FINANCIAL FUNDAMENTALS FROM THE FED

Savvy Savers

Lesson Description

Students calculate compound interest to identify benefits of saving in interest-bearing accounts. They learn the "rule of 72" and apply it to both investments and debt. They learn that there is a relationship between the level of risk for an investment and the potential reward or return on that investment.

Concepts

Compound interest
Interest
Non-interest bearing account
Principal
Risk-reward relationship
Rule of 72
Saving

Objectives

Students will:

- Explain the difference between a non-interest bearing account and an interest-bearing account.
- Calculate interest compounded semiannually.
- Explain and demonstrate the Rule of 72.
- Describe the risk-reward relationship.

Common Core Standards

Gr. 6-12 English Language arts Standards, Literacy in History/Social Studies and Technical Studies

- **Craft and Structure**
- **Integration of Knowledge and Ideas**
- **Craft and Structure**

Content Standards

National Standards in Personal Financial Literacy

Saving and Investing: Implement a diversified investment strategy that is compatible with personal goals.

- **Standard 3:** Saving
- **Standard 5:** Financial Investing
- **Standard 4:** Using Credit

National Standards in Economics

- **Standard 12:** Interest Rates

Time Required

45 minutes

Grade Level

9–12

Materials

- A copy of Handouts 5.1, 5.2 and 5.3 for each student
- Visuals of Handout 5.1—Answer Key, Handout 5.2—Answer Key and Handout 5.3—Answer Key
- A calculator for each student

Procedures

1. Begin by asking students the following:
   - What does it mean to be a saver? *(Answers may vary but may include not spending all of one's income, having money left after paying expenses, income greater than expenses, etc.)*
   - What do you suppose it means to be a savvy saver? *(Answers may vary but may include being a smart saver, knowing about places to save one's money, knowing about different savings accounts, etc.)*

2. Explain that **saving** is income not spent. Distribute *Handout 1: Maria's Saving Decision* to all students and explain that they may see the difference between a saver and a savvy saver when they examine Maria's story. Call on a student to read aloud the first paragraph of Handout 1.

3. Explain the following:
   - A **non-interest bearing account**, or zero-interest account, is one in which no interest is paid on the **principal**—that is, the amount of deposit or account balance.
   - **Interest** is the price of using someone else's money. When people place their money in a bank, the bank uses the money to make loans to others. In return, the bank pays the account holder interest. There are various types of interest-bearing accounts depending on the amount of interest and how often the interest is paid.

- **Compound interest** means that interest is computed on the sum of the original principal and any accrued (accumulated or earned) interest. For example, an account that pays 5 percent interest "compounded semiannually" means that every six months ½ of 5 percent, i.e., 2.5 percent, interest is paid on the principal and any accrued interest.

4. Show students how to calculate 5 percent interest compounded semiannually by demonstrating the answers to problems #1 through #3 on Handout 1. (Refer to *Handout 1: Maria's Savings Decision—Answer Key* for answers.)

5. Distribute a calculator to each student and instruct students to complete Handout 5.1 (problem #4) on their own.

6. Display a visual of Handout 1 and go over answer #4 on the handout. After reviewing all of the questions on Handout 1, ask students the following:
   - What is a non-interest bearing account? *(an account or deposit that does not pay interest on the principal)*
   - What could Maria have bought with the $50.63 of interest she might have earned on her savings? *(Answers may vary.)*
   - Would you classify Maria as a saver or a savvy saver? *(saver)* Why? *(She didn't invest her money in a way that would give her a return on her investment, i.e. an account that pays interest on the principal.)*
   - Why would anyone leave the $1,000 in a non-interest bearing account rather than putting it in an interest-bearing account? *(Answers may vary but may include that she was financially lazy—not proactive—or that she may not have understood the importance of compound interest.)*
   - How much interest would Maria have received had the money been deposited in an interest-bearing account for three years? *($1,159.71 - $1,000.00 = $159.71)*
   - Imagine that instead of $1,000, Maria's grandmother had given her $10,000. After three years, how much interest would $10,000 have earned on a 5 percent compounded semiannually account? *($159.71 x 10 = $1,597.10)*
   - Why is time—i.e., the number of months you have your money in an interest-bearing account—a very important factor in accumulating savings? *(Answers may vary but may include that the sooner you start saving, the sooner you start earning interest not only on your principal but also on accrued interest. Your money works for you over time.)*

7. Ask students the following questions:
   - How many of you would like for the amount of your savings to double over a period of years? *(Answers may vary, but most students will likely want their amount of savings to double.)*
   - How long would it take for Maria's $1,000 to double if she kept the money in a non-interest bearing account? *(It would never double.)*

- How long do you think it will take for Maria's $1,000 to double if she puts the money in a savings account that pays compounded interest? *(Answers will vary.)*

8. Tell students that you are going to show them the **Rule of 72**, which is an easy way to estimate how long it will take their money to double at a certain interest rate. Tell students that in order to determine how long it will take their money to double at a certain interest rate, they should divide 72 by the interest rate. For example, 72 ÷ 5 = 14.4. Therefore the principal in a savings account that pays 5 percent interest will double in a little over 14 years. Explain that the Rule of 72 assumes people leave their money in an account without taking away from it or adding to it. It isn't an exact number, but it's close enough to serve as an estimate.

9. Distribute *Handout 2: The Rule of 72* to all students and ask them to complete the handout by following the instructions.

10. When students have completed Handout 2, display a visual of *Handout 2: The Rule of 72—Answer Key* to review the answers. Discuss the following:

    - Does the amount of interest an account pays have much of an impact on how long it will take for your money to double? *(Yes.)*
    - Interest rates vary over time, but savings accounts are considered to be a safe way to save your money because for most savings accounts your principal is guaranteed. Interest rates for savings accounts generally pay in the 2 percent to 4 percent range, depending on current financial conditions in the economy. This reflects the risk-reward relationship.
    - The **risk-reward relationship** is based on the concept that the higher the risk of loss of principal for an investment, the greater the potential reward of an increase in the principal or higher yield on the principal. And the lower the risk of loss of principal for an investment, the lower the potential reward of increased principal or higher yield on the principal. Therefore, savings accounts are considered very low risk; so, their reward, as compared with other investment options, is a relatively low "yield," or interest rate.
    - The Rule of 72 applies not only to investments but also to debt, because it shows approximately how fast your debt will double at a certain rate of interest.
    - What rate of interest do credit cards charge? *(Answers will vary.)*
    - Credit card rates of interest vary over time and under different financial conditions in the economy, but generally credit cards charge a relatively high rate of interest. Credit cards can charge a high rate because the card companies bear a risk to loan funds to their cardholders.
    - If a credit card charges an interest rate of 18 percent, approximately how long would it take for your debt to double if you made no payment on the debt? *(4 years)*

Closure

11. Review the key points of this lesson by discussing the following:
    - What is a non-interest bearing account? *(an account that pays zero interest on the principal)*
    - What is interest? *(the price of using someone else's money)*
    - What is compound interest? *(Interest is paid on the principal and also on the accrued interest at specific time intervals.)*
    - What level of interest would you expect a safe account or investment that is low risk to pay—low, medium or high—and why? *(low because of the risk-reward principal)*
    - What does the Rule of 72 indicate? *(The rule shows how long it takes to double your money—or your debt—given a specified rate of interest.)*

Assessment

12. Give each student a copy of *Handout 3: Charlie's Financial Goal* and tell them to follow the instructions on the handout. Display a visual of *Handout 3: Charlie's Financial Goal—Answer Key* to review student answers.

Handout 1: Maria's Savings Decision

One year ago, Maria received $1,000 from her grandmother with instructions to save it for college two years from now. She deposited the money in her checking account for which she was paid no interest. She had considered putting the $1,000 in a savings account that paid 5 percent interest compounded semiannually, but she never got around to it. How much money did Maria lose by leaving her $1,000 in a non-interest bearing account for 12 months? Follow the steps below to find the answer.

1. Because the interest on the account is compounded semiannually, the interest is added to the principal every six months. Therefore, divide the annual amount of interest—5 percent—by two to determine interest paid at the end of each six-month period. Every six months, the saver would receive .025 (.05 ÷ 2) interest on the principal plus any accumulated interest. Multiply the principal (plus any accrued interest) by the interest rate. Round to the nearest hundredth. (For example, $25.625=$25.63.) Note that the principal will change each time interest accrues.

Months	Principal (p)	Interest (i)	p + i
6	$1,000.00	$	$
12	$	$	$

2. Fill in the following chart, which shows these two savings options.

Type of account	Original Principal	Interest after 12 months	Total principal and interest after 12 months
Zero-interest checking account	$1,000.00	$	$
5% compounded semiannually	$1,000.00	$	$

3. Maria lost $_____ by keeping her money in a non-interest bearing account rather than putting it in an account that paid 5 percent compounded semiannually.

Handout 1: Maria's Savings Decision, cont.

4. Now, complete the chart below by using the information from question one for months six and 12, and calculate the interest paid for years two and three in the account that pays 5 percent compounded semiannually. Round to the nearest hundredth. Remember that the principal will change each time interest accrues.

Months	Principal (p)	Interest (i)	p + i
6	$1,000.00	$	$
12	$	$25.63	$
18	$	$	$
24	$ 1,076.90	$	$
30	$	$27.60	$
36	$	$	$

Handout 1: Maria's Savings Decision—Answer Key

One year ago Maria received $1,000 from her grandmother with instructions to save it for college two years from now. She deposited the money in her checking account, for which she was paid no interest. She had considered putting the $1,000 in a savings account that paid 5 percent interest compounded semiannually, but she never got around to it. How much money did Maria lose by leaving her $1,000 in a non-interest bearing account for 12 months? Follow the steps below to find the answer.

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Months	Principal (p)	Interest (i)	p + i
6	$1,000.00	*$25.00*	*$1,025.00*
12	*$1,025.00*	*$25.63*	*$1,050.63*

2. Fill in the following chart, which shows these two savings options.

Type of account	Original Principal	Interest after 12 months	Total principal and interest after 12 months
Zero-interest checking account	$1,000.00	*$0*	*$1,000.00*
5% compounded semiannually	$1,000.00	*$50.63*	*$1,050.63*

3. Maria lost $ 50.63 by keeping her money in a non-interest bearing account rather than putting it in an account that paid 5 percent compounded semiannually.

Handout 1: Maria's Savings Decision—Answer Key, cont.

4. Now, complete the chart below by using the information from question one for months six and 12, and calculate the interest paid for year two and three in the account that pays 5 percent compounded semiannually. Round to the nearest hundredth. Remember that the principal will change each time interest accrues.

Months	Principal (p)	Interest (i)	p + i
6	$1,000.00	*$25.00*	*$1,025.00*
12	*$1,025.00*	$25.63	*$1,050.63*
18	*$1,050.63*	*$26.27*	*$1,076.90*
24	$1,076.90	*$26.92*	*$1,103.82*
30	*$1,103.82*	$27.60	*$1,131.42*
36	*$1,131.42*	*$28.29*	*$1,159.71*

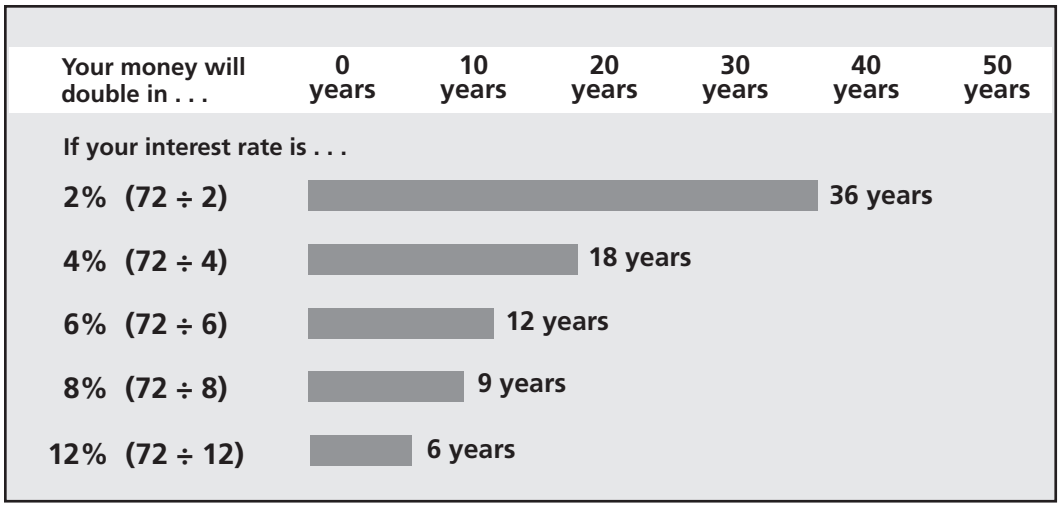
Handout 2: The Rule of 72

The **Rule of 72** is a method to determine the number of years it will take for your savings to double in value. Complete the following chart by shading in the bars in chart below. Begin at 0 years, and shade horizontally to the number of years it will take for an amount of money to double for each interest rate. Please use pencil.

Your money will double in . . .	0 years	10 years	20 years	30 years	40 years	50 years
If your interest rate is . . .						
2% (72 ÷ 2)						
4% (72 ÷ 4)						
6% (72 ÷ 6)						
8% (72 ÷ 8)						
12% (72 ÷ 12)						

Handout 2: The Rule of 72—Answer Key

The **Rule of 72** is a method to determine the number of years it will take for your savings to double in value. Complete the following chart by shading in the bars in chart below. Begin at 0 years, and shade horizontally to the number of years it will take for an amount of money to double for each interest rate. Please use pencil.



Handout 3: Charlie's Financial Goal

1. Charlie is saving to buy a car a year and a half from today. He has $12,000 in a savings account with an interest rate of 4 percent compounded quarterly. How much will Charlie have in his savings account after 18 months? Calculate and fill in the chart below. Round to the nearest hundredth.

Months	Principal (p)	Interest (i)	p + i
3	$12,000.00	$	$
6	$	$	$
9	$	$	$
12	$	$	$
15	$	$	$
18	$	$	$

2. How long will it take Charlie's money to double at an interest rate of 4 percent? _____

3. Charlie wants to explain the risk-reward relationship to his nephew, who is a sophomore in high school. If you were Charlie, how would you explain the principal of risk-reward?

Handout 3: Charlie's Financial Goal—Answer Key

1. Charlie is saving to buy a car a year and a half from today. He has $12,000 in a savings account with an interest rate of 4 percent compounded quarterly. How much will Charlie have in his savings account after 18 months? Calculate and fill in the chart below. Round to the nearest hundredth.

Months	Principal (p)	Interest (i)	p + i
3	*$ 12,000.00*	*$ 120.00*	*$ 12,120.00*
6	*$ 12,120.00*	*$ 121.20*	*$ 12,241.20*
9	*$ 12,241.20*	*$ 122.41*	*$ 12,363.61*
12	*$ 12,363.61*	*$ 123.64*	*$ 12,487.25*
15	*$ 12,487.25*	*$ 124.87*	*$ 12,612.12*
18	*$ 12,612.12*	*$ 126.12*	*$ 12,738.24*

2. How long will it take Charlie's money to double at an interest rate of 4 percent? (*18 years)*

3. Charlie wants to explain the risk-reward relationship to his nephew, who is a sophomore in high school. If you were Charlie, how would you explain the principal of risk-reward? *(When you are investing your money, the higher the risk of loss of principal for an investment, the higher the potential reward. So, relatively safe places to put your money—in a savings account at a bank, for example—yield a relatively low reward because the risk of losing your principal is very low.)*