



**PACIFIC NW**  
FEDERAL CREDIT UNION

# Simple and Compound Interest

$$Y=Prt \text{ and } y=P\left(1 + \frac{r}{n}\right)^{nt}$$

*“Compound interest is the 8<sup>th</sup> wonder of the world. He who understands it, earns it; he who doesn't, pays it.”*

- Albert Einstein

# So what is this “8<sup>th</sup> wonder?”



Think of a **snowflake** – tiny, delicate, if just one falls, the world moves on as normal.

Now, think of a **snowball**. **Roll your snowball** across a snow-covered field – it gets bigger, quickly! When this amount of snow falls, it changes how we behave.

Now, think of an **avalanche** – made of only tiny snowflakes – it has an enormous force and changes the entire landscape, it changes how we physically see our world.

That’s **compound interest**. You can start with just a snowflake (a few dollars) and over time turn it into an avalanche (millions of dollars). OR the opposite can happen, and a small principal amount can end up turning into hundreds of thousands in interest owed over time.

## “What is Compound Interest?”

It is interest earning interest.

For example, suppose you saved and banked \$100 a year ago. It earned \$2 in interest last year. This year, you’ll be earning interest on \$102 dollars (original savings plus the interest earned). That might not seem like much on this scale, but understanding that simple fact can have a major impact on your financial success.

Why is Compound interest important to you?  
Because it can turn just a few dollars today into big money over the course of a lifetime.”

- Sam Ro



Watch these videos to get an idea of how Compound Interest can be helpful OR detrimental to your financial future.

***Compound Interest Explained:***

<https://www.youtube.com/watch?v=wf91rEGw88Q>

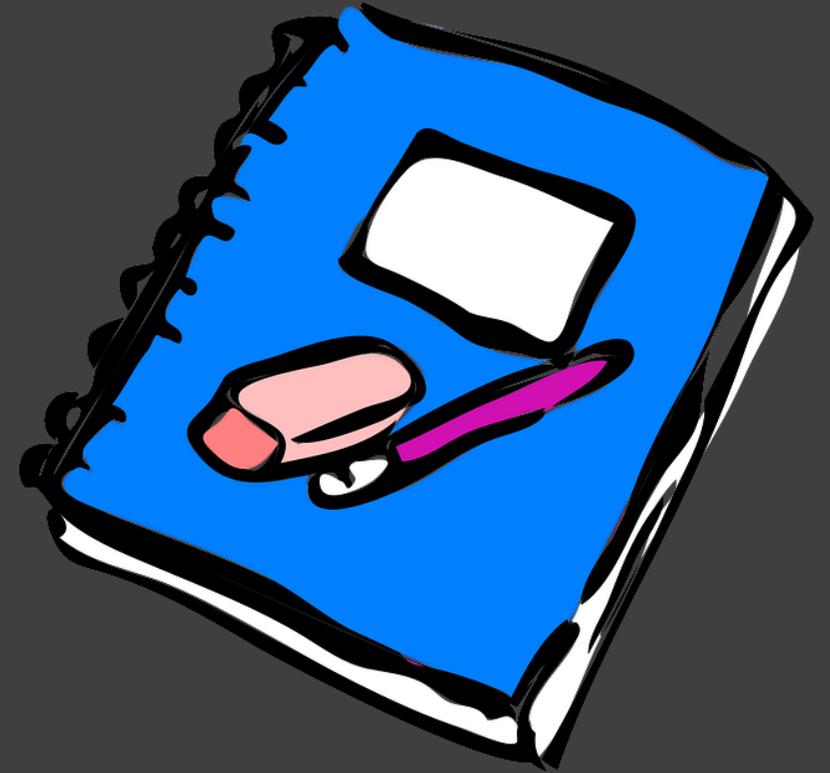
***Cut Credit Card Interest Costs by Exceeding Minimum Payments:***

<https://www.youtube.com/watch?v=veeCia8QeZs>



Go to your workbook to complete the following:

1. ***“Motivate Me!”***  
*A 12-word sound bite encouraging viewers to reduce debt and save money.*
2. ***“Discovering Interest – A Web Quest”***  
*a search for the highest interest rate in a savings account.*



# Saving Accounts

Your sister just started a saving account with the money from her summer job! She's excited when she sees a few extra pennies in her account.

She's gaining 3% **Simple Interest** on the \$5000 she started her account with. She knows the simple interest formula and loves showing you how much money she'll make just leaving her money in her new account. She wants to know how much she'll have if she leaves it alone for 20 years.

$$Y = Prt$$

$$Y = 5000(.03)(20)$$

$$Y = 3000$$

After 20 years, her investment will grow by \$3000 to \$8000 – She is very excited!  
Until...

...she shows you her math. You tell her she needs to do more research and open a different account.

Her **Simple Interest** account isn't earning her enough! An account that compounds the interest would earn her much more. You show her what her \$5,000 at 3% compounded daily could be earning her in 20 years.

P=Principal

r=rate

t=time (in years)

n=compound

\*"n" is commonly shown as

daily (365), monthly (12),

quarterly (4), semi-annually (2),

or annually (1).

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

$$y = 5000 \left( 1 + \frac{.03}{365} \right)^{365(20)}$$

$$y = 5000(1.0000821917)^{7300}$$

$$y = \$9,110.37$$

A difference of \$1,110.37 from her Simple Interest earning!

# Let's think about retirement

This is when you say, “WHAT?!?!  
I’m still in high school!!”

It’s so far off and SO hard to think about when you are young. But now that we know how compound interest works, WHY is it important to begin to invest (even just a small amount each year) early?



# TIME!

Compound interest grows over TIME – **the key to building wealth through compound interest is to give your investment time to build.** The longer you allow your investment to grow, the greater the earnings. Compound interest is often associated with retirement due to the need for an investment to have TIME to mature.



# Let's look at the growth of \$10,000 at 7%

## 20 Years

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

$$y = 10,000 \left( 1 + \frac{.07}{4} \right)^{4(20)}$$

$$y = 10,000(1.0175)^{80}$$

$$y = 40,060$$

## 30 Years

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

$$y = 10,000 \left( 1 + \frac{.07}{4} \right)^{4(30)}$$

$$y = 10,000(1.0175)^{120}$$

$$y = 80,191$$

## 40 Years

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

$$y = 10,000 \left( 1 + \frac{.07}{4} \right)^{4(40)}$$

$$y = 10,000(1.0175)^{160}$$

$$y = 160,511$$

Simple interest on same \$10,000 after 40 years?

$$y = Prt$$

$$y = (10,000)(.07)(40)$$

$$y = 28,000$$

$$28,000 + 10,000 = 38,000$$

# What about loans?

## Are simple interest loans beneficial to the borrower?

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In contrast to the savings account/retirement fund, simple interest is calculated on the principal only. **So, you don't pay interest on the interest.** Because you are paying interest on a smaller amount of money (just the principal), simple interest can be advantageous when you **borrow money**. Most home loans (mortgages) use simple interest.



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Use the provided worksheets to practice using the compound and simple interest formulas.

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