NEXT GEN PERSONAL FINANCE

# Middle School Course

## 5.5 The Power of Compound Interest

### Student Activity Packet

Spanish version

| Name: | Date: |
|---|---|

## INTRO

**WOULD YOU RATHER...?**

| | | |
|---|---|---|
| Have $1,000,000 for the next 30 days? | OR | Start with a penny and double your money every day for 30 days? |

1. Write an explanation of your selection in the box below. Then, discuss your choice and reasoning with a partner.

## LEARN IT

**ARTICLE: What is Simple Interest?**

How does that "Would You Rather" challenge work mathematically? It all comes down to a concept called **interest**. You'll learn about two types of interest in this lesson: simple interest and compound interest. Read the article to learn about how simple interest works. Then, answer the questions.

## What is Simple Interest?

- **What is simple interest?** Simple interest, or interest, is a charge for money that is borrowed. When you deposit money into a savings account at a bank, the bank can use that money and loan it to others. (Don't worry! Your money is safely lent out, and if it's FDIC insured, the federal government will insure up to $250,000 if the bank fails.) In return, the bank pays you interest.
    - Note: for savings accounts, you *earn* interest. But in the case of a credit card or loan, *you* are the one borrowing money, so *you* pay interest to the lender.

- **What is an Interest Rate?** This is the percent earned, usually in a single year.

- **How do we calculate interest?** We can calculate interest by using the equation below.

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

$$I = Prt$$

| Term | Description |
|---|---|
| Principal | initial amount deposited |
| Rate | annual interest rate usually written as a percent (you may need to convert to a decimal!) |
| Time | typically provided in years |

- **Example:**
  If Frank deposits $2,000 at USA Savings Bank with an annual interest rate of 2%, how much money will he earn in interest each year?

$$I = Prt$$

$$= \$2{,}000 \times 0.02 \times 1 \quad \leftarrow \textit{Substitute values (2\% as a decimal = 0.02)}$$

$$= \$40 \quad \leftarrow \textit{Evaluate}$$

  So, in year 1, Frank earns $40 in simple interest. At the end of the year, he has **$2,040** total in his account.

  In year 2, Frank earns another $40 in simple interest. At the end of the year, he has **$2,080** total in his account.

Source

1. Why do you *earn* interest when you put money into a savings account?

2. Imagine you deposited $500 in a savings account that had an annual interest rate of 5% for 5 years.
   - Use the simple interest formula from the article to calculate how much you would earn each year (Column 1).
   - Then, calculate how much money you would have at the end of each year (Column 2).

| Year | Simple Interest Earned | Total Account Amount |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

**VIDEO: What is Compound Interest?**

Now that you understand how interest works and how to calculate simple interest, let's explore another type of interest - compound interest. Watch the video to learn about the power of compound interest. Then, answer the questions.

1. Explain the difference between simple interest and compound interest.

2. Let's go back to our earlier example where you imagined depositing $500 into a savings account that had an annual interest rate of 5%.
   - Calculate how much you would earn each year (Column 1).
     - ***Hint:*** *Be sure to use the NEW total account amount when calculating*

*compound interest earned!*

- Then, calculate how much money you would have at the end of each year (Column 2).

| Year | Compound Interest Earned | Total Account Amount |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

3. Compare your answer for Year 5 here with compound interest to your answer for Year 5 from the table with simple interest. How much more money in interest would you earn with compound interest?

## DO IT

### MATH: Simple vs. Compound Interest

Based on your answer above, you might think that compound interest doesn't make a huge difference...but not so fast! Here's how you can let compound interest work its magic - give your money TIME to grow! Let's now explore how time makes all the difference when using compound interest.

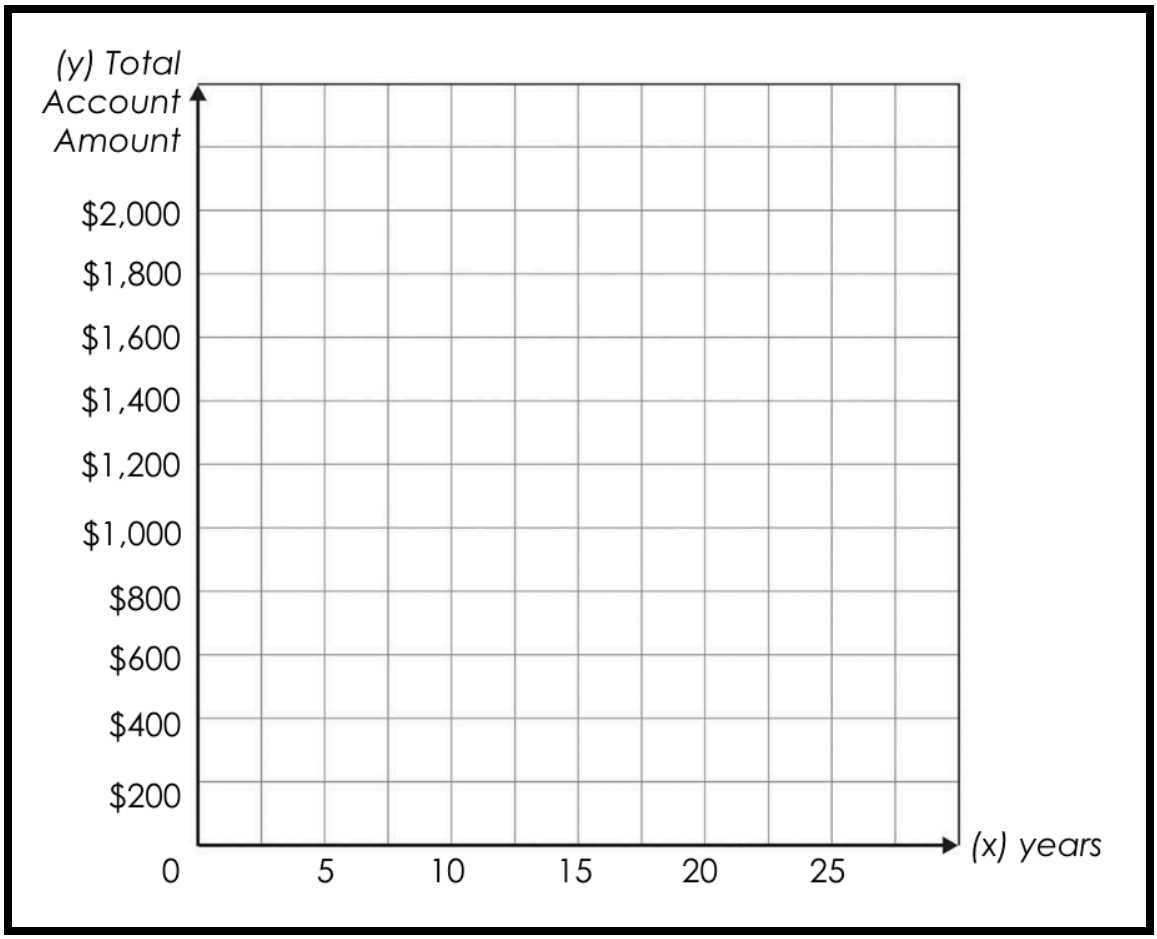
**Part I: The Power of Time**

We will use our earlier example again where you imagined depositing $500 into a savings account that had an annual interest rate of 5%. Use this calculator to fill in the table below to see how much that money will grow after 25 years.

| | Total Account Amounts | |
|---|---|---|
| Year | With Simple Interest | With Compound Interest |
| 5 | | |
| 10 | | |
| 15 | | |
| 20 | | |
| 25 | | |

**Part II: Create a Graph**

Create a graph using the data for simple and compound interests from the table above. You may want to use 2 different colored pencils or markers to indicate the 2 different graphs.



**Part III: Reflection**

5. Which type of interest DOUBLED the initial amount saved? Which type of interest TRIPLED the initial amount saved?

6. Remember that with compound interest, you grew your initial deposit of $500. However, you did not add more money each year. Explain what you think would happen if you added money each year into the account for 25 years.

## EXIT TICKET

1. Explain why compound interest is more powerful than simple interest.

2. How does TIME play an important role in the power of compound interest?