining life.
c. A trademark purchased for $13,000 on November 1, Year 2. Management decided the trademark has an indefinite life.

Required:

1. Compute the amortization of each intangible at December 31, Year 2. The company does not use contra-accounts.
2. Show how these assets and any related expenses should be reported on the balance sheet and income statement for Year 2.

8-84

Requirement 1

Amortization on December 31, Year 2 (straight -line method with no residual value):

Technology : $63,000 ÷ 4 years= $15,750 amortization expense

Patent : $5,400 ÷ 15 years= $360 amortization expense

Trademark : The trademark is not amortized since its management has decided it has an indefinite life

Requirement 2

Income statement for Year 2:

Operating expenses:		
Amortization expense ($15,750 + $360)		$16,110

Balance sheet at December 31, Year 2:
(under *noncurrent assets*)

Intangibles:		
Technology ($63,000 − $31,500*)	$31,500	
Patent ($5,400 − $360**)	5,040	
Trademark	13,000	
		$49,540

* $15,750 amortization expense × 2 years

** $360 amortization expense × 1 year

8-85

Research and Development Costs: Not an Intangible Asset Under U.S. GAAP

FINANCIAL ANALYSIS

Research and development costs are recorded as expenses on the income statement, not assets.

研究开发费用作为费用项目进入利润表，不能作为资产核算

Research and development expenditures typically do not possess sufficient probability of resulting in measurable future cash flows.

8-86

Differences in Accounting for Tangible an Intangible Assets

International Perspective

	GAAP	IFRS
Cost versus Fair Value	Must record at **cost** Adjust for depreciation / amortization and impairment Do not record increases in value	Choose between either cost or fair value Adjust for depreciation/amortization and impairment If using fair value, record increases in value
Research and Development	Expense all costs of researching and developing intangible assets	Expense research costs, but capitalize measurable costs of developing intangible assets

	美国会计准则	国际会计准则
历史成本 vs 公允价值	必须以**历史成本计价** 调整折旧/ 摊销与减值损失 不记录资产的升值	选择历史成本或者公允价值 调整折旧/ 摊销与减值损失 如果采用公允价值模式，需要记录资产的升值
研究与开发	研究开发全部计入费用	研究计入费用；但为开发无形资产发生的可以计量的支出，可作为开发资产核算

8-87

高估开发支出

乐视的研发费用的资本化率高达60%

- 研发前期的考察、调研、人工、材料、设备折旧费用等，这些钱花出去就花出去了，并不能为企业将来带来经济利益。
- 只有到了后期真的研发出某些成果了，并且这些成果能够转化，才能作为资产在账上列示。

14年：无形资产33亿，商誉7亿，开发支出4亿，应收账款19亿，总资产88亿，净资产33亿

- 无形+商誉+开发+应收=63亿，63/88=72%
- 无形+商誉+开发=44亿，44/33=133%

8-88

Acquisition and Depletion of Natural Resources
自然资源的取得与耗费

Natural Resources

- Mineral deposits: gold, iron ore, oil wells, timber tracts.
- Called "wasting assets" because they are depleted (physically used up).
- Recorded at cost when acquired or developed.

Depletion

- Depletion describes the process of allocating a natural resource's cost over the period of its exploitation.
- The units-of-production method often is applied to compute depletion.
- The depletion is **capitalized** as a part of the cost of inventory. The entry to record depletion is:
  Dr. Inventory (+A) ×
  Cr. Natural Resource (−A) ×
- An expense (Cost of Goods Sold) is recorded when the asset is sold.

8-89

生物性资产

生产性生物资产为农牧养殖类企业特有科目，例如奶牛养殖、生猪养殖等。

其资产的生物属性导致可人为调节投资及经营活动现金流，从而改变企业资产价值及实际盈利表现。

企业生产性生物资产核算一般采用公允价值法和成本法两种。不论哪种方式，均存在调节报表的空间。

8-90

生物性资产

粉饰方法	操作手法	目的	报表影响
虚增生物资产规模	公允价值计量下，使用不合理的估值模型使生产性生物资产大幅虚增	提升资产价值和降低企业杠杆率。	1、虚增资产规模； 2、降低企业杠杆率；
公允价值变动损益调节盈利	1、调整公允价值变动损益； 2、反向计提超额公允价值变动损失	1、调节利润； 2、修正此前粉饰利润及资产负债表的行为	1、虚增利润； 2、超额计提减值、调减利润；
混计成熟牛和未成熟牛的养殖成本	公允价值法、成本法：过将部分饲养成熟牛的成本（计入营业成本）调整至饲养未成熟牛的支出（计入投资活动现金流出，不计入损益表）	将费用化支出不合理地计入资本性支出，优化成本和经营性现金流	1、少计营业成本、调整营业利润； 2、虚增投资性现金流出； 3、少计经营性现金流出；

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Learning Objective 8-7

8-7 Explain how the acquisition, use, and disposal of long-lived assets impact cash flows.

8-92

Productive Assets and Depreciation

FOCUS ON CASH FLOWS

	Effect on Cash Flows
Operating activities (indirect method)	
Net income	$xxxx
Adjusted for: Depreciation and amortization expense	+
Gains on sale of long-lived assets	–
Losses on sale of long-lived assets	+
Losses due to asset impairment write-downs	+
Investing activities	
Purchase of long-lived assets	–
Sale of long-lived assets	+

8-93

A Misinterpretation

When the indirect method is used to prepare the Statement of Cash Flows, depreciation is added in the operating section. But **depreciation is not a source of cash.折旧不是现金来源**

Cash from operations can only be provided by selling goods and services.只有销售商品/提供服务才能带来经营活动现金流入

Depreciation can affect cash flows by affecting the amount of taxes that a company pays. The higher the tax depreciation, the lower the taxable income and taxes the company must pay. 折旧会影响企业应纳税额，从而节约税金

FINANCIAL ANALYSIS

8-94

Chapter Supplement: Changes in Depreciation Estimates 折旧估计变更 (1 of 3)

Chapter Supplement

Depreciation is based on two estimates:

ESTIMATED useful life

ESTIMATED residual value

If the estimates change, then the undepreciated asset balance (less any residual value at the date of the change) should be depreciated **over the remaining useful life**.

If improvements are made that extend the assets useful life, the depreciation must also be recalculated.

8-95

Chapter Supplement: Changes in Depreciation Estimates (2 of 3)

Chapter Supplement

To compute the new depreciation expense due to a change in estimate, substitute the net book value for the original acquisition cost, the new residual value for the original amount, and the estimated remaining life in place of the original estimated life.

Original Straight-Line Formula Modified for a Change in Estimate:

$$(\text{Cost} - \text{Residual Value}) \times \frac{1}{\text{Useful Life}} = \text{Original Depreciation Expense}$$

$$(\text{Net Book Value} - \text{New Residual Value}) \times \frac{1}{\text{Remaining Life}} = \text{Revised Depreciation Expense}$$

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Chapter Supplement: Changes in Depreciation Estimates (3 of 3)

Chapter Supplement

Southwest purchased an aircraft for $60 million. The aircraft is depreciated using the straight-line method with a useful life of 20 years and an estimated residual value of $3 million. At the end of year 5, Southwest changed the estimated useful life to 25 years and lowered the residual value to $2.4 million.

Calculate depreciation expense for the fifth year using the straight-line method.

Acquisition cost	$60,000,000
Accumulated depreciation (years 1-4) ($2,850,000 per year × 4 years)	11,400,000
Remaining book value	48,600,000
Less: New residual value	2,400,000
New depreciable amount	46,200,000
Divide by remaining life	÷ 21
Revised annual depreciation	$ 2,200,000

8-97

Exercise 8-7

Bowman Company operates a small manufacturing facility as a supplement to its regular service activities. At the beginning of Year 10, an asset account for the company showed the following balances:

Manufacturing equipment	$75,000
Accumulated depreciation through Year 9	40,500

During Year 10, the following expenditures were incurred for the equipment:

Major overhaul of the equipment on January 2, Year 10 that improved efficiency	$9,000
Routine maintenance and repairs on the equipment	750

The equipment is being depreciated on a straight-line basis over an estimated life of 15 years with a $7,500 estimated residual value. The annual accounting period ends on December 31.

Required:

Give the adjusting entry that should be made by Bowman Company at the end of Year 10 for depreciation of the manufacturing equipment, assuming no change in the original estimated life or residual value. Show computations. Round answer to the nearest dollar.

8-98

December 31, Year 10:	Debit	Credit
Adjusting entry for Year 10 depreciation:		
Depreciation Expense (+E, – SE).....	6,000	
Accumulated Depreciation (+XA, – A).....		6,000

Computation:

($43,500 net book value – $7,500 residual value) ÷ 6 = $6,000

Net book value computation:

$ 75,000	original cost
(40,500)	accumulated depreciation through Year 9
9,000	capitalized overhaul on January 2, Year 10
$ 43,500	net book value on January 2, Year 10

Remaining life computation:

15 years estimated life
– 9 years used
6 Years remaining

($40,500 accumulated depreciation ÷ $4,500 expense) = 9 years

Depreciation expense per year
($75,000 original cost – $7,500 residual value) ÷ 15 years of estimated life =
$4,500 per year through Year 9

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HW8

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