



RULE OF 72

GRADE LEVEL 9-12

“TAKE CHARGE OF YOUR FINANCES”

Time to complete: 60 minutes

NATIONAL CONTENT STANDARDS

Family and Consumer Science Standards: 1.1.6, 2.5.1, 2.5.4, 2.6.1, 2.6.2

National Council on Economic Education Teaching Standards: 3, 11, 12

National Standards for Business Education

- Career Development:
- Economics: III.3-4, NII.1, VII.2
- Personal Finance: III.3-4, IV.1, IV.2

OBJECTIVES

Upon completion of this lesson, students will be able to:

- Understand compounding interest.
- Be able to apply the “Rule of 72.”
- Realize how taxes affect an investment.
- Know the importance of investing early.

INTRODUCTION

The “Rule of 72” is considered the most important and simple rule to financial success. Some say it was Albert Einstein who discovered this simple equation for compounding interest that allows people to easily understand the time value of money. **Time value of money** is a calculation that adjusts for the fact that dollars to be received or paid out in the future are not equivalent to those received or paid out today because compounding interest.

Compounding interest is interest earning interest on interest. The “**Rule of 72**” allows a person to easily calculate when the future value of an investment will double the principal (original) amount.

Simply put, 72 is a magical number. When 72 is divided by the **interest rate**, (percentage rate paid on the money saved or invested), the answer is the number of years it will take the investment to double. It is called the “Rule of 72” because at a 10% interest rate, money doubles every 7.2 years. There are several things a person can quickly calculate by understanding this simple rule:

- How many years it will take the original investment to double its value at a given interest rate using compounding interest. For example, if a person earns 6% on an investment and the rate remains constant the money will double in $72/6 = 12$ years.
- How long it will take for debt to double at a given interest rate if no payments are made. If a person borrows \$1,000 dollars from a friend, who is charging 6% interest, it would take $72/6 = 12$ years for the debt amount to double if no payments were made. It is important to note it is unrealistic for a debt not to charge payments and late fees. However, it is good for students to realize how quickly debt can double.
- The interest rate an investment must earn to be doubled within a specific time period. If a person would like his/her investment to double in two years, a $72/2 = 36\%$ return is required on the investment.
- How many times money (or debt) will double. For example, if a person earns 6% on a \$50,000 investment it will take 12 years to double ($72/6=12$).



Years	Investment
1	\$50,000
12	\$100,000
24	\$200,000
36	\$400,000
48	\$800,000
60	\$1,600,000

The simple mathematical equation for the “Rule of 72” is as follows:

$$\frac{72}{\text{percentage interest rate}} = \text{The number of years needed to double the original investment (or debt)}$$

The “Rule of 72” was derived from the equation for calculating compounding interest:

$$T = P(I + I/N)^{YN}$$

P = original principal amount

I = annual interest rate (in decimal form)

N = number of compounding periods per year

Y = number of years

T = total of principal and interest to date (after n compounding periods)

**Note to Teacher:* The teacher does not have to know how to use this equation. It is simply provided to demonstrate how the “Rule of 72” was derived.

A person must remember a few things when using the “Rule of 72.”

1. The rule is only an approximation. The numbers are rounded. If an individual would like to know the exact return, he or she should contact a financial advisor or use a financial calculator.
2. The interest rate must remain constant throughout the time of the investment.
3. The equation does not allow for additional payments to be made to the original amount.
4. Interest earned is reinvested, creating a compounding interest.
5. Tax deductions are not included within the equation.

Taxes

Taxes are a reality and must be considered when determining the expected return on an investment. **Taxes** are compulsory charges imposed by the federal government on its citizens and their property. If an individual in the 33% tax bracket invests money into a yearly taxable account they will earn 6% on the investment and 4%, after taxes on earned interest. At 6%, an investment will take 12 years to double ($72/6 = 12$). At 4%, an investment will take 18 years to double ($72/4 = 18$). Therefore, taxes cost a person six years of growth.

A person should defer the effects of taxes by investing into a tax-deferred account up to the maximum limit. **Tax-deferred** means that taxes will not be paid until a person takes the money out of the investment. The initial investment, interest earned, and money that would have been paid in taxes will continue to earn money, not subject to taxes, until the person chooses to withdraw the money.

The effect of slower growth as a result of taxes is detrimental as the investment doubles. For example:

Years	Taxable	Tax Deferred
12		\$200,000
18	\$200,000	

24		\$400,000
36	\$400,000	\$800,000

After 36 years, the individual who invests into a taxable account will earn \$400,000 rather than the person who invested into the tax deferred account earning \$800,000.

In this lesson, students learn the many applications to the “Rule of 72.” They will complete a worksheet to reinforce learning by completing calculations.

BODY

1. Give the *Rule of 72* PowerPoint presentation 1.14.3.G1.
 - a. Slides 1 – 5: Rule of 72
 - i. **Compounding interest** can be defined as earning interest on interest.
 - ii. This equation is the basis for the Rule of 72 because at a 10% interest rate money will double every 7.2 years.
 - b. Slides 6 - 7: Time it will take an investment to double.
 - c. Slides 8 – 9: Time it will take debt to double.
 - d. Slides 10 – 11: The interest rate an investment must earn to double within a specific time period.
 - e. Slides 12 – 13: How many times money will double within a specific time period
 - i. Credit card debt assumes that no additional payments or late fees were charged. Generally, a minimum 2% fee is charged to the monthly balance.
 - f. Slides 14 – 16: Taxes
 - g. Someone with a tax-deferred investment would be taxed on their investment when they withdraw the money.
 - i. This is the preferred option because a person’s interest continues to work for them rather than be taxed.
 - h. Slides 17 – 18: Conclusion

CONCLUSION

Review slides 17 and 18 of the PowerPoint presentation.

ASSESSMENT

Have students complete the *Rule of 72* worksheet 1.14.3.A1.

MATERIALS

Rule of 72 worksheet – 1.14.3.A1

Rule of 72 PowerPoint presentation – 1.14.3.G1

RULE OF 72

Name _____

Date _____

	Total Points Earned
20	Total Points Possible
	Percentage

Directions: Use the “Rule of 72” to answer the following questions.

- How long will it take the following investments to double? (9 points)
Round answers to two decimal places.

Investment	Interest Rate	Years to Double
Money Market Mutual Fund	3.1%	
Small Company Stock	12.6%	
3 year Certificate of Deposit	2.8%	
5 year Certificate of Deposit	5.1%	
Large Company Stock	11.3%	
Government Bond	5.3%	
Treasury Bills	3.8%	
Money Market Account	2.6%	
Savings Account	2.3%	

- Jenny has a \$3,000 balance on her credit card with an 18% interest rate. If she makes no payments on her card and no late fees were charged how long will it take for her debt to double? (1 point)

- What if Jenny’s APR was 22% and she makes no payments on her card and no late fees were charged? (1 point)

- Tanner has invested \$500 for college. What rate of return must Tanner earn for his investment to double in 4 years? (1 point)



5. Kari would like to make a down payment on a house. She currently has \$7000. What rate of return must Kari receive for her investment to double in 7 years? (1 point)

6. Mark has invested \$300 at age 16 into a money market account earning 6%. How many times will Mark's investment double before age 52? What will his investment be worth? What would Mark's investment be if he had invested at age 28? (3 points)

7. Jackie's parents invested \$3000 into a common stock earning 10% when she was born. How many times will Jackie's investment double before age 36? What will her investment be worth? What would Jackie's investment be worth if her parent's had waited to invest until she was age 7? (3 points)

8. Provide a reason why is it valuable to invest early. (1 point)

