

Save and Invest—Bonds

Lesson Description

In this lesson, students will learn that bonds are financial assets used to build wealth. Using the more familiar concept of bank loans, bonds are introduced as loans to institutions, including governments, corporations and municipalities, made by investors. Terminology related to bonds, three of the primary issuers of bonds and information about the life of a bond are explained using the interactive capabilities of the whiteboard. An interactive balance sheet helps students analyze the ways that bonds allow investors to build wealth. Students will then learn the difference between the primary and secondary markets, and the factors that affect the price of a bond in the secondary market. Finally, students will learn how changes in bond prices affect bond yields and will calculate current yields of various bonds.

National Standards in K-12 Personal Finance Education (www.jumpstart.org)

Saving and Investing

Standard 3: Evaluate investment alternatives.

Instructional Objectives

Students will:

- ❑ Identify a bond as a financial asset representing a loan to a corporation, municipality or government.
- ❑ Describe the components of a bond.
- ❑ Analyze the impact of bond ownership on a balance sheet.
- ❑ Identify factors that influence a bond's market price.
- ❑ Explain the relationship between a bond's price and its current yield.

Time Required

One 50-minute class period

Materials Required

- ❑ SmartBoard (optional) *If using a computer and projector, please click when procedure says touch.*
- ❑ Interactive PDF file
- ❑ Copies of Handout 1: Bond Assessment

Warning

The first time you teach the lesson, save a master copy to your computer or a flash drive. If you do not, you will not be able to save notes from each class. Before each class, reload the master copy of the notebook file to be certain that all of the elements on each page are ready for use.

Procedure

- 1. Display Slide 1.** Tell the students that the topic of the lesson is bonds.
- 2. Display Slide 2.** Review the instructional objectives for the lesson.
- 3. Display Slide 3.** Brainstorm information about bonds. Student responses will vary but should include the following information.

- Bonds are financial assets.
- Bonds represent loans to corporations, municipalities, governments or their agencies.
- Bonds are term loans. The length of time and interest rate are established before they are sold.

4. Display Slide 4. Use the diagram and the following information to compare bonds and bank loans.

- Institutions can borrow money from two important sources.
- Banks (or other financial institutions) receive deposits from savers and make loans to borrowers.
- Institutions can borrow directly from investors (savers) by selling bonds.
- Bonds and bank loans share some characteristics.
 - Interest rate
 - Term (length of the loan)
 - Regular payments by the borrower
- Bonds and bank loans have important differences.
- A bank, rather than an individual depositor, bears the risk of default on a loan. A bond holder individually bears the risk of default on a bond.

Note: If loan defaults threaten the solvency of the bank, depositors are also protected by deposit insurance.

- Banks generally have more stringent lending guidelines, while individual investors are free to accept more risk when they purchase bonds.

5. Display Slide 5. Use the interactive graphic and information below to describe three types of institutions that often borrow money by issuing bonds.

- Touch the blue icon with the commercial building on the left to display information about corporations.
 - Corporations can issue bonds to finance a wide variety of business activities when costs exceed short-term revenue.
 - Corporations use revenue from doing business to pay the interest on the bonds.
- Touch the purple icon with the Capitol building in the middle to display information about sovereign governments.
 - Sovereign governments issue bonds to finance government activities (e.g., wars or social programs) when costs exceed tax revenue.
 - Governments have taxing authority to generate revenue to pay the interest on the bonds.
- Touch the yellow icon with the city hall on the right to display the information about municipalities.
 - Activities that are financed include public works (streets and utilities), school construction and renovation.
 - Most municipalities levy taxes to pay the interest on the bonds.

6. Display Slide 6. Tell students that most bonds are now issued electronically. However, bonds used to be paper documents that told the investor information about the bond. Use the information below and the interactive graphic to discuss the parts of a bond.

- Touch any of the “\$1000” in the corners of the bond to display information about face value.
 - This bond has a face value of \$1,000.

- The face value is used to calculate the payment the bondholder will receive.
- Touch “The United States of America” to display information about the issuer.
 - The issuer could be a corporation, government or municipality.
 - The issuer makes the interest payments to the bondholders.
- Touch “Matures: 10/15/2021” to display information about the maturity date.
 - On the maturity date (or at maturity), bondholders have the principal (face value) returned and no longer receive interest payments.
- Touch “5% Paid Annually” to display information about the coupon rate.
 - The coupon rate is the interest rate paid to bond holders.
 - The coupon rate is set by the issuer and is used to calculate the annual interest payment.
- Touch any of the “\$50” rectangles at the bottom of the bond to display information about coupons.
 - When bonds were issued in paper form, investors would submit these coupons to receive the interest payment.
 - There is one coupon for each interest payment over the life of the bond. Each coupon specifies the amount of money the bond holder is entitled to receive.
 - The amount is based on the coupon rate and the face value of the bond ($5\% * \$1,000 = \50).

7. Display Slide 7. Use the graphic and the information below to describe the life of a bond.

- At issuance, investors (savers) purchase the bond for the face value.
- Institutions (borrowers) pay the coupon payments for the life of the bond. These payments are fixed by the face value and coupon rate.
- The bond matures on the specified maturity date and investors (savers) receive the face value (principal).

8. Display Slide 8. Use the interactive balance sheet and the information below to explain how bonds help investors build wealth by growing net worth.

- Choose an interest (coupon) rate using the up and down arrows. The default interest rate is 5%. Once you have chosen the interest rate, touch OK.
- Review the components of the balance sheet.
 - Identify the assets and liabilities listed on the balance sheet.
 - Identify net worth on the balance sheet. Remind students that $\text{Net Worth} = \text{Assets} - \text{Liabilities}$. (See BW Lesson 1.)
 - Point out the coupon rate and amount of the annual coupon payment. Remind students that $\text{Coupon Payment} = \text{Coupon Rate} * \text{Face Value of the Bond}$.
- Touch the “Receive Interest” button.
 - Ask students to identify which entries on the balance sheet changed.
Savings and Net Worth increased \$50 (the amount of the coupon payment with 5% coupon rate; will vary when a different interest rate is selected)

Note: The year will advance from 1 to 2.

- Continue to click the “Receive Interest” button to show the coupon payment in Years 2–9.
 - Ask students to identify which entries on the balance sheet changed in each year.
Savings and Net Worth increase \$50 in each year.
 - Ask students why the coupon payment is the same every year.

It is based on the coupon rate and the face value of the bond.

- When the year counter displays year 10, tell students that the 10-year bond is about to mature. Ask them what this would mean to the investor.

When a bond matures, the principal is returned and interest payments stop.

- Touch the “Receive Interest” button again one final time to advance to bond maturity.
- Ask students to identify the changes to the balance sheet.
The savings account will increase by \$1,050 and the bond entry will go to zero. Net worth increased by \$50.
- Ask students to explain why these changes took place.
The bond matured and the investor received the face value and final interest payment, but no longer holds the bond.
- Ask students to identify how much interest the investor received over the life of the bond.
The investor received 10 payments of \$50 for a total of \$500. This is the amount of wealth or increased net worth created by owning the bond.

9. Display Slide 9. Use the graphic and the information below to describe the two ways investors (savers) can purchase bonds.

- Primary Market—Investors (savers) purchase bonds directly from the original issuer (borrowers) for the face value.
- Secondary Market—Investors purchase bonds from other investors.
 - Not all investors hold a bond for its entire life.
 - In this market, the price of bonds is no longer fixed.
 - Once a bond is sold in the secondary market, the new owner will receive the future interest payments.
 - The sales price of a bond in the secondary market does not change the bond’s face value (the amount returned at maturity), the coupon rate or the amount of the coupon payment.

10. Display Slide 10. Use the questions on the graphic and the information below to discuss the information that investors gather about bonds before making a purchase.

- When does the bond mature?
Investors want to know for how long they are going to be loaning their money. While bonds can be sold in the secondary market, only by holding a bond until it matures does an investor receive all of the interest payments and the full face value.
- How risky is the loan?
Investors must consider how likely the borrower is to repay the loan. Strong institutions with long histories of consistent revenue may be more likely to repay their bonds on time than weaker, less stable institutions. Historically, no bonds are considered less risky than bonds issued by sovereign governments, because they can levy taxes to pay them back.
- How does the interest from this bond compare to other bonds?
Investors look at the coupon rate of the bond and other similar bonds. Similar bonds will have comparable maturities and levels of risk. Similar bonds with higher coupons will generally be more desirable and therefore have higher prices in the secondary market.

- Is the income from the bond taxable?
Taxes can have a significant impact on the return of an investment. The interest income from some bonds, usually those issued by municipalities, is exempt from local, state and/or national income taxes. For some investors, the tax savings is worth accepting a lower coupon. For borrowers, the lower coupon helps to manage the cost of their bond issue, while keeping them desirable to investors.

11. Display Slide 11. Use the graph and the information below to extend the discussion of bond maturities.

- Bonds sold by the U.S. Treasury vary in maturity from four weeks to 30 years.
- Under normal circumstances, bonds with longer maturities have to pay higher interest rates to entice investors to commit their money for longer periods of time.
- Investors with very short time frames can buy Treasury bills. Investors with very long time frames can buy Treasury bonds.

12. Display Slide 12. Use the next two slides to extend the discussion of bond risk. Use Slide 12 to introduce a familiar rating system.

- Ask students to identify the ratings displayed.
They are the movie ratings assigned by the MPAA to most movies commercially distributed in the U.S.
- Ask students what they learn about a movie simply by seeing its rating? Answers will vary, but might include the following.
G rated movies are for little kids.
R rated movies are likely inappropriate for children.
- Tell students that movie ratings help people determine whether a movie is appropriate for them based on their age and sensibilities.
- Explain that the MPAA considers many factors—violence, language and adult content—to determine the rating of a movie. Now tell students that there are companies that use ratings to describe their opinions of bonds. The ratings do not guarantee a bond’s successful repayment or its appropriateness for any individual, but they do convey information about the rating company’s opinion of a bond’s quality.

13. Display Slide 13. Use the information below and in the graphic to describe the factors that are considered when a bond is rated.

- Click on the company financials on the left and ask students to respond to the question. Answers will vary, but should emphasize the following points.
The financial situation can impact an institution’s ability to pay interest and repay the face value of the bond. Stronger institutions with better financial situations generally receive higher ratings.
- Click on the sector graphics in the middle and ask students to respond to the question. Answers will vary, but should emphasize the following point.
Some sectors of the economy perform differently and have different strengths and weaknesses.
- Click on the newspaper on the right that represents broader economic conditions and ask students to respond to the question. Answers will vary, but should emphasize the following points.
The overall economy may impact the rating of an institution’s bonds. Weaker economic conditions can negatively impact a company’s likelihood of repayment.
If bond payments are dependent on taxes, the economic health of the community that issues the bond will impact the risk of the bond.

14. Display Slide 14. Use the information below and the graphics on the slide to explain the importance of the coupon rate of a bond.

- If bonds are similar (same maturity and similar risk), investors consider the relative coupon rates.
- Ask students to identify the bond that is the most desirable (3%, 5% or 8% coupon rates).
- Since investors prefer higher interest rates to lower interest rates on similar bonds, demand for bonds with higher coupons is greater.

15. Display Slide 15. Use the information below and the graphic to discuss the factors that affect bond prices when the bonds are purchased in the secondary market. Remind students that in this market, bonds are purchased from other investors rather than the original issuer, and the bonds are not necessarily priced at their face value.

- Three main factors affect the prices in the secondary market.
 - Time until maturity.
 - Credit quality/rating.
 - Coupon rate of comparable bonds.
- Holding any two of the three constant, changes in the third will affect demand.
 - Shorter time until maturity ? more demand and therefore a higher price
 - Higher credit quality ? more demand and therefore a higher price
 - Higher coupon rate ? more demand and therefore a higher price

16. Display Slide 16. Use the graphic and the information below to explain the terms related to bond prices in the secondary market.

- Bond prices fluctuate in the secondary market, depending on time until maturity, credit quality/rating and the coupon rate of comparable bonds.
- The market price of a bond can be the same as the face value, or it can be higher or lower.
- The terms premium, par and discount compare the face value and the current (market) price. However, these terms are not qualitative. Higher prices do not indicate a better quality bond.

17. Display Slide 17. Use the information below and on the slide to discuss the relationship of current price and current yield.

- Changes in the market price do not affect the coupon rate or payment. However, the market price does impact investor returns.
- Current yield is the percentage of the invested amount paid to bond holders through coupon payments. (Current yield = coupon payment ÷ current price)
- With a fixed coupon payment, a higher price causes the current yield to fall.
- With a fixed coupon payment, a lower price causes the current yield to rise.

18. Display Slide 18. Use the graphic to introduce a guided practice.

- The three bonds are identical (same maturity, issuer and face value). Only the coupon rate is different.
- Write a price for each bond on the board. Have students calculate current yield for the three bonds using the formula (Current yield = coupon payment ÷ current price).

Coupon Rate	Current Price	Coupon Payment	Current Yield
3% paid annually	\$650	\$30	4.62%
5% paid annually	\$1,000	\$50	5%
8% paid annually	\$1,300	\$80	6.15%

- For additional practice, change the prices for the bonds. Remember that bonds with higher coupon rates must be priced higher.

Closure

1. Who is loaning money to corporations, municipalities or sovereign governments when bonds are sold?
Unlike traditional bank loans, bonds allow institutions to deal directly with investors when raising capital. Typically, bonds place fewer restrictions on the borrowing institution.
2. Why do the coupon payments on bonds never change?
The coupon payment is calculated by multiplying the face value of the bond by the coupon rate. Since both of these are fixed at issuance, the coupon payment will never change over the life of the bond.
3. What is the difference between the primary and secondary market?
The primary market is where issuers sell their bonds at face value to investors. The secondary market is where investors sell bonds they have purchased to other investors. In the secondary market, prices for bonds are established by market forces.
4. What do par, premium and discount mean with respect to a bond's price and its face value?
Par, premium and discount all refer to the price of a bond in the secondary market with respect to its face value. If the bond is priced higher than its face value, it is selling at a premium. If the bond is priced lower than its face value, it is selling at a discount. If the bond is priced at face value, it is selling at par.
5. What do we get when we divide the coupon payment of a bond by the purchase price? Why are investors interested in it?
Coupon Payment ÷ Purchase Price = Current Yield
Current Yield is the amount of income an investor is going to receive from a bond per dollar spent.

Assessment

Distribute copies of Handout 1 and allow students to complete independently.

Name _____

Date _____

Handout 1: **Bond Assessment**

1. What is the difference between a bank loan and a bond?

2. How are coupon payments calculated? Why does the amount of a bond's coupon payment never change?

3. What is the difference between Treasury bills, Treasury notes and Treasury bonds?

4. How does bond ownership build wealth?

5. What is the difference between the primary and secondary market?

6. What are bond ratings designed to convey to investors?

Suggested Answers

Handout 1: **Bond Assessment**

1. What is the difference between a bank loan and a bond?
Bank loans require that institutions borrow money directly from the bank and adhere to all the requirements of their loan contracts. Bonds allow institutions to deal directly with investors and are typically less restrictive in their lending requirements.
2. How are coupon payments calculated? Why does the amount of a bond's coupon payment never change?
Coupon payments are calculated by multiplying the face value of a bond by its coupon rate. Regardless of the sale price of the bonds, neither the face value nor the coupon rate change, so the coupon payment does not change.
3. What is the difference between Treasury bills, Treasury notes and Treasury bonds?
Treasury bills are short-term, with maturities ranging from four to 52 weeks. Treasury notes are intermediate-term, with maturities ranging from two to 10 years. Treasury bonds are long-term, with a 30-year maturity.
4. How does bond ownership build wealth?
Bonds build wealth through their coupon payments, which are paid as cash to bond owners. As long as a bond does not default (fail to make regular payments), investors receive a predictable income stream based on the coupon rate and face value of the bond.
5. What is the difference between the primary and secondary market?
In the primary market, bond issuers sell their bonds directly to investors. In the secondary market, investors sell bonds to other investors and the price of a bond can vary.
6. What are bond ratings designed to convey to investors?
Bond ratings are designed to convey the creditworthiness of a bond to investors. The more likely the rating agency considers an issuer to repay the particular bond, the higher rating the bond will receive.