

## Lesson 3

# Save and Invest: The Power of Interest

### Lesson Description

This lesson defines the concept of interest as the fee for the use of money over time. Students differentiate between simple and compound interest and use the Rule of 72 to estimate the length of time required for savings to double in value.

### National Standards in K–12 Personal Finance Education ([www.jumpstart.org](http://www.jumpstart.org))

*Saving and Investing*

Standard 3: Evaluate investment alternatives.

### Instructional Objectives

Students will:

- Define and describe interest.
- Compare the growth of savings using simple and compound interest.
- Use the “Rule of 72” to estimate the time required for savings to double in value.

### Time Required

One 50-minute class period

### Materials Required

- Copies of classroom visuals
  - *Visual 1: Simple and Compound Interest*
  - *Visual 2: Watch a Penny Grow in Value!*
  - *Visual 3: Rule of 72*
- Copies of the following handout for each student
  - *Handout 1: Interest*

### Procedure

1. Write the following definition of interest on the board.  
**Interest** is a fee for the use of money over time.
2. Introduce the concept of interest using the following questions:
  - What are some items that you might loan to a friend?  
*Answers will vary but might include school supplies, clothing, media, car, etc.*
  - What is the opportunity cost associated with loaning something to someone else?  
*The owner does not get to use the item for a period of time.*
  - What is a rental payment? How does it compensate the owner for the opportunity cost of loaning the item?  
*When someone rents an item, the original owner maintains a claim on the item, but the renter pays a fee to use the item for a period of time. During that time, the owner does not get to use the item. A wide range of assets, from DVDs to cars to houses and apartments, can be rented. The owner allows someone to use the asset in exchange for the rental payment.*

- How is interest that is paid on savings similar to rent?  
*Refer to the definition written on the board. A saver is paid when they allow someone to use their money for a period of time.*

- Who pays interest? Who receives interest?  
*Interest is paid by a borrower and received by a lender or a saver. Often this transaction occurs through an intermediary like a bank.*

3. Display *Visual 1: Simple and Compound Interest*. Discuss simple interest using the following questions and the simple interest table from the visual. Fill in the blank cells on the table with the information from the completed table below.

- How does a saver know how much interest he or she will receive?  
*Interest is stated as a percentage rate. It is computed as a percentage of the saver's deposit and paid on a regular schedule.*

- How is simple interest computed?  
*The interest payment is computed as a percentage of the **original** deposit amount.*

- How much interest will a saver receive each year on a \$100 deposit that earns 5% simple interest? Use the visual to illustrate. Complete the table with student responses.

*The saver will receive \$5 in interest each year.*

- How much interest will the saver earn in 10 years with simple interest?

*Over 10 years, the saver would earn \$50 in interest.*

Simple Interest			
Year	Beginning Balance	Interest Paid	Year-End Balance
1	\$100	\$5	\$105
2	\$105	\$5	\$110
3	\$110	\$5	\$115
4	\$115	\$5	\$120
5	\$120	\$5	\$125
6	\$125	\$5	\$130
7	\$130	\$5	\$135
8	\$135	\$5	\$140
9	\$140	\$5	\$145
10	\$145	\$5	\$150

4. Display *Visual 1: Simple and Compound Interest*. Introduce the idea of compound interest using the following questions and the compound interest table from the visual. Fill in the blank cells on the table with the information from the completed table below.

- What would happen if each interest payment was deposited in the account and future interest payments were calculated on the new total?  
*Interest payments would grow larger.*

- How could annual compounding change the simple interest example above?

*Since compound interest allows interest to be paid on the original deposit amount as well as on accumulated interest from previous periods, the interest payments grow in each period.*

- How much will the saver receive if the interest is compounded?

*Use the visual to illustrate. Complete the table with student responses. Emphasize that in each year, the interest payment is computed on the sum of the principal (the original \$100) and the interest received up to that point.*

Compound Interest			
Year	Beginning Balance	Interest Paid	Year-End Balance
1	\$100.00	\$5.00	\$105.00
2	\$105.00	\$5.25	\$110.25
3	\$110.25	\$5.51	\$115.76
4	\$115.76	\$5.79	\$121.55
5	\$121.55	\$6.08	\$127.63
6	\$127.63	\$6.38	\$134.01
7	\$134.01	\$6.70	\$140.71
8	\$140.71	\$7.04	\$147.75
9	\$147.75	\$7.39	\$155.14
10	\$155.14	\$7.76	\$162.90

5. Ask students to consider the following offer:

Would you rather receive half a million dollars (\$500,000) today or 1 cent with the promise that if you hold all of the money that you are given, the amount will be doubled each day for a month (30 days)?

Discuss the options with the class. Although the \$500,000 seems extremely generous, the penny that is doubled each day represents a promise of more than \$5.3 million. Display *Visual 2: Watch a Penny Grow in Value!* Tell students that this is an extreme example of the power of allowing money to grow at a compounded rate. While savings will not double in value daily, the Rule of 72 is a tool to estimate how long it will take for the doubling to occur.

6. Display *Visual 3: Rule of 72*. Describe the Rule of 72. This shortcut allows a saver to use the annual rate of return (whether it is an interest rate or a rate of growth in value) to estimate the length of time required for savings to double in value. The answers from the visual are:
- At 4%, the savings will double in approximately 18 years. ( $72 \div 4 = 18$ )
  - At 6%, the savings will double in approximately 12 years. ( $72 \div 6 = 12$ )
  - At 9%, the savings will double in approximately 8 years. ( $72 \div 9 = 8$ )
  - At 12%, the savings will double in approximately 6 years. ( $72 \div 12 = 6$ )

## Closure

7. Review the concepts of this lesson using the following questions:

- Why do savers demand interest?  
*Savers want to be compensated for forgone consumption.*
- Why does a saver earn more with compound interest than with simple interest?  
*Interest is paid on accumulated interest, not just on the original deposit.*

- How can a saver use the Rule of 72?

*A saver can estimate the time required for savings to double in value at a given interest rate.*

8. Preview Lesson 4, *Put It in the Bank*. Banks and other financial institutions are sometimes called financial intermediaries. These institutions bring together savers who are willing to loan money and borrowers who are willing to pay interest for a loan.

### **Assessment**

9. Distribute the *Handout 1: Interest* to each student. Allow students to answer the questions in class or assign as homework.

### Lesson 3 – Save and Invest: The Power of Interest

## Visual 1: Simple and Compound Interest

**If a saver deposits \$100 in an account that earns 5% interest, how will the balance grow over 10 years?**

Year	Beginning Balance	Simple Interest Paid	Year-End Balance
1	\$100	\$5	\$105
2	\$105	\$5	
3	\$110	\$5	
4		\$5	
5		\$5	
6		\$5	
7		\$5	
8		\$5	
9		\$5	
10		\$5	\$150

Year	Beginning Balance	Compound Interest Paid	Year-End Balance
1	\$100.00	\$5.00	\$105.00
2	\$105.00	\$5.25	
3	\$110.25		
4			
5			
6			
7			
8			
9			
10			\$162.90

**Why is compound interest better for the saver?**

## Lesson 3 – Save and Invest: The Power of Interest

### Visual 2: Watch a Penny Grow in Value!

Day	Amount
1	\$0.01
2	\$0.02
3	\$0.04
4	\$0.08
5	\$0.16
6	\$0.32
7	\$0.64
8	\$1.28
9	\$2.56
10	\$5.12
11	\$10.24
12	\$20.48
13	\$40.96
14	\$81.92
15	\$163.84
16	\$327.68
17	\$655.36
18	\$1,310.72
19	\$2,621.44
20	\$5,242.88
21	\$10,485.76
22	\$20,971.52
23	\$41,943.04
24	\$83,886.08
25	\$167,772.16
26	\$335,544.32
27	\$671,088.64
28	\$1,342,177.28
29	\$2,684,354.56
30	\$5,368,709.12

## Lesson 3 – Save and Invest: The Power of Interest

### Visual 3: Rule of 72

The Rule of 72 is a shortcut that can be used to find out how many years it will take an investment to double in value using compound interest.

$$\text{Number of years to double} = \frac{72}{\text{Annual Rate of Return}}$$

If you invest \$50,000, how many years will it take for it to grow to \$100,000?

1. At 4% annual interest
2. At 6% annual interest
3. At 9% annual interest
4. At 12% annual interest

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Lesson 3 – Save and Invest: The Power of Interest

## Handout 1: Interest

If you save \$100 in an account that pays 10% simple interest, how will your original investment grow over 10 years? Round all values to a whole dollar amount.

Year	Beginning Balance	Simple Interest Paid	Year-End Balance
1	\$100	\$10	\$110
2	\$110		
3			
4			
5			
6			
7			
8			
9			
10			

If you save \$100 in an account that pays 10% interest and is compounded annually, how will your original investment grow over 10 years? Round all values to a whole dollar amount.

Year	Beginning Balance	Compound Interest Paid	Year-End Balance
1	\$100	\$10	\$110
2	\$110		
3			
4			
5			
6			
7			
8			
9			
10			





## Lesson 3 – Save and Invest: The Power of Interest

### Handout 1: Interest

#### Suggested Answers

If you save \$100 in an account that pays 10% simple interest, how will your original investment grow over 10 years? Round all values to a whole dollar amount.

Year	Beginning Balance	Simple Interest Paid	Year-End Balance
1	\$100	\$10	\$110
2	\$110	\$10	\$120
3	\$120	\$10	\$130
4	\$130	\$10	\$140
5	\$140	\$10	\$150
6	\$150	\$10	\$160
7	\$160	\$10	\$170
8	\$170	\$10	\$180
9	\$180	\$10	\$190
10	\$190	\$10	\$200

If you save \$100 in an account that pays 10% interest and is compounded annually, how will your original investment grow over 10 years? Round all values to a whole dollar amount.

Year	Beginning Balance	Compound Interest Paid	Year-End Balance
1	\$100	\$10	\$110
2	\$110	\$11	\$121
3	\$121	\$12	\$133
4	\$133	\$13	\$146
5	\$146	\$15	\$161
6	\$161	\$16	\$177
7	\$177	\$18	\$195
8	\$195	\$19	\$214
9	\$214	\$21	\$235
10	\$235	\$24	\$260

## Lesson 3 – Save and Invest: The Power of Interest

# Handout 1: Interest

## Suggested Answers

### Page 2

1. Define “interest” in your own words.

*Student answers will vary, but should include some of the following ideas:*

- *Interest is the price paid to use someone else’s money.*
- *Interest is the payment received if someone else uses your money.*
- *Interest is paid to a saver in return for giving up consumption in the present.*
- *Interest is paid by a borrower because he or she is consuming before income has been earned.*

2. What is the difference between simple and compound interest?

*Simple interest is paid on the amount of the original investment and does not change over time.*

*Compound interest is paid on the amount of the original investment and all accrued interest.*

Use the Rule of 72 to answer the following questions.

3. If you save \$500 in an account that pays 3% annual interest, how many years will it take for your savings to double in value?

*It will take 24 years*

4. For your 10th birthday, your aunt gave you \$4,000. You decide that you would like to save the money to buy a car when you turn 18, but by then you think you will need \$8,000. What interest rate is required to allow you to reach your goal?

*9% annual interest*