Rate of Return

OBJECTIVE

The purpose of this activity is for students to gain a better understanding of compound interest and how it is calculated. They will also see the impact of time and interest rate on savings.

Teacher Directions

Students will work with a partner or small group to calculate the future value of a one-time investment using the formula for compound interest.

The calculations will be based on three different interest rates, and students will create a graph to show that the rate of return does matter.

To make it more practical, students should use a smaller initial investment ($250, $500, $1,000 etc.). Forty years is a good time frame to use, as it reinforces the concept of starting now, saving for retirement, and so on.

Depending on the level of the group and time you want to devote to this activity, there are several methods available to compute the growth of an investment. You can have students use all three ways, or assign them a specific method.

After they compute the first investment at three diﬀerent interest rates, students need to go back, double the investment, and make new computations.

Three Methods of Computation

1. Use the Compound Interest Formula and compute manually:

$$FV = PV(1+r/m)^{mt}$$

- ᵗ FV is the Future Value.
- ᵗ PV is the Present Value (the principal you start with, your first deposit).
- ᵗ r is the annual rate of interest as a decimal (5% is expressed as the decimal .05).
- ᵗ m is the number of times per year the interest is compounded (monthly, annually, etc.).
- ᵗ t is the number of years you leave it invested (use 40)
- ᵗ For this exercise, interest will be compounded once a year.

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2. Use a spreadsheet program, like Microsoft Excel, to compute the FV (Future Value) formula found within the program. Students can also use the spreadsheet program to create graphs based on their data.

- Rate = interest rate (use 12%)
- Nper = total number of payment periods which will equal the total years invested (ex. 40)
- Pmt = the payment made each period (use 0 because it is a one-time investment.)
- PV = present value or the initial investment
- Type = when payments are due beginning or end of period (ex. use 1)

The following is what a student's spreadsheet and graph would look like if using investments of $500 and $1,000 at 5%, 12%, and 18%:

5%	12%	18%	INVESTMENT
$3,519.99	$46,525.49	$375,189.17	$500.00
$7,039.99	$93,050.97	$750,378.34	$1,000.00
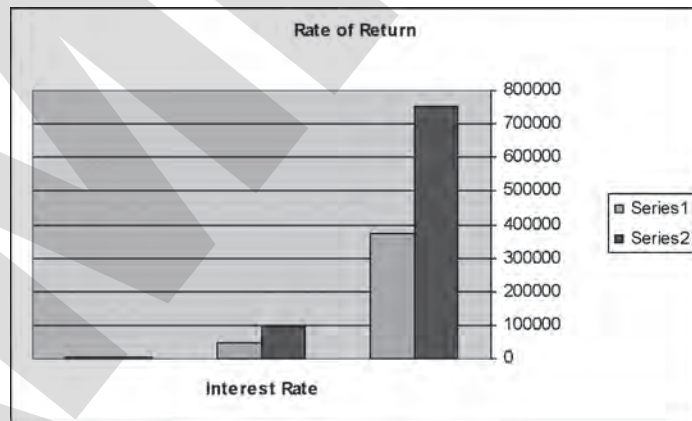
Rate of Return

3. Use the online investing calculator at daveramsey.com
TIP: If you have trouble finding the calculator, search for "investment calculator" using the search box at the top of the site.

RATE OF RETURN
COMPOUND INTEREST—A MILLIONAIRE'S BEST FRIEND

Work with a partner or small group to calculate the future value of a one-time investment using three different interest rates. Then, design a graph that compares the impact of the interest rate on the investment. Use each of the methods below to help you understand how compound interest works.   Use 40 years as the amount of time for your investment, unless your teacher instructs you diˉerently.

Investment 1 _____   Investment 2 _____   Investment 3 _____

Interest Rate _____   Interest Rate _____   Interest Rate _____

Time _____   Time _____   Time _____

1. Use the Compound Interest Formula and compute manually:

$$FV = PV(1+r/m)^{mt}$$

- **FV** is the Future Value.
- **PV** is the Present Value (the principal you start with, your first deposit).
- **r** is the annual rate of interest as a decimal (5% is expressed as the decimal .05).
- **M** is the number of times per year the interest is compounded (monthly, annually etc.).
- **t** is the number of years you leave it invested (use 40).
- *For this exercise, interest will be compounded once a year.*

2. Use a spreadsheet program, like Microsoft Excel, to compute using the Fv(Future Value) formula found within the program. Students can also use the spreadsheet program to create graphs based on their data.
- **Rate** = interest rate (use 12%)
- **Nper** = total number of payment periods, which will equal the total years invested (ex. 40)
- **Pmt** = the payment made each period (use 0 because it is a one-time investment.)
- **PV** = present value, or the initial investment
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