Applications

Anything that we can do to raise personal savings is very much in the interest of this country.

Alan Greenspan, Economist

1. How might those words apply to what has been outlined in this lesson? What "play on words" do you notice in Greenspan's quote? See margin.

2. Arrange the following interest rates in ascending order: 3.4%, 3.039%, $3\frac{3}{16}$%, 3.499%, $3\frac{1}{2}$%. 3.039%, $3\frac{3}{16}$%, 3.4%, 3.499%, $3\frac{1}{2}$%

3. Josh has a savings account at a bank that charges a \$10 fee for every month his balance falls below \$1,000. His account has a balance of \$1,203.44 and he withdraws \$300. What will his balance be in six months if he makes no deposits or withdrawals? \$843.44

4. Linda's savings account has fallen below the \$1,000 minimum balance required to receive interest. It is currently \$871.43. The monthly fee charged by the bank for falling below the minimum is x dollars. Express algebraically how you compute the number of months it will take Linda's account to reach a zero balance if she makes no deposits. Explain. If $x = 9$, how many months will it take? See margin.

5. John, Paul, and George are having a disagreement over interest rates. John says that $6\frac{3}{4}$% can be expressed as 6.75%. George thinks that $6\frac{3}{4}$% can be expressed as 0.0675. Paul remembers converting percents to equivalent decimals and thinks it can be expressed as 0.0675%. Who is correct, and who is incorrect? Explain. See margin.

6. Beth and Mark would like to put some savings in the bank. They most likely will not need this money for 4 years, so Beth wants to put it in a four-year CD. Mark wants to put the money in a passbook savings account. What is the advantage of a CD? What is the disadvantage? See margin.

7. Find the simple interest on a \$2,350 principal deposited for six years at a rate of 4.77%. \$672.57

8. Ryan deposits \$775 in an account that pays 4.24% simple interest for four years. Brian deposits \$775 in an account that pays 4.24% simple interest for one year.
   a. What is Ryan's interest after the four years? \$131.44
   b. What is Ryan's balance after four years? \$906.44
   c. How much interest did Ryan's account earn the first year? \$32.86
   d. How much interest did Ryan's account earn the fourth year? \$32.86
   e. What is Brian's interest after the first year? \$32.86
   f. What is Brian's balance after the first year? \$807.86
   g. Suppose Brian withdraws all of the principal and interest after the first year and deposits it into another one-year account at the same rate, what is his interest for the second year? Round to the nearest cent. \$34.25
   h. Compare the interest Brian earns with the interest Ryan earns for the second year. Who earned more interest? Explain. Ryan earned more; he earned interest on his interest since he opened up a new account.

TEACH

Exercise 2
When students need to convert percents to fractions, have them convert the fractional part to a decimal first, and then move the decimal point.

Exercise 8
This exercise plants the seeds for the underlying concept of compound interest, which is in the next lesson. Notice that if Brian re-deposits his principal and interest each year, he is compounding his interest.

ANSWERS

1. In addition to the pun on 'interest', Greenspan thinks that savings help in several ways. First, they provide citizens with a financial cushion. They also give banks more money to lend for people to buy homes, cars, and so on.
4. $\frac{871.43}{x}$; 97 months; although the quotient is 96.825, it is not until the 97th month that the balance will reach zero.
5. John and George are correct. Paul is incorrect—when the percent is changed to an equivalent decimal, the percent sign is dropped.
6. The advantage is a higher rate of interest. The disadvantage is the CD has a penalty if the money is withdrawn before maturity.

TEACH

Exercise 9
Remind students that if the number of months is not a counting number, they need to round up.

Exercises 15 and 18
Remind students that if they have trouble with formulating literal algebraic expressions, they can solve the same problem with numbers first, to see how the variables should be manipulated.

Exercises 16 and 17
Point out that there are no deposits made to these accounts, and that might be unrealistic. Tell them they will learn how to handle long-term accounts with deposits being made in a later lesson.

ANSWERS

9. a. $268
   b. $179.38
   c. $1,211.51
   d. about 20 months
   e. about 22 months
   f. 5.56%
   g. $4,545.45
   h. $\frac{x}{0.03p}$

9. Use the simple interest formula to find the missing entries in the table. Round monetary amounts to the nearest cent. See margin.

Interest	Principal	Rate (to the nearest hundredth of a percent)	Time
a.	$2,000	3.35%	4 years
b.	$3,500	4.1%	15 months
c.	$20,100	5.5%	400 days
$100	$700	8.8%	d.
$250	$3,000	$4\frac{3}{4}$%	e.
$500	$3,000	f.	3 years
$500	g.	4.4%	30 months
x	p	3%	h.

10. How much simple interest does $2,560 earn in 17 months at a rate of $5\frac{1}{8}$%? Round to the nearest cent. $185.87

11. How long does it take $450 to double at a simple interest rate of 14%? approximately 86 months

12. How long does it take $450 to double at a simple interest rate of 100%? one year

13. What interest rate is needed for $9,500 to earn $900 in 19 months? Round to the nearest hundredth of a percent. 5.98%

14. Assume $20,000 is deposited into a savings account. Bedford Bank offers an annual rate of 4% simple interest for five years. Slick Bank offers a rate of 20% simple interest for one year. Which earns more interest? Neither; they are the same.

15. Assume $\$x$ is deposited into a savings account. Blank Bank offers an annual rate of r% for y years. Thank Bank offers a rate of ry% for one year. Which earns more interest? Neither; they are the same.

16. A couple is planning a savings account for a newborn baby. They start with $3,450 received in newborn baby gifts. If no deposits or withdrawals are made, what is the balance of the account if it earns simple interest at 5% interest for 18 years? $6,555

17. Ron estimates that it will cost $400,000 to send his daughter to a private college in 18 years. He currently has $90,000 to deposit in an account. What simple interest rate must his account have to reach a balance of $400,000 in 18 years? Round to the nearest percent. 19%

18. Zoe creates a spreadsheet to make simple interest calculations. The user inputs values for the principal, rate, and time in years in row 2. Write each formula.

	A	B	C	D	E
1	Interest	Principal	Rate	Time in Years	Time in Months
2					
3					
4					
5					

a. For A2 to compute the interest. =B2*C2*D2
b. For B2 to compute the principal. =A2/(C2*D2)
c. For C2 to compute the interest rate. =A2/(B2*D2)
d. For D2 to compute time in years, given the interest, rate, and the principal. =A2/(B2*C2)
e. For E2 to compute the time in months, given the time in years. =12*D2