LESSON 13

Who Pays and Who Receives?

LESSON DESCRIPTION AND BACKGROUND

The students discover that three factors affect how money grows in savings accounts: the amount deposited, the interest rate, and the length of time the money is held on deposit. Students calculate interest and formulate a generalization about the difference between simple and compound interest.

Lesson 13 is correlated with national standards for mathematics and economics, and with personal finance guidelines, as shown in Tables 1-3 in the introductory section of this publication.

ECONOMIC AND PERSONAL FINANCE CONCEPTS

- Compounding
- Compound interest
- Interest
- Interest rate
- Opportunity cost
- Rule of 72
- Simple interest

OBJECTIVES

At the end of this lesson, the student will be able to:

- Calculate **simple** and **compound interest**.
- Explain the **opportunity cost** of allowing interest to compound.
- Explain the **opportunity cost** of taking **interest** as it is earned.
- Analyze the difference between **simple** and **compound interest**.
- Explain the factors that affect how money grows.
- Apply the **Rule of 72**.

TIME REQUIRED

Two 45-minute class periods

MATERIALS

- A transparency of **Visual 13.1**, **13.2A**, **13.2B**, **13.3A**, **13.3B**, **13.4**, **13.5** and **13.6**
- A copy for each student of **Introduction** and **Vocabulary** sections of **Lesson 13** from the *Student Workbook*
- Copies of **Exercise 13.1A** (enough for half the class) and **13.1B** (enough for half the class)
- One copy for each student of **Exercise 13.2**, **13.3**, and **13.4** from the *Student Workbook*
- One copy for each student of **Lesson 13 Assessment** from the *Student Workbook*
- A bag of large dried kidney beans (or other beans of fairly uniform size)
- Two tall, narrow clear glasses or jars (one labeled "Simple Interest," the other labeled "Compound Interest")
- One small, narrow clear glass or jar (labeled "Interest Paid Out to Depositor")
- Two overhead projectors
- Calculators (one for each student)

ADDITIONAL RESOURCES

To download visuals, find related lessons, correlations to state standards, interactives, and more, visit http://fffl.councilforeconed.org/6-8/lesson13.

PROCEDURE

1. Introduce the concept of "interest" by asking if any students have a savings account. If any students do, ask why they keep their money in a savings account instead of a dresser drawer or a shoebox in their closets. ***(Some students will know that banks provide security and pay interest on savings. Discuss these concepts to make sure students understand them.)***

2. Distribute a copy of the **Introduction** and **Vocabulary** section to **Lesson 13** from the *Student Workbook* to each student. Ask the students to read the passage and study the vocabulary words. When they are done with this, display **Visual 13.1**. Discuss the definitions it presents. Make sure the students understand the difference between simple and compound interest.

3. Explain that some people who earn interest on their savings leave that interest in the bank, in their savings accounts. When they do that, the interest usually "compounds", and savings grow.

4. Explain that some people need the interest they earn to pay for goods and services. They may not want to leave all of it in the bank to compound. If they withdraw their interest—if they "take it as it is earned"—their savings will grow more slowly.

5. Introduce the following simulation activity, designed to show the difference between simple and compound interest.

a. Divide the class into two groups: Simple Interest Group and Compound Interest Group. Give each student in the Simple Interest Group a copy of **Exercise 13.1A** from the *Student Workbook*; give each student in the Compound Interest Group a copy of **Exercise 13.1B**.

b. Give one narrow, tall glass or jar labeled "Simple Interest" and the smaller glass or jar labeled "Interest Paid Out to Depositor" to the Simple Interest Group. Give the other narrow, tall glass or jar, labeled "Compound Interest", to the Compound Interest Group.

c. Display **Visuals 13.2A** and **13.2B** side-by-side on the two overhead projectors.

d. Choose two students, one from each group, to act as bankers. Give each banker a bag of beans. Have each banker count 10 beans from the "bank bag" into his or her group's jar (labeled Simple Interest or Compound Interest). Have the rest of the students note the deposit in Column C on their charts on **Exercise 13.1A** or **13.1B**; point this out on the visuals.

e. Tell the students that the interest rate is 20 percent. Explain that this is an unusually high rate of interest, but it makes the calculations easier to perform and it will not affect the concept to be learned.

f. Instruct the bankers to take two beans from their respective bags to represent the 20 percent interest rate. The Simple Interest banker should put the two beans in the jar marked "Interest Paid Out to Depositor." The Compound Interest banker should put two beans into the jar marked "Compound Interest." (20 percent of 10 = .2 x 10 = 2; make sure the students understand that they must convert interest into decimal form when calculating interest earned.)

g. Explain that when interest is allowed to compound, it is added to the existing balance; as part of the new balance, it also earns interest. When interest is paid out to the depositor, it does not compound.

h. Have both groups look at their ending balance (Column G). Because the Compound Interest Group kept its interest on deposit, it has 12 beans; the Simple Interest Group has only 10.

i. Continue to work through the deposit cycle. (Deposit 10 beans, calculate interest, add "interest beans" to correct jar.) Have each group calculate its new balance (Column D), interest earned (Column F) and ending balance (Column G). Have the students complete six cycles. You can complete the visuals as the students calculate each cycle. Note: Decimals should be rounded to their nearest whole number.

j. Have the students count the beans in the compound interest jar (there should be 119)

and in the two jars for the Simple Interest group. (They should have 60 beans in the deposit jar and 42 beans in the Interest Paid Out jar, for a total of 102.) Double check their answers by having the students calculate the total amount deposited in column C, and the total interest earned in column F.

6. Display **Visuals 13.3A** and **B**, Answer Sheets (or use the transparency you have with the written answers). Note that the Simple Interest Group and the Compound Interest Group each deposited the same amount, 60 beans. However, the Compound Interest Group earned a total of 59 beans in interest, but the Simple Interest Group earned only 42 beans. Ask:

a. What was the "opportunity cost" for the Simple Interest Group as it chose to receive its interest rather than leaving it on deposit, in the account? ***(The opportunity cost was the extra interest they would have earned.)***

b. What was the opportunity cost for the Compound Interest Group as it chose to leave its interest on deposit, in the account? ***(The opportunity cost was not being able to spend the interest at the present time. Remind the students, in connection with this point, that savers sometimes choose not to let interest compound because they have important uses in the present for that interest.)***

7. Point out that the compound interest group not only received interest on the money they saved; they also earned interest on the interest the bank paid them. Display **Visual 13.4**. Ask:

a. How much money was deposited in Deposit Cycle 1? ***($10)***

b. How much money was deposited in the remaining deposit cycles? ***(0)***

c. What is the current Ending Balance? ***($29.87)***

d. How much of the Ending Balance was deposited by the saver? ***($10)***

e. How much of the Ending Balance is the result of interest earned? ***($19.87)***

8. Look back at the previous example from **Visual 13.4**. Tell the students to assume that the saver earned the $10 referred to in Deposit Cycle 1 by working, and then deposited it in the bank. Ask: What job might you perform to earn $10? ***(Some students might be able to earn $10 by cutting someone's lawn, shoveling snow, babysitting, etc.)*** Point out that the saver in **Visual 13.4** has an Ending Balance of $29.87 in the account, but only had to work for $10 of that amount. The rest was paid in interest by the bank. The saver earned interest on the interest that the bank had paid in the earlier cycles.

Answers to Exercise 13.2

Principal	x	Interest Rate	x	Time	=	Simple Interest	÷ 4 =	Quarterly Payments
$60,000	*x*	*6%*	*x*	*1 Year*	*=*	*$3,600*	*÷ 4 =*	*$900*
$20,000	*x*	*5%*	*x*	*1 Year*	*=*	***$1,000***	*÷ 4 =*	***$250***
$10,000	*x*	*10%*	*x*	*1 Year*	*=*	*$1,000*	*÷ 4 =*	***$250***
$80,000	*x*	***7%***	*x*	*1 Year*	*=*	*$5,600*	*÷ 4 =*	***$1,400***
$75,000	*x*	*9%*	*x*	*1 Year*	*=*	***$6,750***	*÷ 4 =*	***$1,688***
$125,000	*x*	*8%*	*x*	*1 Year*	*=*	***$10,000***	*÷ 4 =*	***$2,500***
$200,000	*x*	***7%***	*x*	*1 Year*	*=*	*$14,000*	*÷ 4 =*	***$3,500***
$40,000	*x*	***5%***	*x*	*1 Year*	*=*	***$2,000***	*÷ 4 =*	*$500*
$100,000	*x*	*4%*	*x*	*1 Year*	*=*	***$4,000***	*÷ 4 =*	*$1,000*
$100,000	*x*	***10%***	*x*	*1 Year*	*=*	***$10,000***	*÷ 4 =*	*$2,500*

9. Explain that as savings grow while interest accrues, three important factors affect the amount of interest gained. Display **Visual 13.5** and discuss its contents. Make sure the students understand how the amount of money left on deposit, length of time money is left on deposit, and "interest rate" affect the interest earned.

10. Distribute to each student a copy of **Exercise 13.2** from the *Student Workbook*. Have the students complete the exercise, working independently. (Answers at the bottom of the previous page.)

11. Introduce **Exercise 13.3,** designed to show how the three factors—time, interest rate, and amount saved—affect the way money grows.

a. Distribute to each student a copy of **Exercise 13.3** from the *Student Workbook*. Go over the directions. Assign each student in each team one of the eight situations. (Or make up teams of eight students and have each student on each team select a different situation.) Have each student complete the Calculation Sheet for Racing Toward a Goal to determine when his or her driver will meet the goal. Students could use calculators or a spreadsheet program to do the calculations.

b. When the students have completed their calculations, they should compare their findings with their classmates' (or team's) findings to determine the correct order in which the drivers reached their goals. (Answers follow.)

The correct order of racers is:

F H E G B C D A

(Completed calculation sheets for each racer are found below and on the following pages.)

Answer grid for $2,000 at 6% interest. Racer A reaches the goal of $40,000 in 13 years.

A	B	C	D	E	F	G
Year	**Beginning Balance (from G)**	**Annual Deposit**	**New Balance (B + C)**	**Interest Rate**	**Interest Earned (D x E)**	**Total (D + F)**
1	*0*	*$2,000*	*$2,000.00*	*6%*	*$120.00*	*$2,120.00*
2	*$2,120.00*	*$2,000*	*$4,120.00*	*6%*	*$247.20*	*$4,367.20*
3	*$4,367.20*	*$2,000*	*$6,367.20*	*6%*	*$382.03*	*$6,749.23*
4	*$6,749,23*	*$2,000*	*$8,749.23*	*6%*	*$524.95*	*$9,274.19*
5	*$9,274.19*	*$2,000*	*$11,274.19*	*6%*	*$676.45*	*$11,950.64*
6	*$11,950.64*	*$2,000*	*$13,950.64*	*6%*	*$837.04*	*$14,787.68*
7	*$14,787.68*	*$2,000*	*$16,787.68*	*6%*	*$1,007.26*	*$17,794.94*
8	*$17,794.94*	*$2,000*	*$19,794.94*	*6%*	*$1,187.70*	*$20,982.64*
9	*$20,982.64*	*$2,000*	*$22,982.64*	*6%*	*$1,378.96*	*$24,361.60*
10	*$24,361.60*	*$2,000*	*$26,361.60*	*6%*	*$1,581.70*	*$27,943.30*
11	*$27,943.30*	*$2,000*	*$29,943.30*	*6%*	*$1,796.60*	*$31,739.90*
12	*$31,739.90*	*$2,000*	*$33,739.90*	*6%*	*$2,024.39*	*$35,764.29*
13	*$35,764.29*	*$2,000*	*$37,764.29*	*6%*	*$2,265.86*	*$40,030.15*

Answer grid for $2,000 at 10% interest. Racer B reaches the goal of $29,000 in 9 years.

A	B	C	D	E	F	G
Year	**Beginning Balance (from G)**	**Annual Deposit**	**New Balance (B + C)**	**Interest Rate**	**Interest Earned (D x E)**	**Total (D + F)**
1	*0*	*$2,000*	*$2,000.00*	*10%*	*$200.00*	*$2,200.00*
2	*$2,200.00*	*$2,000*	*$4,200.00*	*10%*	*$420.00*	*$4,620.00*
3	*$4,620.00*	*$2,000*	*$6,620.00*	*10%*	*$662.00*	*$7,282.00*
4	*$7,282.00*	*$2,000*	*$9,282.00*	*10%*	*$928.20*	*$10,210.20*
5	*$10,210.20*	*$2,000*	*$12,210.20*	*10%*	*$1,221.02*	*$13,431.22*
6	*$13,431.22*	*$2,000*	*$15,431.22*	*10%*	*$1,543.12*	*$16,974.34*
7	*$16,974.34*	*$2,000*	*$18,974.34*	*10%*	*$1,897.43*	*$20,871.77*
8	*$20,871.77*	*$2,000*	*$22,871.77*	*10%*	*$2,287.18*	*$25,158.95*
9	*$25,158.95*	*$2,000*	*$27,158.95*	*10%*	*$2,715.90*	*$29,874.85*

Answer grid for $3,000 at 6% interest. Racer C reaches the goal of $41,000 in 10 years.

A	B	C	D	E	F	G
Year	**Beginning Balance (from G)**	**Annual Deposit**	**New Balance (B + C)**	**Interest Rate**	**Interest Earned (D x E)**	**Total (D + F)**
1	*0*	*$3,000*	*$3,000.00*	*6%*	*$180.00*	*$3,180.00*
2	*$3,180.00*	*$3,000*	*$6,180.00*	*6%*	*$370.80*	*$6,550.80*
3	*$6,550.80*	*$3,000*	*$9,550.80*	*6%*	*$573.05*	*$10,123.85*
4	*$10,123.85*	*$3,000*	*$13,123.85*	*6%*	*$787.43*	*$13,911.28*
5	*$13,911.28*	*$3,000*	*$16,911.28*	*6%*	*$1,014.68*	*$17,925.96*
6	*$17,925.96*	*$3,000*	*$20,925.96*	*6%*	*$1,255.56*	*$22,181.52*
7	*$22,181.52*	*$3,000*	*$25,181.52*	*6%*	*$1,510.89*	*$26,692.41*
8	*$26,692.41*	*$3,000*	*$29,692.41*	*6%*	*$1,781.54*	*$31,473.95*
9	*$31,473.95*	*$3,000*	*$34,473.95*	*6%*	*$2,068.44*	*$36,542.39*
10	*$36,542.39*	*$3,000*	*$39,542.39*	*6%*	*$2,372.54*	*$41,914.93*

Answer grid for $3,000 at 10% interest. Racer D reaches the goal of $61,000 in 11 years.

A	B	C	D	E	F	G
Year	**Beginning Balance (from G)**	**Annual Deposit**	**New Balance (B + C)**	**Interest Rate**	**Interest Earned (D x E)**	**Total (D + F)**
1	*0*	*$3,000*	*$3,000.00*	*10%*	*$300.00*	*$3,300.00*
2	*$3,300.00*	*$3,000*	*$6,300.00*	*10%*	*$630.00*	*$6,930.00*
3	*$6,930.00*	*$3,000*	*$9,930.00*	*10%*	*$993.00*	*$10,923.00*
4	*$10,923.00*	*$3,000*	*$13,923.00*	*10%*	*$1,392.30*	*$15,315.30*
5	*$15,315.30*	*$3,000*	*$18,513.30*	*10%*	*$1,831.53*	*$20,146.83*
6	*$20,146.83*	*$3,000*	*$23,146.83*	*10%*	*$2,314.68*	*$25,461.51*
7	*$25,461.51*	*$3,000*	*$28,461.51*	*10%*	*$2,846.15*	*$31,307.66*
8	*$31,307.66*	*$3,000*	*$34,307.66*	*10%*	*$3,430.77*	*$37,738.43*
9	*$37,738.43*	*$3,000*	*$40,738.43*	*10%*	*$4,073.84*	*$44,812.27*
10	*$44,812.27*	*$3,000*	*$47,812.27*	*10%*	*$4,781.23*	*$52,593.50*
11	*$52,593.50*	*$3,000*	*$55,593.50*	*10%*	*$5,559.35*	*$61,152.85*

Answer grid for $4,000 at 6% interest. Racer E reaches the goal of $35,000 in 7 years.

A	B	C	D	E	F	G
Year	**Beginning Balance (from G)**	**Annual Deposit**	**New Balance (B + C)**	**Interest Rate**	**Interest Earned (D x E)**	**Total (D + F)**
1	*0*	*$4,000*	*$4,000.00*	*6%*	*$240.00*	*$4,240.00*
2	*$4,240.00*	*$4,000*	*$8,240.00*	*6%*	*$494.40*	*$8,734.40*
3	*$8,734.40*	*$4,000*	*$12,734.40*	*6%*	*$764.06*	*$13,498.46*
4	*$13,498.46*	*$4,000*	*$17,498.46*	*6%*	*$1,049.91*	*$18,548.37*
5	*$18,548.37*	*$4,000*	*$22,548.37*	*6%*	*$1,352.90*	*$23,901.27*
6	*$23,901.27*	*$4,000*	*$27,901.27*	*6%*	*$1,674.08*	*$29,575.35*
7	*$29,575.35*	*$4,000*	*$33,575.35*	*6%*	*$2,014.52*	*$35,589.87*

Answer grid for $4,000 at 10% interest. Racer F reaches the goal of $26,000 in 5 years.

A	B	C	D	E	F	G
Year	Beginning Balance (from G)	Annual Deposit	New Balance (B + C)	Interest Rate	Interest Earned (D x E)	Total (D + F)
1	0	$4,000	$4,000.00	10%	$400.00	$4,400.00
2	$4,400.00	$4,000	$8,400.00	10%	$840.00	$9,240.00
3	$9,240.00	$4,000	$13,240.00	10%	$1,324.00	$14,564.00
4	$14,564.00	$4,000	$18,564.00	10%	$1,856.40	$20,420.40
5	$20,420.40	$4,000	$24,420.40	10%	$2,442.04	$26,862.44

Answer grid for $5,000 at 6% interest. Racer G reaches the goal of $52,000 in 8 years.

A	B	C	D	E	F	G
Year	Beginning Balance (from G)	Annual Deposit	New Balance (B + C)	Interest Rate	Interest Earned (D x E)	Total (D + F)
1	0	$5,000	$5,000.00	6%	$300.00	$5,300.00
2	$5,300.00	$5,000	$10,300.00	6%	$618.00	$10,918.00
3	$10,918.00	$5,000	$15,918.00	6%	$955.08	$16,373.08
4	$16,873.08	$5,000	$21,873.08	6%	$1,312.38	$23,185.46
5	$23,185.46	$5,000	$28,185.46	6%	$1,691.13	$29,876.59
6	$29,876.59	$5,000	$34,876.59	6%	$2,092.60	$36,969.19
7	$36,969.19	$5,000	$41,969.19	6%	$2,518.15	$44,487.34
8	$44,487.34	$5,000	$49,487.34	6%	$2,969.24	$52,456.58

Answer grid for $5,000 at 10% interest. Racer H reaches the goal of $42,000 in 6 years.

A	B	C	D	E	F	G
Year	Beginning Balance (from G)	Annual Deposit	New Balance (B + C)	Interest Rate	Interest Earned (D x E)	Total (D + F)
1	0	$5,000	$5,000.00	10%	$500.00	$5,500.00
2	$5,500.00	$5,000	$10,500.00	10%	$1,050.00	$11,550.00
3	$11,550.00	$5,000	$16,550.00	10%	$1,655.00	$18,205.00
4	$18,205.00	$5,000	$23,205.00	10%	$2,320.50	$25,525.50
5	$25,525.50	$5,000	$30,525.50	10%	$3,052.55	$33,578.05
6	$33,578.05	$5,000	$38,578.05	10%	$3,857.81	$42,435.86

12. Explain that there is an easy way to estimate the extent to which interest compounds when it is left to accumulate. It is called the "Rule of 72." Using the Rule of 72 enables you to estimate how long it takes for money to double, at a given rate of interest. To use the rule, you divide the number 72 by the interest rate (expressed in percentage terms), and the answer is the approximate number of years required to double your money. For example, at 9 percent interest, money doubles in about 8 years (72 ÷ 9 = 8); at 2 percent interest, money doubles in about 36 years (72 ÷ 2 = 36).

13. How well does the Rule of 72 work? Distribute to each student a copy of **Exercise 13.4** from the *Student Workbook*. Have the students complete the exercise to find out how accurately the Rule of 72 predicts the time it will take for $100,000 to double at different interest rates.

- The students can use an online interest calculator such as the one found at www.1728.com/compint.htm to check out the Rule of 72.
- They should use this procedure:

  1. Solve for YEARS

  Input principal:100000 (do not use commas)

  Input total: 200000 (i.e., double the principal)

  Input rate (do not use a decimal, e.g. 6% = 6)

  2. Click on CALCULATE

  The answer will be the number of years it takes for the principal to double.

- Ask: Does the Rule of 72 Work? ***(Students should observe that the Rule of 72 is fairly accurate in estimating the length of time needed for money to double. In each of the examples, money doubles approximately as predicted by the Rule of 72.)***

CLOSURE

Use the following questions to review the lesson:

- What is simple interest? ***(Interest earned on the principal and paid out to the depositor.)***
- What is compound interest? ***(Interest computed on the sum of the principle and previously earned interest.)***
- What determines the amount of interest earned? ***(The interest rate, the amount deposited, and the length of time on which the interest is calculated.)***
- If you left $3,000 in a savings account earning 8% interest, approximately how many years would it take to double in size? ***(Nine years, when estimated by the Rule of 72, or 72 ÷ 8 = 9.)***

Answers to Exercise 13.4

A	B	C	D	E
Principal	Double the Principal	Interest Rate Percentage	No. of years for money to double (from Web Calculator)	Does Column C x Column D = approximately 72?
$100,000	*$200,000*	*2*	***35.0028***	***70.01***
$100,000	*$200,000*	*3*	***23.4498***	***70.35***
$100,000	*$200,000*	*4*	***17.673***	***70.69***
$100,000	*$200,000*	*6*	***11.8957***	***71.37***
$100,000	*$200,000*	*8*	***9.0065***	***72.05***
$100,000	*$200,000*	*9*	***8.0432***	***72.39***
$100,000	*$200,000*	*12*	***6.1163***	***73.4***

ASSESSMENT

Distribute a copy of **Lesson 13 Assessment** to each student. Have the students complete the assessment, working independently. Answers are shown in **Visual 13.6**. You may want to request that the students round cents to the nearest whole number in performing their calculations.

EXTENSION

Introduce students to Future Value (a method for calculating the value of cash today at a specific date in the future) by using the equation $FV=PV(1+i)^n$.

Explain the variables as follows:

FV = Future Value (the value of the student's savings at some future date)

PV = Present Value (the current value of their savings)

i = the interest rate, expressed in decimal form, that the saver expects to receive for his savings

n = the number of years the saver will be earning interest by saving the money

Pose the following problem:

For high school graduation, Sarah received $2,000 in cash gifts, which she immediately placed in a 5-year Certificate of Deposit (CD) paying 4 percent (.04) annual interest. Approximately how much money will Sarah have when the CD matures in 5 years?

FV = ?

PV = $2,000

i = .04

n = 5

Put it all together as follows:

$FV = \$2{,}000(1 + .04)^5$

$FV = \$2{,}000(1.04)^5$

FV = $2,433.31

Provide similar scenarios using different interest rates and time periods to allow students to practice with the formula. Point out that small changes in interest rates and time periods can make big differences in the outcome.

VISUAL 13.1

Interesting Information about Interest

Interest

The price paid for using someone else's money.

Interest Rate

The price paid for using someone else's money expressed as a percentage.

Principal

Basic amount deposited, without adding interest earned.

Simple Interest

Interest earned on the principal and paid out to a depositor.

Compound Interest

Interest computed on the sum of the principal and previously earned interest.

Compounding

The practice of leaving interest earned on deposit, so that it also earns interest.

Simple Interest

A	B	C	D	E	F	G
Deposit Cycle	**Beginning Balance (from previous G)**	**Deposited Amount**	**New Balance (B + C)**	**Rate of Interest**	**Interest Earned and paid out (D x E)**	**Ending Balance (D)**
1	*0*	*10*	*10*	*20%*	*2*	*10*
2		*10*		*20%*		
3		*10*		*20%*		
4		*10*		*20%*		
5		*10*		*20%*		
6		*10*		*20%*		
Total						

Compound Interest

A	B	C	D	E	F	G
Deposit Cycle	**Beginning Balance (from previous G)**	**Deposited Amount**	**New Balance (B + C)**	**Rate of Interest**	**Interest Earned and paid out (D x E)**	**Ending Balance (F + D)**
1	*0*	*10*	*10*	*20%*	*2*	*12*
2		*10*		*20%*		
3		*10*		*20%*		
4		*10*		*20%*		
5		*10*		*20%*		
6		*10*		*20%*		
Total						

Round decimals to the closest whole number.

Answers to Exercise 13.1A Simple Interest

A	B	C	D	E	F	G
Deposit Cycle	**Beginning Balance (from previous G)**	**Deposited Amount**	**New Balance (B + C)**	**Rate of Interest**	**Interest Earned and paid out (D x E)**	**Ending Balance (D)**
1	*0*	*10*	*10*	*20%*	*2*	*10*
2	***10***	*10*	***20***	*20%*	***4***	***20***
3	***20***	*10*	***30***	*20%*	***6***	***30***
4	***30***	*10*	***40***	*20%*	***8***	***40***
5	***40***	*10*	***50***	*20%*	***10***	***50***
6	***50***	*10*	***60***	*20%*	***12***	***60***
Total		*60*			***42***	

Answers to Exercise 13.1B Compound Interest

A	B	C	D	E	F	G
Deposit Cycle	**Beginning Balance (from previous G)**	**Deposited Amount**	**New Balance (B + C)**	**Rate of Interest**	**Interest Earned and paid out (D x E)**	**Ending Balance (F + D)**
1	*0*	*10*	*10*	*20%*	*2*	*12*
2	***12***	*10*	***22***	*20%*	***4***	***26***
3	***26***	*10*	***36***	*20%*	***7***	***43***
4	***43***	*10*	***53***	*20%*	***11***	***64***
5	***64***	*10*	***74***	*20%*	***15***	***89***
6	***89***	*10*	***99***	*20%*	***20***	***119***
Total		*60*			***59***	

Round decimals to the closest whole number.

The Bank's Contribution

A	B	C	D	E	F	G
Deposit Cycle	**Beginning Balance (from previous G)**	**Deposited Amount**	**New Balance (B + C) Rate of Interest**	**Rate of Interest**	**Interest Earned and left in account (D x E)**	**Ending Balance (F + D)**
1	0	10	10.00	20%	2.00	12.00
2	12.00	0	12.00	20%	2.40	14.40
3	14.40	0	14.40	20%	2.88	17.28
4	17.28	0	17.28	20%	3.46	20.74
5	20.74	0	20.74	20%	4.15	24.89
6	24.89	0	24.89	20%	4.98	29.87
Total		10			19.87	29.87

VISUAL 13.5

Factors That Affect How Money Grows

- Amount of money left on deposit
- Interest rate
- Length of time money is left on deposit

Lesson 13 Assessment: Answer Key

Beginning values:
Amount $5,000
Interest rate 5%
Time 5 years

Change only the amount:
Amount $10,000
Interest rate 5%
Time 5 years

Change only the interest rate:
Amount $5,000
Interest rate 10%
Time 5 years

Change only the time:
Amount $5,000
Interest rate 5%
Time 10 years

Year	Year Start Balance	Interest Rate	Interest Earned	Year End Balance
1	$5,000	5%	$250.00	$5,250.00
2	5,250.00	5%	262.50	5,512.50
3	5,512.50	5%	275.63	5,788.13
4	5,788.13	5%	289.41	6,077.54
5	6,077.54	5%	303.88	6,381.42
1	$10,000.0	5%	500.00	10,500.00
2	10,500.00	5%	525.00	11,025.00
3	11,025.00	5%	551.25	11,576.25
4	11,576.25	5%	578.81	12,155.06
5	12,155.06	5%	607.75	12,762.81
1	$5,000.00	10%	500.00	5,500.00
2	5,500.00	10%	550.00	6,050.00
3	6,050.00	10%	605.00	6,655.00
4	6,655.00	10%	665.50	7,320.50
5	7,320.50	10%	732.05	8,052.55
1	$5,000.00	5%	250.00	5,250.00
2	5,250.00	5%	262.50	5,512.50
3	5,512.50	5%	275.63	5,788.13
4	5,788.13	5%	289.41	6,077.54
5	6,077.54	5%	303.88	6,381.42
6	6,381.42	5%	319.07	6,700.49
7	6,700.49	5%	335.02	7,035.51
8	7,035.51	5%	351.78	7,389.29
9	7,387.29	5%	369.36	7,756.65
10	7,756.65	5%	387.83	8,144.48

**If rounding of cents to the nearest whole number is not completed in each year, the answers will vary from the answer key.*