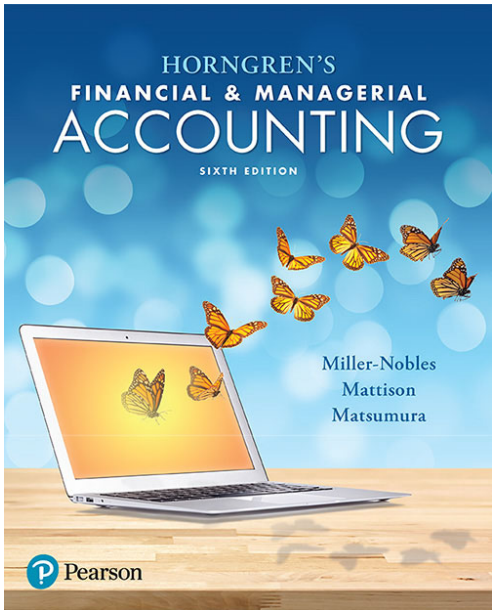

Chapter 12
Long-term Liabilities

1

Chapter 12 Learning Objectives

1. Journalize transactions for long-term notes payable and mortgages payable
2. Describe bonds payable
3. Journalize transactions for bonds payable and interest expense using the straight-line amortization method

2

Chapter 12 Learning Objectives

4. Journalize transactions to retire bonds payable
5. Report liabilities on the balance sheet
6. Use the debt to equity ratio to evaluate business performance

3

Chapter 12 Learning Objectives

7. Use time value of money to compute present value and future value (Appendix 12A)
8. Journalize transactions for bonds payable and interest expense using the effective-interest amortization method (Appendix 12B)

4

Learning Objective 1

Journalize transactions for long-term notes payable and mortgages payable

5

HOW ARE LONG-TERM NOTES PAYABLE AND MORTGAGES PAYABLE ACCOUNTED FOR?

- Long-term liabilities are liabilities that do not need to be paid within one year or within the entity's operating cycle, whichever is longer.
- These liabilities are reported in the long-term liability section of the balance sheet.
- Common long-term liabilities:
  - Long-term notes payable
  - Mortgages payable

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Long-term Notes Payable

On December 31, 2018, Smart Touch Learning signs a $20,000 note payable. It is due in four annual payments of $5,000 plus 6% interest each December 31.

Date	Accounts and Explanation	Debit	Credit
2018			
Dec. 31	Cash	20,000	
	Notes Payable		20,000
	Received cash in exchange for a 4-year, 6% note.		

7

Long-term Notes Payable

- An amortization schedule details each loan payment's allocation between principal and interest and the beginning and ending balances of the loan.
- Interest is computed as beginning balance multiplied by interest rate multiplied by time.

8

Long-term Notes Payable

Exhibit 12-1 | **Long-term Notes Payable Amortization Schedule**

	Beginning Balance	Principal Payment	Interest Expense	Total Payment	Ending Balance
12/31/2018					$ 20,000
12/31/2019	$ 20,000	$ 5,000	$ 1,200	$ 6,200	15,000
12/31/2020	15,000	5,000	900	5,900	10,000
12/31/2021	10,000	5,000	600	5,600	5,000
12/31/2022	5,000	5,000	300	5,300	0
Total		$ 20,000	$ 3,000	$ 23,000	

Beginning balance − Principal payment = $20,000 − $5,000 = $15,000

Beginning balance × Interest rate × Time = $20,000 × 0.06 × 1 year = $1,200

Principal payment + Interest expense = $5,000 + $1,200 = $6,200

9

Long-term Notes Payable

On December 31, 2019, Smart Touch Learning must make its first installment payment of $5,000 principal plus interest on the note.

Date	Accounts and Explanation	Debit	Credit
2019			
Dec. 31	Notes Payable	5,000	
	Interest Expense	1,200	
	Cash		6,200
	Paid principal and interest payment.		

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Mortgages Payable

- Mortgages payable are long-term debts that are backed with a security interest in specific property.
- Mortgages payable are similar to long-term notes payable except that mortgages payable are secured with specific assets, and long-term notes payable are not.

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Mortgages Payable

On December 31, 2018, Smart Touch Learning purchases a building for $150,000, paying $49,925 in cash and signing a 30-year mortgage for $100,075, taken out at 6% interest that is payable in $600 monthly payments, which includes principal and interest, beginning January 31, 2019.

Date	Accounts and Explanation	Debit	Credit
2018			
Dec. 31	Building	150,000	
	Mortgages Payable		100,075
	Cash		49,925
	Purchased building with a mortgage payable and cash payment.		

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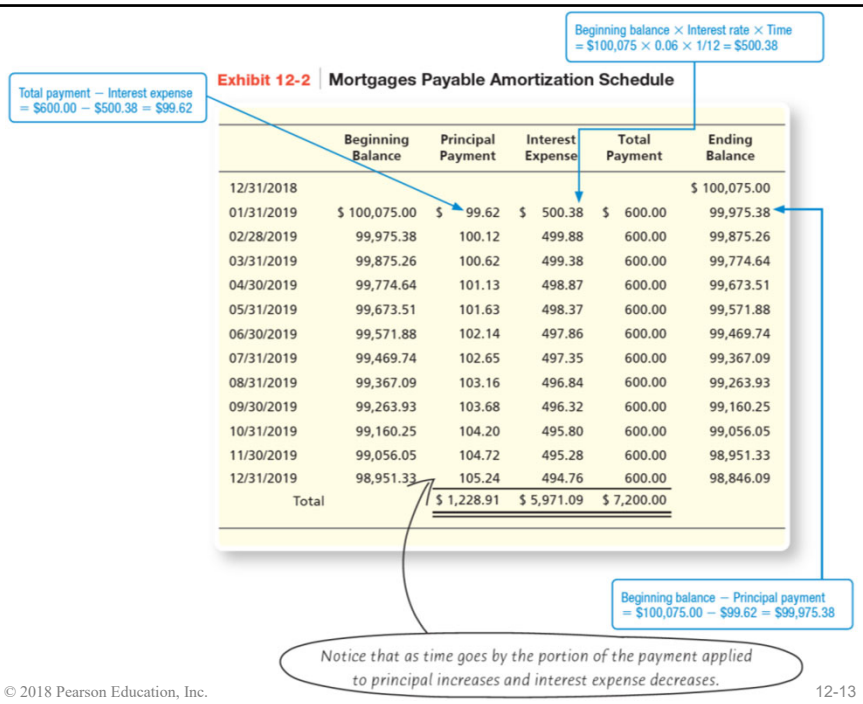

	Beginning Balance	Principal Payment	Interest Expense	Total Payment	Ending Balance
12/31/2018					$ 100,075.00
01/31/2019	$ 100,075.00	$ 99.62	$ 500.38	$ 600.00	99,975.38
02/28/2019	99,975.38	100.12	499.88	600.00	99,875.26
03/31/2019	99,875.26	100.62	499.38	600.00	99,774.64
04/30/2019	99,774.64	101.13	498.87	600.00	99,673.51
05/31/2019	99,673.51	101.63	498.37	600.00	99,571.88
06/30/2019	99,571.88	102.14	497.86	600.00	99,469.74
07/31/2019	99,469.74	102.65	497.35	600.00	99,367.09
08/31/2019	99,367.09	103.16	496.84	600.00	99,263.93
09/30/2019	99,263.93	103.68	496.32	600.00	99,160.25
10/31/2019	99,160.25	104.20	495.80	600.00	99,056.05
11/30/2019	99,056.05	104.72	495.28	600.00	98,951.33
12/31/2019	98,951.33	105.24	494.76	600.00	98,846.09
Total		$ 1,228.91	$ 5,971.09	$ 7,200.00	

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Mortgages Payable

Smart Touch Learning records the first mortgage payment on January 31, 2019:

Date	Accounts and Explanation	Debit	Credit
2019			
Jan. 31	Mortgages Payable	99.62	
	Interest Expense	500.38	
	Cash		600.00
	Paid principal and interest payment.		

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Learning Objective 2

Describe bonds payable

15

WHAT ARE BONDS?

- Bonds payable are long-term debts issued to multiple lenders called bondholders, usually in increments of $1,000 per bond.
- The face value is the amount a borrower must pay back to the bondholders on the maturity date.

Face value = Maturity value = Principal amount = Par value

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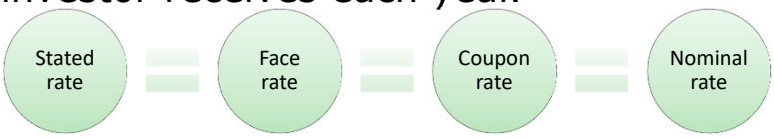
WHAT ARE BONDS?

- The maturity date is the date on which the borrower must pay the principal amount to the bondholders.
- The stated interest rate is the interest rate that determines the amount of cash interest the borrower pays and the investor receives each year.



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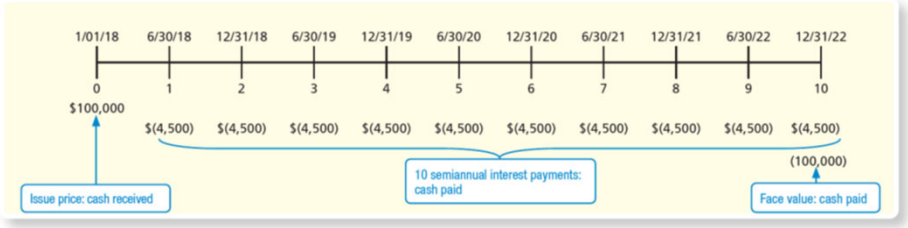
WHAT ARE BONDS?

A five-year, 9% bond issued at a face value of $100,000 on January 1, 2018, will pay 10 semiannual interest payments of $4,500 ($100,000 × 0.09 × 6/12) in addition to the face value payment at the maturity date. The cash flow pattern for this bond is as follows:



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WHAT ARE BONDS?

Exhibit 12-3 | **Bond Certificate**

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Types of Bonds

- Term bonds are bonds that all mature at the same time.
- Serial bonds are bonds that mature in installments at regular intervals.
- Secured bonds are bonds that give bondholders the right to take specified assets of the issuer if the issuer fails to pay principal or interest.
- Debentures are unsecured bonds backed only by the creditworthiness of the bond issuer.

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Bond Prices

- A bond can be issued at any price agreed upon by the issuer and the bondholders. A bond can be issued at face value, a discount or at a premium.
  - A discount on bonds payable occurs when the issue price is less than face value.
  - A premium on bonds payable occurs when the issue price is above face value.

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Bond Prices

Exhibit 12-4 | **Bond Price Information**

Bonds	Volume	High	Low	Close
SMT 9% of 21	12	79.5	78.45	79.5

Price information for the bonds of Smart Touch Learning:

- 12 of Smart Touch Learning's 9% bonds maturing in 2021 (indicated by 21) were traded.
- The bonds' highest price on this day was $795 ($1,000 × 0.795).
- The lowest price of the day was $784.50 ($1,000 × 0.7845).
- The closing price (last sale of the day) was $795.

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Present Value and Future Value

- Money earns interest over time.
- The time value of money is the recognition that money earns interest over time.
- The present value is the amount a person invests now to receive a greater amount in the future.
- The future value is the value of an investment at the end of a specific time frame.

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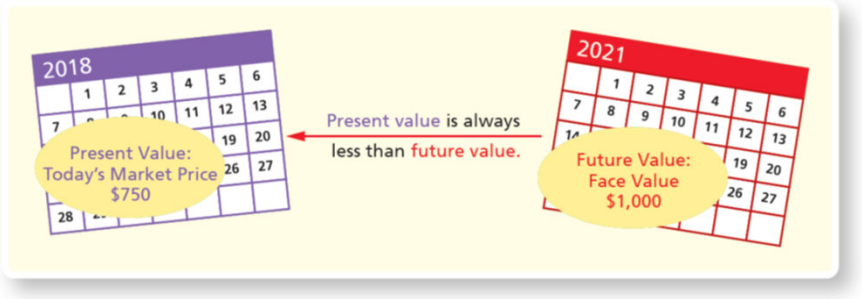
Present Value and Future Value

- Assume that a $1,000 bond reaches maturity three years from now and carries no interest. $750 is a fair price.
- By investing $750 now to receive $1,000 later, you will earn $250 over the three years.



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Bond Interest Rates

- The stated rate is the rate printed on a bond.
- The market interest rate (also known as the effective interest rate) is the rate that investors demand to earn for loaning their money.

Exhibit 12-5 | **Interaction Between Stated Interest Rate, Market Rate, and Price of Bond**

Example: Bond with a Stated Interest Rate of 9%

Bond's Stated Interest Rate		Market Interest Rate		Issue Price of Bonds Payable
9%	=	9%	→	Face value of the bond
9%	<	10%	→	Discount (price below face value)
9%	>	8%	→	Premium (price above face value)

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Issuing Bonds Versus Issuing Stock

- Borrowing by issuing bonds payable carries a risk: The company may be unable to pay off the bonds and the related interest.
- However, debt is a less expensive source of capital than stock and does not affect the ownership percentage.
- Earning more income on borrowed money than the related interest expense is called financial leverage.

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Issuing Bonds Versus Issuing Stock

Exhibit 12-6 | **Issuing Bonds Payable Versus Issuing Common Stock**

	Plan 1: Issue $500,000 of 10% Bonds Payable		Plan 2: Issue $500,000 of Common Stock	
Net income before new project		$ 300,000		$ 300,000
Expected income on the new project before interest and income tax expenses	$ 200,000		$ 200,000	
Less: Interest expense ($500,000 × 0.10)	50,000		0	
Project income before income tax	150,000		200,000	
Less: Income tax expense (40%)	60,000		80,000	
Project net income		90,000		120,000
Net income with new project		**$ 390,000**		**$ 420,000**
Earnings per share with new project:				
Plan 1 ($390,000 / 100,000 shares)		**$ 3.90**		
Plan 2 ($420,000 / 150,000 shares)				**$ 2.80**

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Learning Objective 3

Journalize transactions for bonds payable and interest expense using the straight-line amortization method

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HOW ARE BONDS PAYABLE ACCOUNTED FOR USING THE STRAIGHT-LINE AMORTIZATION METHOD?

- Journal entries are required to record the issuance of bonds at:
  - Face value
  - A discount
  - A premium
- Bonds are a long-term liability.

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Issuing Bonds Payable at Face Value

Smart Touch Learning has $100,000 of 9% bonds payable that mature in five years. The company issues these bonds at face value on January 1, 2018.

Date	Accounts and Explanation	Debit	Credit
2018			
Jan. 1	Cash	100,000	
	Bonds Payable		100,000
	Issued bonds at face value.		

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Issuing Bonds Payable at Face Value

Interest payments occur each June 30 and December 31. Smart Touch Learning's first semiannual interest payment is journalized as follows:

Date	Accounts and Explanation	Debit	Credit
2018			
Jun. 30	Interest Expense ($100,000 × 0.09 × 6/12)	4,500	
	Cash		4,500
	Paid semiannual interest on bonds payable.		

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Issuing Bonds Payable at a Discount

Smart Touch Learning issues $100,000 of 9%, five-year bonds that pay interest semiannually. The market rate of interest is 10%. Smart Touch Learning actually receives $96,149 and records a discount of $3,851.

Date	Accounts and Explanation	Debit	Credit
2018			
Jan. 1	Cash	96,149	
	Discount on Bonds Payable ($100,000 – $96,149)	3,851	
	Bonds Payable		100,000
	Issued bonds at a discount.		

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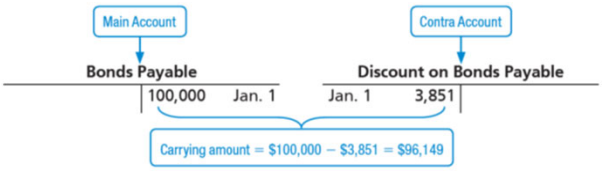
Issuing Bonds Payable at a Discount

After posting:



Smart Touch Learning reports these bonds payable on the balance sheet as follows:

Long-term Liabilities:		
Bonds Payable	$100,000	
Less: Discount on Bonds Payable	(3,851)	$96,149

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Issuing Bonds Payable at a Discount

- Discount on Bonds Payable is a contra account to Bonds Payable.
- Bonds Payable minus the discount gives the carrying amount of bonds, also known as the carrying value.

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Straight-Line Amortization of Bond Discount

- We can amortize a bond discount by using the straight-line amortization method.

In our example, the initial discount of $3,851 is divided over the 10 semiannual interest periods, and $385 is amortized each interest period.

Date	Accounts and Explanation	Debit	Credit
2018			
Jun. 30	Interest Expense ($4,500 + $385)	4,885	
	Discount on Bonds Payable ($3,851 × 1/10)		385
	Cash ($100,000 × 0.09 × 6/12)		4,500
	Paid semiannual interest and amortized discount.		

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Straight-Line Amortization of Bond Discount

The same entry would be made again on December 31, 2018. So, the bond discount balance would be $3,081 on December 31, 2018.

Bonds Payable

	100,000	Jan. 1	

Discount on Bonds Payable

Jan. 1	3,851	385	Jun. 30
		385	Dec. 31
Bal.	3,081		

The December 31, 2018, balance sheet would report:

Long-term Liabilities:		
Bonds Payable	$100,000	
Less: Discount on Bonds Payable	(3,081)	$96,919

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Straight-Line Amortization of Bond Discount

Face value × Stated interest rate × Time = $100,000 × 0.09 × 6/12 = $4,500

Exhibit 12-7 | **Bonds Payable—Discount Amortization Schedule**

	Cash Paid	Interest Expense	Discount Amortized	Carrying Amount
01/01/2018				$ 96,149
06/30/2018	$ 4,500	$ 4,885	$ 385	96,534
12/31/2018	4,500	4,885	385	96,919
06/30/2019	4,500	4,885	385	97,304
12/31/2019	4,500	4,885	385	97,689
06/30/2020	4,500	4,885	385	98,074
12/31/2020	4,500	4,885	385	98,459
06/30/2021	4,500	4,885	385	98,844
12/31/2021	4,500	4,885	385	99,229
06/30/2022	4,500	4,885	385	99,614
12/31/2022	4,500	4,886	386*	100,000
Total	$ 45,000	$ 48,851	$ 3,851	

*rounded

Cash paid + Discount amortized = $4,500 + $385 = $4,885

Carrying amount + Discount amortized = $96,149 + $385 = $96,534

Discount amortized = $3,851 / 10 = $385

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Issuing Bonds Payable at a Premium

- When the stated interest rate is greater than the market interest rate, the bonds are sold at a premium.
- Premium on Bonds Payable is an adjunct account to Bonds Payable.
- An adjunct account is an account that is directly related to another account.

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Issuing Bonds Payable at a Premium

Smart Touch Learning issues its 9%, five-year bonds when the market interest rate is 8%. Assume that the bonds are priced at 104.10, and Smart Touch Learning receives $104,100 cash upon issuance.

Date	Accounts and Explanation	Debit	Credit
2018			
Jan. 1	Cash	104,100	
	Premium on Bonds Payable ($104,100 – $100,000)		4,100
	Bonds Payable		100,000
	Issued bonds at a premium.		

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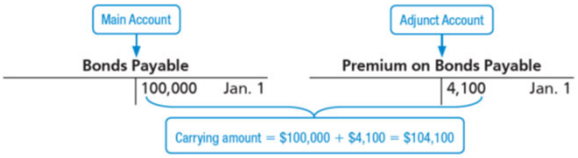
Issuing Bonds Payable at a Premium

After posting, the bond accounts have the following balances:



Smart Touch Learning reports these bonds payable on the balance sheet as follows:

Long-term Liabilities:		
Bonds Payable	$100,000	
Add: Premium on Bonds Payable	4,100	$104,100

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Straight-Line Amortization of Bond Premium

The beginning premium is $4,100, and there are 10 semiannual interest periods during the bonds' five-year life. Therefore, 1/10 of the $4,100 ($410) of bond premium is amortized each interest period.

Date	Accounts and Explanation	Debit	Credit
2018			
Jun. 30	Interest Expense ($4,500 − $410)	4,090	
	Premium on Bonds Payable ($4,100 × 1/10)	410	
	Cash ($100,000 × 0.09 × 6/12)		4,500
	Paid semiannual interest and amortized premium.		

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Straight-Line Amortization of Bond Premium

The same entry would be made again on December 31, 2018. So, the bond premium balance would be $3,280 on December 31, 2018.

Bonds Payable

	100,000	Jan. 1	

Premium on Bonds Payable

Jun. 30	410	4,100	Jan. 1
Dec. 31	410		
		3,280	Bal.

The December 31, 2018, balance sheet would report:

Long-term Liabilities:		
Bonds Payable	$100,000	
Add: Premium on Bonds Payable	3,280	$103,280

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Straight-Line Amortization of Bond Premium

Exhibit 12-8 | **Bonds Payable—Premium Amortization Schedule**

Face value × Stated interest rate × Time = $100,000 × 0.09 × 6/12 = $4,500

	Cash Paid	Interest Expense	Premium Amortized	Carrying Amount
01/01/2018				$ 104,100
06/30/2018	$ 4,500	$ 4,090	$ 410	103,690
12/31/2018	4,500	4,090	410	103,280
06/30/2019	4,500	4,090	410	102,870
12/31/2019	4,500	4,090	410	102,460
06/30/2020	4,500	4,090	410	102,050
12/31/2020	4,500	4,090	410	101,640
06/30/2021	4,500	4,090	410	101,230
12/31/2021	4,500	4,090	410	100,820
06/30/2022	4,500	4,090	410	100,410
12/31/2022	4,500	4,090	410	100,000
Total	$ 45,000	$ 40,900	$ 4,100	

Carrying amount – Premium amortized = $104,100 – $410 = $103,690

Cash paid – Premium amortized = $4,500 – $410 = $4,090

Premium amortized = $4,100 / 10 = $410

Learning Objective 4

Journalize transactions to retire bonds payable

HOW IS THE RETIREMENT OF BONDS PAYABLE ACCOUNTED FOR?

- Retirement of bonds payable involves paying the face value of the bonds.
- Bonds can be retired at the maturity date or before.
- When a bond is matured, the carrying value always equals the face value.

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Retirement of Bonds at Maturity

Smart Touch Learning has $100,000 of 9% bonds that mature on December 31, 2022. (Note that all interest has already been paid, and the discount is fully amortized.)

Date	Accounts and Explanation	Debit	Credit
2022			
Dec. 31	Bonds Payable	100,000	
	Cash		100,000
	Retired bonds payable at maturity.		

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Retirement of Bonds Before Maturity

- Companies sometimes retire their bonds prior to maturity.
- The main reason is to relieve the pressure of paying interest payments.
- Some bonds are callable bonds, which means the company may call, or pay off, the bonds at a specified price.

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Retirement of Bonds Before Maturity

On December 31, 2018, Smart Touch Learning has $100,000 of bonds payable outstanding, with a remaining discount balance of $3,081. The company can buy the bonds in the open market for 95.

Face value of the bonds being retired	$ 100,000
Less: Discount	(3,081)
Carrying amount of bonds payable	96,919
Less: Market price paid to retire the bonds ($100,000 × 0.95)	(95,000)
Gain on retirement of bonds payable	$ 1,919

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Retirement of Bonds Before Maturity

The following entry records retirement of the bonds, immediately after the December 31, 2018, interest payment:

Date	Accounts and Explanation	Debit	Credit
2018			
Dec. 31	Bonds Payable	100,000	
	Discount on Bonds Payable		3,081
	Gain on Retirement of Bonds Payable		1,919
	Cash		95,000
	Retired bonds payable prior to maturity.		

Retirement of Bonds Before Maturity

To retire bonds before maturity:

1. Record partial-period amortization of discount or premium and partial-period interest payment if the retirement date does not fall on an interest payment date.
2. Remove the portion of unamortized Discount or Premium that relates to the bonds being retired.
3. Debit Bonds Payable at face value.
4. Credit a gain or debit a loss on retirement.
5. Credit Cash for the amount paid to retire the bonds.

Learning Objective 5

Report liabilities on the balance sheet

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HOW ARE LIABILITIES REPORTED ON THE BALANCE SHEET?

- At the end of each period, all current and long-term liabilities are reported on the balance sheet.
- When a company issues bonds, a discount or premium is included in the section with the bonds payable.

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Exhibit 12-9 | **Liabilities**

SMART TOUCH LEARNING Balance Sheet (Partial) December 31, 2018			
Liabilities			
Current Liabilities:			
Accounts Payable		$ 12,620	
Employee Income Taxes Payable		2,000	
FICA—OASDI Taxes Payable		1,158	
FICA—Medicare Taxes Payable		855	
Employee Health Insurance Payable		180	
United Way Payable		20	
Federal Unemployment Taxes Payable		15	
State Unemployment Taxes Payable		60	
Employee Bonus Payable		1,000	
Vacation Benefits Payable		800	
Income Tax Payable		3,780	
Sales Tax Payable		600	
Estimated Warranty Payable		700	
Notes Payable (short-term)		400	
Current Portion of Mortgage Payable		1,305	
Current Portion of Long-term Notes Payable		5,000	
Total Current Liabilities			$ 30,493
Long-term Liabilities:			
Notes Payable		15,000	
Mortgage Payable		97,541	
Bonds Payable	$ 100,000		
Less: Discount on Bonds Payable	(3,081)	96,919	
Total Long-term Liabilities			209,460
Total Liabilities			$ 239,953

HOW ARE LIABILITIES REPORTED ON THE BALANCE SHEET?

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Learning Objective 6

Use the debt to equity ratio to evaluate business performance

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HOW DO WE USE THE DEBT TO EQUITY RATIO TO EVALUATE BUSINESS PERFORMANCE?

- The relationship between total liabilities and total equity is called the debt to equity ratio.
- The debt to equity ratio shows the proportion of total liabilities to total equity.
- This ratio measures financial leverage.
- A ratio greater than 1 indicates that the company is financing more assets with debt than with equity.

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HOW DO WE USE THE DEBT TO EQUITY RATIO TO EVALUATE BUSINESS PERFORMANCE?

Kohl's Corporation reported total liabilities and total equity (in millions) on its Fiscal 2015 Annual Report as follows:

	January 30, 2016	January 31, 2015
Total liabilities	$8,115	$8,342
Total equity	5,491	5,991

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HOW DO WE USE THE DEBT TO EQUITY RATIO TO EVALUATE BUSINESS PERFORMANCE?

Kohl's debt to equity ratio as of January 30, 2016 (2015 fiscal year), and January 31, 2015 (2014 fiscal year), can be calculated as follows:

Debt to equity ratio	= Total liabilities / Total equity
2015	= $8,115 / $5,491
	= 1.48
2014	= $8,342 / $5,991
	= 1.39

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Learning Objective 7

Use time value of money to compute present value and future value (Appendix 12A)

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WHAT IS THE TIME VALUE OF MONEY, AND HOW IS PRESENT VALUE AND FUTURE VALUE CALCULATED?

- A dollar received today is worth more than a dollar to be received in the future.
- The fact that invested cash earns interest over time is called the time value of money.
- The time value of money is used to determine the present value of a bond, its market price.

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Time Value of Money Concepts

- The time value of money depends on these key factors:
  1. The principal amount (*p*)—The amount of the investment or borrowing, either as a lump sum or as an annuity
  2. The number of periods (*n*)—The length of time
  3. The interest rate (*i*)—The percentage earned or invested

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Simple Interest Versus Compound Interest

- Simple interest means that interest is calculated only on the principal amount.
- Compound interest means that interest is calculated on the principal and all previously earned interest.

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Simple Interest Versus Compound Interest

Exhibit 12A-1 | **Simple Interest Versus Compound Interest—$10,000 at 6% for 5 Years**

Year	Simple Interest Calculation	Simple Interest	Compound Interest Calculation	Compound Interest
1	$10,000 × 6%	$ 600	$10,000 × 6%	$ 600
2	$10,000 × 6%	600	($10,000 + $600) × 6%	636
3	$10,000 × 6%	600	($10,000 + $600 + $636) × 6%	674*
4	$10,000 × 6%	600	($10,000 + $600 + $636 + $674) × 6%	715
5	$10,000 × 6%	600	($10,000 + $600 + $636 + $674 + $715) × 6%	758
	Total interest	$ 3,000	Total interest	$ 3,383

*all calculations rounded to the nearest dollar for the rest of this chapter

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Future Value and Present Value Factors

In our example, the future value of the investment is:

$$\begin{aligned}\text{Future value} &= \text{Principal} + \text{Interest earned}\\ &= \$10{,}000 + \$3{,}383\\ &= \$13{,}383\end{aligned}$$

If we know the future value and want to find the present value, we can rearrange the equation as follows:

$$\begin{aligned}\text{Present value} &= \text{Future value} - \text{Interest earned}\\ \$10{,}000 &= \$13{,}383 - \$3{,}383\end{aligned}$$

The only difference between present value and future value is the amount of interest that is earned in the intervening time span.

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Future Value and Present Value Factors

- Mathematical formulas specify future values and present values for unlimited combinations of interest rates (i) and time periods (n).
- Separate formulas exist for single lump sum investments and annuities.
- Present value tables contain the results of the formulas for various interest rate and time period combinations.

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Future Value and Present Value Factors

Present and future value tables in Appendix A:

Table A-1	Present Value of $1	Used to calculate the value today of one future amount (a lump sum)
Table A-2	Present Value of Ordinary Annuity of $1	Used to calculate the value today of a series of equal future amounts (annuities)
Table A-3	Future Value of $1	Used to calculate the value in the future of one present amount (a lump sum)
Table A-4	Future Value of Ordinary Annuity of $1	Used to calculate the value in the future of a series of equal future amounts (annuities)

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Present Value of a Lump Sum

- How much would you need to invest today (in the present time) to have $13,383 in five years if the interest rate is 6%?
- Use the PV factor from the table Present Value of $1 (Appendix A, Table A-1).

$$\text{Present value} = \text{Future value} \times \text{PV factor for } i = 6\%, n = 5$$

$$\begin{aligned}\text{Present value} &= \text{Future value} \times \text{PV factor for } i = 6\%, n = 5 \\ &= \$13{,}383 \times 0.747 \\ &= \$9{,}997\end{aligned}$$

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Present Value of an Annuity

- A series of equal payments over equal intervals (years) is an annuity.
- Assume that instead of receiving a lump sum at the end of five years, you will receive $2,000 at the end of each year.

Present value = Amount of each cash inflow × Annuity PV factor for $i = 6\%$, $n = 5$
= $2,000 × 4.212
= $8,424

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Present Value of an Annuity

To verify the calculation:

Year	[1] Beginning Balance Previous [4]	[2] Interest [1] × 6%	[3] Withdrawal $2,000	[4] Ending Balance [1] + [2] − [3]
0				$ 8,424
1	$ 8,424	$ 505	$ 2,000	6,929
2	6,929	416	2,000	5,345
3	5,345	321	2,000	3,666
4	3,666	220	2,000	1,886
5	1,886	114*	2,000	0

*rounded up by $1

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Present Value of Bonds Payable

- We can use the present value of a lump sum and present value of an annuity concepts to determine the selling price of a bond.
- The present value of a bond—its market price—is the sum of:
  - The present value of the principal amount to be paid at maturity
  - The present value of the future stated interest payments, an annuity

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Present Value of a Bonds Payable Issued at a Discount

- Smart Touch Learning issues $100,000 of five-year, 9% bonds that pay interest semiannually. The market interest rate is 10%.
  - Maturity payment = $100,000
  - Periodic interest = $4,500
  - Interest rate = 10% (*5% semiannually*)
  - Number of periods = 10 (*payments twice a year for 5 years*)

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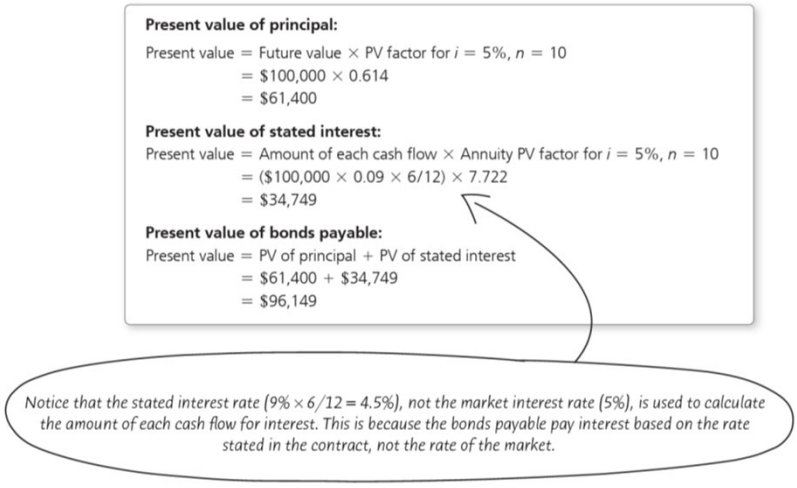
Present Value of a Bonds Payable Issued at a Discount



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Present Value of a Bonds Payable Issued at a Premium

- Smart Touch Learning issues $100,000 of five-year, 9% bonds that pay interest semi-annually. The market interest rate is 10%.
  - Maturity payment = $100,000
  - Periodic interest = $4,500
  - Interest rate = 8% (*4% semiannually*)
  - Number of periods = 10 (*payments twice a year for 5 years*)

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Present Value of a Bonds Payable Issued at a Premium

Present value of principal:

Present value = Future value × PV factor for $i = 4\%$, $n = 10$
= \$100,000 × 0.676
= \$67,600

Present value of stated interest:

Present value = Amount of each cash flow × Annuity PV factor for $i = 4\%$, $n = 10$
= (\$100,000 × 0.09 × 6/12) × 8.111
= \$36,500

Present value of bonds payable:

Present value = PV of principal + PV of stated interest
= \$67,600 + \$36,500
= \$104,100

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Future Value of a Lump Sum

If \$10,000 is invested today (in the present time), how much would there be in five years at an interest rate of 6%?

Future value = Present value × FV factor for $i = 6\%$, $n = 5$
= \$10,000 × 1.338
= \$13,380

At the end of five years, the investment will grow to \$13,380.

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Future Value of an Annuity

Calculate the future value of an annuity, assuming that you will receive $2,000 at the end of each year and assuming an interest rate of 6%.

Future value = Amount of each cash inflow × Annuity FV factor for $i = 6\%$, $n = 5$
= $2,000 × 5.637
= $11,274

This means investing $2,000 per year for five years at 6% will yield $11,274.

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Learning Objective 8

Journalize transactions for bonds payable and interest expense using the effective-interest amortization method (Appendix 12B)

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HOW ARE BONDS PAYABLE ACCOUNTED FOR USING THE EFFECTIVE-INTEREST AMORTIZATION METHOD?

- Earlier we used a straight-line approach for amortizing the discount and determining interest expense.
- The effective-interest amortization method computes interest expense based on the carrying amount of the bond and the market rate at issuance.

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Effective-Interest Amortization for a Bond Discount

- Smart Touch Learning issues $100,000 of 9% bonds at a time when the market rate of interest is 10%.
- The interest expense is calculated using the carrying amount of the bonds and the market interest rate.

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Exhibit 12B-1 | Bonds Payable—Discount Amortization Schedule; Effective-Interest Amortization Method

	Cash Paid	Interest Expense	Discount Amortized	Carrying Amount
01/01/2018				$ 96,149
06/30/2018	$ 4,500	$ 4,807	$ 307	96,456
12/31/2018	4,500	4,823	323	96,779
06/30/2019	4,500	4,839	339	97,118
12/31/2019	4,500	4,856	356	97,474
06/30/2020	4,500	4,874	374	97,848
12/31/2020	4,500	4,892	392	98,240
06/30/2021	4,500	4,912	412	98,652
12/31/2021	4,500	4,933	433	99,085
06/30/2022	4,500	4,954	454	99,539
12/31/2022	4,500	4,961*	461	100,000
Total	$ 45,000	$ 48,851	$ 3,851	

Interest Expense – Cash paid = $4,807 – $4,500 = $307

Carrying amount + Discount amortized = $96,149 + $307 = $96,456

*rounded

Face value × *Stated* Interest rate × Time = $100,000 × 0.09 × 6/12 = $4,500

Carrying amount × *Market* interest rate × Time = $96,149 × 0.10 × 6/12 = $4,807

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Effective-Interest Amortization for a Bond Discount

Using the discount amortization table, record Smart Touch Learning's first interest payment on June 30.

Date	Accounts and Explanation	Debit	Credit
2018			
Jun. 30	Interest Expense ($96,149 × 0.10 × 6/12)	4,807	
	Discount on Bonds Payable ($4,807 – $4,500)		307
	Cash ($100,000 × 0.09 × 6/12)		4,500
	Paid semiannual interest and amortized discount.		

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Effective-Interest Amortization of a Bond Premium

- Smart Touch Learning issues $100,000 of 9% bonds at a time when the market rate of interest is 8%.
- The interest expense is calculated using the carrying amount of the bonds and the market interest rate, similar to the method used for discounted bonds.

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Exhibit 12B-2 | **Bonds Payable—Premium Amortization Schedule; Effective-Interest Amortization Method**

	Cash Paid	Interest Expense	Premium Amortized	Carrying Amount
01/01/2018				$ 104,100
06/30/2018	$ 4,500	$ 4,164	$ 336	103,764
12/31/2018	4,500	4,151	349	103,415
06/30/2019	4,500	4,137	363	103,052
12/31/2019	4,500	4,122	378	102,674
06/30/2020	4,500	4,107	393	102,281
12/31/2020	4,500	4,091	409	101,872
06/30/2021	4,500	4,075	425	101,447
12/31/2021	4,500	4,058	442	101,005
06/30/2022	4,500	4,040	460	100,545
12/31/2022	4,500	3,955*	545	100,000
Total	$ 45,000	$ 40,900	$ 4,100	

*rounded

Cash paid − Interest expense = $4,500 − $4,164 = $336

Carrying amount − Premium amortized = $104,100 − $336 = $103,764

Face value × *Stated* Interest rate × Time = $100,000 × 0.09 × 6/12 = $4,500

Carrying amount × *Market* interest rate × Time = $104,100 × 0.08 × 6/12 = $4,164

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Effective-Interest Amortization of a Bond Premium

Using the premium amortization table, record Smart Touch Learning's first interest payment on June 30.

Date	Accounts and Explanation	Debit	Credit
2018			
Jun. 30	Interest Expense ($104,100 × 0.08 × 6/12)	4,164	
	Premium on Bonds Payable ($4,500 – $4,164)	336	
	Cash ($100,000 × 0.09 × 6/12)		4,500
	Paid semiannual interest and amortized premium.		

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