

Unit 2

Planning and Tracking

Lesson 2B:

Meeting Financial Goals—Rate of Return

Rule 2: Have a Plan.

Financial success depends primarily on two things: (i) developing a plan to meet your established goals and (ii) tracking your progress with respect to that plan. Too often people set vague goals (“I want to be rich.”), make unrealistic plans, or never bother to assess the progress toward their goals. These lessons look at important financial indicators you should understand and monitor both in setting goals and attaining them.

Lesson Description

Students are shown the two ways investments can earn a return and then calculate the annual rate of return, the real rate of return, and the expected rate of return on various assets.

Standards and Benchmarks (see page 49)

Grade Level

9-12

Concepts

Appreciation
Depreciation
Expected rate of return
Inflation
Inflation rate
Rate of return
Real rate of return
Return

Making Personal Finance Decisions

©2019, Minnesota Council on Economic Education. Developed in partnership with the Federal Reserve Bank of St. Louis. Permission is granted to reprint or photocopy this lesson in its entirety for educational purposes, provided the user credits the Minnesota Council on Economic Education.

Compelling Question

How is an asset's rate of return measured?

Objectives

Students will be able to

- describe two ways that an asset can earn a return and
 - determine and distinguish among the rate of return on an asset, its real rate of return, and its expected rate of return.
-

Materials

- Visual 2B.1: Calculating the Annual Rate of Return
 - Visual 2B.2: Expected Rate of Return
 - Handout 2B.1: Calculating the Annual Rate of Return, one copy for each student
 - Handout 2B.1: Calculating the Annual Rate of Return—Answer Key
 - Handout 2B.2: Assessment, one copy for each student
 - One small paper bag for each group of three to five students, with four identical items (e.g., poker chips or pieces of paper) in the bag in the following colors: one red, one white, two blue
 - Paper and pen/pencil for each group of three to five students
-

Time required

45 minutes

Preparation

Prepare the bags as noted in the Materials section.

Procedure

1. Begin the class by asking the students to provide examples of assets. (*Answers will vary but may include houses, cars, stocks, bonds, collectibles, land, jewelry, savings account, certificates of deposit, cash, U.S. savings bonds, boats, or electronics.*)
-

Making Personal Finance Decisions

©2019, Minnesota Council on Economic Education. Developed in partnership with the Federal Reserve Bank of St. Louis. Permission is granted to reprint or photocopy this lesson in its entirety for educational purposes, provided the user credits the Minnesota Council on Economic Education.

2. Explain that assets such as those mentioned can increase your wealth in two ways: (i) The market value—or price of the asset—may increase and/or (ii) the asset can generate income. Discuss the following:
 - What are some assets that may increase in market value? (*Answers will vary but may include stocks, houses, collectibles [e.g., artwork or trading cards], or land.*)
3. Define **appreciation** as an increase in the market value of an asset. Discuss the following:
 - Can the market value of an asset go down? (Yes)
4. Define **depreciation** as a decrease in the market value of an asset. Explain that the market value of all of the assets mentioned could also decrease. Assets that depreciate are less desirable as investment choices. Discuss the following:
 - Which types of assets would you expect to depreciate? (*Answers will vary but may include cars, electronics, or boats.*)
5. Explain that some assets generate income. Discuss the following examples:
 - Money deposited in a savings account or used to purchase certificates of deposit or bonds earns interest.
 - Some companies pay dividends to those who own the company's stocks.
 - Houses and land can generate rental income.
6. Some assets may increase your wealth because their market value increases and because they generate income. Discuss the following examples:
 - If you own a house that you rent, the market value or price of the house may increase over time and it generates monthly income when your tenants pay rent.
 - The market value—or price—of a stock that you own may increase and the company may pay dividends on the stock.
7. Summarize by noting the following:
 - Some assets can increase your wealth only if they appreciate—that is, their market value, or price, increases. For example, the market value of collectibles (such as baseball cards or artwork) may increase.
 - Some assets can increase your wealth only by generating income. For example, interest earned on savings accounts or certificates of deposit is income.
 - Some assets can increase your wealth both ways—such as rental houses and some stocks. They increase in market value and provide income.

Making Personal Finance Decisions

8. Display *Visual 2B.1: Calculating the Annual Rate of Return*. Explain that a useful measure to compare how different assets may increase your wealth is the **annual rate of return**. Discuss the following:
- The **return** on an asset is the income the asset generates, if any, during a given period (such as a year) plus any appreciation or depreciation in the market value of the asset during that period.
 - The rate of return is the return on an asset over a given period divided by the market value (the price it can be sold for in a market) of the asset at the beginning of that period. This ratio is typically multiplied by 100 and expressed as a percentage.
 - For example, suppose an asset had a market value of \$200 a year ago but has appreciated in value and is currently worth \$205. In addition, suppose it also generated \$5 in income. The return would be the \$5 in income generated plus the \$5 appreciation in the market value of the asset, or \$10. The rate of return would be \$10 divided by \$200, or 0.05. Expressed as a percentage, this would be a 5 percent annual rate of return.
9. Distribute a copy of *Handout 2B.1: Calculating the Annual Rate of Return* to each student. Allow time for students to complete the handout and then discuss their answers using Handout 2B.1—Answer Key. (Note that for items G and H, the market value of the assets depreciated. Also, item H is an example of a negative rate of return, which is possible when an asset's market value depreciates.)
10. Ask students to reconsider case F in Handout 2B.1. Discuss the following:
- Although the rate of return was 0 percent, was there really no change in the wealth of the person who placed the cash under the mattress? (*It depends. If the prices of the goods and services this person wants to buy rise during the year, then the \$1,000 would buy fewer goods and services at the end of the year than it would have at the beginning of the year, making the person less wealthy.*)
11. Define **inflation** as a general, sustained upward movement of prices for goods and services in an economy. Explain that inflation is typically measured by the percentage increase in the average price level of goods and services over a period of time. This measurement is called the **inflation rate**. Thus, while investing can increase wealth, inflation tends to decrease wealth because the same amount of money buys fewer goods and services over time.
12. Define the **real rate of return** on an investment as the rate of return on the investment minus the inflation rate. Explain that an asset must have a rate of return greater than the inflation rate to increase your wealth. Give the following example:
- Suppose you earn 4 percent on your savings account while the inflation rate is 3 percent. Your real rate of return would be only 1 percent: 4 percent – 3 percent = 1 percent.

Making Personal Finance Decisions

- For item F on Handout 2B.2, the real rate of return would be –3 percent if the inflation rate were 3 percent: 0 percent – 3 percent = –3 percent.
13. Discuss the following:
- If the inflation rate were 3 percent, which of the assets in Handout 2B.2 would have a positive real rate of return? (*Only B, C, E, and G*)
 - If the inflation rate were 6 percent, which assets would have a positive real rate of return? (*Only C and E. C, with 1 percent [7 percent – 6 percent = 1 percent] and E with 4 percent [10 percent – 6 percent = 4 percent]*)
14. Explain the following:
- The change in the price, or market value, of the asset may vary from year to year. For example, a stock's price may rise 20 percent one year, 10 percent the next, and then fall 4 percent the year after that.
 - It could also vary because the income generated by the asset changes. For example, a company may change the amount of the dividend it pays on each share of its stock, or a bank may change the interest rate that it pays on savings accounts.
15. Define the **expected rate of return** as the amount you anticipate receiving on an investment based on the probable rates of return (often based on how the asset performed in the past). Explain that people considering investing in a certain asset often consider the *expected* rate of return. Discuss the following:
- It is important to realize that the actual rates of return for some assets can vary considerably from year to year.
 - The expected rate of return on an asset is calculated as the weighted average of all the possible actual rates of return, where each possibility is weighted by its likelihood (or probability) of happening.
 - Reassure students that although this sounds very technical, it is really quite simple, as will be demonstrated.
16. Arrange the class into small groups of three to five students. Give each group one bag (as prepared before class), each of which contains one red item, one white item, and two blue items. Tell the students to *not* look in the bags. Explain the following directions:
- Each group should label a sheet of paper from 1 to 10.
 - Each group represents one particular asset (i.e., a stock or bond).
 - In each of 10 rounds, without looking, each group will draw an item from its bag to determine the rate of return their asset will earn for that round as follows:
 - Red item: 4 percent rate of return

Making Personal Finance Decisions

- White item: 8 percent rate of return
 - Blue items: 12 percent rate of return.
17. After each round, each group should record its rate of return (4 percent, 8 percent, or 12 percent) and then return the item to the bag.
 18. Conduct Round 1—have each group draw an item and record its result. Repeat for the remaining 9 rounds.
 19. Explain that these 10 rates represent the 10-year history of returns for each particular asset. Instruct the groups to add the 10 rates and then divide by 10 to determine their average rate of return. Ask some groups to report their average. (While the values will vary, they will all be near 9 percent. Optional: Average all of the groups' averages to get an overall class average, which would be even closer to 9 percent.)
 20. Explain that around 9 percent is the expected rate of return for each of the group's assets. Note that the expected rate of return does not equal any of the actual rates of return in the given rounds. It is also closer to 12 percent than to 4 percent because there were 2 blue items in the bags and blue items represented a 12 percent rate of return. As mentioned earlier, the expected rate of return is based on the weighted average of the possibilities.
 21. Display *Visual 2B.2: Expected Rate of Return*. Explain the following:
 - In this case, there were three possible rates of return: 4 percent, 8 percent, and 12 percent.
 - The chance of getting 4 percent was equal to the chance of drawing the red item, which was one in four, or 25 percent ($1/4 = 0.25$).
 - The chance of getting 8 percent was also 25 percent.
 - The chance of getting 12 percent was 50 percent.
 - Multiplying each possible rate of return by its chance of occurring yields a 9 percent expected rate of return. ($9 \text{ percent} = [4 \text{ percent} \times 0.25] + [8 \text{ percent} \times 0.25] + [12 \text{ percent} \times 0.50]$).

Closure

22. Review the important concepts in the lesson by discussion the following:
 - What are the two ways an asset can earn a return? (*By increasing in market value or by generating income*)

Making Personal Finance Decisions

- What is the real rate of return on an asset? (*The rate of return minus the inflation rate*)
- What is the expected rate of return on an asset? (*The average rate of return you would expect each period from the investment over many periods*)

Assessment

23. Distribute a copy of *Handout 2B.2: Assessment* to each student. Allow time for students to work and then review the answers.

Handout 2B.2: Assessment—Answer Key

1. An asset you bought last year for \$100 has increased \$10 in value and earned \$2 in interest.
 - a. Calculate the asset's rate of return.
12 percent ($[\$12 / \$100 = 0.12]$)
 - b. The inflation rate last year was 3 percent. Calculate the asset's real rate of return.
9 percent ($12 \text{ percent} - 3 \text{ percent} = 9 \text{ percent}$)
2. Assume you are considering investing in an asset that has a 50 percent chance of producing a 10 percent profit and a 50 percent chance of producing a 5 percent loss.
 - a. Calculate the asset's expected rate of return.
The expected rate of return is 2.5 percent $[(10 \times 0.50) + (-5 \times 0.50)]$.
 - b. Is the asset's expected rate of return guaranteed?
No. The expected rate of return is not guaranteed.
 - c. Would you invest in this asset?
Investment risk is determined by the comfort level of the students. Some would buy this asset, while others would not.

Making Personal Finance Decisions

Visual 2B.1: Calculating the Annual Rate of Return

$$\text{Return} = \text{Income generated by an asset} + \text{Change in the market value of the asset during a given period}$$

$$\text{Rate of return} = \frac{\text{Return}}{\text{Market value of the asset at the beginning of the year}}$$

Visual 2B.2: Expected Rate of Return

Possible outcomes (Rates of return)	Chance of happening (Probability)
4%	1 out of 4 = 0.25
8%	1 out of 4 = 0.25
12%	2 out of 4 = 0.50

$$\text{Expected rate of return} = (4\% \times 0.25) + (8\% \times 0.25) + (12\% \times 0.50) = 9\%$$

Making Personal Finance Decisions

©2019, Minnesota Council on Economic Education. Developed in partnership with the Federal Reserve Bank of St. Louis. Permission is granted to reprint or photocopy this lesson in its entirety for educational purposes, provided the user credits the Minnesota Council on Economic Education.

Handout 2B.1: Calculating the Annual Rate of Return

Name: _____

Return = (Income generated by asset + Change in the market value of the asset)

$$\text{Annual rate of return} = \frac{\text{Return}}{\text{Market value of the asset at the beginning of the year}}$$

Directions: Calculate the return and the annual rate of return for each of the following assets:

- A. **Asset:** 1-ounce gold bar purchased for \$800 one year ago
Current value: \$816
Return: _____
Annual rate of return: _____
- B. **Asset:** 1-year certificate of deposit for \$25,000 that pays 4% interest annually
Return: _____
Annual rate of return: _____
- C. **Asset:** House purchased for \$120,000 one year ago that has generated net rental income of \$5,400
Current value: \$123,000
Return: _____
Annual rate of return: _____
- D. **Asset:** \$10,000 in a savings account that pays 3% interest per year
Return: _____
Annual rate of return: _____
- E. **Asset:** 10 shares of a stock purchased one year ago for \$80 each that have paid a \$3 per share dividend over the past year
Current value: \$85 per share
Return: _____
Annual rate of return: _____
- F. **Asset:** \$1,000 in cash placed under a mattress one year ago
Return: _____
Annual rate of return: _____
- G. **Asset:** Bond with a face value of \$20,000 purchased one year ago for \$20,000 that pays 10% interest
Current value: \$18,800
Return: _____
Annual rate of return: _____
- H. **Asset:** Porcelain figurine purchased for \$50 one year ago
Current value: \$49
Return: _____
Annual rate of return: _____

Making Personal Finance Decisions

Handout 2B.1: Calculating the Annual Rate of Return—Answer Key

Return = (Income generated by asset + Change in the market value of the asset)

$$\text{Annual rate of return} = \frac{\text{Return}}{\text{Market value of the asset at the beginning of the year}}$$

Directions: Calculate the return and the annual rate of return for each of the following assets:

- A. **Asset:** 1-ounce gold bar purchased for \$800 one year ago
Current value: \$816
Return: \$16
Annual rate of return: $\$16/\$800 = 0.02 = 2.0\%$
- B. **Asset:** 1-year certificate of deposit for \$25,000 that pays 4% interest annually
Return: $\$25,000 \times 0.04 = \$1,000$
Annual rate of return: $\$1,000/\$25,000 = 0.04 = 4.0\%$
- C. **Asset:** House purchased for \$120,000 one year ago that has generated net rental income of \$5,400
Current value: \$123,000
Return: $\$5,400 + \$3,000 = \$8,400$
Annual rate of return: $\$8,400/\$120,000 = 0.07 = 7.0\%$
- D. **Asset:** \$10,000 in a savings account that pays 3% interest per year
Return: $\$10,000 \times 0.03 = \300
Annual rate of return: $\$300/\$10,000 = 0.03 = 3.0\%$
- E. **Asset:** 10 shares of a stock purchased one year ago for \$80 each that have paid a \$3 per share dividend over the past year
Current value: \$85 per share
Return: $(\$3 + \$5) \times 10 = \$80$
Annual rate of return: $\$80/(\$80 \times 10) = 0.10 = 10.0\%$
- F. **Asset:** \$1,000 in cash placed under a mattress one year ago
Return: \$0
Annual rate of return: $\$0/\$1,000 = 0.00 = 0.0\%$
- G. **Asset:** Bond with a face value of \$20,000 purchased one year ago for \$20,000 that pays 10% interest
Current value: \$18,800
Return: $\$2,000 - \$1,200 = \$800$
Annual rate of return: $\$800/\$20,000 = 0.04 = 4.0\%$
- H. **Asset:** Porcelain figurine purchased for \$50 one year ago
Current value: \$49
Return: $-\$1$
Annual rate of return: $-\$1/\$50 = -0.02 = -2.0\%$

Making Personal Finance Decisions

Handout 2B.2: Assessment

Name: _____

Name: _____

1. An asset you bought last year for \$100 has increased \$10 in value and earned \$2 in interest.
 - a. Calculate the asset's rate of return.

 - b. The inflation rate last year was 3 percent. Calculate the asset's real rate of return.

2. Assume you are considering investing in an asset with a 50 percent chance of producing a 10 percent profit and a 50 percent chance of producing a 5 percent loss.
 - a. Calculate the asset's expected rate of return.

 - b. Is the asset's expected rate of return guaranteed?

 - c. Would you invest in this asset?

Making Personal Finance Decisions

Standards and Benchmarks

National Standards for Financial Literacy

Standard 5: Financial Investing. Financial investment is the purchase of financial assets to increase income or wealth in the future. Investors must choose among investments that have different risks and expected rates of return. Investments with higher expected rates of return tend to have greater risk. Diversification of investment among a number of choices can lower investment risk.

- **Benchmarks: Grade 8**
 1. Financial assets include a wide variety of financial instruments including bank deposits, stocks, bonds, and mutual funds. Real estate and commodities are also often viewed as financial assets.
 5. The rate of return on financial investments consists of interest payments, dividends, and capital appreciation expressed as a percentage of the amount invested.
- **Benchmark: Grade 12**
 1. The real return on a financial investment is the nominal return minus the rate of inflation.

Making Personal Finance Decisions

©2019, Minnesota Council on Economic Education. Developed in partnership with the Federal Reserve Bank of St. Louis. Permission is granted to reprint or photocopy this lesson in its entirety for educational purposes, provided the user credits the Minnesota Council on Economic Education.

Making Personal Finance Decisions

©2019, Minnesota Council on Economic Education. Developed in partnership with the Federal Reserve Bank of St. Louis.
Permission is granted to reprint or photocopy this lesson in its entirety for educational purposes,
provided the user credits the Minnesota Council on Economic Education.