Standard 5: **The student will analyze the costs and benefits of saving and investing.**

The Rule of 72

Micah bought his car, and is now saving for a new speaker system. Imagine. His own surround sound system!

The one he wants costs $287.48 at More Sound. "But how long will it take to save the money?" he thinks.

He has a few dollars left in his savings account, and his birthday is next week.

Aha! He hears from his aunt that Johnson's Appliances is closing, and they need help for their auction. He could earn $100 in just one weekend.

With the balance of his savings account, the $100 and his birthday cash, he would be half way there.

How long will it take him to double the money in his savings account?

Lesson Objectives

⇒ Compare simple and compounded interest.
⇒ Calculate simple and compounded interest.
⇒ Apply the Rule of 72 to determine how much time is needed for savings/investments to double.

Personal Financial Literacy Vocabulary

Compounded interest: Interest earned not only on the principal but also on the interest already earned.

Principal: The original amount of money deposited or invested.

Rule of 72: The length of time, in years, it takes an amount of money saved to double when it receives compound interest. This length of time can be found by dividing the interest rate (expressed as a whole number) into 72.

Simple interest: Interest calculated periodically on the loan principal or investment principal only, not on previously earned interest.

Introduction

The sooner people start saving, the faster their money will grow. Saving for long-term goals is easier when money grows through interest payments. Interest allows savings and investments to grow, even after one stops putting money into the accounts. But, interest rates and types of interest vary greatly from one account to another. Making good choices about saving and investing relies on understanding the differences.

Lesson

Why do we earn interest when we put our money in the bank? The answer may surprise you. When you put money into a savings account, you are loaning the use of your money to the bank while it is deposited in your account. In return the bank guarantees your money is available when needed, making the loan very safe. You receive interest payments as compensation for providing them the use of your money. If you were taking greater risk when you let someone else use your money, you should earn more interest. Interest can be computed two different ways: simple interest and compound interest.

Simple interest is calculated on the money you invest or loan to someone. If you have simple interest of five percent on 100 dollars for three years, you would earn five dollars the first year, five dollars the second year, and five dollars the third year. You would earn a total of fifteen dollars on the 100 dollars over the three-year period. In the following example, remember that 5% equals .05.

Year One: $100 x .05 = $5
Year Two: $100 x .05 = $5
Year Three: $100 x .05 = $5

Total Interest Earned: $5 + $5 + $5 = $15 or $\$5 + 3 \text{ years } = \$15$

Now, try one yourself. At the end of five years, how much money would you have (including your original investment), if you invested $50 a year earning 10% simple interest?

How much did you earn each year?

How much did you earn in five years?

That is not a bad rate of return, but there is even a better option!

Compound interest is calculated on the money that you invest or loan to someone plus any interest they have already paid you. Using the previous example of 100 dollars at five percent for three years would give you $105 at the end of the first year. Then, you would earn $105 x .05 or $5.25 the second year. The third year, you would earn $110.25 x .05 or $5.51 the third year. Over the three year period, you would earn $15.76.

Year One: $100 x .05 = $5
Year Two: $105 x .05 = $5.25
Year Three: $110.25 x .05 = $5.51

The longer money is invested, the more impact you receive from compounding. By the way, most interest earned is compound interest. The physicist Albert Einstein is claimed to have said that compound interest is the most powerful force in the universe! That is a pretty impressive claim from the man who discovered relativity. In fact, compound interest is so impressive it can help make you a millionaire.

Do you want to be a millionaire when you retire? Well, the secret to accomplishing that partly lies in the magic of compounding interest. Begin to save $2080 a year (or $40 a week) starting when you are twenty years old. No matter what happens, continue to put that $40 a week aside. If market returns are average, when you are 65 years old, you will have $1,062,137.57. If you begin ten years later, you will only have $455,540.33 when you are ready to retire. Time is your best friend if you want to be a millionaire! *

The Rule of 72 is an easy way for you to discover how long it will take your money to double using compounded interest. When the rate of return that you have earned multiplied by the number of years invested equals seventy-two, then your money has doubled. Let's look at an example:

You invest your money for 9 years and you earn 8 percent interest.

9 x 8 = 72

It will take you nine years to double your money if you earn eight percent interest.

Here is another example. You invest your money for 12 years and you earn 6 percent interest.

12 x 6 = 72

It will take you twelve years to double your money if you earn six percent interest.

*(Source: Learning, Earning and Investing, published by the National Council on Economic Education, p 152.)

Using the space below, provide three other rates of return and time frames to see how long it takes your money to double.

Why is the Rule of 72 so useful? First, it helps us see how risk and return are related. Remember that in order to earn a higher interest rate, you have to take more risk. The more risk you take, the shorter the length of time it takes your money to double. But don't be fooled. You could also lose a lot of money if you take too much risk, and then you have no money to double!

Comparing the Results

Go to the following activity to compare the results of simple and compounded interest.

COMPLETE: Comparing Simple and Compound Interest – Activity 5.2.1

Ask your teacher to review your answers before continuing with this lesson.

What did you learn from this activity?

When you start saving, will you want simple or compounded interest? Why?

Conclusion

The magic of compounding interest explains why it is important to start saving now. As you get closer to your personal and financial goals, your money will continue growing at a faster pace. Most interest rates on savings today are lower than those used in this lesson. Even still, understanding how to make your money work for you will help you get the most for your savings.

Micah's saving account pays an interest rate of 4%.

72 divided by 4 equals 18 years.

Do you think Micah really wants to wait 18 years to buy his surround sound system? Probably not.

The Rule of 72 assumes that Micah will not add any more money to his savings account. If he continues adding money each month, the power of compounding interest will help him meet his goal much sooner.

Name: _____ Class Period: _____

The Rule of 72
Review Lesson 5.2

Answer the following questions and give the completed lesson to your teacher to review.

Match each rate of return to the length of time it will take it to double.

_____1.	9%	A.	24 years
_____2.	7.2%	B.	10 years
_____3.	6%	C.	8 years
_____4.	3%	D.	12 years

5. At the end of three years, how much money would you have (including the amount you invested) if you invested 100 dollars and earned 6% simple interest?
   a. $18
   b. $100
   c. $106
   d. $118

6. Which form of interest provides the greater return?
   a. simple
   b. compound
   c. complex
   d. fragment

Name: _____ Class Period: _____

Comparing Simple and Compound Interest – Activity 5.2.1

Use the table below to answer the following questions.

Simple Interest Example			
Year	Principal Amount Saved	Interest Earned (10% Annual Interest Rate)	Ending Balance
1	$100.00	$10.00	$110.00
2	$100.00	$10.00	$120.00
3	$100.00	$10.00	$130.00
Total Interest Earned		$30.00	

Compound Interest Example			
Year	Principal Amount Saved	Interest Earned (10% Annual Interest Rate)	Ending Balance
1	$100.00	$10.00	$110.00
2	$110.00	$11.00	$121.00
3	$121.00	$12.10	$133.10
Total Interest Earned		$33.10	

1. Compare the savings results from simple and compound interest.

2. Explain why there is a difference.

3. Use the Rule of 72 to determine how long it will take the principal in this example to double.