

11th - 12th Grade Lesson Plan

Introduction to Earning Interest APR, APY, and Compound Interest

- **CONCEPT**

Saving and investing money safely and wisely are critical skills for folks of all ages and backgrounds. Armed with the knowledge of how investments work, savvy investors can make informed decisions and determine the best investment choices available to them.

- **OBJECTIVES**

Students will learn to:

1. Define and use investment vocabulary.
2. Discover compound interest and its effect on savings.
3. Compute simple and compound interest.

- **NATIONAL STANDARDS & BENCHMARKS**

Jump\$tart Coalition for Personal Financial Literacy (see appendix)
3rd Edition, 2007
National Standards in K-12 Personal Finance Education
Saving & Investing - Standard 3

- **VOCABULARY**

Principal: an amount of money owned by an investor and held by a financial institution such as a bank.

Deposit(s): the act of establishing, or adding to, existing **principal**.

Balance: the amount of money in an account.

Interest: the amount of money you earn by leaving **deposits** in a bank or a financial institution. **Interest** is a **percentage** of your **principal**.

Term: the period of time an investment lasts.

Compound Interest: **interest** calculated on **both** the **principal** you have on **deposit** and **interest** that has accumulated in the past.

Compounding Period: the amount of time that elapses between **interest** payments.

Annual Compounding - once per **year**.

Quarterly Compounding - once every 3 months.

- Jan - March 1st Quarter
- April - June 2nd Quarter
- July - Sept 3rd Quarter
- Oct - Dec 4th Quarter

Monthly Compounding - once per **month**.

Annual Percentage Rate (APR): the percentage rate at which interest is calculated **annually**.

Annual Percentage Yield (APY) - the actual rate your money earns taking **compounding** into consideration.

- **TEACHING MATERIALS**

1. **Lesson Plan**
2. **Teacher Worksheet**
3. **Now You Try Student Worksheet and Answer Key**
4. **11th - 12th Grade Assessment Worksheet and Answer Key**

- **LESSON ACTIVITY**

Annual Compounding - Certificate of Deposit

- The teacher will discuss the following vocabulary terms with the students: **principal, deposit, balance, interest, term,** and **APR**. He/She will define an annual **certificate of deposit** (which compounds annually) and review Example 1 from the **Teacher Worksheet**.
- Next, the teacher will discuss the terms **compound interest** and **compounding period** with the students. He/She will review Example 2 from the **Teacher Worksheet**.

Quarterly Compounding - Statement Savings Account

- The teacher will discuss **quarterly compounding** with the students through the review of the definition and the notes from the **Teacher Worksheet**. He/She will explain that statement savings accounts are examples of accounts that often compound quarterly.
- Next, the teacher will review the pre-calculated example of quarterly interest payments, Example 3, from the **Teacher Worksheet**.
 - **Note:** the calculations presented do not take into account that different months have different numbers of days. **Quarterly** calculations are done by computing annual interest then dividing by four.
- Using the **Teacher Worksheet**, the teacher will compare the interest earned between the two accounts covered thus far: CDs and statement savings accounts.
 - The teacher will explain to the students that **annual interest paid quarterly > annual interest paid annually**. He/She will define and calculate **APY**.
- The students will practice multi-year annual compounding and quarterly compounding calculations using page 1 of the **Now You Try Student Worksheet**.

Compound Interest Formula

- Introduce the Compound Interest Formula

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Where: A = Accumulated Balance

P = Principal

r = APR expressed as a decimal

n = number of compounding periods/year

t = number of years the investment lasts

- Using the quarterly statement savings example, the teacher will practice the compound interest formula. The values are as follows:
 - the formula produces the same accumulated value (\$8,161.20);
 - the interest calculation is \$161.20; and
 - the APY is still 2.015%.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = \$8,000\left(1 + \frac{.02}{4}\right)^{4(1)}$$

$$A = \$8,000(1.005)^4$$

$$A = \$8,000(1.02015)$$

$$A = \$8,161.20$$

APY = \$161.20 / \$8,000 = .02015 = 2.015%

- The students will practice annual vs. quarterly interest calculations using the formula on page 2 of the **Now You Try Student Worksheet**.

Monthly Compounding - Money Market Account

- The teacher will discuss **compounding period** and **monthly compounding** with the students through the review of the definitions and the notes from the **Teacher Worksheet**. He/She will explain that money market savings accounts usually compound monthly instead of quarterly.
- Next, the teacher will review the pre-calculated example of monthly interest payments, Example 4, from the **Teacher Worksheet**.
 - **Note:** the calculations presented do not take into account that different months have different numbers of days. **Monthly** calculations are done by computing annual interest then dividing by 12.
- The teacher will recalculate using the **compound interest formula**.
 - **Note:** the calculations presented do not take into account that different months have different numbers of days. **Monthly** calculations are done by computing annual interest then dividing by 12.

Compare Annual vs. Quarterly vs. Monthly Compounding APYs

- The teacher will use the figures from the **Teacher Worksheet** to review the following points with the students:
 - same principal and APR
 - compare the three investments' return
 - show monthly compounding yields highest APY
- **Now You Try Student Worksheet**
 - The students will practice computing annual, quarterly, and monthly compounding on page 3 of the worksheet.
- **Discussion**
 - The teacher will lead the students in a discussion by asking them the following questions:
 - Why would a bank advertise APY instead of APR for deposits?
 - Why might it advertise APR instead of APY on credit products?
- **ASSESSMENT/ EVALUATION**

The teacher will assess the students' knowledge of APR, APY, and compound interest using the **11th - 12th Grade Assessment Worksheet**.

- **APPENDIX**

Jump\$tart Coalition for Personal Financial Literacy

3rd Edition, 2007

National Standards in K-12 Personal Finance Education

Page 25 of this PDF document: <http://www.jumpstart.org/guide.html>

Saving and Investing

- Overall Competency
 - Implement a diversified investment strategy that is compatible with personal goals
- Standard 3
 - Evaluate investment alternatives

High School
<ul style="list-style-type: none">• Compare the risks and returns of various investments• Calculate investment growth given different amounts, times, rates of return and frequency of compounding• Identify the appropriate types of investments to achieve the objectives of liquidity, income and growth• Identify the appropriate types of investments for accumulating the money for a four-year college education, a wedding, a new business startup, the down payments on a new car and a house and retirement• Use systematic decision making to select an investment